Guideline for the Provision of Intensive Care Services

Version 3 | 2025

CONSULTATION DRAFT

The Faculty of Intensive Care Medicine

Intensive Care Society

Consultation Information

Thank you for taking the time to review GPICS V3.

For information, the following additional sections will be included in the final document:

- Acknowledgements
- Full list of authors and contributors
- List of Minimum Standards and Recommendations to Provide a Quality Service
- Process Table

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Introduction

On behalf of the Faculty of Intensive Care Medicine (FICM) and the Intensive Care Society (ICS), welcome to the third edition of Guidelines for the Provision of Intensive Care Services (GPICS).

The first edition of GPICS (2015) was a landmark publication, building on the earlier Core Standards for Intensive Care Units (2013). GPICS V2 (2019) strengthened this foundation, while GPICS v2.1 (2022) was written to incorporate immediate learning from the SARS-CoV-2 pandemic.

Over the last decade GPICS has become the definitive reference source for the planning, commissioning and delivery of adult intensive care services in the UK.

Many ICUs have found the standards and recommendations within GPICS invaluable in developing successful business cases to enhance their local services and improve patient care. GPICS continues to be used as the benchmark by which local services are peer reviewed and assessed by healthcare regulators, such as the Care Quality Commission (CQC).

One of the challenges with producing a document such as GPICS can be the lack of a hard evidence base for some of the standards and recommendations that may be, by necessity, based on professional opinion and established practice. It is therefore essential that standards and recommendations are subject to regular review and revision, as new evidence becomes available and practice changes.

In this version we have undertaken a significant review and revision to GPICS. This has included an expanded editorial process, with the introduction of a wider Editorial Board and updates to our terminology.

Standards are now defined as **minimum standards**. A minimum standard is something we expect all ICUs to meet, or to record on a risk register if unmet. Minimum standards serve as essential safety markers. They are 'must do' statements. Minimum standards can be viewed as an assurance to patients, the public and clinicians that performance against these standards is being monitored and achieved. The chapter authors and Editorial Board have worked carefully to ensure all minimum standards are realistic, important and deliverable.

Recommendations are now defined as **recommendations to provide a quality service.** While we have no doubt they will still often be referred to simply as 'recommendations', this shorthand belies the shift in our thinking. Our vision is that minimum standards and recommendations to provide a quality service are better aligned with other regulatory and non-regulatory frameworks of the health services of the UK (see Table 1). Recommendations to provide a quality service act as quality markers. They are hallmarks of what a high-quality intensive care service should look like. Good ICUs, forward-thinking ICUs, will achieve many of them. Over time, we anticipate that most ICUs will meet all the recommendations to provide a quality service that are relevant to their patient population. This will ensure equitable and high-quality care for critically ill patients across the UK.

The recommendations to provide a quality service are therefore 'should do' statements, i.e., desirable, but not mandatory, markers of quality care. As such they can be used as a means to drive improvement. Meeting the recommendations should be able to be used as evidence that the intensive care service is, indeed, providing a quality service. Quality indicators are often aspirational and sometimes challenging to achieve, as they may involve action across the whole hospital, healthcare organisation or even wider systems. Nevertheless, it is the intention of the FICM and ICS that these recommendations to provide a quality service should reflect routine practice within UK ICUs.

Table 1. GPICS 3 terminology alignment with other regulatory and non-regulatory frameworks

GPICS 3 Terminology	Care Quality Commission rating	Scottish Intensive Care Society	Health Improvement Scotland
Minimum Standards	Inadequate	Minimum Standard	Requirements
	Requires Improvement		
Recommendations to Provide a Quality Service	Good	Quality Indicator	Good
	Outstanding		

Notes

- Our Editorial Board representatives from Wales and Northern Ireland note that less explicit frameworks are applicable in their nations.
- It is possible that, during the lifespan of GPICS V3, the other frameworks listed in Table 1 undergo changes in terminology. However, this does not alter the plain English reading of the GPICS V3 terminology against these other frameworks. "Good" is still" good", even if the term is not used in a formal regulatory context.

Background is now defined as **background and explanation.** As a deliberate choice in GPICS V3, only one sentence, and only one 'must' or 'should' respectively, is allowed in each minimum standard and recommendation to provide a quality service. This stylistic decision was made to aid auditability and readability. However, more information is sometimes required to interpret a given standard or recommendation. To that end, the background and explanation section contains not only background information and additional explanation as the name suggests but also examples and extrapolations, that can help interpret a standard or recommendation. This makes the background and explanation section just as important to read as the standards and recommendations themselves.

Unless already formalised as a name, **critical care** is referred to as **intensive care** throughout GPICS V3. There is an ongoing broader discussion in the specialty, professional community and services

about which term better reflects the care we deliver in the UK. The decision of the GPICS V3 Editorial Board was more limited. This document is titled Guidelines for the Provision of *Intensive* Care Services. It is produced by the Faculty of *Intensive* Care Medicine and the *Intensive* Care Society. Key Editorial Board members and stakeholders include representatives from the Scottish *Intensive* Care Society, Welsh *Intensive* Care Society and the Northern Ireland *Intensive* Care Society. There are, of course, board members and stakeholders from the British Association of Critical Care Nurses, and other critical care organisations, and no reduction in importance is intended. However, for consistency, and with a view to the future of a College of *Intensive* Care Medicine, 'intensive care' is the preferred terminology used in GPICS 3.

For the purposes of GPICS 3, intensive care is defined as Level 3 and Level 2 care (see Levels of Care for more information). While GPICS V3 does include a chapter on Level 1 - enhanced care, the emphasis is on how enhanced care should interface with intensive care services.

GPICS V3 is **not a clinical guideline** it is concerned with **service provision.** In each chapter, minimum standards and recommendations to provide a quality service address broad themes such as: **infrastructure, people and high-level processes.**

A new development in GPICS was the appointment of Section Editors. The Section Editors played a crucial role in assisting the Lead Editors by working closely with chapter authors and ensuring consistency in style across the chapters.

To reflect the importance that both the FICM and ICS place on equality, diversity and inclusion, we appointed a specific EDI Lead whose remit was to ensure GPICS V3 meets the needs of all those working in and using intensive care services. GPICS V3 has achieved greater diversity of authorship than any previous edition.

For the first time, GPICS V3 includes a chapter on sustainability. We acknowledge the significant role that healthcare, and specifically intensive care, can play in making small changes that contribute to addressing the climate emergency we all face.

GPICS V3 is even more intentional in its four nations understanding than any previous version. You will not find the use of the term 'Trust' without mention of 'Health Board' unless referring specifically to England or Northern Ireland.

The future of intensive care medical leadership lies with its intensivists in training; their involvement in the Editorial Board and process has been invaluable.

For the first time, patient and lay representatives have been involved on the Editorial Board, and their involvement has been fundamental in encouraging us to be bold in our changes. Their insights have helped ensure GPICS V3 reflects the needs of both patients (and their families) and staff providing intensive care services.

To all the chapter authors, both in this version of GPICS and all the preceding versions: you gave of your time and expertise voluntarily. GPICS V3 could not have been written without you.

Finally, to all of you who work and care for patients in any capacity within the UK's intensive care services: thank you. You are part of a team that delivers a standard of care any of us would wish for ourselves or our families. It is a privilege to work beside you. It is a privilege to work in intensive care.

Dr Dale Gardiner

Faculty of Intensive Care Medicine

Lead Editor for GPICS V3

Dr Paul Dean

Intensive Care Society

Lead Editor for GPICS V3

Section 1 | **STRUCTURE**

1.1 Scope of Adult Intensive Care

Authors: Daniele Bryden & Steve Mathieu

INTRODUCTION

Intensive care services provide care, monitoring, and therapeutic interventions to patients with life-threatening conditions or injuries and complex multi-organ dysfunction in and beyond the physical walls of an intensive care facility. Intensive care services underpin the safe and effective working of hospital services. High staffing levels, trained staff and closed organisational models are associated with improved patient outcomes[1].

Intensive care facilities incorporate both intensive and high dependency care in stand-alone or combined units and can be for adults or children. Care needs are defined within the Intensive Care Society Levels of Care Consensus statement[2]. Intensive care services can be dedicated to one speciality/organ e.g. cardiac, liver or neurosurgery/neurology or provide for a general patient population. Increasingly all ICUs provided in a hospital are integrated under the leadership of a single intensive care service regardless of whether they are based at one location or in separate geographical areas within the hospital.

In GPICS V3, a consultant intensive care medicine physician (ICM Consultant) is defined as a Fellow/Associate Fellow or eligible to become a Fellow/Associate Fellow of the Faculty of Intensive Care Medicine[3].

MINIMUM STANDARDS

1. Intensive care services must be managerially led by a designated Clinical Director or Lead Consultant, a Lead Nurse or Matron, and with dedicated operational support from a General Manager or Service Manager.
2. Where the Clinical Director for the service is not an ICM Consultant, the clinical lead for intensive care must be an ICM Consultant.
3. Intensive care services must have a dedicated ICM Consultant available 24/7.
4. Admission to and discharge from the intensive care service must be determined by an ICM Consultant.
5. Intensive care services must have an effective clinical governance structure and robust data collection with participation in national audit programmes for Adult Intensive care.
6. Intensive care services must declare occupancy, physical and staffed capacity and unit stress data through their relevant networks or reporting structures.
7. Hospital Trusts, Healthcare Boards and Operational Delivery Networks (ODNs) must regularly monitor intensive care provision for signs of potential intensive care stress as indicated by the metrics of delayed admissions, overnight discharges, admissions with four or more organ failures,

readmissions and capacity transfers.

8. Intensive care services must ensure that there are robust surge plans in place which align to published guidance where it exists to ensure services are responsive to changes in demand.
9. Intensive care discharges must be discussed pre-emptively at hospital-wide daily bed management meetings and given the same level of priority as hospital admissions[4].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Guidelines for the Provision of Intensive Care Services should be the blueprint for safe and effective services[5,6].
2. Intensive care healthcare professionals should be consulted when acute hospital services are being reconfigured.
3. Enhanced Care services should be developed to provide flexible patient care, including provision of non-invasive ventilation, improve patient flow in elective services, support operative scheduling and release capacity within intensive care[7].
4. Provision for the rehabilitation and follow-up of intensive care patients should be built into all service models of intensive care delivery[8,9].
5. Individuals appointed to an ICM Consultant post should be on the GMC specialist register for ICM.
6. Intensive care services should have a workforce strategy and delivery plan in place which includes multidisciplinary workforce development[10], support for staff health and wellbeing and implementation of new models of working.
7. Research and quality improvement (QI) should be an integral part of the work of the intensive care service evidenced through involvement in NIHR portfolio studies and national benchmarking data sets and QI programmes.
8. At intensive care discharge, plans for future treatment should be documented along with patients' wishes, values and preferences (if known) and included in discharge summaries to GPs[11].
9. Full 24/7 intensive care outreach services should be provided by team members with intensive care training in every hospital with an intensive care unit.

BACKGROUND AND EXPLANATION

A dedicated intensive care physician-led multidisciplinary team that provides collaborative high-quality intensive care and the use of evidence-based treatment and protocols are key elements for provision of high-quality intensive care to seriously ill patients. The intensive care team also has a role in end-of-life care, patient safety, ethics and family support.

There is good evidence that intensivist-led patient management is associated with better patient outcomes than are achieved in units without intensivist cover. In addition, an intensive care team

led by an experienced intensivist in a closed-format unit provides quality care more efficiently ensuring that patients and their families receive appropriate, coordinated management and consistent communication. Where an individual has been appointed into an ICM consultant post who is not on the GMC specialist register for ICM, mitigations will be needed to support the new appointee as outlined by the Faculty of Intensive Care Medicine[10]. Intensive care service workforce strategies need to consider multidisciplinary workforce development[11], support for staff health and wellbeing and implementation of new models of working e.g. development of the Advanced Critical Care Practitioner (ACCP) role[12].

Intensive care survival, particularly when associated with emergency and prolonged admission (>48-72 hours), carries significant physical and psychological burdens impacting on future quality of life: 24% of intensive care survivors are re-admitted to hospital within 90-days of discharge from hospital[13]. Advance care planning and shared decision-making protocols allow healthcare teams to know patient and families' wishes and help to inform appropriate referrals to intensive care.

Capacity and patient flow through the service is key to safe and efficient management of patients requiring intensive care and access to adult intensive care services may be impacted during episodes of unexpected increased demand. Pre-emptive discussion of intensive care discharges ensures optimal patient flow and allows for new intensive care patients to be admitted in a timely manner.

The core principles of the NHS are for equitable access, standards of care and timely admission to intensive care. Every effort should be made to facilitate the discharge of ward ready patients from critical care to optimise bed capacity and staffing standards.

Intensive care is funded through a combination of specialised and local commissioning models based broadly on numbers of organs supported. This funding model can lead to inequitable provision of service for patients. High quality intensive care services ensure consistency of intensive care service provision for all admitted patients and have a demonstrable culture of continual quality improvement underpinned by robust data collection and audit e.g. the Intensive Care National Audit and Research Centre (ICNARC) Case Mix Programme, Scottish Intensive Care Society Audit Group (SICSAG).

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1.2 Intensive Care Outcomes

Authors: Nazir Lone, Joanne McPeake & Dan Harvey

INTRODUCTION

ICUs admit older patients with increasing multimorbidity, many of whom have high-predicted short- and medium-term mortalities with or without these therapies. Such admissions are frequently undertaken in the pursuit of patient-centred outcomes other than mortality; for example, reduction in pain or other distressing symptoms caused by surgical intervention, or admission to intensive care for a period of evaluation[1]', in which both the scope and duration of therapies are limited, not to restrict their benefits, but to reduce their harm. In such circumstances, the success of medical endeavour is not the prevention of death at any cost, but the provision of care in which burdens and benefits are balanced for the individual[2]. An exclusive focus on mortality outcomes will teach us little of the value of such admissions[3]. It may be important to differentiate between intensive care outcome metrics designed specifically to guide such decision making, from those designed to facilitate research, benchmarking, peer review and quality assurance.

MINIMUM STANDARDS

1. ICUs must hold multidisciplinary clinical governance meetings, including analysis of mortality and morbidity.
2. ICUs must participate in a National Audit Programme for Adult Critical Care.
3. ICUs must participate in a mortality review programme using appropriate methodology to maximise learning and improvements in care4,5.
4. ICUs must participate in a programme of healthcare associated infection surveillance to monitor and benchmark infection rates.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. ICUs should develop a consistent approach to patient-centred decision making, evaluating burdens and benefits of admission to intensive care, and be able to demonstrate this through the audit of pre-admission consultation, agreed ceilings of therapy, and time-limited treatment trials.
2. ICUs should support and develop a validated methodology to review referrals to intensive care which can evaluate decision making and subsequent outcomes relating to intensive care admission and decline.
3. Longer-term mortality should be reported on all patients admitted to intensive care.
4. Validated measures of longer-term patient- and family-centred outcomes beyond mortality, including measures of functional ability, socioeconomic consequences, and carer burden,

should be included in local and national audit programs.

5. ICUs should support and develop validated measures of quality of care relating to decision making, end of life care and bereavement.
6. ICUs should consider systematic assessment of patient and family experiences and demonstrate how these are used to guide improvement.

BACKGROUND

Mortality rates in intensive care have been falling for two decades. However, one in five patients admitted to ICUs dies during their hospital admission. Benchmarking of mortality through the reporting of standardised mortality ratios (SMRs) remains an important focus for outcome measurement. The link between SMRs and quality of care, however, remains elusive6. Furthermore, patients referred to, but not admitted to intensive care, are not currently captured in ICU databases and variation in admission practices between units may impact the SMR.

In contrast to SMR measurement, process of care measures, patient experience, research activity, and long-term outcomes provide information which can be directly incorporated to improve practice, and which is therefore empowering to the staff. Crucially, the development and reporting of validated and reliable functional outcome metrics after intensive care will facilitate patient-centred, individualised decision making by patients, families and clinicians7. This will be of critical value for an increasingly ageing and multimorbid population8. Such outcomes may indeed lead to the prioritisation of interventions which maximise maintaining functional independence, even at the expense of mortality, reflecting preferred treatment goals for many older patients with multiple long-term conditions[9].

Process of care measures include audits of the reliability of delivery of best practice (for example, lung-protective ventilation, adherence to sedation policies, consistency of weaning plans) and adverse event monitoring (ICU-acquired infection rates, unplanned extubation, and out of hours discharge from the ICU). Established national audits, such as the Intensive Care National Audit and Research Centre Case Mix Programme and the Scottish Intensive Care Society Audit Group, play a central role in benchmarking quality of care across a range of process measures and outcomes.

Experiential measures include patient and family satisfaction surveys, which provide an important opportunity for organisational reflective learning and important insights into the quality of care in critical care units. Setting up and maintaining satisfaction surveys require investment in staff resources and tools for survey distribution, collation and analysis10. They may usefully be supplemented by staff and medical trainee surveys. Feedback of results and monitoring of actions taken require ownership by senior members of staff and a regular forum for dissemination. Combining this with the establishment of a patient and family group for the ICU provides an important vehicle for constructive change.

Research and audit activity are important indicators of an aspirational and learning environment. Engagement in research generally improves healthcare performance. Participation in a research group is associated with lower burnout rates amongst intensive care nursing staff. The research environment for intensive care has been improved substantially by co-ordinated professional organisations.

In the last decade, a growing body of research has revealed the profound burden that an episode of critical illness can impose on individuals and their family11,12. Furthermore, emerging evidence suggests that bereaved relatives of ICU patients may experience long-lasting, high levels of complicated grief, and adverse mental health outcomes, which may be amenable to intervention13. Evaluating the post-intensive care period in hospital may provide insights into the quality of intensive care rehabilitation, the timeliness and appropriateness of intensive care discharge, the quality of care on the wards and the quality of end-of-life care provision. Assessing care needs and evaluating outcomes over the longer-term requires a funded infrastructure14, with delivery models usually centred around an intensive care follow-up clinic, although the ideal model of care delivery remains uncertain15.

As society ages and the proportion of frail elderly patients presenting with acute illness increases, we will need to develop and report a broader set of outcomes and risk-prediction strategies which will enable informed decision making about the benefits and burdens of intensive care. The focus of intensive care will shift more towards the preservation and restoration of physiological reserve and enabling those who survive to rehabilitate to their maximum potential.

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1.3 Physical Facilities

Authors: Kate Tantam, Tom Best & Ganesh Suntharalingam

INTRODUCTION

Intensive care brings together patients, staff and visitors in one of the most hyperacute, multiprofessional, and emotionally demanding settings in UK healthcare. It is important that the quality and design of the ICU built environment is not seen as merely a technical backdrop but rather as a key component of a clinician-directed, evidence-based treatment pathway. This chapter is a clinical call to arms.

Guiding principles are as follows: all users of an ICU are equally important. Firstly, patients need a safe, humanised environment which delivers timely treatment, seamlessly early access to imaging and necessary interventions, early recovery, and active rehabilitation; all in an environment that maximises orientation, socialisation and healing. Secondly, staff are what makes intensive care, and unit design needs to maximise communication, collaboration, mutual support, health at work and wellbeing. Thirdly, families and visitors deserve equal respect as building users in their own right, and as a major part of the patient experience and recovery process.

This chapter considers the physical facilities for ICUs whether they be Level 2, Level 3 or mixed.

MINIMUM STANDARDS

1. Intensive care facilities must meet all relevant UK healthcare building standards (see background and explanation for further details).1
2. Derogations must be approved at Trust/Health Board executive level with documented reasons and (where appropriate) resolution plans with an agreed timescale.
3. Adaptation or extension (colloquially, 'refurbishment') projects must be planned and benchmarked against the same standards as new buildings.
4. Where compliance is impossible, adaption or extension projects must demonstrate best intent and closest possible approximation to those standards within the constraints of the site.
5. The physical facilities of an ICU must be reviewed at (as a minimum) 5-yearly intervals for continued fitness for purpose.2
6. The layout and circulation must be optimised for collaborative staff working and shared visibility.3
7. Clinical, operational and staff areas must comply with national workplace standards and Health and Safety guidance and legislation.4,5
8. Requirement for single rooms and isolation rooms must be carefully evaluated against projected case-mix and future staffing impact.
9. Unit layout must mitigate the impact of single rooms on patient and staff isolation, including staff safety.

10. New projects must comply with NHS Net Zero guidance6 and consider the whole-life environmental impact of the building.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. In the case of major ICU projects, Trusts/Health Boards should involve clinicians in key decision-making including representative clinical leadership at Project Board level.7,8,9
2. ICUs should be designed with best use of natural and artificial light10,11, control of noise12 and emerging concepts of biophilic environments13 in mind.
3. Design of clinical spaces should minimise the visual and audible impact of clinical equipment for all users, and provide familiarity, communication and entertainment to maximise cognitive engagement for patients.
4. Facilities for families and visitors should be planned respectfully and to a standard comparable with other high-consequence facilities such as cancer centres or children's hospitals.
5. Spaces for staff retreat, quiet working, and on-duty training and education should be positioned to maintain immediate clinical availability.
6. ICUs should be designed for maximum resilience and unit safety, considering future infection control and pandemic compartmentalisation requirements, along with fire safety and emergency evacuation features in line with recent Intensive Care Society and Association of Anaesthetists guidelines14.

BACKGROUND AND EXPLANATION

Scope and purpose

The current UK healthcare building standards are:

- NHS Estates Health Building and Technical Notes (2013-2014) (1)
- HBN 04-02 (critical care)
- HBN 00-01 (general design guidance for healthcare buildings)

An ICU built now will be in service beyond 2050. Physical facilities need to keep pace with evolving clinical practice and both reflect, and help to shape, a forward-looking multidisciplinary intensive care team, its culture and its ways of working. In addition, developments in other clinical specialties will offer future opportunities to reshape the intensive care pathway: for example, emerging imaging technology such as virtual support tools and intelligent CT scanners will allow less specialised staff to perform scans with remote senior radiography support, addressing workforce challenges and making ICU-based or adjacent scanners more workable. Taking advantage of such developments tomorrow will require vision and forward planning today.

Reviewing units every five years ensures they remain fit for purpose, and this can be undertaken using patient and carer feedback, staff concerns and sickness rates, and instrumental environmental

monitoring (such as temperature variation and noise levels), with defects identified and disclosed to local governance pathways, regional (ODN) peer review, and Care Quality Commission inspections[2].

The challenge to clinicians and design teams is to deliver a flexible and dynamic intensive care design that supports innovation and best-practice care in the face of operational and financial pressures, a changing workforce and technological obsolescence. This is not straightforward but is achievable, and the opportunities to get it right are too great to miss. This is particularly important given that the greatest single sustainability impact of a new ICU is likely to be in its construction, which puts a high environmental price on any lost opportunities or missed benefits.

Statement of need

Among hospital patients, the critically ill occupy the most technology-focussed clinical area: but being bedbound and dependent for often prolonged periods, they are also the most in need of a compassionate, supportive environment that actively drives their recovery. All aspects need to be considered including sensory environment, communication, cognitive stimulus and re-socialisation, physical comfort and, as much as possible, autonomy over immediate environment. Most importantly there is now improved understanding that provision of physical rehabilitation - historically under-recognised in HBN 04-02 and other past guidance - is fundamental to the intensive care patient journey and to long-term outcomes.

The importance of addressing NHS staff welfare is now well-recognised[15], and the ICU environment needs to be carefully designed and curated to actively drive open communication, strong teams, safety culture, and staff well-being.[16, 17] All staff spaces would ideally provide natural light, a quiet environment and human centred design, taking full account of ergonomics and Occupational Health assessments in the layout of clinical spaces and placement of equipment and display screens[5]. The quality of the environment for staff needs to receive the same attention and consideration as that for patients and families, with private areas within the unit footprint available for staff support meetings and reflection.

For families and visitors, units may consider including extended bedside presence, appropriately sized and private waiting areas, sensitive discussion space, and consideration of end of life needs.

Design process and clinical engagement

To achieve all of these requirements, building projects need an optimised and empowered design team[18] with strong leadership, a clear vision of future care and engagement across all professions, and representative patient involvement. Designs need to consider optimal collaborative working and shared visibility, ensuring adequate formal team spaces as well as informal communication and chance encounters ('corridor conversations'), which directly correlate with quality of care[3]. Clinical leaders need to have clear responsibilities, support mechanisms, training[9], and remunerated time. The project budget might include funds for clinical engagement exercises, as well as post-

occupancy evaluation and post-occupancy optimisation processes. The physical design and facilities of an ICU ought to be understood as an evidence-based clinical intervention with clinicians seen as leaders and drivers, not merely stakeholders

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1.4 Clinical Information Systems

Authors: Annemarie Docherty, Amar Javaid, Michael Lympany, Anthony Smith & Tamas Szakmany

INTRODUCTION

Clinical Information Systems (CIS) can be broadly defined as a computer-based system that is meant to gather, store, manage and access patient related health information. CIS can manage and process massive amounts of high-resolution data, allowing time and activity efficiency for doctors, nurses, and all intensive care staff. Examples of CIS installations have shown a reduction in medical error rates, improvement in compliance with unit standards of care, and better clinical notes recording, as well as improved reporting data. The challenge for the future of CISs is to add value to healthcare delivery.

MINIMUM STANDARDS

1. All ICUs must have a CIS or a strategic plan for the implementation of one.
2. **Procurement:** CIS procurements and customisation must involve a multidisciplinary collaboration of stakeholders who would typically use, maintain or develop the system.
3. **Compliance:** The CIS must comply with applicable national guidelines, regulations, clinical and technical safety standards.[1-4]
4. **Business Continuity:** The CIS must have a rigorous business continuity plan, with staff trained in its implementation available 24/7, always ensuring access to critical patient data; with no prolonged periods of routine downtime for planned updates or maintenance.
5. **Hardware:** There must be a dedicated workstation at each bed space, and an appropriate number of mobile and fixed devices on the ICU to meet the needs of medical, nursing and allied health staff.
6. **Implementation:** The NHS organisation and vendor company must have a robust plan for implementation of the CIS that supports all staff in its clinical and management use.
7. **Training:** The NHS organisation and vendor company must ensure the CIS is accompanied by a rolling programme of training for all end-users and stakeholders; prior to, during and after implementation; supported by clinical super-users and a multi-platform approach, with due consideration for temporary, rotating and ad-hoc users.
8. **Post-implementation:** The NHS organisation and vendor company must commit to ongoing product maintenance and development, to ensure the CIS keeps pace with the changing needs of intensive care, with 24/7 access to technical support available.
9. **Integration:** The CIS must automatically capture data from ventilators, patient monitoring and have interoperability with the core hospital patient administration system.

10. **Scalability:** The CIS must be scalable to accommodate surge capacity in multiple clinical locations.
11. **System Safeguards:** The CIS must have safeguards and warnings in place to prevent incorrect patient record entries.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Through a single sign-on, the CIS should be capable of bidirectional communication with key hospital systems involved in delivering patient care.
2. The CIS should be capable of prescribing and administration of medicines, including complex infusions, either directly or through integration with HEPMA.
3. CISs should include automatic data capture from electronic devices used to deliver patient care, such as infusion pumps, renal replacement therapy (RRT) devices and cardiac output monitors.
4. The CIS should populate Critical Care Minimum Data Sets (CCMDS) and ICNARC/SICSAG data sets to facilitate benchmarking and governance.
5. The CIS should include embedded decision support tools and warning systems to ensure compliance with care bundles and alert staff to deteriorating patients.
6. The CIS should be developed to support activity related to intensive care, such as quality improvement, rehabilitation and post-ICU follow-up, and intensive care outreach services.

BACKGROUND AND EXPLANATION

In a world of ever-increasing data, a focus for the future must include how to reduce information overload, how to improve efficiency and quality, and how to reduce medical error. There is an evolving evidence base around the use of CISs to improve patient safety and quality.[5] The introduction of a CIS has been proven to reduce length of stay,[6] errors in decision making,[7,8] and errors in drug prescribing.[9] Using CISs has proven to be time efficient. However, poor system design is linked to clinician stress and increased rates of burnout:[10] being mindful of the user experience and Human Computer Interaction (HCI) is of vital importance.

A patient in the ICU may require over 200 clinician-led, evidence-based decisions a day. The potential for error is real. The functions of a CIS that make it an invaluable tool include the capture of complex high-resolution physiological recordings, data from devices used during the patient care process, fluid and medication prescribing and administration, staff activities and decisions in ICUs, together with administrative data for commissioning.

Hospitals may opt for a specialised CIS or one that forms part of a wider electronic health record (EHR). If a CIS is a component of an EHR, these clinically focused systems integrate a wide variety of applications within a monolithic architecture. Long-term sustainability and modernisation of CISs should be factored in. A well-designed integrated customised CIS can reliably standardise and

reduce variation in this decision-making process and deliver a more consistent experience for all patients.[11] Evidence is well established for the superiority of CISs in care bundle compliance[9] and in alerting for specific patterns of disease, e.g. early detection of sepsis[12] and ARDS[13]. CISs help improve the delivery of evidence-based strategies to achieve high rates of compliance, e.g. low tidal volume ventilation[11] and central line care bundle delivery.[14]

Translation of real-time data into alerts or summary intelligence about performance of individuals, teams and clinical services, with instant feedback via dashboards and automated alerts to mobile devices, modifies decision-making practices and improves the clinical effectiveness of clinicians as well as enhancing patient safety and quality.[12,13] Moving to a digital platform will enable remote access and support across sites. There are unique opportunities to collate and mine large sets of granular data, leading to better prediction of outcomes and allocation of resources.[15]

Successful CIS procurement and customisation will be achieved by involving a multidisciplinary collaboration of stakeholders who would typically use, maintain or develop the system. The stakeholders can include, but not be exclusive to a project manager, dedicated clinical representation, procurement officers, clinical engineering, the CCIO (chief clinical information officer) and ICT (information and communication technology) specialists. CISs need to be compliant with applicable national guidelines, regulations, clinical and technical safety standards e.g., the set of common specifications, frameworks and implementation guides that support interoperability.[1-4] Implementation will be enhanced if the CIS supports all staff in its clinical and management use; including eHealth, medical physics, clinical, management, technical and support departments. Additionally, the CIS could benefit from being designed to allow bidirectional communication with key hospital systems involved in delivering patient care, such as point of care testing, Hospital Electronic Prescribing and Medicines Administration (HEPMA), laboratory and imaging systems.

If one consistent message has emerged from the literature on improving quality and safety in healthcare, it is that high-quality intelligence is indispensable.[5] Intensive care as a specialty must now embrace more formal processes to balance rising costs, complexity of care and patient safety. Application of systems engineering principles to CISs in the intensive environment will further enhance the safety and quality of care of our patients.

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1.5 Clinical Equipment

Authors: Ari Ercole & Ciara Collins

INTRODUCTION

The modern ICU is a high-tech area with diverse clinical equipment requirements for diagnosis, monitoring and delivering treatment. Such equipment must be available on a 24/7 and emergency basis, although the precise requirements will be determined by the characteristics of the anticipated patient population. The safe use of a wide variety of patient-facing technology requires staff to acquire and maintain their skills and knowledge. Guidance has been published by the Intensive Care Society[1].

MINIMUM STANDARDS

1. All equipment must conform to the relevant safety standards.
2. All equipment must be regularly serviced and maintained in accordance with the manufacturer's guidance.
3. An uninterruptable power supply must be provided, adequate to provide at least one hour of continuity of any critical equipment that does not have battery back-up.
4. Equipment must be uniquely identified and listed on an appropriate asset register along with details of its life cycle and service history/requirements to facilitate planned maintenance and replacement.
5. Sufficient equipment must be available to meet the service demand for patient care in a clinically appropriate timescale, including in periods of surge.
6. ICUs must have appropriate systems in place to ensure an adequate supply of consumables.
7. There must be a designated equipment clinical lead for intensive care.
8. All staff must be appropriately trained, competent and familiar with the use of equipment.
9. Electro-biomedical engineering (EBME) support must be available either in-house or on a contracted basis to ensure equipment is appropriately serviced.
10. There must be appropriate sterile services and documented procedures for decontamination of equipment
11. There must be a robust mechanism for reporting adverse incidents resulting from the use of clinical equipment and responding to national safety alerts[4,6.]
12. ICUs must have the facility to store clinical and point-of-care ultrasound images in an appropriate picture archiving and communication system, so they form part of the clinical record[7].
13. Clinical information systems must automatically capture data from ventilators, patient monitoring and have interoperability with the core hospital patient administration system.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Equipment, wherever possible, should be standardised, both in ICU and across intensive care services that have more than one unit, and in other areas where elevated levels of clinical care may need to be delivered.
2. There should be an appropriate archiving system for diagnostic images which can be safely retained and be available for clinical review for the same duration of the patient record.
3. There should be indemnity and governance policies in place for loan equipment.

BACKGROUND AND EXPLANATION

Clinical equipment in intensive care typically involves high-cost capital items. Patient, institutional and staffing considerations will guide exactly what equipment needs to be purchased and available. Clinical needs dictate equipment specification, but a competitive tender will be required for sums greater than a set institutional threshold for equipment not available through the NHS supply chain. The institution's purchasing department as well as the clinical engineering department has an essential role in ensuring compatibility with existing infrastructure, that servicing is feasible and so that any dependencies (e.g. on IT infrastructure) have been considered. A robust programme for the routine replacement of capital equipment is of paramount importance. Equally, the appropriate provision of an adequate supply of consumables is no less important than the equipment itself. Consideration and planning are required to provide any necessary additional capacity in both equipment and consumables in times of intensive care surge.

Equipment, once purchased, requires regular service and maintenance in accordance with the manufacturer's guidance and needs to be checked by clinical staff (medical, nursing, AHPs and support staff) immediately before use. Staff require a robust training and skills assurance process to ensure the safe and appropriate use of clinical equipment. The keeping of training records is an important aspect of risk assurance.

The decontamination (cleaning, disinfection, and sterilisation as appropriate, depending on equipment risk category and sensitivity of devices[1]) relies on staff training and the appropriate provision of sterile services. This will include the adherence to national standards for the re-sterilisation of endoscopes and other reusable equipment[2,3].

The designated equipment clinical lead for intensive care can be supported by the EBME provider and works within the organisation's overarching equipment governance framework. The EBME support can be either in-house or on a contracted basis to ensure EBME personnel have the appropriate skills and equipment to service the equipment used. While the equipment lead may not lead on intensive care governance, they have a vital role in ensuring there is a robust mechanism for reporting adverse incidents resulting from the use of clinical equipment[4]. Serious incidents involving clinical equipment may also need to be reported to the Medicines and Healthcare Products

Regulatory Agency (MHRA)[5]. Similarly, when the MHRA[6] issues safety alerts pertaining to medical devices, or alerts by the device manufacturers the equipment lead has a vital role in ensuring that such alerts are cascaded to staff and acted upon as appropriate.

Specific equipment considerations to meet local service demand:

- Immediate access to point of care blood gas analysis and glucose/ketone analysis on a 24/7 basis is an expectation for any ICU.
- Magnetic resonance imaging (MRI) compatible equipment for use where mechanically ventilated patients are to undergo MRI investigation. Clear labelling of MRI compatible equipment and staff training is required.
- The provision of diagnostic ultrasound equipment is best guided by the likely patient population and staff expertise. At very least, patient care in ICU requires immediate access to sufficient ultrasound equipment to ensure that intravascular catheters can be placed safely and in a timely manner, even in emergent circumstances

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1.6 Cardiothoracic Intensive Care

Authors: Tony Vassalos, Mike Charlesworth & Ollie Dare

INTRODUCTION

Across the UK, a variety of cardiothoracic ICU models exist, ranging from standalone supra-regional tertiary referral centres to smaller units supported within a large general hospital setting. Following the COVID-19 pandemic delays to patient pathways have resulted in patients with more complex physical, social and medical comorbidities presenting urgently and in a more morbid condition.

This has led to an increasingly challenging cardiothoracic intensive care environment in which patients with acute and advanced heart failure, heart and lung transplantation and mechanical circulatory support are commonplace.[1-3]

MININUM STANDARDS

1. There must be a resident doctor or ACCP (Advanced Critical Care Practitioner) and a resident cardiac surgeon with on-site 24/7 access to advanced airway skills.
2. Clinical perfusion services, theatre staff and appropriate facilities must be readily available for emergency resternotomy and cardiopulmonary bypass 24/7.
3. Those on the resident medical rota must be trained in Cardiac Surgery Advanced Life Support (CALS) and capable of chest reopening 24/7.[4]
4. Transoesophageal echocardiography (TOE) must be immediately available in all cardiothoracic ICUs and those units providing extra-corporeal circulatory support[5].
5. The care of patients within each cardiothoracic intensive care area must be directed by a job-planned consultant trained in cardiothoracic intensive care through a structured bedside ward round that involves access to multidisciplinary input 7/7.
6. The postoperative care for all cardiothoracic surgery patients must meet the clinical and staffing requirements of similar patients cared for in a general ICU as per GPICS standards.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Cardiothoracic ICUs should have local acute heart failure patient pathways to provide 24/7 access to multidisciplinary review and consideration for advanced heart failure therapies.[6]
2. There should be an Enhanced Recovery after Surgery (ERAS) lead nurse or consultant within cardiothoracic intensive care to drive enhanced recovery protocols.[7, 8]
3. Centres in which primary percutaneous coronary interventions (PCI) are performed 24/7 or designated heart attack centres should develop extracorporeal cardiopulmonary resuscitation (eCPR) protocols to ensure appropriate patient selection and efficient clinical management.[9]
4. Prehabilitation of frail or high-risk cardiothoracic surgical patients should be available from a multidisciplinary allied health professional team.[10,11]

5. Multidisciplinary decision making that includes advanced care planning should be undertaken with high-risk or complex cardiothoracic surgical patients as part of the consent process prior to surgery.[12]
6. Transfer policies should be developed within tertiary referral centres to facilitate efficient repatriation of cardiothoracic surgery and cardiology patients back to base hospital for ongoing care.

BACKGROUND AND EXPLANATION

The cardiothoracic surgical landscape continues to evolve to now include many forms of open, closed, minimally invasive, robotic and hybrid procedures. The nature of cardiothoracic surgery demands that all patients are cared for postoperatively in a unit that conforms to the GPICS standards of Level 2 or 3 intensive care facilities. Patients may frequently have complications and require rapid escalation of their level of care. ICUs therefore need to be flexible and responsive to the needs of the patient.[1,3]

At the same time the complexity of cardiothoracic patients is increasing with many patients presenting late, urgently and with significant measures of frailty. This is having a detrimental impact on patient outcomes emphasising the need to mitigate risks and determine if surgery is appropriate or 'realistic medicine'.[2] Cardiothoracic prehabilitation has been slow to develop compared to other surgical specialties but a recent increased awareness has demonstrated the potential benefits within a high-risk or frail patient cohort.[10,11] Enhanced recovery protocols need to be promoted together with advanced care planning to adapt patient pathways, personalise the care given and drive clinical excellence.[7,8,12]

The development and success of advanced heart failure therapies and ongoing work with extracorporeal cardiopulmonary resuscitation has further highlighted the emergent need for centralisation and organisation of our cardiogenic shock networks across the UK.[6] The success of such therapies has had a significant impact on the cardiothoracic intensive care environment with multidisciplinary team working required throughout the entire week to maintain patient standards of care. Similar service expansion within interventional cardiology has further added to this burden.

Medical and nursing staffing challenges have led to new models of care provision. This has included the integration of ACCPs, clinical perfusionists, cardiologists and general intensivists with interests in cardiothoracic intensive care.

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1.7 Neurocritical Care

Authors: Lara Prisco, Charis Banks & Sandeep Lakhani

INTRODUCTION

Neurocritical care describes the specialist care required in the management of patients in intensive care with neurosurgical or neurological disorders. Its provision in specialist neurosciences centres has been shown to reduce mortality and improve functional outcomes for patients[1].

The consultant-led multidisciplinary team requires understanding of the individual neuroscience condition along with full general intensive care expertise. While the guidelines for the provision for general intensive care services also apply to neurocritical care, specialist additional requirements are needed for the delivery of standard neurocritical care.

Early integration of specialist rehabilitation vital. In addition to in-hospital mortality, long-term function is a key outcome metric. Deciding on the best interests or overall benefit of treatment may be challenging due to loss of capacity which is frequent in neurocritical care patients.

MINIMUM STANDARDS

1. ICM Consultants providing out of hours neurocritical care and advice must have regular timetabled sessions in neurocritical care[2].
2. Neurocritical care units must have access to appropriate clinical expertise from the following specialist services: neurosurgery, spinal surgery, neurology, stroke, diagnostic and interventional neuroradiology, neurophysiology and neurorehabilitation [3].
3. Patients must be cared for by a multi-professional intensive care team with specialist involvement of admitting specialties, diagnostic/interventional specialties, and neurorehabilitation using agreed protocols, national, and international guidelines and recommendations[3].
4. Neurocritical care units must have access to appropriate equipment and facilities and clinical expertise in their use and interpretation[4].
5. All patients requiring immediate lifesaving neurosurgery must be admitted to the local neurosurgical centre irrespective of the initial availability of neurocritical care beds[5].
6. All ICUs which may manage patients following traumatic brain injury must have up to date policies which follow national and international guidance, including discussion with specialists and, if required, transfer to a specialist centre[6,7].
7. Neurocritical care must have resources to support and be part of regional networks for the safe and timely management of all patients with relevant brain and spine pathologies, with agreed rational transfer and repatriation policies[8].

8. There must be processes in place within regional critical care networks to request advice from their respective local neuro intensive care services(in addition to neurosurgery and neurology), which is documented and forms part of the patient record.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Neurocritical care units should seek to develop expertise in additional specialist equipment and facilities[4].
2. Neurocritical care units should have access to specialist clinical expertise from neuropsychology.
3. Neurocritical care patients' long-term outcome should be assessed at three months or later, in all needed adults who were admitted for more than four days, ideally in specialist neurocritical care follow-up clinics[9,10].

BACKGROUND AND EXPLANATION

Since the publication of GPICS V2.1 in 2019, we have seen the conclusion of CENTER-TBI project with over 250 publications to date[11], the widespread expansion of 24/7 access to mechanical thrombectomy services[12] and advances in multimodal monitoring in neurocritical care[13]. The COVID-19 pandemic has also formalised the regional critical care transfer network enabling safer movement of patients for both escalation of care and repatriation[14].

In developing the new standards and recommendations for GPICS V3 we have attempted to provide clear guidance on the facilities and equipment needed in the treatment of critically ill neurosciences patients. Acknowledging the fiscal pressures faced across the board, the recommendations allow for some nuance whilst recognising the importance of using individualised care parameters for our patients. Concurrent monitoring of cerebral electrophysiology, haemodynamic, and oxygenation can provide valuable insight into the true interpretation of the patient's underlying condition and may help guide prevention of secondary brain injury[13].

The emphasis on the breadth of specialist services neurocritical care patients require is recognition to the complexity of this cohort. By ensuring patients being managed in neurocritical care units have availability of expertise from neurosurgery, spinal surgery, neurology, stroke, diagnostic and interventional neuroradiology, neurophysiology and neurorehabilitation[15] we will impact the long-term functional outcomes.

Table 1 outlines the minimum expectation for a neurocritical care unit's in-house access to appropriate facilities, equipment which would include the necessary clinical expertise in their use and interpretation [10].

Table 1

Facilities	Equipment
Diagnostic and interventional radiology (CT, CTA, CTP, MRI, DSA)	Intracranial pressure monitoring
Neurosurgical operating theatres	24/7 intermittent electroencephalography and evoked response monitoring
Cerebrospinal fluid biochemistry and microbiology laboratory	24/7 processed EEG monitoring
	Neurorehabilitation equipment (tilt-table, specialist chairs, etc.)

Neurocritical care units should seek to develop expertise in additional specialist equipment and facilities. Table 2 outlines example facilities and equipment which may form part of providing a quality service[4].

Table 2

Facilities	Equipment
Blood- and CSF- based proteomic and metabolomic biomarkers laboratory (or clinical pathway)	Continuous 10/20 electroencephalography
Drug levels testing laboratory	Brain Tissue Oxygen (PbO2)
	Transcranial doppler ultrasound (neurosonography)
	Pupillometry
	Near Infrared Spectroscopy
	Cerebral micro-dialysis
	Optic nerve sheath diameter (US/CT)

Finally, the standard that patients requiring life-saving neurosurgery must be admitted to the local neurosurgical unit irrespective of the availability of neurocritical care beds – made in January 2017 in the Coroners' Regulation 28: Report to reduce further deaths[5] – remains an essential standard of neurocritical care provision.

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1.8 Smaller Remote and Rural Intensive Care Units

Authors: Jack Parry-Jones & Catriona Barr

INTRODUCTION

Whilst other chapters in the GPICS also apply to remote and rural ICUs, this chapter is intended to describe the steps small geographically remote units can undertake, with assistance from their local networks to develop sustainable solutions to maintain intensive care service for their local population.

There remain some differences in opinion about how best to define‘ small ’and ‘remote’. For intensive care services, remote, defined as more than 30 km away from the next nearest ICU, is deemed more useful practically than small, defined as a unit serving a population of fewer than 200,000 people 1,2,3. As intensive care has evolved in the UK, remote may also be usefully seen as how far away the nearest tertiary services are: cardiology intervention, neurocritical care, interventional radiology etc. Travel times, as opposed to distance, are also more useful but vary according to the time of day, time of year and weather conditions. The positive transformation of critical care transfer and retrieval services has changed the way remote is perceived. In future, digital and remote access are likely to be paramount.

This guidance only applies to a minority of ICUs in the UK. Using the definitions of small (catchment population of less than 200,000), or remote (more than 30 km from the next nearest emergency department):

Unit type	England	Scotland	Wales	Northern Ireland
Small	28	12	3	2
Remote	24	15	6	2
Small and Remote	18 (10.7%)	11 (33%)	3 (23%)	2 (22%)

NHSE Stocktake 2023	22 units in England defined as small	Fewer than 8 level 2 and 3 beds
Nuffield Trust	12 Hospitals in England defined as remote	Remote being more than 60 minutes to the next nearest hospital

MINIMUM STANDARDS

1. Critical Care Network (CCN/regional network support must be provided to ensure small and remote units meet GPICS.
2. The intensive care service must be led by a consultant trained in intensive care medicine.
3. There must be access to advice from an intensive care consultant at all times.
4. Dedicated daytime intensive care must be provided by an intensive care consultant, with no other commitments (see Chapter 2.1 Consultant Staffing).
5. All ICUs must have immediate 24/7 on-site access to a clinician with advanced airway skills.
6. There must be a 24/7 dedicated resident medical rota for the ICU.
7. Regional transport arrangements (road and air) must be agreed to allow timely, safe transfer of patients with an appropriate level of monitoring, staffing, and skills.
8. ICUs, including Level 2 units, must participate in a national patient outcome benchmarking audit.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Network support should be explicit, resourced and supported by all stakeholder healthcare organisations, including Trusts, Hospital Boards, Critical Care Networks and regional structures.
2. ICUs should consider the development of telemedicine (digitally enabled remote intensive care) techniques for clinical decision making and educational support, in conjunction with their regional network and specialist centres.
3. Remote ICUs should implement appropriate joint clinical governance procedures with both networked units and transfer services.
4. Where an intensive care pharmacist, psychologist or other AHP, cannot be effectively delivered locally in a small unit, advice should be accessible from specialist colleagues through network support.
5. Training bodies should devise and support remote and rural training posts in intensive care.
6. Small and remote units should, where practical and feasible, implement cross site working for all multidisciplinary staff to maintain retention of skills and training.

BACKGROUND AND EXPLANATION

Small and remote hospitals continue to provide an essential acute service to their local communities and often to tourists. Without intensive care many acute hospital services would not be possible. There is evidence that centralising some acute care services improves outcomes but there is also increasing recognition that patients benefit from care closer to home.[4,5] This means acute in-patient care, and therefore intensive care input, is likely to remain part of many small and remote hospitals.

In providing the necessary on-site intensive care to this cohort of patients, the smaller volume of patients necessitates different staffing patterns. The challenge is to implement a system which allows a combination of task-based skills available 24/7, within an overarching strategic support structure.

Networked solutions are therefore embedded into these standards and recommendations. Three key areas that need local and network decisions are: recruiting and retaining staff including consultants and residents, the maintenance of core nursing skills and competencies, and overall service sustainability. Of these, multidisciplinary staffing remains the single biggest issue raised by small and remote units themselves.

Residents

There must be a 24/7 dedicated ICU resident staff member. This will normally include a person dedicated to the ICU, however currently in very small, remote hospitals it may be necessary to combine roles, provided that processes are in place to call additional staff when required.

Within current workforce constraints and training requirements, a dedicated ICU resident tier comprised of combinations of SAS, clinical fellows, IMTs (internal medicine trainees), ACCS (Acute Common Care Stem), ACCPs (Advanced Critical Care Practitioners), with necessary basic airway skills combined with support from a doctor (e.g. emergency medicine, anaesthesia, intensive care) with advanced airway skills, also resident within the hospital, is acceptable.

The on-call team would then usually comprise a hospital resident anaesthetist and an ICU resident without advanced airway skills. The residents would work together so both are involved with intensive care patients. The skill-mix of the resident overnight team may vary, and the amount of on-site consultant presence needs to reflect this.

Consultants

Staffing structures reflect the smaller volume of patients and, in common with many specialties, it can be difficult to achieve separate consultant on-call rotas. Evidence points to the importance of dedicated intensive care consultant presence but evidence for dedicated overnight intensive care consultant cover is less clear. The limited evidence available from the UK suggests that patient outcomes are not worse when consultants combine out-of-hours activity in ICM with another specialty.[7] The standard of a consultant in ICM directing care is key to achieving the best outcomes, and this can be met in small or remote units by 7/7 daytime cover with trained intensivists and access to out-of-hours advice from intensivists when needed. This could be by local or network arrangement.

Maintaining competencies

In providing a service in small and remote hospitals, intensive care staff may be faced with looking after patients of any age with the full range of life-threatening emergencies. Furthermore, individual pathologies or age groups may be seen infrequently. Maintaining safe levels of technical skills for such a broad range of patients requires increased training resources for both medical and nursing staff. This may involve funding cross-site working with larger or specialist centres where geography allows, or by periodic attachments to other units. 'Telemedicine' and more modern video linkage, both for clinical input and continued professional development, can help improve collaboration

and needs to be encouraged and developed.[8] Utilising Network experience in using online communication platforms allows successes to be consolidated and built upon.

Transfer services

Patients may need transfer from remote and rural units because of the need for a higher level of care or for specialist care, and it is particularly important for remote and rural units that transport arrangements are timely, comply with intensive care transfer standards, and where at all possible, do not deplete remote and rural units of their essential staff. Some patient groups need particular transport arrangements which need to be incorporated into planning: examples include those with infectious diseases, bariatric patients, patients referred for time critical interventional radiology procedures, and secondary transfers for major trauma patients. Patients may also need to be transferred back to small and remote units for care closer to home and families.

Sustaining the service

Recruiting and retaining medical staff to work in small and remote hospitals hinges on work-life balance combined with suitable on-going training so they are equipped to work confidently as generalists. Utilising a wider group of doctors-in-training (DiT) to participate in intensive care provides a key to their training as well as a sustainable rota. Support from national bodies is important so that staff feel their work is regarded as equally valid when compared to large tertiary centres. Lastly, there needs to be a focus on increasing medical ICM training attachments to remote and rural hospitals. DiT are more likely to return as consultants to hospitals where they have training experience. Units themselves benefit; having DiT keeps a unit vibrant, and the connections help guard against professional isolation. Organisations which supervise training would do well to be mindful of the needs for generalist consultant cover when developing curriculum content and setting learning outcomes.

Level 2 only units

A subset of small and remote hospitals provide only Level 2 beds accompanied by a stabilisation and transfer service for Level 3 patients.

The absence of Level 3 patients on site presents challenges in recruitment and retention of medical and nursing staff, and care may not be directly provided by a consultant in ICM. A supportive network structure is therefore essential for all staff to feel confident in dealing with an intensive care patient.

Such units require immediate access to telemedicine advice from a linked Level 3 unit or retrieval service. Resourcing in a linked Level 3 unit needs to reflect the support, advice and educational role that it has for partner Level 2 units.

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1.9 Enhanced Care

Authors: Jack Parry-Jones, Stephen Webb & Tim Wenham

INTRODUCTION

A gap has existed between intensive care services and ward care for a wide variety of different patient groups. The development of better Critical Care Outreach Team (CCOT) services and wider recognition of the deteriorating patient does not remove this gap; rather, the CCOT may provide clearer recognition and data for the need to develop enhanced care units. Some services e.g. coronary care, respiratory support, weaning, stroke and renal units already recognise this gap and provide enhanced care for their patients. There is also a wide increasing recognition that enhanced care for other select patient groups, for example maternity[1] can provide safer more effective care.

MINIMUM STANDARDS

1. Enhanced care services must sit within a designated lead directorate, engage in appropriate national data collection, and utilise patient, carer and service user feedback to improve services.
2. There must be a clear leadership structure with a designated lead clinician and lead nurse.
3. To promote a cohesive well-functioning unit, all specialties and clinical leads interfacing with the Enhanced Care service, including intensive, must meet on a regular basis.
4. There must be clear operational Standard Operating Procedures (SOPs) covering admission, daily operations, transfer and discharge.
5. There must be twice daily senior clinical decision maker documented review with one being a consultant-led ward round with the nurse-in-charge with input from other appropriate MDT members.
6. There must be clear clinical escalation procedures to Level 2 or Level 3 intensive care in the event of patient deterioration.
7. Enhanced care units that do not have on-site intensive care services must have the ability to treat and stabilise patients, with an established agreement with the local intensive care service and transfer services to move patients when escalation to intensive care is deemed appropriate.
8. There must be regular multidisciplinary governance meetings.
9. There must be clear policies on the level of monitoring and treatment appropriate to the needs of the patient group and the enhanced care unit.
10. There must be a robust handover policy, including documentation of clear parameters for further escalation.
11. All patients admitted to an enhanced care unit must have a documented and agreed Treatment Escalation Plan (TEP).

12. The TEP must be reviewed at the time of discharge, including suitability of re-admission for enhanced care and/or intensive care.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Enhanced care units should refer to the relevant curriculum and published guidance to determine the grade of doctor or Advanced Non-Medical Practitioner most appropriate to deliver care. There may be a requirement to provide additional education and training. [1,2,3,4]
2. Registered practitioners working in Enhanced Care areas should meet the 'National Competency Framework for registered practitioners: Level 1 and Enhanced Care Areas'. [2]
3. The registered nurse:patient ratio should match patient acuity, skill mix, volume of work and the variety of services offered.

BACKGROUND AND EXPLANATION

It is difficult to provide a set of universal standards and recommendations for enhanced care services because local needs and the solutions to those needs can be very variable. There is also an increasing recognition of the need for enhanced care units covering acute medicine, respiratory medicine, post-operative care and immunotherapies including CAR T (Chimeric Antigen Receptor T cell therapy). The number of patients receiving immunotherapies, with its attending risks of e.g. cytokine release syndrome, immune effector cell-associated neurotoxicity and sepsis is set to increase considerably in the next 5-10 years.

Stand-alone enhanced care units that don't have on-site access to intensive care services such as in elective 'cold' surgical sites, need to pay particular attention to recognition of the deteriorating patient, the ability to stabilise and treat patients prior to safe and timely transfer to critical care, and the decisions over where elective surgery is best undertaken by regular review of morbidity and mortality.

These standards and recommendations borrow heavily from published work by the Faculty of Intensive Care Medicine, the Society of Acute Medicine, the Intensive Care Society and the British Thoracic Society [1,2,3,4]. Depending on what type of enhanced care service is being developed or envisaged, we recommend the references provided at the end of this chapter. We also recommend speaking directly with those who have already developed such enhanced care services for lessons learnt in their delivery. Others' experience regarding operational structures, clinical processes and governance arrangements will be invaluable to the development of new services.

By first describing the service and then defining the required skills, it will be easier to identify the personnel best equipped to deliver this safely. The team will consist of a variety of medical and non-medical staff based on local factors and will vary both within and between organisations. Data

arising from the implementation of Martha's Rule may have an additional effect on driving future changes in the local provision of enhanced care services.

Enhanced care services need not necessarily sit within intensive care services, but the intensive care service needs to be directly engaged with, to provide the necessary safety and governance if an increase in the level of care is deemed necessary.

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1.10 Critical Care Networks

Authors: Claire Horsfield, Kujan Paramanantham, Mark Blunt & Mike Carraretto with contributions from NHS Wales Executive Critical Care, Trauma and Emergency Medicine Network, Andrew Mackay, Jon Silversides and the National ODN Managers & Medical Leads Group

INTRODUCTION

Adult Critical Care (ACC) networks have been in existence since 2000 and have evolved to meet service needs and expectations[1,2]. They were established to support delivery of a collaborative model of care for critically ill patients within defined geographical regions, improving equity of access, experience, and health outcomes. Service standards have redefined their function and governance; ACC networks support the monitoring and consistency of service delivery, irrespective of the responsible commissioner, to deliver high quality patient-centred care.

The standards and recommendations are based on the NHS England ACC Clinical Network Specification[3]. Whilst this specification was developed for the Networks within England, the standards taken from this document would be relevant for all networks across the four nations.

MINIMUM STANDARDS

1. Networks must develop, agree, and implement best practice pathways across the network that support improved patient flow.
2. Networks must monitor demand and capacity; working with network member organisations to have oversight of pathways and develop services.
3. Networks must work to reduce unwarranted variation in pathways and processes, including by working with other related networks.
4. Networks must monitor and improve quality, safety, experience, and outcomes according to the standards of the network service specification.
5. Networks must benchmark services nationally and with other networks to identify good practice and innovation though peer review and other network governance activities.
6. Networks must increase network effectiveness through training and development; identifying opportunities aligned with the network plan and assessing future workforce needs for the team.
7. Networks must identify and manage service risks through regional and system quality structures, following agreed escalation processes through their annual work programmes.
8. Networks must engage, link and share best practice with all partners locally, regionally and nationally identifying opportunities for shared solutions and resources, enabling and empowering collaboration via agreements with clear roles and delegation.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Networks should support the development and implementation of extended health and wellbeing measures that enable staff to practice safely.
2. Networks should plan for capacity management at times of increased demand, including surge planning and mutual aid within and between networks.
3. Networks should contribute to the design of measures of quality, safety, and patient experience (through metrics that are SMART and widely captured).
4. Networks should evaluate the impact of any changes on quality, safety, experience, and outcomes across whole pathway and identify vulnerable groups experiencing gaps in access, experience, and outcomes.

BACKGROUND AND EXPLANATION

ACC networks are clinically driven and support a culture of collaboration. Their success relies on the engagement, interaction and commitment of stakeholder members and participating member organisations to deliver agreed outcomes. These non-statutory organisations create climates for innovation and improvement that lead to the delivery of safer, high-quality, equitable patient-centred care. Networks have an important role to play in support the development and implementation of extended health and wellbeing measures to enable staff to practice safely. This includes psychological support that is easily accessible to intensive care staff.

ACC networks across all four countries of the UK have been established with broadly similar objectives. Although there has been national recognition of the positive impact of ACC networks, the structures, funding arrangements, prioritization and reporting processes for the networks remain varied. It is important, that networks are resourced and supported to facilitate effective stakeholder engagement to deliver network plans, support continuous quality improvement and meet expectations.

England

In England, NHS England has produced an ACC network specification[3], which sets out expectations and the governance/accountability for ACC networks. They have also produced the adult critical care service specification[4] which providers are expected to adhere to as part of the NHS Standard Contract. This document reinforces the need for critical care networks and will require that their members engage with their local network and comply with the functions and work plans of the network.

Scotland

Networks with formal management responsibilities do not exist in Scotland. Management of intensive care services in Scotland sits with each of the 14 territorial health boards. The Scottish Critical Care Delivery Group was formed from the clinician chairs of each acute Trust and,

subsequently, the Health Board's Critical Care Delivery Group. This group has links to the Scottish Government through a senior medical officer and is being assimilated into the Centre for Sustainable Delivery (CfSD) using their national specialty delivery group model. The CfSD will play a key role in the recovery and redesign of NHS Scotland, and through this work, ensure ongoing delivery of sustainable critical care services across Scotland.

Wales

The NHS Wales Executive was introduced to drive improvements in the quality and safety of care and improve population health across Wales. In 2021 the National Clinical Framework heralded a significant change in the role and operations of networks, making them clinically led and strategic, rather than operational (the network can establish an operational network if one is required).[5]

The Critical Care, Trauma and Emergency Medicine Strategic Clinical Network launched in October 2023 with the expectation to provide strategic direction to the services and provide national direction on how best to organise, deploy and develop resources. Directed by the Quality Statement for critical care[6], the Service Specification for Adult Critical Care Services in Wales[7] was published in March 2023.

Northern Ireland

The Critical Care Network NI (CCaNNI) was established in 2007 to support the then Health and Social Care Board (NI) in commissioning intensive care services across the region. The CCaNNI standing committees and Network Board have a remit to provide a robust framework to ensure decisions and developments maximise service development and ultimately patient outcomes. With the move of the functions of the Health and Social Care Board to the Department of Health (NI), consideration is being given to the future role of CCaNNI to include the operational and strategic functions provided.

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1.11 Commissioning (England)

Authors: Ramani Moonesinghe and Anna Vogiatzis

INTRODUCTION

In England, adult critical care services are commissioned by both NHS England and by Integrated Commissioning Boards (ICBs) underpinned by the national service specification[1] which sets out the associated standards of service delivery.[2] The service specification is intended to be applicable to all adult patients requiring critical care irrespective of the source of funding.

The transition in England of delegated commissioning of adult critical care to ICBs which started in April 2024, will simplify commissioning arrangements and support system level planning based on local population need. Post-delegation, NHS England will continue to set consistent national standards, services specifications and clinical commissioning policies; develop metrics and quality dashboards to support improvement, oversight and assurance; and provide national clinical leadership, expert advice and support to ICBs. There are three data tools which support the commissioning of adult critical care:

- The Critical Care Minimum Dataset (CCMDS)[3] contains a subset of mandatory items for the generation of Critical Care Health Care Resource Groups (HRGs). CCMDS is also used in Wales.
- The Intensive Care National Audit and Resource Centre (ICNARC) Casemix Programme provides risk adjusted data for England, Wales and Northern Ireland which incorporates and is consistent with CCMDS.
- The Directory of Service which is a daily data return provided by critical care services on occupancy, staffing and system pressure. It is used to update the Adult Critical Care capacity dashboard to support operational decisions, including in relation to mutual aid and responses to surge in line with published guidance.[4]

Adult Critical Care Networks5 (see Chapter 1.10) provide an essential link between providers and commissioners in England with a focus on service improvement, quality of care and equitable access to services.

MINIMUM STANDARDS

1. All ICUs must comply with any national commissioning arrangements as set out in relevant service specifications.
2. All providers must contribute case mix and outcome data to peer audit.
3. CCMDS1 must be collected and reported in all designated adult critical care locations.
4. Adult critical care reference cost submissions must assign costs to individual HRGs.
5. All providers must submit data to the Specialised Services Quality dashboard.

6. All providers must submit data twice daily to the National Directory of Service.
7. All providers of adult critical care must be members of a Critical Care Network.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Trained personnel should collect all 34 fields in CCMDS.
2. There should be clinical oversight of the CCMDS data entry/data submission to ensure accuracy of data.
3. Preparation of reference costs should include experienced clinician involvement.

BACKGROUND AND EXPLANATION

In England, the adult critical care service specification was updated in 2022 to reflect changes to patient population and demographics, updated and new guidance, and standards. The service specification and associated quality metrics form part of the contract between providers and commissioners and is used to inform planning activity (bed days), case mix (% of each HRG) and the local prices via the annual contracting process. Healthcare providers and commissioners in England report against these plans in year, on a monthly basis. In parallel to this, providers report against defined indicators set out in the English national service specification on a quarterly basis and this is reported quarterly via the English National Dashboard.[4]

Activity data and case mix reporting

All providers must contribute case mix and outcome data to peer audit. This is via ICNARC.

The Adult CCMDS[3] was mandated for use in 2006. This dataset, combined with the NHS HRG 4 grouper, categorises patient-related activity into one of seven healthcare resource groups[3]. The HRGs describe the total number of organs supported throughout an individual patient's clinical episode within critical care; healthcare organisations then quantify their actual costs per HRG through the annual reference cost submission.

Data collection should be done by trained personnel and commence from the date and time that the patient first occupies a designated critical care bed or, if in a non-designated critical care location (theatre recovery/ward), data entry should only occur when a patient has received critical care for a period of time in excess of four hours. The care received by patients in these non-designated areas will include clinical interventions, monitoring and continuous supervision normally associated with a critical care area.

The first critical care HRG based reference cost submission occurred in 2008/2009. These quantified total expenditures in England at £1.29B in 08/09. Activity has fluctuated over time; the table in below sets out these changes year on year[6].

Critical Care	Financial Year	£'b	Activity 000	Activity% change from 2014/2015 baseline
National Cost Collection: National Schedule of NHS costs - NHS trust and NHS foundation trusts	2014-15	£1,848	1,466	
	2015-16	£1,934	1,479	0.9%
	2016-17	£1,943	1,499	1.4%
	2017-18	£2,038	1,461	-2.6%
	2018-19	£2,130	1,491	2.1%
	2019-20	£2,149	1,327	-11.0%
	2020-21*	N/A	N/A	N/A
	2021-22	£2,815	1,313	-1.0%

*Accurate recording of cost collection was not possible during the COVID pandemic.

Associated specifications and guidelines

The NHS England adult critical care surge planning guidance4 was most recently updated in 2023, to reflect changes in the commissioned service landscape and the fluctuation in demands on capacity.

The Adult Critical Care capacity dashboard was first developed in 2020 as part of the response to the Pandemic, this was updated in 2022 to reflect the changes to capacity and to refine the data definitions to support operational decision-making.

Adult Critical Care Networks have been in place since 2013. The national network service specification[4] was published in 2024 which sets out the core, universal and extended functions of Adult Critical Care Networks in England.

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1.12 Commissioning (Scotland, Wales, Northern Ireland)

Jo Davies, Rory Mackenzie, Barbara Miles, Babu Muthuswamy, Richard Pugh & Jon Silversides

INTRODUCTION

Commissioning in Scotland, Wales and Northern Ireland does not occur in the same way as England. This chapter highlights the different approaches to funding and organising adult intensive care services in the devolved nations.

MINIMUM STANDARDS

1. All ICUs must comply with any national commissioning arrangements as set out in relevant service specifications.
2. All providers must contribute case mix and outcome data to peer audit.
3. In Scotland, all intensive care providers must contribute case mix and outcome data to peer audit via the SICSAG national audit.
4. In Wales, the Critical Care Minimum Dataset (CCMDS)[1] must be collected and reported in all designated Adult Critical Care locations.
5. In Wales, all providers of adult intensive care must be members of the National Strategic Clinical Network for Critical Care, Trauma and Emergency Medicine[2].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. In Wales and Northern Ireland (as well as England see Chapter 1.11), trained personal should collect all 34 fields in CCMDS.
2. In Wales and Northern Ireland (as well as England see Chapter 1.11), there should be clinical oversight of the CCMDS data entry/data submission to ensure accuracy of data.
3. All providers of adult intensive care should be members of an intensive care network.

BACKGROUND AND EXPLANATION

Scotland

The NHS in Scotland is provided through 14 geographical NHS health boards and eight National NHS health boards, which provide national or specialist services. The budget is centrally allocated and calculated on a population basis, with adjustments made for factors that influence healthcare need, such as social deprivation or service provision over large, rural areas. Each board commissions adult critical care beds based on local assessment of need with dependency definitions and benchmarking. This is done using a dataset very close to CCMDS collected through the Scottish Intensive Care Society Audit Group (SICSAG). All ICUs in Scotland are required to collect and submit a minimum dataset to SICSAG[3], which reports annually to the Scottish Government through Public

Health Scotland and to health boards and the public. This includes quality standards, capacity, activity, and outcomes. The Scottish Critical Care Specialty Delivery Group is formed from health board nominated clinical and operational leads with representation from other national partners including Public Health Scotland and supporting professions. It is hosted within the Centre for Sustainable Delivery, a Scottish Government commissioned body tasked with supporting NHS Scotland in the remobilisation, recovery and redesign of services. This group is tasked with reviewing pathways, processes, innovation and aspects of workforce with a strong focus on the measurement of impact of changes with an overarching aim of reducing inequalities in access to care. It provides improvement and implementation support to health boards with performance monitoring remaining a Scottish Government function. Funded Scottish Level 3 general adult intensive care beds increased by 30 in 2021. Beds recorded within individual unit returns by SICSAG have continued to increase over recent years: 2019 Level 3 beds 193.3, Level 2 beds 300.7; 2023 Level 3 beds 218.5, Level 2 beds 338.5, reflecting individual board decisions around best local configuration of Level 3 and Level 2 bed distribution.

All critical care providers in Scotland must contribute case mix and outcome data to peer audit via the Scottish Intensive Care Society Audit Group (SICSAG) national audit.

Wales

Adult intensive care services in Wales are provided by six health boards. Each of these health boards is responsible for the internal planning and delivery of intensive care services according to defined quality attributes (Care of the Critically Ill Quality Statement, Welsh Government 2021[4]), recommendations (Task and Finish Group on Critical Care Final Report, Welsh Government 2019[5]) and a national service specification (NHS Wales Health Collaborative Service Specification for Adult Critical Care Services, NHS Wales Health Collaborative, 2023[6]). Oversight is provided by the National Strategic Clinical Network for Critical Care, Trauma and Emergency Medicine and through its Critical Care Clinical Reference Group. Some specialist services in Wales may be directly commissioned by the NHS Wales Joint Commissioning Committee (e.g. ECMO, paediatric critical care, neurorehabilitation and long-term ventilation).

All intensive care providers in Wales must contribute case-mix and outcome data to peer audit via the national Intensive Care Audit and Resource Centre (ICNARC). The Integrated Unscheduled Care Dashboard captures unit intensive care capacity and staffing data, providing a measure of the operational pressures required for NHS Wales surge planning and mutual aid responses. Performance and activity indicators can now be monitored using the Critical Care Network Service Specification KPI Dashboard. Together, these dashboards will further inform critical care commissioning processes at local and network level.

There has been a recent small increase in intensive bed numbers from 176 to 181; in addition, Welsh Government funding of Post-Anaesthetic Care Unit services across Wales has enabled a clearer

separation of planned intermediate- and high-risk surgical workflow and a potential freeing of intensive care capacity. In parallel, establishment of the Adult Critical Care Transfer Service has enabled more timely clinical transfers and repatriations closer to home when tertiary episodes end[5]. Longer-term planning of regional and national capacity and configuration is the subject of a current network-wide collaborative working group.

Northern Ireland

In Northern Ireland, the commissioning of intensive care capacity is currently undertaken by the Strategic Planning and Performance Group of the Department of Health. Capacity is commissioned through block contract with each of the provider trusts. There are currently 91 commissioned intensive care beds (73.5 Level 3 equivalent beds) across the five trusts. A needs assessment of capacity is close to completion. This will inform the future position for intensive care services in Northern Ireland.

All intensive care providers in Northern Ireland must contribute case mix and outcome data to peer audit via the national Intensive Care Audit and Resource Centre (ICNARC).

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Section 2 | **WORKFORCE**

2.1 Consultant Staffing

Authors: Matthew Williams & Teresa Evans

INTRODUCTION

GPICS V3 builds on the staffing standards previously recommended in GPICS V2. Patients need to be able to receive the same standard of intensive care wherever they are admitted in the UK. The minimum standards are expected to be achieved by all ICUs and for all patients. Adoption of the recommendations will have a beneficial impact on both quality of care and safety for patients, as well as support sustainable consultant staffing.

Through this chapter, where the term intensive care consultant is used, we mean to include both consultants on the specialist register and specialists who are working on the intensive care consultant rota. Consultants in intensive care medicine are medical doctors on the GMC's specialist register and either are a Fellow/Associate Fellow of the Faculty of Intensive Care Medicine or eligible to become a Fellow/Associate Fellow.

Specialists are non-training doctors with at least 12 years postgraduate training and six years in the relevant specialty. They may not be on the specialist register. The 2021 contract, and guidance documents on job descriptions, contracts and career progression for Specialists clearly describe that such doctors can contribute to consultant equivalent clinical activities.

MINIMUM STANDARDS

1. There must be a designated Clinical Director and/or Lead Consultant for intensive care medicine.[1]
2. During the daytime and seven days a week the care of all critically ill patients must be led by an intensive care consultant.
3. The intensive care consultant responsible for the ICU – the duty consultant - must be immediately available 24/7 (i.e., continually contactable and, if non-resident, able to attend within 30 minutes).
4. Patient care in an ICU, including clinical decision-making regarding patient admission and discharge, must be led by, and be accountable to, an intensive care consultant.
5. In ICUs that remain staffed out of hours by non-intensive care consultants they must have access to advice from a Consultant in ICM 24/7.
6. The daytime intensive care consultant to patient ratio must not normally exceed a range between 1:8 and 1:12.
7. An intensive care consultant must undertake ward rounds twice a day, one of which must be face to face, seven days a week.

8. Consultants with any commitment to intensive care, providing in or after-hours patient care, must have a minimum of 2 programmed activities (PAs) devoted to acute intensive care medicine.
9. Supporting professional activities (SPAs) must be recognised with a minimum 1.5 PAs for individual clinician's revalidation requirements.[2]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. The ward round should have daily access to multidisciplinary input from nursing (bedside and nurse-in-charge), microbiology, pharmacy and physiotherapy
2. There should be readily accessible input from dietetics, speech and language therapy, occupational therapy, and clinical psychology as required, to assist decision making.
3. The intensive care consultant rota should avoid excessive periods (> 24 hours) of direct patient consultant responsibility.
4. Consultant work patterns should be designed to facilitate continuity of care within the constraints of providing a sustainable out-of-hours service[3,4,5] and workforce.
5. A mechanism for consultant-to-consultant handover should be in place.
6. An intensive care consultant job plan should have a minimum of 4 direct clinical care (DCC) PAs in total, of which at least 2 are daytime DCC PAs.
7. Additional responsibilities for SPA activities should be recognised within job planned activities, and appropriate time allocated.
8. Sufficient (often annualised) DCC time should be job planned to support relevant non-patient facing clinical (patient related) activities such as writing Coroner's reports and responding to incidents and complaints.[6]

BACKGROUND AND EXPLANATION

The key standard in GPICS V3 follows that of GPICS V2 in that the care of all critically ill patients must be led by an intensive care consultant seven days a week. It is expected that, where possible, all ICUs will evolve over time to have 24/7 intensive care consultant cover. Where this is not currently possible, solutions to have access to 24/7 intensive care consultant advice are required; these could include developing local network arrangements and the use of digitally enabled remote intensive care support.

The standards and recommendations are made to support consultant staffing models in all ICUs in the UK. The recommendation that an intensive care consultant job plan should have a minimum of 4 DCC PAs in total, of which at least 2 are daytime DCC PAs, will be pro-rata for less than full time consultants. This does not detract from the standard that consultants with any commitment to intensive care, providing in or after-hours patient care, must have a minimum of 2 PAs devoted to acute intensive care medicine. Maintaining scope of practice in intensive care will best be

accomplished by working some DCC in the daytime, ideally alongside other intensive care colleagues and participating in ICU led CPD activities.

Closed units, where clinical decision making includes patient admission and discharge being directed by a dedicated intensive care consultant, are the optimum configuration to delivering intensive care[3]. A meta-analysis showed that these are consistently associated with reduced intensive care and hospital mortality and length of stay.[2]

The best UK evidence to date on patient to intensive care consultant ratio (Patient Intensivist Ratio, PIR) related outcome is by Gershengorn et al.[7] This utilises UK data from the Intensive Care National Audit and Research Centre (ICNARC) dataset. It demonstrated a U-shaped distribution of PIR ratio outcomes with an optimum ratio of 7.5 patients per intensive care consultant the hours of 0800 and 1600. Lower ratios and higher ratios of up to 12 patients per intensive care consultant were associated with an increased mortality, after which mortality plateaued. This lends weight to the current division of large units into manageable 'pods'. The acuity and predicted mortality appear to impact on this ratio, however there is increasing consideration of secondary outcome measures being of equal or greater importance to both staff and patients. This includes morbidity, quality of communication and risk of burnout.[8] The evidence suggests that eight patients per pod is optimum, but this number could be higher, provided it doesn't include the interruption of acute admissions.

Rota patterns should support patient outcomes, patient and relative satisfaction and consultant career sustainability.[5,10] ICUs will vary according to acuity, workload and experience of doctors and practitioners employed, leading to a variance in optimal solutions for staffing. Some ICUs may wish, with local agreement, to utilise resident intensive care consultants, while others will support shift systems.[6,9] Rotas for consultants and resident staff have to be aware of the risks of fatigue and burnout. A consultant rota with fewer than eight participants is likely, with the frequency of nights and weekends, to be too burdensome over a career. The benefit of rotas supporting less than seven-day consecutive day working is increasingly recognised.[6,9,10] Blocks of daytime working with separate night-time cover are recommended, to provide continuity of care, whilst balancing these demands. Good handover of patient care from consultant to consultant is essential.

SPA time must be recognised with a minimum 1.5 PAs for individual clinician's revalidation requirements.[5] For consultants revalidating in two specialties consideration can be given for this to be increased especially where scope of practice has less overlap with ICM clinical practice. Additional SPA allocations need to be recognised within job plans for activities such as educational supervision, or discrete roles in research, management or education, including leadership of such activities, as well as regional and national roles in support of intensive care medicine. Important operational supporting activities for ICU services (e.g. overseeing rotas, mortality review, clinical governance, Faculty Tutor) also need to be supported by this process.

The COVID pandemic highlighted many historic staffing concerns, the requirement for sustainable provision of intensive care services[5] and the risk that sustained high levels of stress can pose, leading to burnout and moral injury to ICU staff. There is increasing recognition of the importance of work life balance to ensure sustainability of the workforce.[1,6,] Once established, burnout is difficult to manage, may contribute to depressive illness, and comes at significant cost to the individual and the NHS. The Critical Staffing series clearly outlines the change in dynamic of the intensive care workforce, and ways in which staff can be supported to achieve sustainable careers. A good work-life balance and supportive working environment offers some protection, and it is recommended that departments consider a variable job plan that reflects the changing nature of stressful situations by time and individual. ICU leadership, culture, education, working practices, cohesiveness and the ethos of the intensive care team are vitally important determinants of patient outcome and staff well-being.

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Recommended Resources

Factsheet: ICU Physician Staffing. Leapfrog hospital survey. Last revision 4/1/2022

Critical Staffing | The Faculty of Intensive Care Medicine (ficm.ac.uk)

2.2 Resident Medical Rotas

Authors: Sarah Clarke, Shashi Chandrashekaraiah & Andrew Sharman

INTRODUCTION

Patients need to receive the same standard of intensive care wherever they are admitted in the UK. GPICS V3 builds on the resident medical rota staffing standards originally published in *Core Standards for Intensive Care* and GPICS V1 and V2, recognising that some ICUs may have had initial difficulty meeting these standards. Audit of compliance with respect to the resident medical rota staffing standards (previously the 'non-consultant medical staffing chapter in GPICS V2) appear to be well adopted.

In the UK, the resident medical rota is fulfilled according to local clinical need by a number of professional groups – resident doctors, specialty and associate specialist (SAS) doctors, locally employed doctors (LEDs) and advanced critical care practitioners (ACCPs). The intensive care consultant remains the senior decision maker, with responsibility for role allocation of the resident medical rota team.

Achievement of the below standards and recommendations will have a beneficial impact on both quality of care and safety for patients and preserve the wellbeing of the workforce.

MINIMUM STANDARDS

1. The resident medical rota must be compliant with working time directives (i.e. Working Time Directive 2003).
2. The staff to patient ratio on the resident medical rota must not normally exceed 1:8 24/7.
3. All staff on the resident medical rota must have training in basic airway skills.
4. All ICUs must have immediate 24/7 on-site access to a clinician with advanced airway skills.
5. Resident medical rotas must be cognisant of fatigue and the risk of burnout.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. The staff to patient ratio on the resident medical rota should be reduced if local arrangements dictate that the intensive care resident is expected to provide emergency care outside of the ICU (e.g. wards and emergency department).
2. Resident medical rota staff should have appropriate, adequate educational and resource support to aid career development, retention and sustainability.
3. The resident medical rota should recognise the need to provide clinical leadership opportunities to intensivists in training and those on an intensive care portfolio pathway.

BACKGROUND AND EXPLANATION

Medical consultants lead the specialty of intensive care medicine. Closed units, led by intensive care consultants, have consistently been associated with a reduced intensive care and hospital mortality and length of stay[1,2]. This is maintained by having a dedicated resident medical rota[3-5].

A key standard from GPICS V2, is that the staff-to-patient ratio for the resident medical rota 'should not normally exceed' 1:8. This has been strengthened in V3, to a minimum standard (must) in recognition of the increased patient complexity and 24/7 nature of intensive care.

Historically the resident medical rota has been staffed by intensivists in training and other resident doctors in training. Increasingly SAS doctors, locally employed doctors and ACCPs have had a vital role in supporting safe staffing levels. As well as the commitment to intensive care provided by anaesthetists in training, resident staffing numbers have been boosted by expansions to and new curricula for intensive care medicine, acute care common stem training, and internal medicine training (IMT). Some ICUs, with local agreement, may even utilise consultants on resident medical rotas, especially where they struggle to employ sufficiently experienced staff with the required competencies to support a senior resident rota[6].

GPICS V3 acknowledges that intensive care is a 24/7 service. Variations of case load, care pathways, availability of staff groups, education need assessments and local governance agreements, will always determine local implementation of the resident medical rota. These considerations impact on the scope of practice and skill mix of the resident medical rota at an individual ICU level.

Regarding airway skills, it is a minimum standard that all staff on the resident medical rota must have basic airway skills and that all ICUs must have immediate access to a clinician with advanced airway skills.

There are many pressures on intensivists in training with curricular and other commitments, as they are being trained to be the leaders of the specialty. Similar pressures exist for residents in training from other specialties. The importance of a supportive, understanding and engaged learning environment, with interested mentors and supervisors is imperative, along with strategies to enhance resident doctors' working lives[7]. ICUs need to consider providing clinical leadership opportunities to intensivists in training and those on an intensive care portfolio pathway. The Training Capability Assessment encourages ICUs to think about the learning needs of all their medical staff and make sure that learning opportunities go to the most appropriate member of the team[8].

International Medical Graduates (IMGs) will benefit from FICM's initial assessment of competencies in ICM criteria which helps to recognise previous ICM experience outside of the UK[9]. IMGs have a higher incidence of non-standard outcomes at annual appraisals and are more likely to struggle with postgraduate examinations[10,11]. Recognition of the factors involved in differential attainment by

trainers is a significant step in supporting and developing this important group, in addition to those with additional learning requirements and other protected characteristics.

Locally employed doctors (LED) and Specialty and Associate Specialists (SAS) doctors are important members of the intensive care workforce, but they may be underutilised and tasked with delivering service requirements compared to intensivist and other residents in training and consultants[11]. LEDs and SAS doctors have different contractual terms and conditions, but ICUs need to provide equal learning and career progression opportunities including leadership and management roles or enable the development of specific skills in their area of interest.

Many SAS and LEDs are IMGs with a wealth of skills and experience but require extra support and guidance working in the NHS initially. ICUs would benefit from supporting and developing this staff group as many may progress to be permanent members of staff and be a huge asset to the intensive care team in terms of patient care and continuity of service.

ACCPs are members of the intensive care workforce, responsible to, and supervised by, the intensive care consultant (see Chapter 2.6 for more details on ACCPs). They may through their defined scope of practice, contribute to the provision of the resident medical rota. This will be determined by employers' governance frameworks and individual local service needs as healthcare systems evolve to meet the demands of complex patient care. ACCPs may alleviate the burden on intensivists in training and other medical staff, without compromising the training opportunities, to permit a more efficient and responsive healthcare delivery model.

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Additional Resource

https://ratings.leapfroggroup.org/sites/default/files/inline-files/2022%20IPS%20Fact%20Sheet.pdf

2.3 Registered Nurse Staffing Standards

Authors: Natalie Pattison, Andrea Berry, Claire Horsfield & Nicki Credland with contributions from the UK Critical Care Nursing Alliance

INTRODUCTION

Nurse staffing requirements for each ICU have to be determined by the skills, skill mix and knowledge required to support the patient case mix. Other considerations include additional specialist care requirements, geographical layout of the unit and number of single rooms. Nurse staffing cannot be predicated solely on bed or patient numbers. These standards address specific areas of workforce and reflect nursing dependency requirements rather than patient acuity. It provides a framework around skill mix, educational standards and leadership for a flexible, agile workforce to deliver high-quality care for all critically ill patients and families.

The Adult Critical Care Nursing Career Pathway has been created by the UKCCNA to support workforce development, the purpose being to assist in staff retention, workforce stability thereby providing high quality, safe effective patient care. All ICUs will ideally be working towards the implementation of the Adult Critical Care Nursing Pathway in addition to the individual standards described below.

Applying the minimum standards in isolation is not supported by the evidence. Adhering to all standards will optimise staffing so as to provide safe and high-quality patient care.

Some of the standards have additional context; this information can be found in the background and explanation section below.

MINIMUM STANDARDS

1. Level 3 patients must have a minimum registered nurse:patient ratio of 1:1 to deliver direct care. (Note 1)
2. Level 2 patients must have a minimum registered nurse:patient ratio of 1:2 to deliver direct care. (Note 1)
3. Each ICU must have an identified supernumerary intensive care matron/lead nurse, dedicated solely to managing intensive care, who has overall responsibility for the nursing elements of the intensive care service[1, 2, 3].
4. The supernumerary matron/lead nurse must hold the same specialist intensive care nurse educational standards as direct care staff providing care to critically ill patients and families[2, 3].
5. There must be a supernumerary clinical shift leader on duty 24/7 in all ICUs [2] *refer to career framework*.
6. All clinical shift leaders must be working towards completion of CC3N Step 4 Competencies [4] and hold a post-registration critical care award[3].
7. ICUs with more than 10 beds, and each additional 10 beds thereafter, and/or ICUs with large

numbers of single rooms, additional infection prevention control requirements or a wide geographical unit footprint, must have at least one additional supernumerary Enhanced Critical Care Nurse (band 6 with the critical care course and step 3 competency[4]). (Note 2)

8. There must be no more than 20% of registered nurses from bank/agency, who are NOT substantively employed by the unit, on any one shift[5,6]. (Note 3)
9. Each ICU must have dedicated Professional Nurse Advocates (PNAs) within the establishment, who are given designated time to deliver the role[7,8].

Education

10. A minimum of 50% of registered intensive care nurses must be in possession of a post-registration critical care award. (Note 4)
11. Each ICU must have a dedicated supernumerary clinical educator responsible for coordinating the education and training of intensive care staff[3].
12. The ratio of clinical educator must equate to a minimum of 1 WTE per 50 registered nurses and non-registered healthcare support workers (headcount)[3].
13. Clinical educators must be in possession of post-registration Adult Critical Care Award [2,9], National Competencies for Adult Critical Care Nurses Step 4 [4] and an appropriate post-graduate certificate in education or equivalent[3,9].
14. All novice intensive care nursing staff (staff new to intensive care, including internationally educated nurses) must be allocated a period of 12 weeks supernumerary practice to enable achievement of basic specialist competence [10].
15. In preparation for accessing the post-registration Adult Critical Care Course all new staff must complete the National Critical Care Step 1 Competencies [4].

BACKGROUND AND EXPLANATION

Additional notes to the minimum standards

Note 1: There needs to be professional judgment and flexibility when applying these ratios to accommodate higher nursing dependency (such as Level 2 patients[11] who might require more than 1:2 nursing care), and it needs to be reviewed on a shift-by-shift basis[2,12-14], and within shift. Additional supernumerary registered nurses will be required in areas with a high number of single rooms (in addition to clinical shift leader), during infection outbreak and when in surge.

Note 2: This is in addition to the clinical shift leader and direct care nurses[3]. There is a requirement for one additional enhanced critical care nurse for each multiple of 10 beds (i.e. 11-20 beds =1, 21-30 beds +2, etc.). Pod models might be appropriate to consider with ICUs with high numbers of single rooms, so a nurse-in-charge is allocated across a pod area within the footprint.

Note 3: All registered nursing staff supplied by bank/agency need to demonstrate, using documented evidence, that they are competent to work in an intensive care environment. All agency/bank staff are to be provided with unit orientation.

Note 4: Adult Critical Care post-registration courses need to follow the National Standards for Critical Care Nurse Education[9] and include both academic and clinical competence assessment (CC3N Step 2 & 3 competencies)[4]. These nurses are regarded as enhanced critical care nurses. The career framework outlined in Appendix 1 recommends that these enhanced critical care nurses are Agenda for Change Band 6.

Note 5: The supernumerary period can be split over more than one period if required. Following assessment, where staff have transferrable skills, this overall period may be reduced[4].

Staffing Principles

Safe staffing is underpinned by optimal outcomes for patients and for staff[15]. A pre-determined number of registered nurses, which is calculated and formula-based, must be rostered to deliver direct care, maximise safety and optimise bed capacity and patient flow[11]. The critical care registered nursing establishment needs to be calculated with sufficient headroom (required to meet planned and unplanned leave) including additional educational/PNAs/sickness/turnover, based on local requirement[13]. The Adult Critical Care Nursing Career Pathway addresses skill mix, education and competence required for each role with the nursing establishment.

There are clear associations between patient outcomes such as hospital-acquired infection, mortality, hospital costs and family satisfaction, and the level of nurse staffing in ICU[16-20]. Skill mix affects the way in which intensive care nurses manage the organisational complexity of staffing to ensure safety. This in turn is impacted by education, stress, burnout, moral injury and staff turnover. High workloads, lower nurse staffing levels, reduced levels of experience and high proportions of temporary staff are linked with poor outcomes at a patient, staff, and hospital level [6]. There is some evidence to suggest that having more registered nurses is associated with a positive effect on a range of patient outcomes. Patient acuity and level of care are not predictors of patient dependency, and the nursing care required [13]. The evidence base is expanding, however there are currently no intervention studies to guide deployment of staff in ICU[20].

Overall responsibility for ensuring these standards are met, lies with Trust/Health Board management and Executive Boards. The optimal configuration of staffing models remains unclear but needs to account for local requirements including skill mix, acuity, dependency and environment factors, such as unit geography and number of single rooms.

These standards account for education requirements, unit context, and skill mix. There are consistent and ongoing issues with nurse retention, compounded by the COVID-19 pandemic[14]. Optimising a stable, but agile and competent workforce, which can respond to dynamic shifts in patient care

requirements, demands high quality skills, effective leadership, and appropriate staffing numbers. They should be read in conjunction with UK Critical Care Nursing Workforce Optimisation Plan[21].

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2.4 Registered Nursing Associate Staffing Standards

Authors: Karen Wilson & Nicki Credland with contributions from the UK Critical Care Nursing Alliance*

INTRODUCTION

The Registered Nursing Associate (NAR) is a new role in intensive care. NARs hold a position on the Nursing and Midwifery Council (NMC) register allowing direct patient care under the supervision of a registered nurse (RN)[1,2,3](see Table 1).

The role of the NAR is assistive[4] and focused on augmenting care delivery. NARs are a valuable part of the intensive care nursing team however, they are not a replacement for the RN role[5]. These GPICS standards and recommendations provide a framework to support the utilisation of NARs in intensive care.

Applying only some of the minimum standards below in isolation is not supported by the evidence. Therefore, all minimum standards must be adhered to, to optimise the role of the NAR in intensive care. These standards are to be used in conjunction with the standards set out in Chapter 2.3 Registered Nurse Staffing.

MINIMUM STANDARDS

1. NARs must work within their scope of practice as defined by the Nursing and Midwifery Council[2].
2. NARs provide an assistive function and must not be responsible for planning, evaluating or leading care[6].
3. NARs must not be used to replace RN roles (including registered and unregistered nursing assistive roles) and only support RNs to deliver direct care[2,4,5].
4. No more than 10% of the intensive care nursing workforce must be non-registered Health Care Support staff (including NARs) as a proportion of direct care nursing staff[7].
5. NAR supervision must be provided by the supernumerary Enhanced Intensive Care RNs in units with greater than 10 beds; in units with less than 10 beds this will need to be agreed locally.
6. NARs must complete the National Critical Care Nursing Associate Competences.
7. All staff performing assistive nursing roles must receive appropriate training and undergo competence assessment[8,9].
8. The supernumerary period for an NAR commencing employment in intensive care must be a minimum of three months.

BACKGROUND AND EXPLANATION

In 2015, a Health Education England commissioned report *Raising the bar: Shape of Caring;* recommended that a new role was created to bridge the gap between health care support

workers and RNs[10]. This resulted in the creation of the NAR role. The first NARs were registered by the NMC in 2019. This role was intended to enable wards / units to "grow their own" and provide an alternative route into the nursing profession. The NAR role is an assistive role to support RNs in care delivery and is not a substitute for the RN workforce[5]. NARs work as part of the multidisciplinary team to augment care delivery by RNs. Table 1 highlights the main differences between the role of the NAR and the role of the RN[11].

Nursing associate 6 platforms	Registered nurse 7 platforms
Be an accountable professional	Be an accountable professional
Promoting health and preventing ill health	Promoting health and preventing ill health
Provide and monitor care	Provide and evaluate care
Working in teams	Leading and managing nursing care and working in teams
Improving safety and quality of care	Improving safety and quality of care
Contributing to integrated care	Coordinating care
	Assessing needs and planning care

NMC Nursing & Midwifery Council

NARs are registered by the NMC following completion of a two-year foundation degree. The NMC provides the framework and standards to which NARs are required to comply. These standards have six platforms of proficiency as opposed to seven standards for RNs[1,2,3]. Whilst RNs can plan, provide and evaluate care, the NAR role is to provide and monitor care. The responsibility and overall accountability for assessing, planning, and evaluating care always rests with the RN[1,2,3].

Care delivery within the intensive care environment is highly complex and requires dynamic risk assessment. RN supervision is essential to ensure that NARs work within their scope of practice. Provision of this supervision cannot impact on the care of intensive care patients and recommended intensive care RN:patient ratios has to be maintained [7]. There is significant evidence that degree level RNs are associated with a positive effect on a range of patient outcomes [12]. Similarly, low RN staffing levels have been linked to increased omissions in care[8]. Therefore, there needs to be careful consideration of the ratio of NARs to RNs on each shift. Best Practice Guidelines and Critical Care Nursing Associate competences have been developed to assist NARs in intensive care to work within their defined scope of practice [14,15]. Careful consideration in the allocation of patients is also required by the intensive care shift coordinator.

Additional research is needed to determine the impact of the NAR role within intensive care on patient outcomes. Understanding the differences in scope of practice and the impact that this has on the professional boundaries between NARs and RNs working in intensive care is also needed [9].

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2.5 Advanced Critical Care Practitioners

Authors: Carole Boulanger, Kate Mayes & Brigitta Fazzini

INTRODUCTION

The Advanced Critical Care Practitioner (ACCP) is now a well-established part of many intensive care multi-professional teams in the UK. ACCPs provide advanced clinical care for patients during their intensive care admission. They are experienced registered healthcare professionals with previous intensive care experience, trained to Masters level, and have developed their skills and theoretical knowledge to a very high standard. They are empowered to make advanced clinical decisions to ensure that patients receive timely, personal and effective care. In many ICUs in the UK, ACCPs fulfil roles in the resident medical rota.

ACCPs retain their base professional regulator [NMC/HCPC] and are trained to FICM ACCP membership standards. They work at an advanced level encompassing the four key pillars of advanced practice clinical, education, research and leadership[1].

MINIMUM STANDARDS

1. ACCPs must act within the formal code of conduct of their present statutory regulator, acknowledging any limitations in their knowledge and skills.
2. ACCPs must work to an agreed scope of practice with clearly defined standard operating procedures and local governance arrangements.
3. ICUs employing ACCPs must ensure the ACCP standard operating procedures are regularly reviewed as part of the unit's governance arrangements.
4. As part of training and ongoing professional development, ACCPs must develop a high level of clinical judgment and decision-making, evidenced by adherence to and meeting the capability portfolio requirements of FICM ACCP curriculum 20232.
5. ICUs who employ or train ACCPs must have an ICM Consultant Lead for ACCPs.
6. Trainee ACCPs must practice for two-years in a completely supernumerary capacity within the required structure of the FICM ACCP Curriculum and with the appropriate level of supervision.[2]
7. ACCPs must meet the requirements of their base professional regulator.
8. Continuing professional development (CPD/appraisal) for ACCPs must be carried out on an annual basis according to FICM CPD/appraisal guidance and which meets revalidation requirements of their base professional regulator[3].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

Professional Recognition and Management

1. ACCPs should gain FICM ACCP Membership as their specialty credential.

2. ACCP line management should be a tripartite arrangement between the ICM Consultant Lead for ACCPs, clinical supervisor and the professional lead from the ACCPs base profession (or Lead ACCP where in post).
3. ICUs employing or training ACCPs should ensure favourable working conditions in line with the FICM Sustainable Career Pathway to help to retain senior ACCPs[3, 4].

Scope of Practice

4. ACCPs should work autonomously within their scope of practice within a multi-professional team led by an ICM Consultant to deliver care to critically ill patients.
5. ACCPs should be non-medical prescribers whilst working autonomously within scope of practice within statutory limitations.

Training

6. Employing units should aim to train and/or appoint those practitioners eligible for, or holding, FICM ACCP membership to ensure they practice at a national standard of knowledge base and minimum skillset in meeting the FICM ACCP Curriculum capabilities.
7. ACCPs should have dedicated supporting professional activity (SPA) time alongside clinical commitments recognised within their job plan (i.e. 80/20 split) to meet the requirements of the other pillars of advanced practice.
8. ACCPs should be supported, where appropriate, to progress towards completing appropriate FICM Optional Skill Frameworks (OSFs)[5].

BACKGROUND AND EXPLANATION

Since the role's inception in 2008, the number of ACCPs holding FICM membership has increased. ACCPs contribute to the delivery of intensive care services with appropriate intensive care consultant oversight and work within clear local governance and scope of practice. Since the original FICM ACCP curriculum (2023), the national landscape around advanced practice has altered significantly. ACCPs come under the umbrella of the Centre for Advanced Practice (NHSE) with equivalence across the four nations. All ACCPs are experienced healthcare professions holding significant intensive care experience and professional regulation.

ACCPs provide the ICU with a consistent point of contact for the multidisciplinary team and support effective inter-professional communication. ACCPs work collaboratively through intensive care caseload and facilitate educational opportunities by their contribution to the service needs of the ICU resident rotas. The ACCP role model also offers a career structure and the opportunity to retain senior and experienced nurses and Allied Health Professionals by remaining clinical while diversifying their profile and skills in education, research, and leadership.

ACCPs work as part of the multidisciplinary team to meet the needs of critically ill patients coupled with increasing demands on intensive care services, supporting intensive care consultants and

resident doctors. With local agreement, an ACCP with remote supervision from an ICM consultant can provide onsite 24/7 immediate intensive care resident cover for units. ACCPs contribute to essential unit activities such as governance, education, research, quality improvement projects, policy and guidelines. The FICM ACCP FAQs provides clear guidance on the role in clinical practice.[8] The career pathway for ACCPs offers Optional Skills Frameworks [7] for extended skills based on local service need. When considering expanding ACCP scope of practice, a local impact assessment on medical and other professional training opportunities, can ensure effective consideration of all training and service needs within the department.

Dedicated supporting professional activity (SPA) time is needed alongside clinical commitments within an ACCP job plan, in an 80/20 split. This will additionally require associated study or professional leave to maintain continual professional development (in addition to SPA time) and an associated study budget.

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2.6 Pharmacy Team

Authors: Fraser Hanks & Mark Borthwick with contributions from FICM Pharmacist Committee, Intensive Care Society Professional Advisory Group (PAG), and devolved health administration intensive care pharmacy leaders.

INTRODUCTION

Pharmacy teams include pharmacists, pharmacy technicians, and pharmacy assistants, and are essential ICU team members[1]. Integration of pharmacists into the ICU team reduces patient mortality, ICU length of stay, and adverse drug events, while reducing costs[2-8], particularly through ward round attendance[2]. ICU pharmacists and pharmacy technicians deliver patient-centred medicines optimisation, including medicines reconciliation, and medication review[1].

Pharmacy teams deliver additional professional support activities such as guideline development and implementation, clinical incident investigation, education, research and audit delivery. They ensure compliance with mandated medicines management standards[9], timely medicines supply, financial reporting and commissioner reimbursement.

MINIMUM STANDARDS

1. There must be a designated intensive care pharmacist(s) for every ICU.
2. Intensive care pharmacist(s) must be available five days a week.
3. There must be a minimum 0.14 WTE pharmacist for every intensive care bed10-11.
4. Clinical pharmacy services to intensive care must be available seven days a week.
5. Intensive care pharmacist(s) must attend daily multi-professional ward rounds on weekdays (excluding public holidays).
6. The most senior pharmacist(s) within a healthcare organisation who works on a daily basis with critically ill patients must be able to demonstrate advanced level intensive care pharmacist practice.
7. Other clinical pharmacists who provide a service to intensive care areas must have the minimum competencies to allow them to do so.
8. Other clinical pharmacists who provide a service to intensive care must have access to an advanced or consultant level intensive care pharmacist for advice and referrals.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be intensive care pharmacist(s) available seven days a week.
2. Intensive care pharmacists should undergo an independent, recognised process to verify competence level.

3. Senior specialist intensive care pharmacist support should be provided within the organisation but may be supplemented from expertise from across an intensive care network or on a regional basis.
4. Peer-to-peer practitioner visit(s) should occur at least once a year to ensure training issues are identified and to help maintain the competence of small teams and sole workers.
5. Where a team of intensive care pharmacists is in place, there should be a structured range of expertise, from foundation to consultant level.
6. Job plans for senior permanent staff members should be in place to ensure appropriate prioritisation across all pillars of practice.
7. There should be sufficient patient-facing pharmacy technical staff and pharmacy assistants to support medicines management and supply activities.

BACKGROUND AND EXPLANATION

Complex, dynamic and personalised medication plans are essential to account for the rapid pharmacodynamic and pharmacokinetic changes that occur during critical illness. Intensive care pharmacy teams optimise medication use, manage high risk medication in a high-pressured clinical environment, using evidence-informed decision making. ICU pharmacists in the ICU multi-professional team encourage professional collaboration, improve clinical outcomes, and reduce costs[2-8]. The PROTECTED-UK study clearly shows proactive pharmacist medication reviews result in medicines optimisation or error correction for every one in six prescribed medicines [12]. Where weekend services were provided, the contribution rate was double that of weekdays [13]. Experienced/specialist pharmacists made contributions with higher clinical impact than more junior team members [12]. Additionally, national guidelines direct medicines reconciliation to occur within 24 hours of hospital admission or when patients move clinical setting 14-15.

Smaller pharmacy teams are particularly vulnerable to the competing demands of the wider pharmacy department. Intensive care pharmacists may have additional non-ICU duties, these roles need to be clear in job planning. Non-ICU duties do not count towards the ICU WTE figure. Service continuity uplifts ensure the intensive care pharmacy service remains viable, regardless of the size of ICU.

The pharmacy core advanced curriculum [16], specialist intensive care pharmacy curriculum[17], and credentialing program provides an independent method for assessing pharmacist competency at advanced or consultant level [18]. Credentialling of consultant level practitioners is mandatory, though to date advanced level credentialing is voluntary. It remains the responsibility of chief pharmacists (or equivalent) to ensure pharmacists are competent for their role. Peer-to-peer practitioner visit can identify training issues and to help maintain the competence of small teams and sole workers. This supports General Pharmaceutical Council (GPhC) revalidation, and Pharmaceutical Society of Northern Ireland (PSNI) continuing professional development.

Pharmacy technicians and assistants add resilience to medicines management processes, releasing clinical pharmacist and nursing time for medicines optimisation and direct patient care[1]. Pharmacy technicians and assistants provide medicines reconciliation, medicines management, financial reporting, reimbursement and audit. It is suggested that roles for these staff groups be developed widely in line with workforce strategies[1].

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2.7 Physiotherapists

Authors: Gareth Cornell, Clair Martin & Paul Twose

INTRODUCTION

Physiotherapy remains an integral component in the multidisciplinary management of critically ill patients admitted to intensive care, considering both respiratory management and early rehabilitation.

The role of physiotherapy and physiotherapy services continue to adapt and innovate to meet the needs of the patients and their families. The importance of personalised, patient centred care remains paramount, and is demonstrated through utilisation of increasingly advanced diagnostic and interpretation skills to inform and adapt interventions (both respiratory and rehabilitation), ensuring maximal value and benefit. There is also increasing awareness of the importance of physiotherapy contribution both within and beyond intensive care to multiprofessional education, governance, risk and assurance, quality improvement, and research, all with a focus on improving patient outcomes and experience. As such, standards and recommendations have been updated based on key assumptions that previously have become business-as-usual.

MINIMUM STANDARDS

1. ICUs must have access to a physiotherapist covering all aspects of intensive care (including respiratory, rehabilitation and recovery) five days per week[1,2].
2. There must be emergency access to 24-hour respiratory physiotherapy.
3. The physiotherapy service in each ICU must have operational policies detailing core standards and a framework for effective management of safety, risk and quality.
4. All ICUs must have a recognised lead physiotherapist with at least an enhanced level of practice accountable for safety, quality, governance, training, and mentorship.
5. A workforce development plan must be in place which encompasses all registered and non-registered physiotherapists working within intensive care.
6. Physiotherapy staff must have support to meet the requirements of their role and meet professional and regulatory CPD requirements.
7. Intensive care physiotherapists must utilise the ICS AHP capability framework, to track and guide professional development, working within the four pillars of practice[3].
8. Physiotherapists must be involved with non-direct patient facing roles within the ICU service delivery including, training and any relevant clinical guideline development, clinical governance and morbidity and mortality meetings.
9. Physiotherapy staff must attend ICU patient care MDT meetings.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be a minimum of 0.25 WTE physiotherapist per ICU bed.
2. Physiotherapy services should provide assessment and intervention for patients requiring rehabilitation and recovery seven-days per week.
3. The physiotherapy intervention(s) as part of the patients individualised rehabilitation plan, should be matched to the acuity, dependency and complexity of the patient, considering the patients clinical needs and tolerance to interventions.
4. For organisations with multiple ICUs and/or who provide regional specialist services or are a designated major trauma centre, the organisation should have a recognised consultant or advanced-level physiotherapist across intensive care services.
5. Physiotherapy services, either independently or in conjunction with other nursing and AHP services, should take proactive steps to maximise the utilisation of rehabilitation/therapy support workers and assistant practitioners across the intensive care pathway, utilising apprenticeships, and other training paths to support this.
6. Physiotherapy services, either independently or in conjunction with other medical, nursing and AHP services, should create evidence-informed clinical guidelines and standard operating procedures for common physiotherapy patient needs.
7. The lead physiotherapist, or appropriate deputy, should actively participate in all relevant local, and where appropriate regional (e.g. ODN), intensive care leadership forums and structures.
8. Physiotherapy services should consider roles dedicated to supporting the training and development of core ICU physiotherapists and those fulfilling emergency out of hours work[4]

BACKGROUND AND EXPLANATION

As an integral part of the intensive care multi-professional team, physiotherapists provide specialist assessment and intervention as part of a holistic approach to patient care. Physiotherapy provision has to appropriately align to the nature and demands of the local intensive care service/s as well as local population needs, across the breadth of the intensive care pathway, including recovery.

Respiratory physiotherapy remains a major focus for both the spontaneously breathing and mechanically ventilated patient. Whilst airway secretion clearance, optimisation of lung volumes, ventilation and respiratory function remain core to practice[5], physiotherapists are increasingly involved in the development of ventilator and tracheostomy weaning plans[6,7]. The availability of 24-hour respiratory physiotherapy may occur through a range of service models and arrangements.

Recent literature continues to support the delivery of early mobilisation to prevent or reduce the debilitating effects of critical illness. This includes focus on duration and intensity of intervention[4], as well as innovative approaches to delivering rehabilitation services outside of usual working hours[2]. Physiotherapists are increasingly involved in the provision of follow-up services for patients including intensive care recovery clinics and post hospital rehabilitation programmes[2]. The physiotherapy

intervention(s) as part of the patients individualised rehabilitation plan, should be matched to the acuity, dependency and complexity of the patient, considering the patients clinical needs and tolerance to interventions. This may include provision of rehabilitation services outside of traditional working hours and should be evaluated for value and effectiveness.

Across the UK, significant variance exists with how physiotherapy services are structured and provided to intensive care. Few ICUs meet existing recommendations for physiotherapists to Level 3 bed ratios, emphasising on-going challenges to how physiotherapy services are commissioned and resourced[6,8]. The impact of non-compliance is yet to be determined although it could be a focus for future research, and must consider multiple factors such as the acuity, complexity and diversity of the patient case-mix, skill mix of the physiotherapy team and service structure.

Current workforce development plans are expected to include:

a. competency/capability frameworks which reflect relevant national competency and professional development frameworks
b. an appropriate local training and development programme
c. supervisory and appraisal framework
d. job plans
e. annual training needs analysis.

Future research needs to consider utilisation of therapy support workers or rehabilitation assistants to aid in the development of staffing recommendations. There is clearer evidence to promote services ensuring physiotherapy staff are appropriately job planned to have primary responsibility to intensive care services. This has been shown to increase both clinical and non-clinical activity, including involvement in strategic planning, governance, and research[8].

Whilst no national post-registration competency framework or curricula exists, the development of the ICS physiotherapy pillar provides guidance on expected levels of practice from novice to consultant level practitioner[3]. There are recognised structures, processes and resources in place that support learning and development in the workplace and enable individuals to meet the requirements of their role and meet professional and regulatory CPD requirements. This will be further enhanced by the implementation of the Intensive Care Society AHPs in critical care capability framework.

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2.8 Dietitians

Authors: Ella Terblanche & Danielle Bear

INTRODUCTION

The provision of nutrition support to patients on the ICU is complex with many requiring enteral and/or parenteral nutrition to meet their nutritional needs[1,2]. The risk of malnutrition in these patients is high, independent of the route of nutrition (oral, enteral and/or parenteral), and the dietitian is best placed to provide nutritional advice to the multi-professional team and patients in ICU on the optimal way to manage nutritional needs[3,4].

MINIMUM STANDARDS

1. ICUs must have access to a dietitian five days a week[5,6].
2. If the intensive care dietitian is working alone, they must be at an enhanced level[7].
3. Where more than one dietitian is required, there must be an identifiable lead dietitian at enhanced or above level to ensure an appropriate range of expertise within the team and to have overall responsibility for the service provision.
4. Intensive care dietitian(s) must utilise the ICS AHP capability framework, to track and guide professional development, working within the four pillars of practice[8].
5. Intensive care dietitian(s) must attend ICU patient care MDT meetings
6. Intensive care dietitian(s) must have regular communication with the consultant where nutritional goals, risks and plans are discussed[9].
7. Intensive care dietitian(s) must lead on the development and implementation of any local nutrition support guideline(s) and protocols[8].
8. Intensive care dietitian(s) must contribute to appropriate strategic meetings and clinical governance activities, including leading regular nutrition-related audits and quality improvement projects.
9. Intensive care dietitian(s) must provide a structured handover to a ward dietitian when patients are discharged from the ICU, considering nutrition-related morbidity as per the NICE Quality Standard[10].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be a minimum of 0.1 WTE dietitian per intensive care bed.
2. Intensive care dietitian(s) should provide ongoing education and training for other healthcare professionals.
3. Intensive care dietitian(s) should consider gaining extended skills such as inserting feeding tubes, using indirect calorimetry to determine energy expenditure and/or non-medical supplementary prescribing.

4. Intensive care dietitian(s) should participate in any nutrition related research activity.
5. Intensive care dietitian(s) should be a member of the national Critical Care Specialist Group of the British Dietetic Association.

BACKGROUND AND EXPLANATION

Malnutrition leads to poor outcomes in the critically ill[11], highlighting the need for a dietitian to be a core part of the multi-professional team[3]. International guidelines recommend an individualised nutritional strategy after the first few days in ICU[1] with dietitians personalising nutrition in partnership with clinicians, patients and carers[2]. Additionally, dietitians ensure ongoing monitoring, develop and implement nutrition guidelines, contribute to education and may also undertake extended roles such as inserting feeding tubes[4]. Given the expertise and complex decision-making skills required for the safe nutritional care of critically ill patients, any dietitian leading care or working alone must have enhanced clinical practice capabilities.[7,8]

Evidence suggests that having a dietitian as part of the ICU multi-professional team rather than relying solely on feeding protocol has multiple patient benefits including earlier initiation of enteral feeding, increased nutrition delivery, and reduced use of inappropriate parenteral nutrition[12-14]. Dietitian designed and implemented protocols lead to a reduction in constipation, diarrhoea and Clostridium difficile infections[15].

Extended roles are becoming more common with clear benefits including minimising enteral feeding delays and avoiding x-rays, endoscopy referrals and parenteral nutrition; providing overall cost savings[16], when dietitians insert enteral feeding tubes; avoidance of over and underfeeding with indirect calorimetry[12] and efficient and timely prescribing of parenteral nutrition, vitamins and minerals, and pancreatic enzyme therapy with non-medical supplementary prescribing [17], potentially leading to fewer medication errors.

Patients frequently experience nutrition-related morbidity on discharge from the ICU such as malnutrition, changes in eating patterns, poor or excessive appetite and dysphagia [18]. NICE CG83[9] states that nutrition goals are set with the patient. In addition, a structured handover must be provided on discharge from ICU to the ward in line with the NICE quality standard for rehabilitation after critical illness[10].

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2.9 Speech and Language Therapists

Authors: Sarah Wallace OBE & Susan McGowan

INTRODUCTION

Patients in intensive care frequently have difficulties with communication, swallowing and weaning [1-4]. Timely access to Speech and Language Therapy (SLT) promotes humanisation of care, patient well-being, and functional recovery [5,6]. Early SLT intervention supports communication, voice restoration and swallowing rehabilitation[4,7,8]. Assessment and management of dysphagia, including using instrumental tools such as FEES (Fibreoptic Endoscopic Evaluation of Swallowing) identifies laryngeal dysfunction, guides timing of safe oral intake, and informs ventilator and tracheostomy weaning plans [9,10,3,4,2]. SLT input prevents nutritional and respiratory complications from undiagnosed dysphagia[11,19] and adverse psychological effects associated with an inability to communicate[5].

MINIMUM STANDARDS

1. ICUs must have access to an SLT five days a week[8-10].
2. All patients with a tracheostomy must be referred to SLT at the point of sedation hold for assessment of communication and swallowing needs[8,10].
3. SLTs must have the competency and capability to assess, manage and treat complex dysphagia and communication impairments in the ICU environment[9,10,13-15].
4. SLTs must track and guide professional development using the ICS capability framework, clinical pillar, and the RCSLT competency documents[13-15].
5. FEES must be available for SLTs to use in ICU for the assessment and management of laryngeal dysfunction and dysphagia[8-10,13-15,3,4].
6. SLTs must provide communication and swallowing goals for the rehabilitation prescription and medical handover at step-down[9,10,12,14-16].
7. SLTs must attend ICU patient care MDT meetings[6,8-10,12].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be a minimum of 0.1 WTE SLT per ICU bed.
2. SLTs should advise staff, patients and patients' family/friends on communication strategies and aids to facilitate effective communication[1,4,5,7-10,14,17,19].
3. SLTs should contribute to tracheostomy or non-invasive ventilation weaning plans[4,6,8-10,14,15].
4. SLTs should provide education to the team on ICU specific manifestations of communication disorder and dysphagia and the impact these have on weaning[1,3,4,6,10,14].
5. SLTs should contribute to ICU ward rounds, tracheostomy teams, training, and any relevant clinical guideline development, clinical governance and morbidity and mortality meetings.[6,8-10, 12-14]

6. SLTs should participate in any relevant collaborative audit or research activity.[10,13-15]

BACKGROUND AND EXPLANATION

The presence and recognition of the contribution of SLTs in ICU has increased since the inception of GPICS [4,8,9,13,16]. The minimum recommended staffing level of 0.1 WTE SLT per intensive care bed care reflects the continuing need to provide frequent intervention in line with the reported prevalence of dysphagia (up to 93%)[1,-4,11,18], dysphonia (76%) [2,4,12,16] and other communication problems in patients with critical illness [5,7,17]. ICUs with complex patient cohorts may require a much higher WTE.

Communication and swallowing difficulties arise due to underlying and presenting medical conditions (e.g. COPD, sepsis, ARDS), concomitant conditions (e.g. neuromyopathy of the swallowing muscles) or the presence of equipment/technologies used to support life (e.g. intubation, tracheostomy or ventilation)[1-4,18]. Problems frequently persist as a part of Post Intensive Care Syndrome necessitating ongoing SLT management and rehabilitation[1,6].

Early SLT assessment provides diagnostic and prognostic indicators of communication and swallowing recovery, informs ventilator and tracheostomy weaning, and identifies targeted therapy[1,4,7,10,11,17,19]. Prompt intervention also prevents the negative impact of dysphagia on nutrition and respiration[1,4,6,18,19]. SLT-led FEES detects laryngeal oedema, vocal fold immobility and glottic insufficiency, and informs airway protection including the actual risks of aspiration, airway patency, safe oral feeding, and voice [3,4].

SLTs promote early voice restoration [4,5,7,17], through Above Cuff Vocalisation [4,7,19], and one-way valves [4,7,17], and facilitate patient communication through low and high-tech communication aids[4,7,9]. SLT Intervention mitigates anxiety, supports decision making, communication of choices and enables participation in rehabilitation [4,6,7,9,19].

Working as an embedded member of the ICU multidisciplinary team improves outcomes, reduces weaning times and length of stay and is upheld by national guidance[6,8,9,11,19]. SLTs are currently well placed to collaboratively develop ICU services, actively identify and contribute to research and audit and continue to develop innovative clinical interventions [10,14,17,19].

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2.10 Occupational Therapy

Authors: James Bruce, Claire Rock & Samantha Eperson

INTRODUCTION

Occupational Therapy (OT) in the ICU involves the assessment and treatment of patients with acute and critical illnesses. It focuses on supporting patients to engage in purposeful activity to improve physical, cognitive and emotional function and helping them

Current guidelines recommend the OT role in supporting post intensive care recovery including managing the impact of impairments or disabilities to restore function and improve independence. Rehabilitation should be multidisciplinary, supporting patients to achieve their individualised goals, by maximising recovery of physical, cognitive and psychosocial functions to improve quality of life.[1]

MINIMUM STANDARDS

1. ICUs must have access to an OT 5 days a week[2].
2. All OTs working in ICU must utilise the AHP Critical Care Capability Framework, to track and guide professional development, working within the four pillars of practice.[3]
3. There must be a designated lead OT working at an enhanced level (or above), accountable for ICU service provision, workforce and professional development.
4. OTs must complete a needs-based assessment using holistic measures of health and disability including activities of daily living in ICU.
5. OTs must be able to assess and contribute to non- pharmacological treatment options for patients who present with delirium in line with the P.A.D.I.S. guidelines (pain, agitation, delirium, immobility and sleep).[4, 5]
6. OTs must have time in their job plan to attend ICU patient care MDT meetings.
7. OTs must be involved with non-direct patient facing roles within the ICU service delivery including training, relevant clinical guideline development, clinical governance and morbidity and mortality meetings.[6]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be a minimum of 0.15 WTE OT per ICU bed.[4,7,8]
2. The OT service should aim to deliver a seven-day service for intensive care patients.
3. OTs should be involved in post intensive care unit recovery services.[2]
4. The lead OT should be responsible for supporting learning opportunities, training and clinical supervision for junior staff providing OT services in intensive care.
5. OTs should be involved in research and development.
6. OTs should be linked with local and national critical care networks.

BACKGROUND AND EXPLANATION

In the UK 59.1% of ICUs have provision of OT and 36.5% have ICU ring-fenced OT provision [6]. OT can reduce sedation use, potentially decrease delirium, support rehabilitation, and potentially decrease intensive care and hospital lengths of stay however, business cases are declined year after year [10]. Poor understanding of the role and benefits of OT can lead to underutilisation and detriment to patients[7].

OT specific roles include assessment of function; mood and engagement; early discharge planning; rehabilitation maintenance of joint range; seating assessments; sensory assessments; occupation assessment and intervention for mental health needs; assessment of cognition and delirium management [11].

The effectiveness of OT for managing delirium in non-mechanically ventilated patients was shown in a RCT by the introduction of daily 40-minute sessions twice a day with significant improvements in delirium presentation and cognitive ability[4].

A paper published in 2023 highlighted that physical and occupational therapy can benefit patients in the ICU, improving their mobility, independence with self-care, and decreasing their length of stay. 30 minutes of therapy is adequate for benefits of function in the ICU population [9].

Non-direct roles suggest only half of the ring-fenced staff attended multidisciplinary ward rounds; 11% engaged in research; and 10% were involved in business processes regarding their unit management. The OT exposure was the lowest of the four disciplines examined (compared to Physiotherapy, Dietetics and Speech and Language Therapy)[6].

The ICS AHP Critical Care Capability Framework will guide and support the development of the four professional pillars of practice, across six levels of practice, giving OTs a clearly defined career pathway within this specialty[3]. More research around the ICU OT role is greatly required to support the role development.

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2.11 Practitioner Psychologists

Authors: Dorothy Wade, David Howell & Julie Highfield

INTRODUCTION

The psychological impact of critical illness may be severe, with 40-60% of patients experiencing distress and 50-80% developing delirium during their admission to an ICU[1,2]. Around 50% also experience psychological difficulties including anxiety, depression or post-traumatic stress after hospital discharge[3].

The core role of practitioner psychologists (clinical, health or counselling psychologists registered with the Health and Care Professions Council) is to promote the psychological health of critically ill patients during their ICU admission and subsequent recovery period.

Our standards and recommendations are drawn from NICE clinical guideline CG83[4] and quality standard QS158[5] on rehabilitation after critical illness in adults; and Guidance for the integration of practitioner psychologists in intensive care from the Intensive Care Society[6].

MINIMUM STANDARDS

1. ICUs must have access to practitioner psychologists.
2. Where integrated practitioner psychologists are present, they must be embedded within intensive care multidisciplinary teams to address the psychological health needs of patients and their families/loved ones6.
3. Where integrated practitioner psychologists are present the most senior practitioner psychologist must be part of the intensive care leadership team, to advise on systemic issues influencing staff well-being.
4. All patients in ICU must be screened for psychological distress[5].
5. Patients with psychological distress in ICU must be triaged to receive psychological interventions as appropriate.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

Staffing

1. There should be a minimum of 0.1 WTE practitioner psychologist per intensive care bed[6].
2. Practitioner psychologists should be integrated into the ICU.
3. A small to medium sized unit (up to 20 beds) should be led by a grade 8b practitioner psychologist.
4. For larger units (more than 20 beds), or those with multiple sites, an 8c consultant psychologist should lead, with support from qualified psychologists at lower bands (7-8b)

Screening/assessment

5. Patients should receive assessments for psychological difficulties throughout the critical care pathway as specified by NICE QS 158 (5) and ideally delivered or supervised by qualified practitioner psychologists.

Interventions in the ICU

6. Practitioner psychologists should provide evidence-based interventions for patients who have been assessed as at-risk of psychological morbidity (see background for more detail).
7. Practitioner psychologists should also work indirectly, by offering advice and consultation to other ICU staff about psychological issues that arise in these colleagues' clinical work.
8. Practitioner psychologists should offer short term family support with a view to supporting decision making and signposting families to appropriate psychological services in the community.
9. Practitioner psychologists should be involved in education, research and QI projects to improve psychological understanding and care in the ICU.

Post-ICU interventions

10. ICU practitioner psychologists should contribute to post ICU rehabilitation and recovery services.

BACKGROUND AND EXPLANATION

The value of the practitioner psychologist role in ICU has received increased recognition and been further developed since the first version of GPICS[7]. With the rapid incorporation of practitioner psychologists into ICUs in the UK, the Intensive Care Society produced guidelines to support their integration [6]. This revised GPICS chapter aligns with those guidelines, which were also endorsed by the British Psychological Society. NICE guidelines on delirium[8], patient experience in hospital[9], anxiety, depression and post-traumatic stress disorder [10] underpin the development and provision of psychological assessments and interventions for ICU patients.

Regarding assessment in the ICU, validated measures such as the Intensive Care Psychological Assessment Tool[11]) or PICUPS tool [12] are recommended. ICU psychologists can support psychologically informed management of delirium, and provide direct psychological interventions to patients for distress, early trauma, low mood or anxiety. They aim to help patients to cope with illness and ICU admission.

The Faculty for Intensive Care Medicine's report on Life after Critical Illness [13] also emphasises the need to integrate practitioner psychologists into post-intensive care settings. The post-ICU psychology role includes producing information resources; participating in follow-up reviews for patients and families; providing evidence-based therapies for difficulties such as anxiety, depression, post-traumatic stress or cognitive impairment; and/or making onward referrals to other specialist services.

Our new standards and recommendations assert the need for sustainable ICU psychologist roles, and for assessments and interventions for patients to be recognised as the key priority of practitioner psychologists embedded in multidisciplinary ICU teams.

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2.12 Healthcare Scientists Specialising in Intensive Care

Authors: Stefanie Curry, Michal Pruski, Antonio Rubino & Dave Edwards

INTRODUCTION

The healthcare science workforce is at the forefront of the NHS1. Critical Care Scientists/Technologists (CCS) have specialist knowledge of scientific and technical principles, with application to advanced physiological monitoring and direct patient care within the intensive care setting. As part of a multi-professional team delivering care to critically ill patients, CCSs work to support advanced clinical practice, development of clinical services and adoption of new technologies in response to scientific research and innovations1. In this way, CCSs deliver the commitments of the NHS Constitution and support service improvement to ensure a sustainable NHS.

MINIMUM STANDARDS

1. Critical Care Scientists must comply with the professional standards of behaviour and practice set out in Good Scientific Practice (GSP)[1].
2. Critical Care Scientists responsible for management of medical devices and point of care diagnostic services must comply with the standards set by the Medicines and Healthcare Products Regulatory Agency (MHRA)[2] and the International Organisation for Standardisation (ISO) standard (22870:2016)[3].
3. Critical Care Scientists voluntarily registered with the Health and Care Professions Council (HCPC) must meet the Standard of Proficiency[4] and comply with the Standards of Conduct, Performance and Ethics[5].
4. ICUs receiving trainee healthcare scientists for training in intensive care must comply with the requirements for training set for them by the National School of Healthcare Scientist (NSHCS)[6].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Critical Care Scientists should successfully complete an approved training programme, either via accredited specialist training or as part of the Scientist Training Program (STP) commissioned by the National School of Healthcare Science (NSHCS).
2. Critical Care Scientists should be registered with the HCPC.
3. Critical Care Scientists should work collaboratively to be a dynamic member of the multidisciplinary team.
4. Critical Care Scientists should provide advice to medical, nursing, and wider multidisciplinary team about the safe and effective use of medical devices used within the intensive care environment
5. Critical Care Scientists should develop and support research activities.,

6. Critical Care Scientists should provide effective management and support for medical devices, including advising on optimal clinical settings and troubleshooting, resulting in focused, efficient, and high-quality care.
7. Critical Care Scientists should contribute to the educational needs of the multidisciplinary team
8. Critical Care Scientists should demonstrate flexibility and adaptability to work across diverse pathways of patient care and clinical services that are both routine and highly specialised.
9. Critical Care Scientists should work safely and effectively within their scope of practice and ensure they do not practise in areas where they are not proficient.
10. As part of the multidisciplinary team, Critical Care Scientists should contribute to the strategic direction, planning and delivery of intensive care services.
11. Critical Care Scientists should engage with the Society of Critical Care Technologies (SCCT) as their professional body to work in collaboration with the Academy for Healthcare Science and the NSHCS.

BACKGROUND AND EXPLANATION

Healthcare scientists comprise approximately 5% of the total healthcare workforce across the NHS in the United Kingdom, with more than 60,000 healthcare scientists employed in over 50 different scientific specialisms[6]. In their specialist roles, healthcare scientists undertake complex scientific and clinical roles, defining and choosing investigations, making key judgements about complex facts, and providing specialist knowledge in clinical situations[1]. As a result, approximately 80% of all diagnoses across the NHS can be attributed to the work of healthcare scientists[6]. The CCS workforce was modernised as part of an initiative led by the NSHCS to plan for a future workforce with the right skills and behaviours to deliver high-quality patient care. This led to the establishment of the Scientists' Training Programme (STP) to ensure CCSs were educated and trained to meet the challenges of modern healthcare[6]. A structured clinical training programme and careful supervision ensure trainees and qualified CCSs never work outside of their competencies and are always consistent with patient safety.

The output from these master's level STP and accredited specialist training programmes are relevantly trained CCSs who can work across traditional professional demarcations, with flexible skills and the ability to adapt and innovate[6]. *Good Scientific Practice* sets out the principles, values and the standards of behaviour and practise for the whole healthcare science workforce, which has demonstrated a high calibre of work and has a positive impact in raising standards and enhancing the quality of patient care. To ensure that quality is placed at the centre of healthcare science delivery, CCSs play a central role in safe and effective patient care by ensuring information dissemination and by ensuring innovative scientific and technological advances are translated into models of integrated care for improved patient outcomes. Working directly with the medical, nursing and allied health professionals in intensive care, the CCS can enhance delivery of highly

technical patient care. This benefit is most apparent when the CCS can apply specialist knowledge of technology and scientific processes to directly support the intensive care team. In this way, the CCS facilitates effective diagnosis, therapy, monitoring, rehabilitation, and risk management. To help meet the standards of the Care Quality Commission[7] and to ensure healthcare organisations comply with the Medical Devices Regulation[2], CCSs can help optimise cost, risk, and performance of medical devices by addressing strategies for appropriate use of medical devices and development of local policy.

As a qualified, permanent position on the ICU, the role of the CCS represents a highly skilled member of the multidisciplinary intensive care team.

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2.13 Support Staff

Authors: Ana Coelho & Marghanita Jenkins

INTRODUCTION

Support staff are a vital part of the multidisciplinary intensive care team. In addition to registered medical, nursing and allied health professionals, ICUs are reliant upon a range of support staff whose roles are vital to the provision of high-quality care. and form an essential part of the multidisciplinary team.

Within this section, these key roles will be identified, and standards established, acknowledging that due to the wide variation in roles and qualifications the evidence is not strong for this group of staff.

`Support staff' include healthcare support workers (healthcare assistants), unregistered nurses, housekeepers/domestics/cleaners, ward clerks (receptionists), data clerks/analysts, secretarial and administrative staff.

MINIMUM STANDARDS

1. All support staff must have clearly identifiable roles with specific competencies.
2. All support staff must have a period of induction and supernumerary status.
3. All support staff must be appropriately trained, competent, and familiar with the use of equipment[1].
4. All support staff must be included within the intensive care team and be updated on key unit issues and developments[2].
5. Support staff roles must be clearly identifiable to colleagues, patients, and visitors to the department, either by uniform and/or name badges.
6. Intensive care areas must develop healthcare support worker roles to assist registered nurses in delivering direct patient care and in maintaining patient safety[3].
7. Healthcare support workers must complete the Care Certificate, the CC3N HCSW competencies and adhere to the Code of Conduct for healthcare support workers[4,5].
8. Administrative roles must be developed to ensure all clinical staff are free to give direct patient care and supported with essential data collection[3].
9. Each intensive care area must have sufficient staff responsible for the cleanliness of the environment.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. All staff should be encouraged to attend further training and/or education to support their development.
2. Each intensive care area should have healthcare support workers 24/7 to assist nursing staff in

delivery of direct patient care.

3. Each intensive care area should have ward clerk/receptionist cover seven days per week.
4. Each intensive care area should have a dedicated housekeeper/cleaner seven days per week.
5. The training available for the dedicated team should comply with the gold standard star rating offering the ability to be flexible with all the nuances required in ICU.
6. The core housekeeper/cleaner team should be comprised of a minimum of two members for every 12 ICU beds over a 12-hour period.
7. Each intensive care area should have a data clerk or dedicated time allotted to a suitable member of staff for data entry to a nationally recognised audit casemix programme and responsibility for the validation of these data.[6]
8. Each intensive care area should have access to a designated suitable TRiM (Trauma Risk Management) practitioner to support when required.
9. Each intensive care area should have a designated medical equipment technician allocated to support overseeing and maintenance/contracts and sourcing/procurement of specialist devices and safety of equipment.

BACKGROUND AND EXPLANATION

The importance of support staff in the provision of good intensive care is fundamental to deliver good all-round patient care. Support staff enable those with the expertise in intensive care to efficiently offer the care they have been trained to implement, while developing roles in a complex environment that supports patient safety at all levels. Support staff offer a great number of essential contributions which include assistance with personal hygiene and the moving and handling of patients, stocking up of bedside consumables/equipment and cleaning of bed areas, all of which provide an excellent resource for registered staff and support for patients. In addition, all support staff play an important role in communicating with patients and relatives, ensuring comfort measures and relieving anxiety.

ICUs may achieve the standards within these guidelines with development of a variety of roles, depending on unit size. The Intensive Care National Audit and Research Centre (ICNARC) 'advise that a unit with approximately 600 admissions a year need one full-time member of staff (or equivalent) to keep up with the demands of validation within the prescribed timescales for active participation'[6].

Training of such staff is important, with competency assessments and individual performance review embedded in the unit philosophy[1,2,3,4,5]. To sustain this workforce, units might consider appropriate progression pathways. Encouraging staff to attend further training and/or education would support their development, including the pathways to develop through the NHS bands for example Health Care Support Worker>Nursing Associate>Senior Nursing Associate>Registered Nurse.

Training programs for Band 4 roles are developing within intensive care nursing with the current guidance on the CC3N Best Practice Guidelines for Registered Nursing Associates in Critical Care published by the Critical Care Nurse Networks National Nurse Leads. Despite being a role in its infancy, they are increasingly involved with delivery of care under indirect supervision of registered nursing staff (see Chapter 2.4 on Registered Nursing Associate Staffing for more information).

Medical equipment technicians aid in education, training/training logs for all the equipment used in the intensive care setting. This role could also be involved in the stock levels and consumables coming through the supply chain, highlighting any blocks to supply that may impact patient safety/human factors at local and if needed organization development network

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2.14 Induction, Return to Work and Exit

Authors: Sarah Marsh & Julie Platten

INTRODUCTION

ICUs are staffed by a diverse multidisciplinary team from different healthcare backgrounds. This chapters refers to all staff working within intensive care and discusses induction, return to work and exit from intensive care.

Induction is an important process to ensure that all staff feel welcome within the unit and that they are supported to do their role. The induction provides intensive care staff with the skills, knowledge and competencies they need as well as an understanding of the organisational and geographical setting.

Intensive care staff, like any other healthcare group, may require time away from work. The return-to-work process forms an integral part of re-integration ensures staff are supported during this time.

Exit refers to when staff permanently leave intensive care and can include reasons such as starting a new post, finishing a rotation or at the end of a fixed-term contract. Retirement is its own special life-event and is not covered here.

The processes of induction, return to work and exit are vital to ensuring a quality service as well as improving retention and reducing attrition.

MINIMUM STANDARDS

Induction

1. All new members of staff must have an appropriate-to-role induction led by relevant members of staff.[1-3]
2. Special consideration and adaptation of the induction programme must be given to those members of staff new to intensive care.
3. Special consideration and adaptation of the induction programme must be given to those members of staff from overseas for whom the NHS is a new environment, including a supernumerary period where needed.
4. All intensive care nursing staff new to intensive care, including nurses from overseas, must be allocated a period of up to 12 weeks to enable achievement of basic specialist competencies.[4]
5. Where direct care is augmented using assistive and supportive staff (including registered and unregistered nursing roles), appropriate induction must be provided by suitably trained intensive care nursing staff using national competencies.[5]

Return to Work

6. There must be a policy in place to support staff returning to work after a period of absence.

7. Medical staff returning after three months or more, must have a personalised plan for their supported return.[6,7]

Exit

8. All staff when leaving intensive care must have the opportunity to feedback on their experience of working in the ICU including opportunities for learning and development.[8]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

Induction

1. Feedback from participants in the induction process should be gathered to inform future inductions.

Return to Work

2. Feedback regarding the process from those returning to work should be gathered to inform future processes.

Exit

3. A summary of trends gathered from the exit information should be reported to the ICU and hospital senior leadership.

BACKGROUND AND EXPLANATION

Induction is an important process for staff members new to any ICU. It is an opportunity for the unit to welcome staff, help them to integrate into the unit and ensure that they have the knowledge and skills to deliver a quality, safe service. The induction may take place over a number of days and use a variety of methods to deliver the programmes including pre-induction material to review, web-based learning packages and simulation. It is best practice for the new staff member and those providing the induction to keep a record of the induction, and the contents of the induction continuously reviewed to ensure accuracy and relevance. It is important that relevant and appropriate members of staff lead the induction.

High quality induction would cover topics such as:[1,2]

- Orientation to the physical layout of the ICU.
- Introduction to key members of medical, nursing, allied professional and operational support staff.
- Arrangements for access to all IT systems, including passwords, provision of identification badges and tutorials on the use of any clinical IT systems on the day of induction.
- Explanation and distribution of rostered work pattern, and their roles and responsibilities when rostered to work both during the daytime and out of hours.
- Highlighting key departmental guidelines and how to access them.

- Information on health and safety including fire safety, manual handling and infection control.
- Assigning mentors for new staff within intensive care[2].
- Assigning an educational supervisor (and/or a clinical supervisor) for resident doctors, ACCPs and where appropriate speciality doctors.[9-11]
- Guidance on how to raise patient safety concerns.
- Guidance on how to raise issues of bullying and undermining.
- Signposting key learning and training opportunities available in the ICU, department and wider local hospital.

Returning to work after a period of absence can be a stressful time. The reasons for taking time away from work can vary from personal to professional matters including ill health, caring responsibilities and professional development such as research. The length of absence may influence the speed of return to practice. If able, the absence from work might be planned prior to leaving alongside the plan for return, with attention given to changes in working hours, occupational health requirements and additional training needs. Upon returning to work, a supernumerary period would ideally be completed with regular check points to ensure progress is being made towards a safe return and a date to commence full duties agreed by both the returning member of staff and their supervisors.

Facilitating good induction and return to work processes can help to improve retention of staff but inevitably there will be an attrition rate. 'Exit interviews' aim to limit the loss of knowledge by capturing what staff know and have learned from their time spent in the organisation before they leave. It is also an opportunity to identify significant problems or barriers they have previously experienced in carrying out their work and can lead to a better understanding of challenges faced by the workforce.[8]

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2.15 Continuing Professional Development, Education and Training

Authors: Sarah Marsh & Julie Platten

INTRODUCTION

Access to and the provision of education and continuing professional development is essential for clinical staff working within intensive care. Education and training ought to be considered a high priority due to its intrinsic link with the delivery of safe and high-quality patient care.

The requirements for the provision of a suitable education environment for clinical staff working in intensive care are defined in a number of publications from key organisations including the Service Specification for Adult Critical Care[1], the General Medical Council[2], the Critical Care National Network Nurse Leads (CC3N) [3,4,5] and the FICM[6].

MINIMUM STANDARDS

Nursing

1. The ratio of Clinical Educator must equate to a minimum of 1 WTE (whole time equivalent) per 50 registered nurses and non-registered healthcare support workers (headcount).[1,3,4]
2. A minimum of 50% of registered intensive care nurses must be in possession of a post-registration critical care award.[3]
3. All Clinical Shift Leaders must be working towards completion of CC3N STEP 4 Competencies and hold a post-registration critical care award.[3]
4. All registered nurses working in intensive care must be working towards completing the Steps National Competency Framework for Adult Nurses in Critical Care (Step 1,2&3).[3,4,5]

Critical Care Outreach

5. Critical Care outreach, rapid response or equivalent team members must have achieved or be working towards the appropriate competencies in line with the Critical Care Outreach Practitioner Framework.[7]

Medical Doctors, ACCPs

6. All senior doctors responsible for the educational supervision of doctors in training and ACCPs must be developed, supported and appraised annually using the criteria recognised by the GMC for this role.[1,8]
7. There must be sufficient time allocated in the Educational Supervisor's job plan to allow 0.25 PA per doctor in training/resident doctors, 0.25 PA per ACCP in training and 0.125 PA per trained ACCP. [9,10]

8. All doctors and ACCPs must have a bespoke personal development plan relevant and realistic to their developmental needs.[10, 11,12]
9. All doctors and ACCPs must be given the time and opportunity to achieve the objectives within the personal development plan as agreed with their educational/clinical supervisor or appraiser.[10, 11,12]
10. There must be a regular medically led teaching programmes relevant to all medical doctors and ACCPs.
11. Time to attend the medically led teaching programme must be protected, with attendance mandatory for all those rostered to attend.
12. All intensive care training units must have an FICM-appointed Faculty Tutor.
13. Faculty Tutors must be given the same support and time to perform their role in terms of SPAs, as other College/Faculty Tutors from other specialties.[6,13]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

Nursing

1. Clinical educators should have, or be working towards, a post-registration adult critical care award, National Competencies for Adult Critical Care Nurses Step 4 and an appropriate post graduate certificate in education or equivalent with dedicated time and resources allocated to facilitate this.[4,5]
2. Critical Care Educators should have a job plan that ensures they have allocated time for all aspects of the role including preparation of educational resources.
3. Critical Care Educators role and time should be always protected unless in exceptional circumstances.
4. Nurse education programmes should follow the National Standards for Critical Care Education and include both clinical competence and assessment.[4]
5. Specialist step competencies should be completed whenever relevant to the case-mix of the unit.[5]

Medical Doctors, ACCPs

6. All SAS grade doctors should have a designated tutor/ clinical supervisor with regular meetings.[14]
7. Medical doctors should be able to access the resources (including time to learn) that will support the revalidation process.[15]

Multidisciplinary team

8. Study leave should be provided for all members of the MDT for intensive care-related courses and conferences.

9. All members of the MDT should be offered the educational opportunities they require to develop capabilities across a range of learning experiences to meet the defined learning outcomes for their continuing professional development.[1,4,16]
10. The medically led teaching programme should be open to all members of the multidisciplinary team.[1,4,6]
11. The hospital library and/or department should provide access to relevant and up-to-date intensive care medicine journals and books relevant to nursing, medical and allied health professional staff.

BACKGROUND AND EXPLANATION

Continuing professional development for staff working within intensive care is vital to deliver safe and quality care to patients. This includes the development of skills, knowledge, attitudes and behaviours to improve performance of individuals and teams.

ICUs are staffed by MDTs from medical, nursing and AHP backgrounds, and the educational activities and the learning environment have to reflect this, with participation in education by all members of the MDT being encouraged.

To provide quality education and training, trainers need the time and resources with which to prepare and deliver educational opportunities, and this requires underpinning by an educational delivery infrastructure for all staff groups. As such the development of the workforce ought to be included in the unit's workforce strategy and delivery plan.[1]

Learning environments that encourage transparency in reporting patient safety issues and any deficiencies in educational provision, as well as providing timely feedback on the issues raised and how they have been resolved, will ensure the provision of a quality intensive care service.

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2.16 Staff Wellbeing

Authors: Julie Highfield, Mike Carraretto, Catherine Plowright & Ema Swingwood

INTRODUCTION

Wellbeing relates to the ability to reach potential and to experience positive emotions. In the context of work, this translates to staff being able to do a good job and feel good about the job they do. Research has made the link between staff wellbeing and patient safety[1], quality of care and organisational performance- such as productivity[2]. Many guidelines[4-6] outline the responsibility of the employer to adopt a preventative and proactive approach in its wellbeing strategy. Focusing on primary prevention (i.e. working conditions both physical and psychological), in addition to secondary (e.g. wellbeing education) and tertiary interventions (e.g. occupational health, psychological intervention) ensures staff can reach their potential. Psychosocial risks at work are present in all aspects of healthcare, however in intensive care there is increased exposure to such risks. The UK Health and Safety Executive considers it an organisational responsibility to modify factors that impact on work-related stress[7].

MINIMUM STANDARDS

1. ICUs must have a staff health and wellbeing policy to support staff experience, engagement and retention[3, 5, 6, 8].
2. ICUs must provide adequate environmental conditions conducive to physically safe and healthy working[5,6]. Please see Chapter 1.3 Physical Facilities for more information.
3. Each staff role must be designed to meet the work demands with the resources required to fulfil the job, including rotas being consistent with Health and Safety Executive requirements for adequate rest. [5-7].
4. Staff must be provided with formal and informal meeting spaces and systems to enable discussion and management of the emotional impact of work. [1,3,4,5,6,8,9].
5. ICUs must monitor health and wellbeing at an individual and team level[3].
6. There must be clear and timely access to occupational health assessment and associated required interventions to support time from work, reasonable adjustments to work, and interventions to restore health and wellbeing as appropriate[3,5,6]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be adequate staffing resources consistent with GPICS v3.
2. Staff should have access to job planning, personal development planning, annual appraisal and equity of access to educational opportunities[3].

3. Leaders should be appropriately recruited, and have access to appropriate personal development, including the facility for mentoring and/or coaching services to support them in their role[3,4,5,6,9].
4. ICUs should promote a supportive work environment to foster healthy working relationships, psychological safety and positive culture.[3, 5]
5. There should be timely and meaningful consultations on changes and initiatives that regularly keep the staff informed[5,9].
6. ICUs should provide frequent opportunities for shared learning, clinical communication, and reflection.
7. Staff of all grades and professions should be offered opportunities to contribute towards wider quality, safety and innovation projects.

BACKGROUND AND EXPLANATION

Poor staff wellbeing and burnout are associated with poor patient safety outcomes[10], with evidence indicating that increasing staff engagement could be an effective means of enhancing patient safety[11]. Intensive care staff are regularly exposed to work-related psychosocial stressors. The acknowledgement of this, and our understanding of the means to mitigate this have come further since the first iteration of this chapter in GPICS v2. There are several UK bodies who have consensus guidelines about the health and wellbeing needs of NHS staff.

ICUs should monitor and regularly review metrics of staff well-being as quality indicators (including measures of engagement rather than just measures of sickness), as well as utilising a stress risk assessment (such as the Health and Safety Executive's template)[3,5] and considering legal obligations such as the Health and Safety at work Act 1974, and the Equality act, 2010.[12,13]. Staff ought to have access to occupational health services, including physiotherapy and psychological therapy as required[3,5,6].

Work should be preventative, with ways of engaging staff (e.g. newsletters and staff forums, involving staff in quality improvement) and encouraging two-way communication. Staff benefit from access to different ways to psychologically process what they have experienced at work. This includes routine clinical practice (e.g. multidisciplinary rounds, mortality and morbidity meetings, operational debriefs), access to restorative clinical supervision (e.g. as provided by Professional Nurse Advocates), Peer Support, as well as specific reflective events (e.g. Schwartz Rounds, Post Event Team Reflections)[5]. Equality, diversity and inclusion needs to be embedded as part of the culture.

Many of the standards and recommendations in this chapter have been designed to operate as part of a package of measures for staff wellbeing. They are not intended to be single interventions but instead will require a process of ongoing action and monitoring.

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2.17 Equity, Diversity, and Inclusion

Authors: Sekina Bakare, Aoife Abbey, Olusegun Olusanya, Luke Flower, Mariam Amoran, Catherine Roberts, & Avinash Jha with contributions from the ICS EDI Working Group members and WICM Board.

INTRODUCTION

This chapter provides a practical guide for ICUs to cultivate an environment conducive to staff excellence, thus enhancing patient care. It offers evidence-based strategies for fostering equity, diversity, and inclusion (EDI) and serves as a roadmap to identify and achieve specialty-wide priorities and goals. By emphasising actionable steps, it reflects the commitment the Faculty of Intensive Care Medicine and the Intensive Care Society have to advancing EDI principles within intensive care.[1]

MINIMUM STANDARDS

Addressing unacceptable behaviour

1. ICUs must have a policy for recognising, reporting, and addressing unacceptable behaviours within the department, including bullying, harassment, and discrimination.[2]

Transparency

2. ICUs must ensure that the determinants of workplace equity, including role allocation, career progression, international recruitment processes, rostering and leave allocation are subject to transparent processes, which have inclusivity and equity at their core.[2]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

Leadership and Infrastructure

1. ICUs should appoint a lead for equity, diversity, and inclusion (EDI Lead).[3]

Policy and Strategy

2. ICUs should develop a locally tailored EDI vision statement that reflects the context and needs of their intensive care services.[2]

Data Analysis and Representation

3. ICUs should report EDI related data through established local governance structures with a focus on role allocation, promotion, and access to leadership opportunities.[2]

Training and Development

4. All staff members should receive training on equity, diversity, and inclusion that is relevant, meaningful, and easily accessible.[1]
5. All staff members should have equitable access to educational resources, funding, and opportunities for professional development.[2]
6. ICUs should assign dedicated mentors for specific groups known to experience barriers to career progression, such as international graduates and Locally Employed Doctors (LEDs) to ensure that they receive tailored support and development opportunities.[2,4]

Support for Carers

7. ICUs should have policies and provide support for staff members with caring responsibilities, such as parental leave and flexible working arrangements.[5]

Return to Work Policies

8. ICUs should have a compassionate and individualised return-to-work policy for staff members returning from extended leave due to reasons such as illness, maternity/paternity/parental leave, or caring responsibilities.[5]

Work-Life Balance and Career Longevity

9. ICUs should offer flexibility in rota and job planning to accommodate the diverse and evolving needs of staff.[5]

Reproductive health policy

10. ICUs should promote an open and supportive environment for discussing reproductive health, underpinned by clear policies and awareness of available support and resources.[1]

Medical Bias Awareness

11. ICUs should ensure that procurement processes prioritise medical devices that function to the same standard across the diverse population they serve.[6]
12. ICUs should provide training in culturally competent care, with emphasis on recognising how clinical conditions may present differently among patients of different ethnic backgrounds, to reduce disparities in healthcare outcomes.[6]
13. ICUs should support individualised care that actively minimises the risk of diagnostic overshadowing or bias towards patients with chronic health conditions, disabilities, or other protected characteristics.
14. ICUs should establish regular forums for senior decision-makers to reflect on and discuss admission decisions.

BACKGROUND AND EXPLANATION

Intensive care thrives on the blended skills of a multi-professional team, where fostering equity, diversity, and inclusion is essential for optimal patient care. A diverse workforce alone does not ensure inclusivity; proactive strategies are required to address disparities and drive meaningful change.

This new chapter in GPICS V3 outlines recommendations to help intensive care services support today's multi-professional teams. These recommendations draw on evidence from diverse reports and best practice frameworks crafted by leaders in intensive care and the broader medical community. Towards an Inclusive Future, the largest EDI project in intensive care, uses the lived experiences of the multidisciplinary community to start to develop resources, education, and initiatives that prepare intensive care for the future. The Workforce Wellbeing Best Practice Framework and Critical Staffing Series guide stakeholders in enhancing recruitment, retention, job satisfaction, and unit culture, positively influencing patient safety and clinical outcomes. The NHS EDI improvement plan highlights EDI as essential for building a caring, efficient, and safe NHS, while outlining actions to improve workforce experiences, boost retention, and attract diverse talent. [1,3,4,5]

ICUs should appoint an EDI Lead from any MDT role, ensuring they have protected time in their job plan to fulfil their clearly defined responsibilities.[3] The EDI Lead plays a central role in fostering an inclusive culture. This individual should collaborate with colleagues to develop a vision statement reflecting the department's commitment to EDI, ensuring it remains relevant over time.

Transparent workforce data analysis is crucial to tracking trends across all protected characteristics; age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race including colour, nationality, ethnic or national origin, religion or belief, sex, and sexual orientation. Partnering with HR, ICUs need to monitor promotion pathways, access to training, and retention rates to inform strategies for equitable career progression.[2,3,15]

EDI training will ideally cover unconscious bias, cultural competence, and inclusive communication, ideally integrated into clinical simulation for practical relevance. Staff have to be equipped to deliver culturally competent care, recognising disparities in healthcare access and conditions that present differently across ethnic groups.

Equitable access to professional development is essential. ICUs need to ensure all staff can benefit from education, funding, and mentorship, including tailored resources for those with disabilities or neurodiversity. Targeted support needs to be available for international graduates and underrepresented groups, fostering role models and career development.[2,5]

Flexible working arrangements are vital for staff with caring responsibilities, ensuring policies on parental leave and work-life balance are transparent and well-supported. ICUs need to provide

structured return-to-work support, including mentorship, refresher training, and wellbeing resources, to ease reintegration after extended leave.[5]

Job planning and rotas should proactively accommodate individual needs, recognising the impact of disability, ageing, and reproductive health concerns including menopause, pregnancy, baby loss, and miscarriage. Clearly signposted support pathways and a culture of open discussion needs to be embedded to ensure that staff navigating these challenges, particularly those with disabilities, feel valued, supported, and able to thrive.[1]

By embedding EDI principles into all aspects of ICU operations, this chapter provides a practical guide to fostering inclusivity, enhancing team performance, and capitalising on the innovation and productivity improvements that diversity brings.

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Section 3 | **PROCESSES**

3.1 Admission, Discharge and Handover

Authors: Fiona Christie & Matt Rowe

INTRODUCTION

Timely access to definitive care is an essential component of improving patient outcomes. The prompt escalation of care, including intensive care admission, necessitates direct involvement of the referring and receiving consultants. Standardised systems for the recognition and appropriate escalation of the deteriorating patient have to be in place, with consultant-to-consultant referral for all unplanned admissions wherever possible. The provision of clinical care within an intensive care setting involves a collaborative, multidisciplinary approach with standardised handovers for all clinical groups. All referrals need to trigger an immediate and frequently reviewed treatment plan with a documented treatment escalation plan. Efficient discharge processes can facilitate patient flow and will ideally occur as early as possible during the working day.

This chapter should be read in conjunction with Chapter 2.1: Consultant Staffing.

MINIMUM STANDARDS

Admission

1. The time and decision to admit to the ICU must be clearly documented in the patient record.
2. The decision and management plan for any admission must be discussed with the duty consultant responsible for the ICU[1,2] and the nurse in charge, as soon as possible.
3. There must be clear documentation on the decision process for those who are referred and not accepted for intensive care admission and the in-patient treating team informed of the decision.[2,3]
4. Patients must be reviewed, in person, by a consultant responsible for the ICU as urgently as the clinical state dictates, and always within 14 hours of admission to intensive care.
5. Patients on intensive care must have a clear and documented treatment escalation plan.[2,4]

Discharge

6. Discharge from intensive care to a general ward must occur only between 0700hrs and 2159hrs, except for reasons of surge.[5-7]
7. Out of hours discharges must have an incident report completed.
8. The nurse in charge (or area leader in larger units) must be present in person for the ward round to ensure appropriate multidisciplinary discharge planning.

Handover

9. There must be a standardised handover procedure of patient care and responsibility at shift change for medical, nursing and AHP staff.

10. There must be a standardised handover procedure for medical, nursing and AHP staff for patients discharged from ICU [3,8]
11. Handover for patients discharged from ICU must include their structured rehabilitation programme.[3,9,10]
12. An intensive care consultant must undertake ward rounds twice a day, one of which must be face to face, seven days a week.[4,11] (see Chapter 2.1: Consultant Staffing)

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

Admission

1. Unplanned admissions to the ICU should occur within four hours of making the decision to admit and the completion of the essential resuscitation and imaging.[2, 12,13]
2. Unplanned admissions should be seen by an intensive care doctor within one hour of admission and first line management commenced, with clear documentation of discussion with the duty consultant in intensive care.
3. Patients considered 'high risk' (defined as where the risk of mortality is greater than 10%, or where a patient is unstable and not responding to treatment as expected), should have consultant involvement within one hour.[4]
4. ICUs should monitor and review the causes for unplanned readmissions, to focus improvement efforts on factors leading to readmission.

Discharge

5. Discharge from intensive care to a general ward should occur within four hours of the decision.[5-7]
6. Patients requiring repatriation to their local hospital to continue care should be transferred within 48 hours of acceptance by the receiving hospital. (See Chapter 3.10: Transfer)
7. All patients discharged from intensive care should be reviewed by the intensive care team within the first 24-48 hours of leaving the unit.
8. Patients discharged from intensive care should have access to an intensive care follow-up service[9,10,14]

Intensive Care Outreach

9. ICUs should have a dedicated outreach team, separate to those with responsibility for the day-to-day running of the unit, able to respond promptly to concerns raised by the in-patient ward teams, support admission to ICU and review intensive care ward discharges.

BACKGROUND AND EXPLANATION

Data from the ICNARC Case Mix Programme Public Report 2022/23 recorded 201,505 critical care admissions to a total of 267 intensive care units in England, Wales and Northern Ireland[15], SICSAG recorded 37,927 admissions to intensive care units in Scotland in 2022.[16] The extent to which any

individual hospital provides intensive care services should depend on the skills, expertise, access to specialties and facilities available. Whilst some patients will require transfer to another facility with advanced or sub-specialist clinical capabilities, non-clinical transfers should be avoided.

Recognition of the deteriorating patient, together with timely admission to intensive care and the initiation of definitive treatment has consistently been shown to be of prognostic importance.[2,13] Consultants in intensive care medicine play a crucial role in treatment planning, ensuring quality care, reducing mortality, and shortening hospital stays.

Discharge from the ICU should be a planned event, occurring as early as possible in the working day to facilitate high quality handover of care, improve communication with receiving in-patient teams and allow adequate opportunity for review. ICNARC data highlights an increasing number of delayed intensive care discharges exceeding 24 hours. Delayed discharges are shown to negatively impact on patients, with increased risk of delirium, sleep disturbance and delays in rehabilitation leading to an increased length of hospital stay.[5] Furthermore, delay in ICU discharge may also delay or reduce availability of ICU resources for patients requiring admission.

A standardised, high-quality handover must accompany every patient on ICU discharge. The receiving (ward) team responsible for ongoing care have to be directly involved in this process and there should be a verbal as well as written handover.

Handover needs to include, as a minimum:

- A summary of the intensive care stay, including diagnosis, treatment and changes to chronic therapies
- A plan for monitoring and further investigation
- A plan for ongoing treatment alongside a clearly documented treatment escalation plan (including Do Not Attempt Cardiopulmonary Resuscitation where appropriate)
- A clearly documented plan with regards to the patient's suitability for readmission to an intensive care environment, any limitations on treatment and any family discussions that have taken place on this issue.
- An assessment of the patients ongoing rehabilitation needs incorporating physical, emotional, psychological and communication needs.
- Intensive care follow-up arrangements
- A named contact e.g. an appropriate intensive care consultant from whom further information can be sought as appropriate.

Complex patients at risk of prolonged recovery need to have a multi-professional, coordinated recovery programme documented. Goals need to be continually reviewed across the recovery continuum with early patient and carer involvement.

Unplanned re-admission rates (within 48 hours) have been reported as approximately 1.1%.[15] Unplanned readmissions are associated with increased length of stay, increased consumption of resources and a higher morbidity and mortality.[17] A high early re-admission rate may reflect premature discharge, incorrect use of ward care, inadequate handover or a poor response to treatment despite appropriate care. All ICUs must have processes in place to review recent discharges from the ICU environment and take steps to minimise unplanned readmissions to intensive care.

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3.2 Capacity Management

Authors: Sam Waddy, Andy Georgiou & Ritoo Kapoor

INTRODUCTION

The management of intensive care capacity is complex. Intensive care teams are required to balance the needs of patients referred to them, as emergencies and as planned admissions after elective major surgical procedures, with the needs of the patients already under their care. Most of the UK has a low intensive care bed base per head of population which makes capacity management even more challenging and limits the ability to create safe expansion areas at times of high demand[1]. The COVID-19 pandemic brought this into sharp focus, and there is now greater understanding that surges in demand need to be managed at a regional (e.g. network) level, ensuring equity of intensive care access for patients.

MINIMUM STANDARDS

1. Acute hospitals must model their number of intensive care beds based upon expected need. [6,7].
2. All ICUs in England must report their bed capacity to the national Directory of Services (DoS) twice a day and include a CRITCON score[2].
3. Intensive care must only be used for patients who require intensive care services with any breaches reported using the hospital incident reporting system.
4. The duty consultant and the duty nurse in charge of the ICU must jointly make the final decision on the safe utilisation of intensive care beds and this decision is not to be over-ridden.[3]
5. ICUs must have documented capacity escalation plans suitable for their hospital facilities, which are reviewed routinely and ratified at board level.
6. ICUs must have an escalation policy which covers the exceptional circumstance of providing Level 3 care outside of the unit.
7. Transfer to other hospitals' ICUs to create capacity (interhospital capacity transfer or non-clinical transfer) must be conducted only when all internal options to avoid transfer have been exhausted.
8. Interhospital capacity transfers must be reported using the hospital incident reporting system, formally reviewed and reported to the executive team.
9. Interhospital capacity transfers for the purposes of facilitating elective surgery must be avoided[4].
10. Regional intensive care networks must have escalation plans documented and agreed at board level in hospitals, to allow the duty ICM Consultant and duty nurse in charge to support the coordination and use of intensive care beds across the region.
11. Regional intensive care networks must have an agreed policy on escalation of care during times of high demand[5].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Health Boards, Networks and Regions should model their number and location of intensive care beds based upon the expected need for their patient population.
2. To deliver a quality service, individual ICUs should contribute towards Health Boards, Networks and Regions having 10 intensive care beds per 100,000 people in their catchment population (aged 16 and over).[6,7]
3. All ICUs should model their occupancy and admissions to predict their daily emergency admission requirements and provide this information to hospital wide bed management to inform decisions before starting major elective surgical cases.
4. ICUs should have a policy for surge activity in exceptional circumstances such as major incidents and pandemics.

BACKGROUND AND EXPLANATION

The UK has just under 4,000 adult intensive care beds (Level 2 or 3) available and operates at around 81% capacity[1]. It has amongst the lowest number of intensive care beds compared to nations in the European Union (8.4 vs mean 15.9/100,000 population respectively), increasing pressure on intensive care capacity[8]. At least 465 operations are cancelled each month due to lack of intensive care bed capacity[9]. Determination of cancellation and causation is challenging, and this figure is likely an underestimate.

Calculating the expected need for intensive care beds will be based upon population, age, ethnicity, deprivation, patient pathways and elective vs non elective activity, as well as historic and any expected expansion of activity.

Operating at or near maximum capacity adversely affects patient mortality, length of stay and acuity of admissions[10]. When units operate at capacity, it is almost inevitable that only patients requiring immediate organ support are admitted to the detriment of others.

Ensuring there is a staffed bed(s) vacant for emergency admissions is an appropriate, straightforward method of ensuring timely admission. Plans to recreate this capacity may start as soon as it is used. Decisions to proceed with elective surgery will consider the provision of emergency capacity over the subsequent 24 hours and the likely discharges from intensive care.

Escalation planning

Decisions regarding how to manage capacity will require clinical oversight, taking into account individual patient need and likelihood of benefit from intensive care. The final decision on the safe utilisation of intensive care beds rests jointly with the duty consultant and the duty nurse in charge of the intensive care unit and their clinical decisions cannot be over-ridden[3].

Escalation plans at both organisational and regional (e.g. Network) level are essential to manage the risks around limited capacity. Plans for surge events include location and design (such as all beds being capable of delivering Level 3 care), training (particularly for staff in escalation areas such as recovery and theatres), supervision (of staff used as part of escalation), equipment (to include devices, power and gas supplies for delivering Level 3 care) and staffing ratios. All units must have an escalation policy which covers exceptional circumstances. This includes incident reporting of the event, risk mitigation strategies and escalation to the executive team.

Executive teams at hospital board level need oversight of any escalation and the provision of intensive care outside of the ICU always needs to be regarded as exceptional. It is unsafe for intensive care to habitually use escalation areas and 'normalise' their use amongst both clinical and operational teams.

At a regional level, escalation plans might include:

- Escalation and repatriation between secondary and tertiary units.
- The process of escalation to and within the region/network, and when required, prioritisation of transfers over local elective activity.
- Agreed intensive care admission criteria and thresholds for restriction of planned activity to assist neighbouring ICUs during periods of extraordinary demand, e.g. pandemic or major incident scenarios.

Patients who are subjected to a non-clinical transfer have a longer ICU stay and are exposed to additional risks, so capacity transfer is still to be regarded as a system failure in all but the most extreme pandemic scenarios[11, 12, 13]. It is essential that Critical Care Networks (or equivalent), Health Boards/Trusts and NHS regions ensure that there are operational guidelines/principles in place to guide acute hospitals in decision making around capacity transfer to ensure patient-centred decisions are made. This might include transfers only once all physical beds are occupied and staffed, all elective surgery cancelled, all ward-fit patients discharged from intensive care, all reasonable efforts made to temporarily increase staffing, and no prospect to increase staffing by the oncoming shift.

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3.3 Critical Care Outreach, Rapid Response Systems and Early Intervention

Authors: Natalie Pattison, Victoria Metaxa, Debbie van der Velden & Emma Lynch

INTRODUCTION

Critical care outreach teams (CCOT), rapid response teams (RRT) and medical emergency teams (MET) are crucial in supporting and initiating early interventions in deteriorating and critically unwell patients, outside of intensive care. In the UK, most rapid response systems are configured as nurse-led critical care outreach teams providing 24/7 coverage[1,2].

Representing a multidisciplinary response, CCOT/RRT/MET teams are expected to achieve a designated level of practitioner competency to treat deteriorating patients and patients at-risk of deterioration[3]. Core components of care provision include system-wide avoidance of failure to rescue through patient-level management and treatment, supporting goals of treatment and care[4], staff education, and ward-based follow-up and rehabilitation post-intensive care (discharge liaison)[5].

Outreach from intensive care (CCOT/RRT/MET) forms the efferent limb of the rapid response system activation, with escalation of deterioration via early warning scoring systems to call for further help. A National Early Warning Score (NEWS or (NEWS-2)[6] is recognised as the current recommended tool for call systems[7,8].

Latest NHS England guidance, following the roll-out of Martha's Rule, and implementation of Worry and Concern response systems in the NHS, has proposed 24/7 CCOT provision in all acute English NHS Trusts[9], with a similar patient and family initiated escalation roll-out across Wales[10]. Getting it Right First Time (GIRFT) reported that 86% of all acute NHS Trusts in England had CCOT services[1].

MINIMUM STANDARDS

1. There must be a hospital wide, standardised approach to the detection of the deteriorating patient and a clearly documented escalation process, including to intensive care, available 24 hours a day, seven days a week[1,11,12].
2. All acute hospitals must use a validated track and trigger early warning score system that allows rapid detection of the signs of early clinical deterioration in all adult patients over 16 years and includes escalation procedures to intensive care services[4].
3. Hospital policies must clearly outline graded, patient escalation pathways, including through to intensive care services, as required.
4. Hospitals must ensure there is a clinical review of all patients with a NEWS ≥5 (or equivalent if NEWS2 not in use), a score of 3 in a single parameter or any clinical concern via a rapid response system incorporating intensive care expertise[6].

5. There must be clear governance through audit of track and trigger response systems[13]and action of poor compliance healthcare organisation wide, reportable at board level.
6. Hospitals must ensure patients receive care from appropriately trained critical care outreach, rapid response or equivalent teams[4,11].
7. All patients must be reviewed by CCOT (or equivalent) following discharge from the intensive care unit to the ward, due to increased risk of deterioration post-ICU for as long as they are at risk (and at least in the first 24 hours).
8. All critical care outreach teams within acute hospitals in England and Wales must use the National Outreach Forum national minimum dataset[14] for collating metrics on critical care outreach/rapid response team activity in order to provide clear data for benchmarking on their outcomes and activity.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be regular (quarterly and annual) review of activity to review service provision, and liaison with the appropriate patient safety champions and committees in the hospital[15].
2. Outreach from intensive care should sit within intensive care directorates to ensure rapid access to intensive care facilities, provision and professional support, as needed.
3. Intensive care outreach staff, whether they sit within or outside intensive care directorates, should possess intensive care competency (enhanced, advanced, consultant), and achieve the competency level set out as part of their role description and in the Critical Care Outreach Practitioner (CCOP) Framework[3].
4. Acute kidney injury alerts, or similar pathological markers, should work in concert with any track and trigger early warning score system to ensure recognition of deteriorating and at-risk patients.
5. There should be a patient/carer activated system, supported by intensive care outreach services, for escalating concerns about deteriorating patients all the way up to intensive care, through mechanisms such as Call for Concern[4,16,17].
6. There should be accessible educational support for registered and non-registered ward staff in caring for the acutely ill and deteriorating ward patient[4,11], supported by critical care outreach and rapid response teams.

BACKGROUND AND EXPLANATION

The development of outreach from intensive care has been embraced by hospitals seeking to address failure to rescue and the ongoing limitation of intensive care bed capacity, preventing unnecessary mortality and morbidity of critically ill ward patients, and providing care regardless of location. Rapid response systems, including CCOT/MET, have evolved into a wider variation of configuration, dependent upon perceived local need and resources available. This has led to a wide variety in the provision of these services. As outreach from intensive care services expand

across the NHS, quality indicators and operational standards[5] help guide configuration of services and future provision.

Despite equivocal early evidence for certain patient outcomes such as mortality, readmission or length of stay[18,19], the value and impact of CCOT, medical emergency teams (MET) and rapid response services (RRS) are still advocated and widely recognised[1].

CCOT, MET and RRS support acutely and critically ill patient pathways, working collaboratively with other parts of the hospital, and their remit includes measures to tackle 'failure to rescue' through early identification and management of patient deterioration; addressing treatment goals and treatment preferences with patients; timely admission to an intensive care bed when required; and delivery of effective follow-up for patients post discharge from intensive care.

Outreach from intensive care and rapid response encompasses seven core elements, set out using the PREPARE acronym:

- **P**atient track and trigger
- **R**apid response
- **E**ducation, training and support
- **P**atient safety and clinical governance
- **A**udit, evaluation and monitoring of patient outcome and continuing quality care
- **R**ehabilitation after Critical Illness (RaCI)
- **E**nhancing service delivery[5]

Hospital policies must clearly outline graded patient escalation clinical pathways, including through to intensive care services, as required. Graded clinical response strategy consists of three levels: low, medium and high[11]. This incorporates escalation to intensive care services. Each level of response should detail what is required from staff in terms of observation (vital sign) frequency, skills and competence, interventional therapies, and senior clinical involvement, with intensive care expertise. It should define the speed and urgency of response, including a clear escalation policy (incorporating process for referral to intensive care for an intensive care bed, treatment escalation plans for limitations of medical treatment and goals of care discussions) to ensure that an appropriate response always occurs and is available 24/7.

There must be clear governance through audit of track and trigger response systems[16] and action of poor compliance healthcare organisation wide, reportable at board level. This may be the responsibility of critical care outreach or wider patient safety teams. Data capture of activity and outcomes related to CCOT/MET/RRS is a core activity so that services can be benchmarked across regions and nationally. Activities undertaken by outreach are broad, as outlined in the framework[3], and include post-critical care discharge liaison to ensure optimal recovery for both patients at-risk and post-intensive care patients, supporting rehabilitation post-critical illness[20]. Also fundamental to

CCOT/RRT/MET activity is supporting ward-staff education[3, 21]. RRT service provision may also collaborate with other services, encompassing e.g. altered air-airway support, resuscitation team, Hospital at Night services and acute pain teams.

Hospitals must ensure patients receive care from appropriately trained critical care outreach, rapid response or equivalent teams[4,11]. These teams may sit outside intensive care services but should possess competency in the care of critically ill patients (enhanced, advanced, consultant) within the service, and achieve the competency level set out as part of their role description and in the Critical Care Outreach Practitioner (CCOP) Framework[3].

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3.4 Infection Control

Authors: Thomas Craven & Melanie Griffiths

INTRODUCTION

ICUs bring together patients who are more vulnerable to acquiring nosocomial infections and more likely to receive broad-spectrum antibiotics. Breaking the chain of infection with comprehensive infection prevention and control (IPC) measures is essential to reduce the burden of infection and the development and spread of antimicrobial-resistant infections[1]. Many infection control practices such as hand hygiene, environmental cleaning, antimicrobial stewardship, isolation prioritisation and surveillance strategies apply throughout all healthcare locations, with intensive care having specific or distinct requirements.

MINIMUM STANDARDS

1. ICUs must identify an embedded ICU nurse who has protected time to carry out IPC duties on intensive care.
2. ICUs must comply with national standard infection control precautions (SICPs) and transmission-based precautions (TBPs), adapted if necessary, according to local need.
3. All patients must undergo a clinical risk assessment for Carbapenemase-producing Enterobacterales (CPE) screening at admission to intensive care.
4. All patients must be screened for carriage of MRSA (Methicillin Resistant *Staphylococcus aureus*) at admission to intensive care and those identified as MRSA positive be offered topical decolonisation/suppression.
5. ICUs must comply with Infection Prevention Society High Impact Interventions or equivalent, adapted if necessary, according to local need*.
6. ICU patients must have scheduled and predictable weekday interactions with a microbiologist (or equivalent).
7. ICUs must contribute to national surveillance of nosocomial infection through local surveillance and reporting.

   * Except those dealing with prevention of surgical site infection.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. ICUs should identify a clinical lead for infection control.

BACKGROUND AND EXPLANATION

Infection prevention and control strategy is set at a national level, and national infection control manuals define SICPs and TBPs which comprehensively describe many important aspects of infection control such as hand hygiene, environmental cleaning, personal protective equipment,

and patient isolation. Compliance is mandatory for all health care locations and trust or board wide infection control teams are responsible for setting and delivering local strategy. ICUs are exceptional because, primarily, their patients and treatments present additional routine risk. A formally recognised role embedded within the ICU is considered a minimum acceptable standard to ensure adequate delivery of infection control practices at a unit level; as well as advocating for better practice, perform education, promote antimicrobial stewardship, conduct surveillance, and develop unit specific IPC initiatives. Scheduled and predictable interactions with an intensive care pharmacist will ensure optimal antimicrobial stewardship, including appropriate dosing. (see chapter 2.7 for more details on the Pharmacy Team).

ICUs utilise many invasive devices that are associated with additional risk for healthcare associated infection[2]. The Infection Prevention Society has published several iterations of High Impact Interventions[3] based on evidence, guidelines, legislation, and expert consensus. The interventions describe care bundles for the insertion phase and ongoing care phase for the following:

- Prevention of ventilator-associated pneumonia
- Prevention of infections associated with:
    - peripheral vascular access devices,
    - central venous access devices,
    - infections in chronic wounds,
    - urinary catheters,
- Promotion of stewardship in antimicrobial prescribing.

The interventions also cover the prevention of surgical site infection but, whilst important in ICU, the specific interventions described cover the pre- and intra-operative phases of surgery only. For this reason, the application of the associated care bundles is not often directly applicable in ICUs, and so they are exempt from these standards. The elements of each care bundle are succinct and auditable. ICUs can adapt and evolve their care bundles in line with local need and new evidence. In addition to prevention, surveillance of common and harmful device associated infections is a component of the strategy to reduce their morbidity and units should conduct surveillance as required by their national reporting system.

CPE are amongst the highest threat of all emerging pathogens[4], forming a subdivision of carbapenem resistant organisms (CRO). CPE are spread through direct and indirect contact with the patient and their environment, so screening can identify patients and reduce the risk of transmission to others in the ICU. Each patient will undergo a risk assessment at the time of admission with the components of the risk assessment are set nationally and may evolve with time. MRSA carriage, mortality, and morbidity has fallen[5] over the last two decades at least in part due to an effective screening and eradication strategy. All patients admitted to high-risk areas (including

intensive care) must be screened for MRSA carriage and eradication/suppression offered to those with positive screening results[6].

Antimicrobial resistance (AMR) is predicted to result in 10 million deaths globally by 2050 if no action is taken[7]. Antimicrobial stewardship (AMS) is a key cornerstone in reducing AMR. along with adherence to UKHSA 'Start Smart then Focus' and WHO guidance 'AWaRe'[8]. Antibiotic treatment ought to be used only when clearly indicated, reviewed daily, rationalised when possible, and discontinued as soon as it is no longer needed. AMS applies within and beyond ICU and is often complex, involving many individuals from several professions and disciplines, making it difficult to define easily which ICUs are good antimicrobial stewards and which are not. A simple but key component of ICU, AMS requires regular interaction between patients, intensive care professionals, microbiologists, and pharmacists to check adherence to local antimicrobial policy and provide case-specific advice including dose adjustment.

There are no standalone actions to prevent infection. IPC activity needs to be multifaceted and continuous[9].

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3.5 Interaction with Other Services: Microbiology, Pathology, Liaison Psychiatry and Radiology

Authors: Esther Davis & Raymond McKee

INTRODUCTION

Intensive care medicine is a multidisciplinary arena which, by its very nature, requires timely interaction with multiple services. Certain specialty areas have more significant impact on patient management; these are considered in greater detail.

MINIMUM STANDARDS

1. Telephone advice from a microbiologist must be available 24 hours a day, seven days per week.[1,2]
2. Further interpretation and clinical advice from the relevant consultant pathologist or clinical scientist must be available 24 hours per day, seven days per week.[3]
3. Pathology and radiology providers must have systems in place to identify and rapidly communicate critical or unexpected results.[4,5,6]
4. Clinicians must have robust mechanisms in place so that appropriate action is taken following rapid communication of critical and unexpected results.[4]
5. A radiologist must be immediately contactable to support the diagnostic management of acutely ill patients at all times.[5,7]
6. Imaging and reporting for patients with critical conditions must be prioritised.[5,6]
7. Liaison psychiatry services must review all mental healthcare referrals within 24 hours of referral.[8,9,10]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be planned microbiology input to patient care on a daily basis; regular 'in person' ward rounds to facilitate team discussion and learning are preferred.[1,2,11]
2. Units that provide acute care should have access to interventional radiology (IR) services either onsite or by formal arrangement to transfer to a site where the service is available.[12]
3. Liaison psychiatry staff should be available to advise acute colleagues on issues around mental capacity.[8,9]
4. Regular clinico-radiological meetings are recommended to facilitate team discussion and shared learning.

BACKGROUND AND EXPLANATION

Intensive care is a multi- and interdisciplinary specialty. This includes the services provided by psychiatry, radiology, microbiology and other laboratory medicine to effectively and safely manage

the complex, critically ill patient. The standards and recommendations in this area have been refined and reworded on the basis of updated evidence and standards from other specialties, as well as consideration of their pragmatic application.

This includes specific updates around microbiology where the principle is regular consistent two-way discussion between teams. This enables timely advice, based on accurate, appropriate clinical information. It has become increasingly clear that a flexible approach in how this is provided may ultimately result in more consistency without compromising effectiveness.[1,2,11]

The communication of urgent, and clinically important findings from the laboratory or radiology departments are vital for patient safety, as are subsequent robust mechanisms to respond within intensive care. This is emphasised in these simplified standards.

Fostering relationships between other specialties and intensive care clearly has tangible advantages within daily practice for our decision-making on treatments and investigations as well as mutual education. Establishing these communication channels in routine situations will then reap benefit in more critical and urgent scenarios. This culture within an ICU underpins the ability to fulfil the recommendations in this area.

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3.6 Rehabilitation

Authors: Zudin Puthucheary, James Bruce, Sarah Vollam & David McWilliams

INTRODUCTION

Mortality from critical illness continues to decrease, with a hospital mortality in 2019 of 18.5%.[1] Survivorship following admission to ICU is increasingly considered to be a defining issue for modern critical care.[2] Survivors have substantial functional limitations that persist in 70% at 6-12 months, functional capacity can be impaired for more than five years and 30% remain carer-dependent.[3-5]

Rehabilitation is recognised as a key part of recovery from critical illness, managing the impact of impairments or disabilities to restore function and improve independence.[6] Rehabilitation should be patient-centred, supporting patients to achieve their individualised goals, by maximising recovery of physical, cognitive, and psychosocial functions to improve quality of life.[7]

MINIMUM STANDARDS

1. A comprehensive assessment of rehabilitation needs must be carried out within four days of admission to intensive care and updated at ICU discharge, using a validated screening tool.
2. Those patients identified to have rehabilitation needs must have a clearly documented, personalised, multidisciplinary rehabilitation plan which is updated weekly and handed over to the receiving team at ICU discharge.
3. Rehabilitation goal setting must occur at least weekly for all patients engaged in rehabilitation, with input from all members of the multidisciplinary team.
4. A comprehensive reassessment must take place two to three months after discharge either in person or remotely using a validated screening tool.
5. Delivery of the multidisciplinary rehabilitation plan must be audited in line with departmental clinical governance frameworks.
6. All intensive care staff with patient facing roles must have pain, agitation, delirium, immobilisation, and sleep (PADIS) education as part of their ICU induction.
7. There must be a documented structured assessment of PADIS on the daily medical review.
8. Written information at the time of discharge from hospital, including ongoing rehabilitation plans and discharge information, must be communicated to the patient, their general practitioner and other secondary care professionals offering ongoing care.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Assessments post hospital discharge should consider and measure patient recovery or persistent deficits that were identified at ICU and hospital discharge.

2. A member of the ICU multidisciplinary team should be named on the rehabilitation plan as contact for staff and patients to provide ongoing advice and support throughout the recovery pathway, up to the time of follow-up assessment.
3. There should be a dedicated clinical lead for intensive care rehabilitation.
4. Post-ICU discharge, patients should be followed up on the ward by a designated member of the ICU multidisciplinary team to support their rehabilitation plan.
5. There should be a holistic assessment of a patient's current limitations and include encouragement to participate in identified activities which are purposeful to the patient with a view to regaining independence of function.

BACKGROUND AND EXPLANATION

Many who leave ICU alive suffer from post intensive care syndrome[8,9] to which many factors contribute such as rapid acute muscle wasting and associated disability[10]; cognitive problems relating to impaired short-term memory and executive function; depression, anxiety and post-traumatic stress-disorder[11]; and dysphonia and dysphagia in those with and without tracheostomies[12]. Impacts are compounded by increased sedentary behaviour, and from psychosocial problems that arise from increased dependency, unemployment and economic deprivation[5,13].

Recovery from critical illness commences in ICU, with the ICU multidisciplinary team who expertly assess and plan the recovery during the patients' illness in collaboration with ward-based multidisciplinary teams on step down. Assessments need to be made using validated screening tools that aim to identify issues that will impact progress during recovery and influence the development of a bespoke rehabilitation plan. One such tool is the Post-ICU Presentation Screen (PICUPS), and other tools may be developed over time.[7,14] Delivery of the multidisciplinary rehabilitation plan must be audited, and include provision of rehabilitation services from a range of professions including, physiotherapists, occupational therapists, speech and language therapists, Rehabilitation coordinators, clinical psychologists and consultants with an interest in rehabilitation. Rehabilitation requires a personalised approach, including orientation boards, patient diaries and engagement with family members to maximise humanisation.

Additional standards and recommendations to this chapter build on and recognise the wealth of research, national awareness and patient voices in the need for detailed rehabilitation standards. Patients have increasingly vocalised the gaps in service provision and communication along their recovery journey. Responsibility for such service delivery sits not with individual enthusiasts, but with clinical services, and therefore falls under individual services clinical governance umbrella.

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3.7 Post ICU Recovery and Follow-Up

Authors: Joel Meyer, Sandra Taylor & Andrew Slack

INTRODUCTION

Critical illness can lead to long-term physical, cognitive and psychosocial problems for both patients and caregiver(s) after returning home, termed post intensive care syndrome (PICS). Patient-specified goal-directed rehabilitation should begin in ICU and continue through to ward discharge and the return home. Rehabilitation is led initially by inpatient allied health professionals and then after returning home by the GP, community services, and where available post-ICU recovery services; these are most frequently an outpatient clinic model with health professional consultation virtually or in person. Key outcomes need to be focused on a return to pre-ICU functional status addressing physical and mental morbidity with social and financial support, when needed.

MINIMUM STANDARDS

1. All patients at risk of PICS, must be assessed for PICS following ICU stepdown.
2. Information about the post ICU outpatient services and support available must be communicated to patients, their family and friends, and/or their caregiver(s).
3. All ICUs must provide a case mix-appropriate post-ICU recovery outpatient clinic delivered by dedicated staff.
4. Post-ICU recovery outpatient clinic services must assess and manage both physical and non-physical (cognitive and psychosocial) domains.
5. Every post-ICU recovery outpatient clinic consultation must provide a letter to the patient or their caregiver and the patient's GP which summarises the consultation and, where appropriate, the ICU stay.
6. All post-ICU recovery outpatient clinic services must produce a standard operating procedure (SOP) and scheduled reports of activity/performance, including the proportion of eligible patients seen.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. All ICUs should have a multiprofessional post-ICU recovery outpatient clinic team.
2. All post-ICU recovery outpatient clinic teams should provide digital or paper format information about common post-ICU problems signposting to advice, guidance and support that incorporates social and financial wellbeing resources.
3. All post-ICU recovery outpatient teams should have access to ICU diaries and an ICU patient and relatives peer support group.
4. Post-ICU consultation clinic letters should include details of post ICU issues identified, individualised recovery goals, and recommended actions.

5. All post-ICU recovery outpatient teams should complete a systematic enquiry into common post-ICU problems and gather patient-reported outcome measures where possible.
6. All post-ICU recovery outpatient teams should incorporate patient and caregiver feedback about their ICU experience and the outpatient clinic to co-design and improve these services.

BACKGROUND AND EXPLANATION

In the UK, during 2021, ICNARC data reported 140115 patient admissions to ICU, with 114,449 (81.7%) surviving ICU and 105,614 (75.8%) surviving the acute hospital admission[1-2]. 80% were independent prior to admission.

After returning home, quality of life can be impacted by:

- PICS prevalence up to 80% with around 50% having persistent symptoms beyond the first year home[3].
- Anxiety (62%), depression (36%), and posttraumatic stress disorder (PTSD) (39%).[4]
- Unplanned readmission to hospital within three months of returning home (25-30%).
- An inability to return to work (40%), job loss (20-36%), occupation change (7-66%) and worsening employment status (5-84%).
- An inability to resume driving (30%).
- Commonly under recognised issues include sleep disorders, sexual dysfunction, cognitive impairment, nutritional status and pain
- Caregiver/family PICS (PICS-F) has a highly variable prevalence, ranging from 6% to 69% in the first six months with some affected for years[5].

ICU clinicians across the globe with well-established post-ICU recovery services have undertaken research and demonstrated the need for holistic outpatient care led by intensivists and multidisciplinary teams. The Faculty of Intensive Care Medicine, agreed to lead a working party, on Life After Critical Illness (recommendation 12 of its Critical Futures programme). The working party published "Life after critical illness: A guide for developing and delivering aftercare services critically ill patients" in October 2021.[6]

This document provides best practice guidance in the development, commissioning and management of 'Follow up' services, including learning from existing examples of practice:

- Terminology/definitions
- Breadth and scope of current UK practice
- Service model archetypes and eligibility criteria
- Toolkits and resources for implementation of a new service
- Running a service
- Business case development
- Service specifications

- Governance
- Referral process, efficiency, DNA
- Measures, outcomes, benchmarking
- Extending services – primary care, community, adolescent, regional network

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3.8 Involving, Supporting and Respecting Patients

Authors: Alexander Bastin, Sian Saha, Laura Allum & Pam Ramsay with ICUsteps Trustees

INTRODUCTION

Critical illness can be life changing. Admission to intensive care is often unexpected and it can be a very alien and frightening environment for patients.

Patients might experience:

- Psychological distress and cognitive difficulties.
- Painful, distressing, and embarrassing procedures.
- Delirium and/or paranoia.
- Confusion and disorientation.
- Frustration and boredom.
- Amnesia.
- Partial awareness while under sedation.
- Lack of sleep.
- An inability to communicate or retain information.

All healthcare professionals should consider how their practice may affect the patient experience and recovery.

MINIMUM STANDARDS

1. There must be easily accessible documented evidence of a formal assessment of a patient's communication needs and any adaptations required.
2. Patient preferences, values and beliefs which may impact on their care must be recorded and easily accessible to the healthcare team.
3. Patients must be regularly assessed, using validated tools if available, and the results recorded for pain, thirst, dyspnoea and delirium.[1,2,3.]
4. All ICUs must have a guideline for managing patient pain, thirst, dyspnoea and delirium.[1,2,3,7]
5. All ICUs must have a guideline for promoting patient sleep using non-pharmaceutical interventions.[3,5,7]
6. Delerium information and explanation must be available for patients and signposted when appropriate.[2]
7. Patients must be provided with and signposted to information and support after their ICU experience.[4]
8. All ICUs must have a designated safeguarding lead and policies on safeguarding vulnerable patients.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Staff should receive specific training about the patient experience of ICU and how the experience can be humanised.
2. The ICU team and patient's family and friends should be invited and supported to complete a patient diary and/or a timeline of ICU events to support patients' post ICU recovery[6,7].
3. Where appropriate a 'this-is-me' board or equivalent should be displayed with patient specific information to provide staff with insight to the patient as a person.
4. The ICU should have a formal mechanism to receive patients' feedback after discharge.
5. Patients should be offered the opportunity to attend an ICU follow up clinic.

BACKGROUND AND EXPLANATION

The purpose of these standards and recommendations is to improve the patient experience within the ICU, where possible to reduce the incidence of Post Intensive Care Syndrome (PICS) and to promote patient rehabilitation.

Common issues that affect the patient experience include pain, thirst, dyspnoea, delirium and sleep. These can be assessed using validated tools such as the Critical Care Pain Observation Tool -CPOT, Confusion Assessment Method for the ICU - CAM-ICU. National (e.g., NICE guidelines: Delirium prevention, diagnosis and management) and local guidelines to manage these issues and to promote sleep should be rigorously followed. These may include interventions such as making clocks available for patients to see, access to natural daylight, visits to outdoor spaces, and use of eye masks and earplugs for sleep[2]. Assessment of patient needs may include suggestions for promoting patient communication (e.g., use of interpreters, flash cards, wipe boards) and preferences for cognitive stimulation where appropriate (e.g., music, news, access to outside spaces, phones).

While it is common for patients to have difficulty retaining information on the ICU, it is vital that all efforts are made to provide clear explanations to all patients about their care on the ICU, including the possibility that they may experience delirium. Verbal information (ongoing dialogue) may be most appropriate while the patient is in the ICU, but information in different formats and languages should be available both within the ICU and on discharge. Information about the ICU and delirium should be signposted to all patients, via local or national resources, such as ICUsteps (available online or printed), NHS.uk and criticalcarerecovery.com.

Patient diaries can be an effective tool to help patients process their ICU experience and aid in psychological recovery. The patient 'this is me' board supports humanisation while in the ICU and can assist healthcare providers in delivering tailored care. The board may include patient interests/ hobbies, cultural/religious preferences, family/friends, photographs, family/friends. Particular attention to finding ways to understand and respect patient preferences, values and beliefs can

make the ICU experience less distressing for the patient, for example, and as appropriate for each patient, around close relationships they may have, culture, religion and gender identity.

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3.9 Involving and Caring for Patients' Family and Friends

Authors: Sian Saha, Laura Allum, Pam Ramsay & Alexander Bastin with ICUsteps Trustees

INTRODUCTION

'Family' is not a singular unit; it is composed of various individuals with varying importance to the patient. For that reason, we use 'family and friends' in this chapter.

Family and friends play important roles in a patient's ICU journey, and they often experience significant emotional, psychological, and practical challenges. Understanding and addressing these challenges is essential to foster a supportive environment for both patients and their family and friends.

Almost invariably patients are willing for their closest family and friends to be kept updated by the intensive care team. If this is not the case, patient autonomy and confidentially must be respected. Ideally, patients will nominate at admission to ICU which family and friends they consider need to be kept updated by the ICU team. If this is not possible, owing to the patient lacking capacity, respectful assumptions by the ICU team will need to be made.

MINIMUM STANDARDS

1. Patients' family and friends must be able to visit every day.
2. The ICU must have rest areas and spaces for discussions with family and friends visiting the patient.
3. General information regarding the ICU must be available and readily accessible for patients' family and friends.
4. When not physically present on the ICU, patients' nominated family and friends must be able to receive general updates regarding the current state of the patient.
5. If patients lack capacity their nominated family and friends must be able to receive clinical updates and be involved in any important clinical decisions.
6. Communication with family and friends regarding the patient must be clearly documented.
7. If patients lack capacity, there must be documented evidence of discussion with nominated family and friends to ascertain patients' needs and preferences regarding their care.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. ICUs should have a formal mechanism to receive patients' family and friends' feedback.
2. ICUs should identify staff to lead in supporting family care and developing this service.
3. ICUs should provide staff training on effective support and communication for patient family and friends which incorporates any formal and informal feedback.

4. Family and Friends should be signposted to accessible information regarding common ICU conditions.
5. Appropriate ways for family and friends to support a patients' wellbeing and psychological care should be defined locally and clearly signposted.
6. Technology to allow family and friends to communicate virtually with the patient or the ICU staff should be available.
7. The ICU team and patient's family and friends should be invited and supported to complete a patient diary and/or a timeline of ICU events to support patients' post ICU recovery1, 2.
8. Information regarding additional support for patients' family and friends should be available.
9. Bereavement support should be provided to the family and friends of those who die on ICUs.
10. Nominated family and friends should be offered an opportunity to discuss the care of a patient who dies on the ICU with a member of the clinical team.

BACKGROUND AND EXPLANATION

Admission to an ICU can be an incredibly stressful experience for the patient's family and friends. Effective communication with family and friends is essential; it can help them better cope with the situation, while promoting family engagement which is a key component to safe and effective patient care [3]and reducing the incidence of Post Intensive Care Syndrome-Family (PICS-F)[4].

Information about the ICU needs to be available in various formats and languages, and shared both verbally and in the most appropriate format ideally as soon as the patient is admitted. This information could include details such as visiting hours, contact phone numbers, an overview of ICU equipment, common medical terms, and an introduction to the ICU team[5].

Family and friends' engagement in ICU activities can include practical tasks, such as applying moisturising cream or doing mouthcare which may help reduce symptoms of PICS-F and support the patient to feel safe[6]. Family and friends can also inform the healthcare team about the patient's needs and preferences, such as any communication impairments, cultural/religious and dietary preferences. To support the healthcare team to humanise the ICU environment, family and friends can bring in patients' personal items such as toiletries, books, and personal phones when appropriate.

Providing information to family and friends, about common ICU conditions (e.g. delirium) is also important. This can be done through local resources or national websites such as ICUsteps (ICUsteps.com) or Critical Care Recovery (criticalcarerecovery.com). These online resources provide helpful information as well as psychological and practical support for family and friends which can be signposted during the patient's ICU admission and on ICU discharge. Support for family and friends may also be available through family liaison nurses, social workers, psychologists, follow-up clinics, peer support groups, and information resources. Where available, these will be signposted.

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3.10 Inter- and Intra-Hospital Transfer of the Critically Ill Adult Patient

Authors: Richard Browne, Hannah Crofton, Kyle Gibson & Scott Grier

INTRODUCTION

Intra-hospital transfer of critically ill (both illness and injury) patients includes transfer from the Emergency Department and Theatres to the ICU as well as journeys to diagnostic and therapeutic areas. There are approximately 35,000 inter-hospital adult intensive care transfers per annum[1,2,3], the majority being escalations of care to access specialist services (time-critical, urgent or planned) and the remainder repatriation, continuation of care and capacity transfers.

The same high standards of intensive care must be provided regardless of type of hospital (NHS and Independent Sector), location within the hospital, type of transfer, urgency and transferring team [4,5,6].

MINIMUM STANDARDS

1. Transfer for immediate lifesaving interventions (time critical interventions) must not be delayed or prevented by the availability of an intensive care bed.
2. The decision to undertake inter-hospital transfer must be made jointly by consultants at the referring and receiving hospitals.
3. There must be documented evidence of a risk assessment prior to any transfer (inter or intra).
4. All clinical team members involved in the transfer (inter or intrahospital) of critically ill patients must be trained and competent in intensive care transfer.
5. Critically ill patients requiring transfer must receive the same level of monitoring as they would within an ICU.
6. Critically ill patients requiring transfer must have the same level of documentation as they would within an ICU.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Where dedicated Adult Critical Care Transfer Services are available, all referrals for inter-hospital transfer of critically ill or injured patients should be made to these services.
2. Patients requiring repatriation to their local hospital to continue care should be transferred within 48 hours of acceptance by the receiving hospital.
3. ICUs should have a lead consultant responsible for intensive care transfer who oversees education and training, governance arrangements, audit and quality improvement initiatives and data analysis to ensure that patients undergoing Intra- and Interhospital transfer receive the same quality care.

4. Acute hospitals should have access to a CEN compliant intensive care transfer trolley with appropriate equipment securely mounted to it, which is regularly checked and serviced.
5. Acute hospitals should have dedicated intensive care transfer equipment and drugs bags that contain at least the minimum stock detailed in the Guidelines on the transfer of the critically ill adult 2025.[4]
6. Dedicated intra- and inter-hospital transfer checklists should be used throughout the transfer process to ensure adequate preparation and to enhance patient and accompanying staff safety (available in the Guidelines on the transfer of the critically ill adult 2025).[4]

BACKGROUND AND EXPLANATION

Since the publication of GPICS V2, the intensive care transfer landscape has changed immeasurably. Until recently, transfer of adult intensive care patients was largely ad-hoc and relied heavily on NHS ambulance providers and, most often, clinicians with varying experience of intensive care transfer from referring hospitals. The COVID-19 pandemic paved the way for the permanent commissioning and development of dedicated Adult Critical Care Transfer Services (ACCTS) in England and Wales, mirroring the services already operating in Northern Ireland and Scotland. It is expected that all patients will have access to a dedicated ACCTS wherever they are in the UK, at any time of day, within the next two years.

The development of ACCTS and wider experiences during the COVID-19 pandemic have transformed the focus on intensive care transfer and thus have shaped the standards and recommendations described above. In 2025, the 2019 FICM/ ICS 'The Transfer of the Critically Ill Adult Guidelines' will have been comprehensively rewritten to reflect these changes and their contents applied to all patients.

The improved organisation and focus on intensive care transfer means that Acute Hospitals, Health Boards/Trusts, Critical Care Networks and ACCTS (where they are operational) have to work collaboratively. A national minimum mandatory dataset (MMDS) for inter-hospital transfers, much like the ICNARC Case Mix Programme dataset, has been developed within England and needs to be submitted for all inter-hospital transfers of adult patients. Collaborative working with the devolved nations will ideally enable a MMDS to be submitted for all inter-hospital transfers in the UK in future. Clinical governance processes to ensure incident reporting, thematic review and shared learning should be core elements of Critical Care Networks, Health Boards and ACCTS.

All patients requiring intensive care transfer within or between hospitals must have the same high standards of care regardless of where they are being transferred and regardless of who the transferring clinical team are. It is now expected that transfers are led by appropriately trained, competent and experienced clinicians with competencies from FICM, RCoA and UKCCNA evolving to reflect these changes. Formal documented risk assessment is required for any transfer and needs to include the patient's physiological status, likelihood of changes or deterioration, the transfer

proposed and the required competencies, seniority and experience of the transferring clinical team. The lead consultant responsible for intensive care transfer is responsible for ensuring these requirements are met and where able, work collaboratively with regional Critical Care Networks.

Transfer of patients for immediate lifesaving interventions (time critical interventions) must not be delayed or prevented by availability of an intensive care bed. Receiving hospitals must accept such patients, perform the life saving intervention then consider the safest and most appropriate location for ongoing care. This may include further transfer to another centre for ongoing treatment and care.

Critical Care Networks, Health Boards/Trusts and NHS regions need to ensure that there are operational guidelines/principles set out to guide Acute Hospitals in decision making around capacity transfer to ensure patient-centred decisions are made (e.g. transfers only occur once all physical beds are occupied and staffed, all elective surgery cancelled, all ward-fit patients discharged from critical care, all reasonable efforts made to temporarily increase staffing, and no prospect to increase staffing by the oncoming shift).

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3.11 Care at the End of Life

Authors: Sally Humphreys, Eloise Dawe & Joseph Cosgrove

INTRODUCTION

Intensive care focuses primarily on life sustaining therapies but with in-hospital mortality at 17-20% the provision of good end-of-life care (EoLC) is vital[1,2]. Additionally, treatments initiated to save life can be invasive, distressing and potentially conflicting with palliative care [3]. Clinical teams must therefore recognise that some treatments may not be to the patient's overall benefit and be able to clearly and compassionately communicate this [4]. They must that ensure decisions are taken in accordance with relevant statutory requirements and professional guidance [5-11].

'Family' is not a singular unit; it is composed of various individuals with varying importance to the patient. For that reason, we use 'family and friends' or 'family/friends' in this chapter.

MINIMUM STANDARDS

1. ICUs must have an identified clinical lead for EoLC.
2. There must be an embedded psychologist within intensive care teams to address the psychological health needs of end-of-life patients, their families/friends and staff [12].
3. There must be clear and comprehensive documentation of a shared decision-making process for all end-of-life patients [13].
4. Clear access pathways must be in place for appropriate patients who wish to transfer to another EoLC setting such as a hospice or home[14].
5. Multi-professional teams must manage EoLC patients [11] including senior intensive care medical and nursing staff, referring teams and specialty palliative care teams.
6. ICUs must have a standardised process to regularly assess and document symptom control (including pain and anxiety/agitation/delirium at a minimum) in patients at the end-of-life [10,11].
7. Anticipatory medication must be prescribed using an individualised approach considering the patient's needs, views, values, and preferences [10].
8. ICUs must use recognised tools that encompass spiritual, emotional, practical, physical, and psychological needs and pain scores (e.g. RESPECT[15]).
9. The diagnosis and confirmation of death must follow the circulatory or neurological criteria set out by the Academy of Medical Royal Colleges in 'A Code of Practice for the Diagnosis and Confirmation of Death' [16].
10. Access to bereavement support and follow up must be available for patients, families/friends and staff who have experienced end-of-life decision making [4].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. ICUs should have guidance in place that provides patients the opportunity to have individualised EoLC specific to their wishes e.g. access to pets, outdoor space[17], and a personalised environment.
2. ICUs should provide space for close family and friends who wish to stay overnight with a dying patient, within or close to the ICU[18].
3. Intensive care morbidity and mortality meetings should regularly include a review of the effectiveness of any symptom management protocols and the overcall care provided for patients (and their families/friends) who received care at the end-of-life[18].

BACKGROUND AND EXPLANATION

Transitioning to EoLC prioritises symptom management, psychological support (for patients and their families/friends), and alignment of treatments with individual care goals, values and preferences. The purpose of this chapter is to ensure that ICUs have appropriate structures and processes in place to allow individualised care plans to be implemented which meet current legal and quality standards for intensive care patients in the last days/hours of their life.

Skills in quality EoLC are dependent on symptom management, good leadership, planning, decision making, communication and multidisciplinary working. The majority of deaths on the ICU follow withdrawals or limitations of treatments when failure of curative treatments become apparent[3,4,19]. These decisions need to be individualised and include a shared approach to decision making [9]. The GMC has published extensive guidance to aid decision making in this area. It covers best practice for adults with and without capacity and considers relevant law 8.

There is an increasing awareness of the long-term impact that involvement in EoLC has on the psychological wellbeing of family members/friends and others involved in such care [20]. This chapter therefore reflects an increased focus on psychological support, wellbeing and bereavement. It also introduces the importance of reflective learning from all deaths and increases the number of standards on individualised care and collaborative working.

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3.12 Organ and Tissue Donation

Authors: Tom Billyard, Alison Ingham & Helen Tyler

INTRODUCTION

Consideration of organ and tissue donation is a key component of good end-of-life care (EoLC)[1]. Facilitating donation is a core service of every ICU, and all acute hospitals have a role in implementing best practice in all stages of the donation pathway. There are well-defined UK professional, legal and ethical frameworks setting out best practice, developed with, and endorsed by, national professional bodies.[2 3]

MINIMUM STANDARDS

1. Clinicians must consider organ and tissue donation for all patients reaching end of life in the ICU, as part of a holistic care plan.1,4
2. Each acute Health Board/Trust must have a Clinical Lead for Organ Donation (CLOD) who works with a linked Specialist Nurse for Organ Donation (SNOD) to ensure best practice in donation is delivered and local policies are up to date.
3. To ensure safe donation practice, ICUs must follow the circulatory or neurological criteria set out by the Academy of Medical Royal Colleges in 'A Code of Practice for the Diagnosis and Confirmation of Death'.5
4. ICUs must contribute data to the NHS Blood and Transplant (NHSBT) national potential donor audit.
5. ICUs must use national guidance to optimise donor care after consent/authorisation to increase organ utilisation and optimise transplant outcomes.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. The intensive care team should be represented on the Health Board/Trust's Organ Donation Committee, which provides oversight of all aspects of deceased organ and tissue donation[6,13].
2. The CLOD and linked SNOD should regularly review and share within the ICU local performance data from the NHSBT national potential donor audit, to ensure that timely identification and notification of potential donors to organ donation services is occurring.
3. The CLOD and linked SNOD should regularly review and share within the ICU local performance data from the NHSBT national potential donor audit, to ensure that any approach to the family for organ donation is a collaborative approach by the intensive care team and the SNOD.
4. The Donation Actions Framework provides detailed guidance on the professional, legal and ethical considerations for donation in England, Wales and Northern Ireland and should be used to support decision-making and guide practice, with recognition of the applicable legislation[2].

5. All intensive care staff likely to be involved in the care of potential organ or tissue donors should receive training in the principles of donation so that patients and their families can receive the care and support they need during the donation process.[12,19]

BACKGROUND AND EXPLANATION

The potential for organ transplant has increased year on year as surgical techniques and transplant after-care has improved. The need for an increase in organ donors was recognised by the Organ Donation Taskforce Report in 2008 and has been delivered by subsequent NHSBT strategy documents and extensive service development.[6] Robust professional guidance exists to ensure safe and supported practice and is essential as the field advances and new technologies emerge.

The duty of care to the patient remains the priority at all times and care planning has to hold this at its core.[1,7,8] The decision-making regarding withdrawal of life sustaining treatments and the move to EoLC must be made in line with professional and legal guidance and be independent of any potential for organ donation. However, the expressed decisions and values of the patient will direct how EoLC is delivered and inform any assessment for donation. The diagnosis of death by circulatory or neurological criteria must conform to current practice standards, irrespective of potential organ donation.[5]

The public perception of donation and societal engagement with the subject has shifted considerably. The strong public and political support on the adoption of an opt-out system across the UK nations demonstrates this. Exploring a patient's decision regarding donation is now an expected part of practice, detailed in clinical and legislative guidance.[1,3,4] Every ICU needs to be able to deliver holistic, person centred EoLC that supports potential organ and tissue donation. There are now well-embedded UK processes for identification and referral of potential donors and gaining consent/ authorisation for donation. Alongside these the ethical, legal and professional framework which underlies donation has been developed to ensure safe and reliable donation processes.[2] There are differences in the legislation of the devolved nations in respect to organ and tissue donation; most significantly in Scotland where a number of additional safeguards were included within the deemed authorisation legislation.[3] The SNOD expertise and training in delivery of these processes is essential and is maximised by early collaborative working.

The CLOD and the local organ donation committee need to ensure systems exist within every Health Board/Trust to facilitate high quality donation practice in a consistent manner.[6] The role of intensive care staff includes active donor management to increase organ utilisation and optimise transplant outcomes.[2,9] The SNOD will support staff in use of care bundles following neurological death, delivery of appropriate patient management within professional guidance, and potential adjustments to place or process at end of life.[10] The positive changes in UK donation practice have resulted in a doubling of the number of donors since 2008. However, despite these improvements the consent / authorisation rate for donation remains low compared to other comparable countries with

deceased donation programmes. This is a significant barrier to the UK achieving a world-class donation and transplant service. ICU staff can help improve consent / authorisation rates through their communication with patients and families; allowing families time to understand and accept end-of-life or death, pro-actively planning end-of-life donation conversations with the SNOD and undertaking a collaborative approach for donation at an appropriate time.[11,12]

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3.13 Legal Aspects of Capacity and Decision Making

Authors: Monika Beatty, Chris Danbury & Victoria Metaxa with contributions from: the FICM Legal and Ethical Policy Unit (FICM LEPU) and ICS Legal and Ethics Advisory Group (ICS LEAG)

INTRODUCTION

It is assumed that all adult patients have capacity to make decisions about their treatment – i.e. to give or withhold consent, or to choose among the available options - unless proven otherwise. If a patient has that capacity, their decision has to be respected, even if the treating clinician considers that decision to be unwise.

Autonomy or self-determination is a fundamental principle of human rights and a cornerstone of medical law. Advance care planning (ACP) can be used to promote self-determination by documenting an individual's wishes prior to a potential loss of decision-making capacity.

Decisions involving patients who lack capacity, have to be made as per the requirements and principles laid out in the relevant home nation's capacity legal framework[1,2,3]. When disagreement occurs between the treating team and the patient/family, conflict management is paramount to ensure optimal care and avoid moral conflict or acting unlawfully.

MINIMUM STANDARDS

1. Determination of capacity for a specific treatment/refusal of treatment must be made by the treating clinician in accordance with the relevant legal framework for capacity, that is applicable to the UK Home Nation, in which the patient is being treated 1,2,3,4,5.
2. The basis for all treatment decisions regarding patients who lack capacity must be documented and be specific to the proposed intervention.
3. When the patient has validly made choices in advance (by way of making an advance decision to refuse treatment, an advance statement of their wishes, or – in England, Wales and Scotland, by appointing an attorney) every effort must be made to implement those choices.
4. All efforts must be made to allow critically ill patients to exercise their capacity.
5. ICM Consultants must have 24-hour access to the organisation's legal team, with clear and specific local guidance detailing how to request legal advice.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. ICUs should provide regular training for staff, outlining how to undertake capacity assessments in intensive care for the management of patients who may lack capacity.
2. Capacity is decision and time specific, and capacity should be assessed with the level of care that is commensurate with the nature/severity of the decision.

3. Where decisions involving capacitous patients may lead to serious consequences, senior clinicians should be involved in assessing capacity.
4. ICUs should have access to a second opinion external to organisation and mediation services, in the event of disagreement.
5. In cases of intractable conflict, staff support should be provided in the form of debrief, psychological interventions or wellbeing advice.

BACKGROUND AND EXPLANATION

Capacity is time and decision specific and may fluctuate, especially in critically ill patients, consequent to their acute clinical condition and/or the treatment provided. It is therefore key to safe, ethical, and lawful practice that staff understand the legal principles that underpin capacity assessment. Capacity needs to be assessed with the level of care that is commensurate with the nature/severity of the decision. Where decisions involving patients who have capacity may lead to serious consequences e.g. the withdrawal of life sustaining treatment, senior clinicians should be involved in assessing capacity, a second opinion is strongly recommended along with repeating the capacity assessment.

At any given time, a patient may have capacity for one decision but lack it for a different one. Furthermore, capacity can be difficult to assess in critically ill patients, whose ability to communicate may be restricted or impaired. In such cases, conditions need to be optimised for critically ill patients to exercise their capacity e.g., via the use of relevant communication aids, language translators and/or the provision of information in a suitable format.

The documentation for all treatment decisions regarding patients who lack capacity will include details regarding:

- The determination of best interests/benefit, which has to be patient-centred and include an evaluation of the potential risks vs benefits. Best interests are not confined to medical issues and have to encompass other aspects, such as religious beliefs.
- The conversation(s) undertaken between the treating consultant and individuals close to the patient (family and friends), or where applicable the patient's legal representative, the Mental Welfare Commission (Scotland) or IMCA (England & Wales).
- Whether there is a change in the patient's capacity to make relevant decisions during ICU admission

If the patient has made a valid and applicable Advance Decision to Refuse Treatment (ADRT), it has to be respected[1,4]. This is particularly relevant where life sustaining treatment is being withheld on the basis of an ADRT. In this situation, there can be no doubt as to its validity or applicability; where debate or concerns exist, seeking early legal advice is prudent, along with providing emergency life

sustaining treatment in the interim (N.B., although ARDTs do not have formal statutory authority in Scotland or in Northern Ireland, they are likely to be highly persuasive to the court).

Disagreement and Conflict

Disagreement and conflict in ICU are inevitable, given the high emotional burden of the acute illness and the life-or-death decisions that are frequently made. A deeper understanding of why conflict occurs may allow ICU clinicians to recognise and challenge their own cognitive biases, as well as those of patients' relatives, thus preventing escalation of conflict when it does occur[6]. When this is not possible, there are options to resolve conflict with external input, either in the form of a second opinion, mediation or an application to the courts. Written local guidance regarding how to enact these interventions is recommended.

Parties ought to seek alternative dispute resolution methods, the learnings from which can be applied to various healthcare settings (as illustrated in recent case law examples in England and Wales). Increasing attention has since been given to other ways of resolving conflict before it reaches the courtroom. Mediation has been proposed as a non-adjudicative process, which promotes communication and mutual understanding instead of confrontation and a 'right/ wrong' stance. Despite conceptual benefits, concerns still exist around the regulation of the mediation process and further research is needed into its effectiveness in the medical setting.

In cases of conflict and significant disagreement staff support should be provided in the form of debrief, psychological interventions or wellbeing advice. Units should be proactive and develop policies to ensure such support can be promptly delivered.

There are three main legal jurisdictions in the UK; England and Wales, Scotland, and Northern Ireland; each with its own legal system, which includes capacity legislation (N.B., in Northern Ireland, the Mental Capacity (Northern Ireland) Act 2016 is not yet fully implemented and yet does not cover treatment decisions). The UK Supreme Court is the final appellate court for all three jurisdictions and its decisions bind all lower courts wherever they may be located. Treatment for patients who lack capacity will be either in accordance with their best interests (England and Wales, Northern Ireland) or of overall benefit (Scotland). If legal advice is required, all healthcare organisations, NHS Trusts and Health Boards have a legal services department and/or access to external solicitors.

The UK Supreme Court has made clear that in England and Wales, if at the end of the process of decision-making for patients who lack capacity, it is apparent that the way forward is finely balanced, or there is a difference of medical opinion, or a lack of agreement to a proposed course of action from those with an interest in the patient's welfare, an application should be made to the Court of Protection[7,8]. A comparable approach is likely to be applicable to the relevant courts in Scotland and in Northern Ireland, and the same criteria should be used for legal advice. The Courts have said repeatedly that the initial application should come from the health body and not from the family.

The Deprivation of Liberty Safeguards (in England and Wales, and Northern Ireland) will rarely be a relevant issue for critically ill patients requiring emergency interventions[9]. The courts have emphasised in England and Wales that in emergency life-threatening situations, the priority for patients who lack capacity is to ensure that care is delivered in accordance with their best interests, and this is not usually to be treated as a matter of deprivation of liberty[10]. At the time of writing, no directly equivalent safeguards apply in Scotland.

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Section 4 | **CLINICAL CARE**

4.1 Standardised Care of the Critically Ill Patient

Authors: Richard Innes & Peyton Davis

INTRODUCTION

The evidence base underpinning intensive care practice is improving and has enabled a degree of consensus on a number of elements of care, which are briefly presented in this chapter. In addition to trial data informing major areas of practice such as ventilation, there are multiple observational studies suggesting that adoption of a treatment 'bundle' approach leads to better outcomes, although randomised studies are currently lacking and are difficult to perform[1,2].

All intensive care units need to have policies, guidelines and/or checklists to achieve the following minimum standards and might consider their position in relation to the recommendations. However, while these are standards and recommendations that most patients will benefit from, there will be exceptional circumstances (e.g. severe asthma, unstable spinal injuries, and morbid obesity) in which these standards/recommendations are clinically not applicable or achievable.

The importance of sufficient numbers of appropriately trained staff for intensive care remains vital for delivering safe and effective patient care outcomes.

MINIMUM STANDARDS

1. Patients must be assessed daily for risk of thromboembolic disease and receive appropriate prophylaxis[3].
2. Patients undergoing controlled mechanical ventilation who have Acute Respiratory Distress Syndrome (ARDS) must receive a tidal volume of less than or equal to 6 ml/kg PBW.
3. Ventilated patients must have respiratory function evaluated daily and undergo spontaneous breathing trials where appropriate.
4. Sedation must be individualised to patient needs and the appropriateness of a sedation hold considered daily[4].
5. All patients must be assessed regularly for evidence of pain, with analgesia optimised to minimise sedation requirements.
6. All patients must be screened daily for evidence of delirium using a validated method.
7. The need for continued indwelling catheters (intravascular or urinary) must be considered daily.
8. Indwelling intravascular catheters must be inspected daily for evidence of infection using a suitable scoring system to guide necessity for removal.
9. Monitoring of invasively ventilated patients must include continuous waveform capnography.
10. Care bundles must be in place for Intubation Associated Pneumonia (IAP) prevention, Central Venous Catheter (CVC) insertion and maintenance, and Peripheral Venous Cannula (PVC) insertion and maintenance.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. For patients without ARDS, a tidal volume of 4-8 mls/kg PBW and a peak/plateau pressure (depending on mode) of below 30 cmH20 should be targeted.
2. A ventilated patient care bundle should be in place with appropriate mechanisms for ensuring adherence.
3. Unless clinically contra-indicated, ventilated patients should be nursed in a semi-recumbent position at 30 to 45 degrees.
4. Where there is no contraindication, enteral nutrition (EN) should be initiated within 48 hours after admission to the ICU5.
5. When EN is not feasible or insufficient, parenteral nutrition should be started as soon as possible in patients with (or at high risk of) malnutrition, which maybe a combination of cachexia (disease related) and malnutrition (inadequate consumption of nutrients).
6. All sedated patients should have sedation levels monitored hourly using a recognised scoring system to ensure sedation is minimised.
7. Noise levels and patient interventions should be minimised overnight to facilitate natural sleep.
8. A transfusion threshold of 70g/L should be used in general intensive care patients unless a higher target Hb may be beneficial in patients with sepsis (in the first six hours), ischaemic stroke, traumatic brain injury with cerebral ischaemia, or acute coronary syndromes.6
9. Drug infusion concentrations should be standardised in line with Intensive Care Society, Standard Medication Concentrations for Continuous Infusions in Adult Critical Care, 2020

BACKGROUND AND EXPLANATION

The bundled approach to clinical care is considered effective in improving clinical outcomes. The underlying premise is that by ensuring adherence across multiple logical elements of care, outcomes for patients can be improved. The most widely adopted bundle of care is the 'Ventilator' or 'Ventilator Associated Pneumonia' (VAP) bundle as advocated by the Institute for Healthcare Improvement (IHI)[8]. Many hospitals have reported dramatic reductions in VAP rates using this approach. However, VAP is a subjective outcome and lower VAP rates after implementing a bundle may partly reflect stricter application of subjective VAP criteria. Notably, most studies that have reported lower VAP rates after implementing a bundle have not reported parallel decreases in mortality, though it is likely they will reduce length of mechanical ventilation[1,2].

Some interventions beyond the IHI ventilator bundle might bring additional benefit to ventilated patients, such as low tidal volume ventilation, sedation minimisation, conservative fluid management, and early mobilisation. Thus, care bundles are an evolving entity, and new and better care bundles that integrate these promising new processes are needed.

It is important that care bundles are subjected to the same scientific rigour as traditional interventions, and to date this approach is lacking. Much data is observational in nature with varied study methodology, and this makes comparison difficult. Some interventions which are initially thought to be helpful (e.g. chlorhexidine mouth washes for ventilated patients) may subsequently be shown to be harmful or of no benefit[9] Others, such as the use of drugs for gastric protection, have benefits (reduced bleeding) but also harm (higher rates of VAP and in some populations cancer), and so all components need to be implemented with some reference to the clinical context to ensure, where possible, benefit outweighs harm[1,2].

When implementing standards of care, the IHI recommends achieving reliability of > 95% . The three most frequently used strategies to achieve this are: education; reminders (such as checklists); and audit/feedback. The increasing use of electronic health records within intensive care may facilitate both development of new bundles and adherence to existing ones.

Where available, ICUs need to use recognised and validated screening and scoring systems. For example:

- The Confusion Assessment Method for the ICU (CAM-ICU) or the Intensive Care Delirium Screening Checklist (ICDSC).
- The Visual Infusion Phlebitis Score (Jackson 1998)[9] for indwelling intravascular catheters.
- The Riker Sedation–Agitation Scale or the Richmond Agitation–Sedation Scale for sedated and ventilated patients.

Intensive care is a combination of therapies, such as bundles, but their efficacy is reliant on the absolute essential factor of safe staffing numbers, training, education and protocols to deliver care in a recognised and standard format.

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4.2 Respiratory Support

Authors: Gavin D Perkins, Ellen A Gorman & Daniel F McAuley

INTRODUCTION

Over 100,000 patients per year with acute respiratory failure are admitted to intensive care in the UK for mechanical ventilation and respiratory support. There are peaks and troughs of demand, with the winter months normally being the busiest time. Patients spend on average eight days requiring invasive mechanical ventilation. Non-invasive respiratory support may avoid the need for invasive mechanical ventilation in some patients with acute respiratory failure. Liberating a patient from ventilation (weaning) is a key priority. Standardised management improves outcomes for patients with acute respiratory failure[1], therefore evidence-based guidelines can inform optimal management and approaches to weaning[2-8].

This chapter should be viewed in conjunction with Chapter 4.4 on airway management.

MINIMUM STANDARDS

1. ICUs must have access to sufficient modern invasive and non-invasive ventilators, continuous positive airway pressure and high flow nasal oxygen devices.
2. Pulse oximetry, waveform capnography, ECG, blood pressure monitoring, ventilator alarms (where relevant) and point-of-care arterial blood gas analysis must be used for all patients receiving advanced respiratory support.
3. ICUs must have evidence-based guidelines for the management of acute respiratory failure, which include Acute Respiratory Distress Syndrome (ARDS)[2-5].
4. ICUs must have an evidence-based guideline for the prevention of ventilator associated pneumonia6.
5. ICUs must have an evidence-based guideline for ventilation weaning, which includes sedation use,
6. ICUs must have an evidence-based guideline for referral for Extra-Corporeal Membrane Oxygenation[7-8].
7. Equipment and standard operating procedures, including checklists, must be in place for any high-risk procedure[9-11].
8. Units must have protocols in place to manage oxygen flow at times of peak demand, and to ensure safe use of oxygen cylinders where there is no access to pipeline supply[12,13].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Tidal volume (ml/kg predicated body weight), plateau airway pressures and cumulative fluid balance should be monitored and recorded daily in all patients with acute respiratory failure[2-4].

2. ICUs should audit adherence to guidelines, standard operating procedures and checklists relating to the management of acute respiratory failure[2-8].
3. ICUs should monitor ventilator associated pneumonia rates[7].

Non-invasive respiratory support should be considered for all patients with respiratory failure that are not responding to standard oxygen therapy[5,14,15], although non-invasive ventilation should be used with caution in more severe ARDS[16].

BACKGROUND AND EXPLANATION

This chapter focuses on supportive care interventions for acute respiratory failure rather than pharmacological treatments.

To deliver safe and effective care, ICUs must have sufficient equipment, trained staff, evidence-based guidelines, standard operating procedures and checklists to deliver safe patient care[9-11]. Systems must be in place to ensure the safe continuation of oxygen supply during times of peak demand, and to ensure the safe use of oxygen cylinders[12,13].

High-risk procedures require appropriate equipment and standard operating procedures, including checklists. There is national guidance which can be adapted for many high -risk procedures including for intubation, extubation, bronchoscopy, prone positioning and tracheostomy [9-11].

Non-invasive respiratory support should be considered for all patients with respiratory failure that has not responded to standard oxygen therapy. Pressure targeted, non-invasive ventilation is an effective treatment for acute hypercapnic respiratory failure [5]. Pressure targeted, non-invasive ventilation, continuous positive airway pressure ventilation and/or high flow nasal oxygen can also be effective in reducing the need for intubation in patients with acute hypoxaemic respiratory failure [14,15]. In patients with COVID-19 related acute hypoxaemic respiratory failure current evidence favours the use of continuous positive airway pressure as the first line choice for non-invasive respiratory support[14]. Evidence also supports the use of non-invasive respiratory support following extubation in those at high risk of respiratory failure or as an adjunct to aid weaning in those who fail a spontaneous breathing trial[17].

The routine use of high frequency oscillation ventilation, recruitment manoeuvres, extracorporeal carbon dioxide removal (ECCO2R) are not clinically recommended[18]. There is insufficient evidence at present to inform clinicians about the role of awake prone positioning, endotracheal tubes with subglottic suction, airway pressure release ventilation, and automated weaning technologies in acute respiratory failure. Ideally patients receiving these therapies would do so as part of a clinical trial where available.

Patients with and at risk of ARDS benefit from ventilation strategies which limit exposure to airway pressures >30 cm H2O and tidal volumes >6ml kg (3, 4). Guidelines recommend the use of protective ventilation and prone positioning for at least 12 hours in adults with moderate and severe ARDS. Conservative fluid management, higher PEEP strategies, and ECMO are also supported, while high

frequency oscillation, high pressure recruitment manoeuvres, ECCO2R are not recommended[3, 4]. Many of the principles described remain relevant for COVID-19[2].

Evidence supports the use of sedation and weaning protocols which include the use of spontaneous breathing trials with inspiratory pressure augmentation, minimisation of sedation, use of non- invasive ventilation in patients at high risk of extubation failure, early mobilisation, weaning protocols and cuff leak test in patients at high risk of post-extubation failure. [6, 8].

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4.3 Prolonged Mechanical Ventilation and Complex Home Mechanical Ventilation Services

Authors: Ben Messer, Michael Davies & Louise Rose

INTRODUCTION

Approximately 5% of ventilated, critically ill patients will not wean successfully from mechanical ventilation within 21 days.[1,2] Up to 20% of these will require long-term invasive ventilation and 40% non-invasive ventilation (NIV) in the community following discharge from a Specialised Weaning Unit (SWU).[3] There is evidence that specialist teams that offer a structured approach to the care of patients requiring prolonged mechanical ventilation (PMV) greater than 21 days improve patient outcomes.[4]

This section highlights the standards and recommendations relevant to the provision of intensive care services for patients who require PMV and would benefit from input from a SWU co-located within a complex home mechanical ventilation (HMV) service. National guidance endorsed by the Intensive Care Society (ICS) and British Thoracic Society (BTS) on the structure of SWUs was published in 2023.[5]

MINIMUM STANDARDS

1. There must be a referral pathway to a SWU/complex HMV service which any intensive care unit can access for advice and/or assessment.[5]
2. Patients receiving PMV must be managed by a multi-professional team with specialist expertise and experience in managing this patient group.
3. Any plan for advice from, assessment by, or transfer to a regional SWU must be made in collaboration with the patient and their family and documented in the medical record.
4. All patients with single-organ respiratory failure (continued invasive mechanical ventilation but no other acute organ support) at day 21of their intensive care stay must have a documented review focused on the potential merit of referral to the regional SWU/complex HMV centre for advice, assessment or transfer.
5. Locally agreed protocols must be in place to define which other patients are discussed with the regional SWU/complex HMV centre.[5]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. The SWU/complex HMV centre should be staffed with a multi-professional team as outlined in the ICS/BTS SWU document.[5]
2. Patients with pre-existing comorbid conditions associated with weaning difficulties should be referred to the regional SWU/complex HMV centre at the soonest practical time-point of their intensive care stay.

3. Patients under the care of a regional complex HMV service, admitted to an ICU in another hospital, who are unable to be weaned to their baseline level of ventilation, should be transferred to the hospital where the regional complex HMV service is located at the soonest practical time-point of their intensive care stay.
4. The regional SWU/complex HMV service should be involved in hospital discharge planning and carer training for patients discharged home with HMV.
5. The care of patients receiving PMV who meet the criteria for discussion with SWU/complex HMV services should undergo careful review and ongoing audit including submission of data to a national database if available.

BACKGROUND AND EXPLANATION

A combined ICS/BTS document was published in 2023 recommending the SWU model of care for the UK and providing guidance on the standards of care and infrastructure for these units.[5] Admission to an SWU is only part of the continuum of care for patients with weaning failure. A collaborative approach within regional networks involving advice and potentially remote assessment from the SWU is encouraged.

Most patients requiring invasive mechanical ventilatory support in intensive care can be successfully weaned.[6] However, a small, but significant, proportion fail to wean and remain ventilator-dependent for a prolonged period. A 2003 UK study found that 12% of mechanically ventilated patients will require more than 28 days of respiratory support,[1] while a 2011 study found that found that 6% of patients will require more than 21 days of ventilatory support.[2] These patients have higher mortality and occupy a disproportionate number of intensive care bed days, leading to increased healthcare costs.[2] More recent data in a non-UK setting found a PMV prevalence of 5% to 6%.[7,8]

The European Society of Intensive Care Medicine (ESICM)/ European Respiratory Society (ERS) 2007 international consensus document (currently being updated) concluded that intensive care units may lack the structure and focus to manage patients with prolonged weaning failure.[9] Although a range of organisational models exist for management of these patients, a systematic review of 24 studies from 16 countries found better outcomes were associated with those patients admitted to a SWU.[4]

Key to successful patient outcomes is to ensure that all components of care are optimal. A multi-professional rehabilitation plan, optimal sedation management, and structured weaning plan may improve the rate and timing of weaning from ventilation. Furthermore, patients at risk of weaning failure need to be identified as soon as possible following admission to intensive care. Such patients include those with progressive neuromuscular disease, chronic respiratory disease and morbid obesity. Careful ongoing review and audit of criteria for discussion with SWU/complex HMV services is part of good patient care. This includes submission of data to a national database if available. In the event of PMV, discussion with and transfer to a SWU co-located with a complex HMV centre is

associated with improved outcomes and facilitates discharge with NIV or invasive ventilation required by a majority of patients.[3]

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4.4 Airway Management

Authors: Andy Higgs & L-J Mottram

INTRODUCTION

Over 100,000 patients per year are admitted to intensive care in the UK and receive invasive mechanical ventilation. Almost all of these will undergo advanced airway management, which involves tracheal intubation and/or formation of a tracheostomy. About 6% of all intensive care patients have a known anatomically difficult airway or several anatomical risk factors[1,2,3]. More recently, the concept of the physiologically difficult airway has been recognised [2] and perhaps most UK Level 3 ICU patients have elements of the physiologically difficult airway. Evidence-based guidelines help to inform the optimal advanced airway management, including its institution and common complications[3].

MINIMUM STANDARDS

1. ICUs must have clear processes for summoning advanced airway practitioner support, including personnel able to perform and assist an awake tracheal intubation and ENT support[3].
2. ICUs must have immediate access to the appropriate airway devices which include the equipment necessary to manage a difficult airway[3].
3. Each patient undergoing an advanced airway intervention must have a trained airway assistant[3].
4. Key airway management records must be regularly accessible to the clinical team.
5. ICUs must have regularly checked, audited and restocked airway trolley, comprising Difficult Airway Society (DAS) guideline Plan A-D drawers[4].
6. When managing an airway, ICUs must have access to appropriate monitoring in accordance with the DAS-ICS-FICM-RCoA guideline on intubation in the critically ill patient[3].
7. All patients ventilated via an artificial airway must be appropriately monitored in accordance with the DAS-ICS-FICM-RCoA guideline on intubation in the critically ill patient[3].
8. ICUs must have immediate access to chest radiography and POCUS to assess the airway and exclude complications of airway management.
9. ICUs must have a named medical doctor as lead for airway management.
10. ICUs must have written guidance for airway management in ICU.
11. Standardised bed head signage must be displayed for patients with laryngectomies, tracheostomies and known difficult airways[5,6]
12. ICUs must ensure that patients with complex, or 'at risk', airways are identified at handover and that a plan for emergency reintubation is made.[1,3]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Safe airway management checklists should be available and used routinely[2,3].
2. ICUs should regularly undertake audits of airway practice and complications.
3. ICU procurement should be made in tandem with emergency and operating departments to ensure consistency of airway devices and approach.
4. ICUs should have a named individual as AHP or nursing Airway Lead.
5. ICUs should incorporate human factors and sim-based training with airway teaching[7].
6. ICUs should have written guidance for securing an artificial airway device, suctioning and humidification.
7. ICUs should ensure appropriate de-briefing after complications of airway management.

BACKGROUND AND EXPLANATION

Airway management is complicated in critically ill patients by their inherent physiological instability. The potential for harm during airway manipulation is greater than in other patient groups, and therefore optimal conditions, equipment, processes and team performance are imperative for safe airway management.

A UK network of airway leads was developed to drive improvements in airway safety. Every ICU requires a medical doctor to be named airway lead who can be solely responsible for intensive care but may also be the RCoA hospital airway lead. If not the same individual, regular liaison between the airway leads for intensive care, the emergency department and the anaesthetic department is needed.

Airway leads are able to develop written guidelines and improve training standards, with a renewed focus on core competencies for trained airway assistants. We suggest incorporating simulation and human factors elements in addition to airway technical skills training, as critical incidents continue to highlight this need [1,3,7,8]. Auditing airway practice and complications to identify excellence, training needs and areas of practice requiring improvement will be an important part of the airway lead role. In addition, a proactive and adaptive safety culture needs to be encouraged within units and across hospital departments, prioritising safe airway management as a key domain of intensive care practice.

The range of equipment for airway interventions must be commensurate with national and international standards and be readily available for use. There is increasing evidence for videolaryngoscopy to improve airway management, training and safety[3,9]. Capnography is a key monitoring standard, and recent international guidance highlights its role in preventing unrecognised oesophageal intubation [10]. Equipment must be stored for optimal and immediate use in emergency situations, using the Difficult Airway Society Plan A-D approach[4]. Stocking and

checking this equipment must become embedded within daily intensive care safety procedures, with a named individual responsible for stock control of airway devices.

ICUs require immediate access to airway devices as deemed appropriate by the airway lead and following risk assessment:

- Direct and video-laryngoscopes [3,9], including standard MacIntosh geometry VL devices and hyperangulated blades.
- Airway adjuncts (e.g. oropharyngeal and nasopharyngeal airways, bougies, Aintree Intubation Catheters™ or equivalent, stylets and any device-specific adjuncts.)
- Self-inflating and flow-driven manual ventilation bag devices, HFNO and CPAP-NIV devices.
- High pressure, low volume cuffed endotracheal tubes and 2nd generation supraglottic airways
- Tracheostomy tubes including standard and adjustable-flanged, flexible reinforced tracheostomy tubes, and those incorporating sub-glottic suction ports
- Flexible bronchoscopes and laryngoscopes[3].

Good record keeping and readily accessible documentation is an essential part of airway management. Key information includes:

- The laryngoscopic views obtained during any previous intubation attempts should be recorded, together with the name of the operator and which device was used
- Date of intubation or tracheostomy formation
- Tube size and insertion depth
- Tracheal cuff pressure (ideally maintained at 25cm H2O, or 5cm H2O above peak airway pressure).
- Date of any tube change
- $ETCO_2$
- ABGs
- Ventilation parameters[3].

Written guidance (such as guidelines, SOPs, checklists, etc.) for airway management in ICU include:

- Planned and emergency intubations both on and off ICU, which should include preventing unrecognised oesophageal intubation, managing intubation in airborne infection (e.g. Covid19), and managing failed intubation including rescue techniques, such as intubation via supraglottic airway and emergency Front of Neck Access (eFONA)[3].
- Extubation in ICU[3].
- Safety checklists for intubation and percutaneous tracheostomy [3,5].
- Managing tracheostomy/laryngectomy emergencies [5,6].
- Maintenance of an artificial airway during patient re-positioning including patient turns and prone positioning.

These can be supplemented by the use of cognitive aids to optimise time sensitive management of airway complications [8].

Tracheostomy is an area of specific risk. Insertion checklists and standard procedures [5,6], alongside appropriate bedside signage is an important part of patient safety. Any complex airway, inclusive of tracheostomised patients, is a key point of information that requires communication to receiving teams in hand over.

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4.5 Renal Support

Authors: Marlies Ostermann & Lui G Forni

INTRODUCTION

There is no currently available treatment for severe acute kidney injury (AKI) and renal replacement therapy (RRT) remains the mainstay for supportive therapy. The main types of acute RRT available for critically ill adults in the UK are haemodialysis and haemofiltration provided either continuously or intermittently. Acute peritoneal dialysis is rarely used.

MINIMUM STANDARDS

1. ICUs must have the necessary facilities and expertise to provide acute RRT for patients with AKI on a 24/7 basis.
2. Patients receiving acute RRT must be cared for by a multi-professional team, trained and experienced in delivering and monitoring RRT.
3. Patients receiving acute RRT, where the cause of AKI is unclear or where RRT will be needed on intensive care discharge, must be discussed with the local renal team.
4. The dose of RRT must be prescribed at the beginning of the RRT session, reviewed daily and tailored to the needs of the patient.[1]
5. There must be close collaboration with an intensive care pharmacist with suitable experience in AKI and the effects of RRT.
6. When discharged from intensive care, the accepting team and GP must be informed that the patient had received RRT for AKI whilst in intensive care so that appropriate follow-up can be arranged.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. The decision to initiate RRT should be based on the condition and prognosis of the patient as a whole, and not on isolated urea or creatinine values.[1,2]
2. Where life-threatening complications of AKI occur and are not responding to medical management, RRT should be started emergently unless a decision has been made not to escalate therapy.[1,2]
3. There should be close liaison with the regional renal service regarding transfer and vascular access for patients with end-stage renal failure, who are not in a renal unit or dialysis centre and require urgent RRT in ICU.
4. Patients with end-stage renal failure who are not in a renal unit or dialysis centre and require urgent RRT may need intensive care admission.
5. The choice of therapy should be based on patient status, expertise of the clinical staff, and the available technique(s).

6. The decision to use anticoagulation to maintain circuit patency and the choice of anticoagulant should be based on the potential risks and benefits in an individual patient, the expertise of the clinical team, and the options available.

BACKGROUND AND EXPLANATION

Critically ill patients with severe AKI commonly receive RRT.[4] The optimal timing remains uncertain but in patients without limitations in care, there is consensus that RRT is indicated in case of urgent or refractory complications of AKI. Recent randomised controlled trials (RCTs) confirm that pre-emptive or earlier RRT does not confer clinical benefit, implying that a "watch and wait" strategy is acceptable [5-7] , rather than relying on isolated urea or creatinine values.[1,2]

The choice of technique depends on availability, clinical expertise and patient characteristics. Although continuous RRT (CRRT) offers the theoretical advantage of improved haemodynamic tolerance, evidence to support this is conflicting. Secondary analyses of the AKIKI and IDEAL trials suggested that, compared to conventional intermittent haemodialysis (IHD), CRRT as first modality conveyed no benefit in terms of survival or kidney recovery and might even have been associated with harm in some patients.[8] In contrast, data from the RENAL, ATN and STARRT AKI trials demonstrated better outcomes if CRRT was used as first modality.[9,10] At this stage continuous and intermittent RRT needs to be considered as complementary therapies for AKI.[1]

The dose of acute RRT needs to be tailored to the patient's metabolic and fluid status. RCTs have failed to demonstrate improved survival or renal recovery with higher delivered doses.[11,12] The KDIGO guideline recommends delivery of an effluent volume of 20–25ml/kg/h for CRRT.[1] To compensate for interruptions in treatment, a higher dose may have to be prescribed (i.e. 25-30mL/kg/h). When using intermittent RRT, a Kt/V of 3.9 per week ought to be delivered.

The KDIGO guideline suggests regional citrate anticoagulation for CRRT, and unfractionated or low-molecular weight heparin for patients receiving intermittent RRT.[1] However, citrate anticoagulation requires training and expertise and is not available in all intensive care units in the UK.[13]

Drug clearance is affected by the mode and dose of RRT. Therefore, drug doses need to be reviewed and adjusted each time RRT is started or the prescription of RRT is altered. Input from intensive care pharmacists is advised. Standard enteral nutrition is recommended, provided there are no refractory electrolyte abnormalities or fluid overload.[14]

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4.6 Gastrointestinal Support and Nutrition

Authors: Ella Terblanche & Hugh Montgomery

INTRODUCTION

Malnutrition is typically understood as encompassing undernutrition from inadequate intake/absorption of food, nutrient classes (e.g. protein/energy) or elements (e.g. vitamins). It is also a disorder of overnutrition, usually from excess energy intake causing obesity. ICU admission may result causally (directly or via co-morbidities), or through impacts of malnourishment-causing diseases.

MINIMUM STANDARDS

1. Nutritional status and risk must be assessed and documented on ICU admission.
2. Malnutrition risks increasing mortality, morbidity and length of stay, and must be sought and assessed in all patients staying in ICU >48 hours[1].
3. The type and position of nasogastric tubes (NGTs) used for enteral nutrition (EN), hydration and/or drug administration, must comply with NHS Improvement guidelines and be no larger than 14 french gauge[2,3].
4. A range of EN products must be available to meet the service needs.
5. A 'standard' parenteral nutrition (PN) bag must be available within 24 hours.
6. There must be access to a range of PN bags which include vitamins, trace elements and minerals.
7. A nutrition support guideline must be available without waiting for a patient specific dietitian's plan, to promote nutrition delivery and to advise on managing EN intolerance.
8. Guidance must be in place to identify and support nutrition in those at risk of refeeding syndrome.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Nutritional intake targets should be compared daily with actual intake.
2. After initial protocolised feeding, individualised nutritional intake plans should be initiated to address nutritional deficits, avoid refeeding syndrome, and correct micronutrient deficiencies.
3. An individualised obesity management plan should be made to avoid overfeeding and address any comorbidities[4].
4. An intensive care dietitian or appropriately trained clinician should assess energy, protein, and micronutrient targets weekly, with adjustments for patients with a BMI > 30 kg/m^2.
5. The energy content from medications and fluids should be accounted for to avoid excess calorie and/or lipid intake.

6. Nasal bridles should be provided for securing NGTs in agitated patients, with adherence to local guidelines for their use and aftercare being ensured.
7. Bowel management should be assessed daily in all patients and managed according to local policy guidelines.
8. EN should be continued in patients in prone position or treated with extracorporeal membrane oxygenation [3].
9. EN should be continued until extubation[3].

BACKGROUND AND EXPLANATION

Every patient admitted to ICU requires assessment of nutritional status and risk which includes assessment of recent changes in weight, food intake and absorption; causes of altered intake; and the possibility of specific micronutrient deficiencies (on ICU, most commonly being that of zinc in diarrhoea/dermatitis, and of B-vitamins in habitual excess alcohol intake). Oral enteral nutrition (EN) is the preferred route of feeding, where safe and adequate to do so.

It is important that the ICU has a nutrition support guideline which promotes protocolised nutrition delivery without waiting for a patient specific dietitian's plan, and which addresses vomiting, large gastric residual volumes, diarrhoea and failure to reach EN targets. Nutritional intake targets need to be compared daily with actual intake, with deficits monitored, and steps taken to remedy them. The energy content from certain medications and fluids (e.g. propofol, IV glucose and citrate anti-coagulation renal replacement therapy) needs to be accounted for to avoid overfeeding.

Nutrition support is recommended to be instigated within 48 hours in patients expected not to be on a full oral diet within three days. EN support for inadequate oral intake helps meet macro- and micronutrient requirements, maintains gut integrity, supports immune function and reduces hospital-acquired infections[5,6]. If EN fails/is inappropriate, isocaloric parenteral nutrition (PN) delivery delivers similar outcomes[5,6].

Every ICU patient staying more than 48 hours needs to be considered at risk of malnutrition [1,5] and identified and graded using a nutritional assessment. Additional micronutrient requirements need to be met, and re-feeding syndrome avoided.

While an optimal feeding strategy is debated, an individualised approach after the first week is recommended[3,7]. Meeting early full energy/protein targets likely offers no benefit[8-10] and needs to be avoided in the first three days of admission/ early phase of acute illness until clinical stability has been achieved [3,7]; administration can be increased after day three to meet full targets by day seven[5]. Indirect calorimetry (IC), the gold standard measurement of energy expenditure, is recommended[5,6]; predictive equations are inaccurate often leading to over/under-feeding[11]. If IC is unavailable, weight-based calculations are used (12-25kcal/kg/day in the first 7-10 days)[5,6].

Energy/protein requirements may rise during the (hard to define) recovery phase[3,7], but high- (2.2g/kg/day) and standard-dose(1.2g/kg/day) protein load deliver similar mortalities and times-to-discharge alive, while high-protein may harm those with acute kidney injury and the most severely-ill[9].

Micronutrients (trace elements/vitamins) in EN and PN[5] need to address existing deficiencies and meet ongoing needs (greater with active depletion e.g. losses via CRRT, intestine, surgical drains and burns[12,13]). Suboptimal EN delivery (e.g. from gastrointestinal dysfunction-related EN intolerance (ENI) is associated with greater duration of mechanical ventilation and ICU stay, and mortality[14,15]. Routine gastric residual volume (GRV) measurement, commonly used to assess GI dysfunction and ENI, correlates poorly with gastric emptying, regurgitation, and aspiration/pneumonia[16] and is not recommended in American guidelines [6]; European guidelines[5], however, suggest the use of post pyloric feeding and/or prokinetic agents (metoclopramide, erythromycin) if GRV >500ml.

Bowel management is an important aspect of gastrointestinal support. Local policy guidelines on daily bowel management assessment are recommended to include:

a. Monitoring and documentation of bowel habits (frequency & type)
b. Minimising the use of drugs that can cause constipation or diarrhoea
c. Assessing the need for, and performing, rectal examination to identify faecal loading/impaction and then to treat it.
d. When to use laxatives, enemas, and suppositories
e. Management of ileus.

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4.7 Liver Support

Authors: Brian Hogan, Nick Murphy & Julia Wendon

INTRODUCTION

Liver failure is a broad term which can be divided into four main sub-types. Identifying the correct type of liver failure is essential as there are significant differences in both the prognosis and available management options.

The four broad types of liver failure outlined in this chapter with examples of the underlying aetiology

Acute Liver Failure (ALF)	**Encephalopathy + coagulopathy** (INR > 1.5) in a patient with **no pre-existing liver disease.** The most common sub-types in the UK are hyperacute (often from paracetamol intoxication) or sub-acute (which can be seronegative or from auto-immune or other drug-induced liver injuries).[1]
Acute-on-Chronic Liver Failure (ACLF)	**Decompensation** and **extra-hepatic organ failures** in a patient with known **advanced chronic liver disease / cirrhosis.** This is often precipitated by a decompensating event such as sepsis, upper gastrointestinal bleeding or acute alcohol associated hepatitis.[2]
Post-Hepatectomy Liver Failure (PHLF)	Liver failure following liver resection, often for a liver metastasis or primary liver cancer.
Liver Failure in multi-system illness	Liver failure in patients with a multi-system illness. This is perhaps best described as 'liver failure in the critically ill'. This may be as part of sepsis (predominantly cholestasis); low cardiac output states (ischaemic hepatitis); systemic disease such as malaria, dengue, macrophage activation or hemophagocytic syndrome; or infiltrative processes (malignancy).

Patients with ALF and PHLF are ideally managed in liver failure centres. Some patients with liver failure (e.g. those with ACLF and those with liver failure as part of a multi-system illness - like ischaemic hepatitis) are managed outside of liver failure centres but would benefit from specialist discussion with intensivists and liver specialists at the regional liver centre.

MINIMUM STANDARDS

1. Contact with a liver transplant centre must be made early, following admission of any patient with ALF to an ICU.[3]
2. ICUs managing liver failure and liver trauma must have access to a 24/7 interventional radiology service and/or be part of a network that can provide rapid access to such provision.
3. ICUs managing liver failure must have 24-hour access to both diagnostic and therapeutic upper GI endoscopy services and/or be part of a network that can provide rapid access to such provision.
4. ICUs managing liver failure must have an intensive care pharmacist with suitable experience in liver failure recognising increased volumes of distribution as drug dosing may need adjusting.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. ICUs managing liver failure should have a multidisciplinary team of intensivists and hepatologists, and access to input from other relevant specialties.
2. Patients with liver failure, plus any other organ dysfunction, should be considered for admission to intensive care.
3. Patients with non-ALF liver failure should be discussed early with the regional liver centre, as guided by consultation with the local hepatology service.
4. Patients with ACLF should be discussed early with regional centres, as guided by consultation with the local hepatology service.
5. ICUs admitting patients with variceal bleeding should have agreed pathways to regional centres providing trans-jugular intrahepatic portosystemic shunt (TIPS) for patients with bleeding varices, ensuring early and timely access to such interventions.
6. Viscoelastic tests, such as thrombo-elastography or ROTEM, should be available to guide the use of blood products.[4]
7. Strategies to prevent, monitor and manage intracranial hypertension (ICH) should be available in centres managing patients with ALF.

BACKGROUND AND EXPLANATION

Acute liver failure (ALF) is often used (incorrectly) as a generic term for liver dysfunction in the setting of critical illness. It is also used as a description of severe liver injury accompanied by organ failure seen in patients with chronic liver disease, more correctly termed acute on chronic liver failure (ACLF). Liver dysfunction, when seen as part of a multi-system illness, such as septic or cardiogenic shock, is more correctly referred to as hypoxic or ischaemic hepatitis or cholestasis of sepsis. These distinctions are important, as prognosis and management are different, and the definitions are clarified in the table above.

ICUs managing liver failure require a multidisciplinary team of intensivists and hepatologists and access to input from other relevant specialties, such as, liver surgeons, anaesthetists, infectious diseases, cardiology, and haematology as required. They can and should provide advice and liaison with intensive care patient transfer services as required.

Patients with liver failure, whatever the cause, should be considered for admission to an ICU. Attention is needed for cardiovascular support, rapid correction of actual or relative hypovolaemia, neurological assessment, and airway management, plus consideration of early renal and metabolic support.

Intravenous antibiotics need be considered in any liver failure patient with a suggestion of sepsis on admission to intensive care. Infectious complications are very common in patients with liver failure. The choice of antibiotic will be driven by knowledge of local microbiological resistance patterns.

Acute Live Failure additional considerations

ALF is a rare syndrome, estimated to affect between 2-5 people per million of the UK population each year. The most common cause in the UK is paracetamol toxicity. Cerebral oedema resulting in raised intracranial pressure can occur in those with high-grade encephalopathy (GCS < 8) and associated risk factors. In addition to supportive care, there is evidence that plasma exchange may be of benefit when instituted early in the course of the syndrome. Liver transplantation is indicated in a select group who fulfil poor prognostic criteria.

Changes in conscious level need to always be viewed as a serious development; encephalopathy is the most likely cause but metabolic causes, especially hypoglycaemia, need to be excluded. Early intubation for airway control and protection may be required, and almost always for transfer to another centre.

Pregnancy-related ALF presenting to the ICU is most likely to be Hemolysis, Elevated Liver enzymes and Low Platelets (HELLP) syndrome, pre-eclampsia, fatty liver of pregnancy or liver rupture. Management of this cohort of patients requires effective and close working between obstetric services, neonatology and intensive care. Coagulopathy is often associated with bleeding in this disease group. (See Chapter 4.12 Care of the critically ill pregnant (or recently pregnant) person)

ACLF, PHLF, ischaemic hepatitis and other Liver dysfunction additional considerations

Other patients with liver failure need to be discussed early with the regional liver centre as guided by consultation with the local hepatology service. Advice about management, prognosis, possible transfer, and interventions (TIPS, Transplant, clinical trials) can be discussed, and clear lines of communication established.

ACLF is common and, whilst outcomes are continually improving, is still associated with a high mortality when >3 organ failure is established. There is often a precipitant such as an upper GI bleed, alcohol associated hepatitis or infection, although none may be identified. The syndrome is

characterised by worsening jaundice and encephalopathy with an increasing extra hepatic organ failure burden carrying a worse prognosis. Renal failure in this setting carries a high attributable mortality. Initial care is supportive with a focus on managing any precipitant and treatment of sepsis. Patients with ACLF may now be listed and prioritised for liver transplant from the ICU, but outcomes are better if listed early. Patients with ACLF, who may be suitable transplant candidates, need to be referred early in their admission.

Bleeding from oesophageal varices carries a better prognosis than other precipitants of ACLF. Airway protection and endoscopic control of bleeding are essential, alongside consideration for TIPS early for refractory bleeding or if at high risk of re-bleeding.

Management of liver dysfunction in the setting of a multi-system disease is a broad area perhaps best described as 'liver failure in the critically ill'. Systemic infections and other inflammatory processes can precipitate severe liver dysfunction.[5] Malignant infiltration from lymphomas or overwhelming liver metastasis can sometimes present with liver failure. The list of other potential causes is long.

A cohort of patients present with signs and symptoms of liver failure due to a low cardiac output state and present as hypoxic hepatitis; their management will require focus on improved cardiac parameters recognising the liver as a secondary event. Heat stroke can present in a similar manner, but this time metabolic demand can exceed supply.

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4.8 Cardiovascular Support

Authors: Peter J McGuigan, Claire Boynton, Scott Kemp & Alastair Proudfoot

INTRODUCTION

More than 149,000 patients are admitted to hospital with acute heart failure or myocardial infarction in England, Wales and Northern Ireland each year.[1,2] Cardiovascular disease (CVD) accounts for a quarter of all deaths in the UK each year. [3] An estimated 6.1 million people in England live with CVD; clinicians need to have a high index of suspicion for cardiac dysfunction in intensive care.[3]

Cardiovascular instability is the most common reason for admission to UK ICUs, with basic cardiovascular support the most common organ support delivered.[4] The need for cardiovascular support may reflect new cardiac pathology or concurrent critical illness that decompensates the cardiovascular system. Echocardiography is essential for the diagnosis of cardiac conditions with networks of care fundamental to the management. Most patients requiring cardiovascular support will be successfully managed in ICUs throughout the UK by the delivery of Level 2 and 3 care. However, some patients will require specialist cardiac input or transfer.

MINIMUM STANDARDS

1. ICUs must be able to manage patients requiring advanced cardiovascular support (Level 2 and 3 care) which would include the use of invasive arterial blood pressure and central venous pressure monitoring and inotropes.
2. Patients admitted to ICUs with potentially reversible cardiogenic shock or who are candidates for transplantation must be discussed early with cardiology centres capable of providing mechanical cardiovascular support (MCS) or quaternary advanced heart failure centres.[1,5]
3. Patients admitted to ICUs with acute heart failure must be reviewed within 24 hours of admission by a specialist heart failure multidisciplinary team.[6-8]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Immediate coronary angiography and PCI of the infarct-related artery (if indicated) should be considered in critically unwell patients with complications of Acute Coronary Syndrome (ACS).[9]
2. In cases of mechanical complications of ACS or acute valvular pathology resulting in cardiogenic shock, Heart Team discussion should occur to consider emergency surgical or catheter-based repair.[9]
3. All ICUs should have the capability to either non-invasively or invasively assess cardiac output.
4. Tertiary cardiac centre ICUs should have the ability to perform advanced hemodynamic monitoring.
5. Cardiac networks should be established to include tertiary cardiology centres and quaternary advanced heart failure centres.[5]

6. Clear pathways should exist for the transfer of patients to tertiary cardiology centres or quaternary advanced heart failure centres, and for repatriation of patients back to their local intensive care service.[3,5]
7. ICUs should adopt the Society for Cardiovascular Angiography and Interventions (SCAI) staging as the standardised descriptor of cardiogenic shock to facilitate triage, communication and expediency of discussion with tertiary cardiology centres and quaternary advanced heart failure centres.[5]
8. A consultant intensivist should input into Heart Team discussions when planning procedural treatment for intensive care patients and those at high risk of requiring intensive care support post procedure.[3]
9. Tertiary cardiology centres should work with transfer services to ensure they develop the requisite skills to transfer the sickest cardiology patients.[10]

BACKGROUND AND EXPLANATION

For patients who present with a diagnosis of cardiac dysfunction or in whom pre-existing cardiac disease has decompensated due to critical illness, imaging, multidisciplinary working, and networks of care are essential to high quality care.

Networks of care use a collaborative model to deliver safe and effective elective and emergency services which ensures equity of access to high quality care. The structure for a recommended cardiology network has been previously defined in the *Cardiology GIRFT Programme National Specialty Report*.[3] This report outlines a cardiology network comprising four levels of care, with all hospitals participating in the network ensuring patient access to all four levels. In brief these are made up of:

- **Level 1** -base level services for acute cardiology patients
- **Level 2** - level 1 plus access to pacing and PCI services
- **Level 3** - level 2 plus 24/7 access to PCI, interventional electrophysiology and 7/7 access to TOE
- **Level 4** -level 3 plus structural interventions, VT ablation and cardiac surgery.[3]

These levels of care provide the bases for established networks for myocardial infarction, cardiac conduction and valvular pathologies. However, these levels of care do not include the provision of MCS or transplantation. Cardiogenic shock (CS) networks are less well established; however, CS networks have the potential to leverage existing cardiology networks to develop a 'hub and spoke' model of care. [5]This is likely to take the following format:

- Level 1 and 2 centres focusing on recognition of CS (through NEWS2 and early access to echocardiography) and stabilisation.
- Level 3 and 4 centres acting as CS centres providing interventional cardiology services and

short-term MCS. Within CS centres, expert decision making will be led by a Heart /team comprised of an interventional cardiologist, a cardiac intensivist, cardiac intensive care nursing staff, a heart failure cardiologist and a cardiac surgeon with or without a member of the regional transplant team or specialist palliative care.

- A small number of quaternary advanced heart failure centres providing access to long-term MCS and heart transplant.

Whilst current guidelines recommend that hospitals who admit acute cardiology patients have access to echocardiography 24/7, this may not be universally available. Intensive care physicians have an important role in improving access to echocardiography out-of-hours to support / exclude the diagnosis of cardiac pathologies.[5] This will facilitate appropriate triage. The sickest patients need to undergo emergent echocardiography by someone trained to British Society of Echocardiography (BSE) level 1 standard or higher.[3,5,9]

Pulmonary artery flotation catheters remain the gold standard cardiac output monitor. However, their use is infrequent outside cardiac centres. All centres need to have the capability to either non-invasively or invasively assess cardiac output; centres might consider limiting the variety of cardiac output monitors used and/or concentrate the skillset in a smaller number of clinicians.

Patients with acute cardiology pathology who are deteriorating despite supportive care should be discussed with the Heart Team. The composition of this multidisciplinary team will vary between sites. However, networks of care ensure that all patients have equitable access to imaging, interventional cardiology, and cardiac surgical services as well as leveraging existing care pathways such as those that deliver primary PCI. Intensive care transfer services are likely to play an integral role in the functioning of cardiology networks but may require upskilling.[3,10]

For the sickest of patients, MCS or cardiac transplant may be appropriate[1] and early discussion with quaternary heart failure centres is recommended.[5] Where patients (who are candidates for escalation) remain in their base hospital, regular communication with the tertiary or quaternary centre is crucial.[11]

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4.9 Intensive Care Ultrasound

Authors: Marcus Peck, Ashley Miller, Hannah Conway & Prashant Parulekar

INTRODUCTION

Intensive care ultrasound is quick, non-invasive and facilitates the acquisition of critical information when and where it is most needed. As such, it has become an integral part of managing critically ill patients[1-4]. While it has many clear benefits, it also consumes intensive care resources and constitutes potential clinical risk. The following standards and recommendations are designed to promote safety and quality in any intensive care ultrasound service.

MINIMUM STANDARDS

1. ICUs must have the equipment to provide point of care intensive care ultrasound[5,6].
2. Ultrasound machines must be equipped with linear, curvilinear, and phased array probes.
3. Ultrasound equipment must be readily available, serviced regularly and part of a capital replacement program
4. ICUs must have a clinical lead for ultrasound.
5. Dedicated infection control guidance must be accessible and its compliance audited[7].
6. Providers who scan and report independently must be trained to an appropriate level for their clinical practice.
7. When performing scans to inform clinical decision making, providers must store a structured report in the patient record.
8. When performing scans to inform clinical decision making, providers must store images for quality assurance purposes.
9. When performing scans for training purposes, learners must only store reports in the patient record if a trained provider has verified them first.
10. Transoesophageal echocardiography (TOE) must be immediately available in all cardiothoracic ICUs and those units providing extra-corporeal circulatory support[8].
11. ICUs must have the facility to store clinical and point-of-care ultrasound images in an appropriate picture archiving and communication system, so they form part of the clinical record.[9]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. All ICUs should be able to train staff in intensive care ultrasound.
2. ICUs that engage in remote review and/or supervision should employ secure, cloud-based image transfer systems.
3. The clinical lead for ultrasound should have sufficient time in their job plan for the associated quality assurance processes.

4. The intensive care ultrasound service should be supported by a fully trained link-person within the cardiology and radiology departments, as appropriate.
5. ICUs should provide dedicated education and ultrasound governance meetings.
6. ICUs should foster robust quality assurance processes, including peer review of image and reporting quality.

BACKGROUND AND EXPLANATION

The most common use of intensive care ultrasound is for vascular access. Increasingly point of care ultrasound is used by ICU clinicians for whole-body imaging of critically ill patients. It is demonstrably superior to physical examination and chest radiography in detecting life-threatening causes of shock and acute respiratory failure, and many other clinical situations[10-12].

In an unstable patient, echocardiographic data, particularly Doppler derived, can provide haemodynamic information that adds valuable diagnostic and pathophysiological insights[3]. TOE may be of value in patients with poor transthoracic windows, trauma, patients following cardiac surgery, and those receiving mechanical circulatory support[8].

Ultrasound providers emanate from a variety of clinical backgrounds, providing they can achieve suitable levels of competence with appropriate training.

Various competency-based ultrasound training and accreditation systems exist in the UK, most of which use an organ-based, modular approach.

Knowing how to acquire, interpret and integrate images into clinical practice represents only the beginning of the learning process. To be a safe and effective ultrasound provider, and to develop new skills, one needs to be surrounded by the right framework of support and governance. This includes access to expert supervision.

Exposure to supervision may pose challenges as this depends on local availability of experienced trainers. Some centres have addressed these issues by embracing remote supervision through telemedicine software. This method facilitates immediate guidance, feedback and mentorship by overcoming geographical constraints and improving access to expertise[13-16.]

Educational and ultrasound governance meetings play a crucial role in improving the quality and safety of patient care[16]. These meetings serve as essential platforms for exchanging knowledge, developing skills, and standardising practices among providers. The incorporation of such meetings is integral to the quality assurance processes recommended for each centre[18].

An essential component for providing a point of care intensive care ultrasound service is the appointment of an ICU clinical lead with responsibility for equipment, coordinating training and governance. Recognition of this role in that person's job plan is encouraged.

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4.10 Neurological Support

Authors: Jessie Welbourne, Zoeb Jiwaji & Donna Rawlings

INTRODUCTION

The provision of specialist services for stroke, neurotrauma, and other neurological conditions is progressively becoming centralised. However, many patients with acute brain and spinal cord pathology will present to and require neurological support within non-specialist ICUs. This includes those admitted following out-of-hospital cardiac arrest, seizures, stroke, neuroinfective and neuroinflammatory disorders.

This chapter should be considered alongside and complements the standards and recommendations within Chapter 1.7 Neurocritical Care.

MININUM STANDARDS

1. Treatments, including transfer for specialist neurological interventions, must be in line as far as possible with individual preferences, including consideration of Advance Care Plans or Anticipatory Care Plans (Scotland) if applicable[1].
2. Neuroprotective treatment for patients who remain unconscious following cardiac arrest must follow national and international consensus guidelines, including fever-avoidance for at least 72 hours[2].
3. A multimodal approach for neuroprognostication as per consensus guidelines must be used and documented following hypoxic-ischaemic brain injury after cardiac arrest[3].
4. Patients admitted to intensive care with intracerebral haemorrhage must be discussed with neurosurgical or stroke care specialists for consideration of, and transfer for appropriate specialist interventions[4].
5. Adults with middle cerebral artery infarction admitted to intensive care, meeting the criteria described in NICE NG128 must be discussed with a specialist centre for consideration of decompressive craniectomy within 48 hours of symptom onset[4].
6. Diagnosis of death using neurological criteria must be conducted as per the Academy of Medical Royal College's Code of Practice and the endorsed national testing forms[5].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Agreed access and documentation processes should be in place for neuro intensive care, neurosurgery and neurology specialist advice when required.[6].
2. Patients with perceived devastating brain injury should be admitted to intensive care to aid prognostication as per national consensus guidance, unless the extent of co-morbidity makes continued organ support of no overall benefit regardless of potential neurological recovery[7].

3. The management of intracerebral haemorrhage should include the prompt reversal of anticoagulation and consideration of acute blood pressure lowering as per national and international guidelines[8].
4. All patients with acute ischaemic stroke meeting guidance criteria should be referred to the nearest thrombectomy centre and, if appropriate, transferred for intervention within recommended time-frames[9].

1. Core temperature should be monitored in patients requiring intensive care admission following traumatic brain injury, aneurysmal subarachnoid haemorrhage, intracerebral haemorrhage or acute ischaemic stroke to ensure normothermia is maintained, fever avoided and shivering managed. [10-11].
2. Patients with suspected bacterial meningitis or viral encephalitis and reduced consciousness requiring intensive care support should be managed as per consensus recommendation, including blood cultures, timely administration of antibiotics and/or antivirals, and CSF sampling following neuroimaging[12].
3. Refractory generalised status epilepticus requiring treatment with anaesthetic agents should have seizure control confirmed with EEG monitoring (locally or following transfer to a specialist centre)[13-14].
4. Assessment and management of patients with prolonged disorders of consciousness should follow national guidance, including specialist input from an expert Prolonged Disorders of Consciousness Physician[15].

BACKGROUND AND EXPLANATION

Patients requiring neurological support are frequently encountered in intensive care settings, with many not necessitating transfer to a specialist neurosciences centre. Alongside relevant neurological investigations and interventions, it is important to recognise that patients in this group derive substantial benefit from expert general intensive care encompassing optimal ventilation, oxygenation, cardiovascular support, sedation management, nutritional provision, and VTE prophylaxis strategies.

In addition, individuals needing neurological support may also require specific treatments tailored towards neuroprotection and management of neurological diagnoses. A key challenge is predicting long-term outcomes following neurological injury, with an emphasis on using evidence-based and patient-centred approaches to guide both treatment and end-of-life decision-making.

Given the nature and occasional rarity of certain neurological conditions, regional policies and intensive care networks are advised to facilitate the management of neurological patients at non-specialist facilities, including (but not limited to) refractory status epilepticus[13], autoimmune encephalitis[16], acute inflammatory polyneuropathy[17] and decompensation of chronic neurological disease, with prompt transfer to specialised centres when specialist intervention is warranted.

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4.11 Burns

Authors: Ascanio Tridente, Brendan Sloan, Nicole Lee & Ian Clement

INTRODUCTION

The exact incidence of burns injuries is not known, as some people do not seek medical advice. It is nevertheless estimated that around 250,000 patients suffer burns injuries in the UK each year [1]. There is a high prevalence of burn injury in the frail elderly and in those with severe mental health problems. Approximately 120,000 people with burn injuries attend Emergency Departments (ED) in the UK yearly, resulting in around 8000 admissions to secondary care. Of these, approximately 350 will require fluid resuscitation due to the severity of their injuries[2]. Treating burns victims is expensive, but volumes of activity are low, due to the combination of the intricacy and peculiarity of the injuries, and their infrequency[2]. It is therefore important that the most severely ill burns patients are cared for where specialist burns and intensive care expertise are both available.

Burn care in the UK is organised in centres, units and facilities. Patients with the worst injuries and highest intensive care requirements are cared for in centres, those with moderate size and severity burns in units, while facilities care for those patients with less complex burns. Most critically ill burn patients in the UK are looked after within a general ICU with burns surgical and multidisciplinary input. Some hospitals have a dedicated burns ICU.

The following standards and recommendations apply to all adult burn patients receiving intensive care.

MINIMUM STANDARDS

1. Working practices must promote multidisciplinary care between the burn and intensive care medical, nursing and allied healthcare professional teams, encouraging joint decision making[3].
2. A burns theatre must be located in close proximity (preferably within 50 metres) to any service providing intensive care for burn injured patients[3].
3. Burns patients requiring intensive care must be jointly managed by consultants in burns surgery and intensive care medicine with the appropriate level of burns specific training[3].
4. Clinical guidelines for treatment and care related specifically to burns patients must be available in ICUs which manage burns patients[3].
5. Thresholds for referral to adult and paediatric burns Services must be adhered to, as detailed by the National Burn Care Referral Guidance[4].
6. Transfer of critically ill burn patients between services must comply with Intensive Care Society guidelines[5].

RECOMMENDATIONS TO PROVIDE A QUALTIY SERVICE

1. Services should have access to specialist care pathways to meet the needs of patients with mental health issues and those frail and elderly.
2. All burns over 20% total body surface area (TBSA) should have access to thermally controlled single-bedded cubicles[3,6].
3. Services providing burns centre level care should be, ideally, co-located with a major trauma centre[3].
4. Where burns centre level care cannot be co-located with a major trauma centre mechanisms for ensuring appropriate integration with major trauma centre care should be established.
5. The implementation of end-of-life care in the early stage of a burn injury should only be made following multidisciplinary holistic assessment, involving at least two consultants, one of whom should be a specialised burn care surgeon and the other an intensivist with experience in burns care[7].
6. There should be nominated intensive care and anaesthesia lead consultants for burns, who participate in network regional and national clinical governance activities, morbidity and mortality audit meetings.
7. There should be a minimum of one nurse per shift with CC3N specialist burn competencies8 in in general ICUs looking after burns patients, and ideally a 75% CC3N competencies compliance in dedicated burns ICU[3].

BACKGROUND AND EXPLANATION

The latest data would suggest that the 50% mortality (LD50) for burns based on total body surface area (TBSA) affected depends on age group, varying from approximately 90% for the age group <50, to around 55% for patients aged 50-79, and being as low as around 20% for patients agreed ≥80 years ([9]). To achieve these outstanding outcomes, care needs to be provided by a fully integrated multidisciplinary team, with daily multidisciplinary ward rounds[3,10].

Guidelines

Clinical guidelines for treatment and care related specifically to burns patients must be available in ICUs which manage burns patients[3]. These may include:

a. Fluid resuscitation and management of associated complications.
b. Assessment and management of burns to the face and airway. Including the recommendation to use fibre-optic bronchoscopy or naso-endoscopy to assess inhalation injury[11]
c. Management of smoke inhalation injury and its sequelae, including carbon monoxide and cyanide poisoning.

d. Recognition and management of the acutely unwell and deteriorating burn injured patient, including burn specific criteria for the diagnosis of sepsis.
e. Management of hypothermia and hyperpyrexia.
f. Management of burn wound infections including antimicrobial stewardship.
g. Nutritional assessment.
h. Rehabilitation.

Hypothermia

Hypothermia has a profoundly adverse effect on burn patients, who are particularly vulnerable during initial assessment and resuscitation. Strategies to vigorously prevent this, including provision of a thermoneutral environment, need to be used. One of simplest methods to reduce this hypermetabolic response is to increase the ambient temperature using a thermally controlled cubicle[3].

Infection

Infection is a significant cause of mortality in major burns. Methods of protecting patients from infection include early primary excision and skin grafting, regular aseptic dressing changes and isolation of the patient in a single-bedded cubicle.

Transfer

Transfer of patients between services may involve considerable distances due to the relatively small number of specialist burn-only intensive care beds in the UK. Services need to ensure that consideration is given to provision of adequate drugs, fluids, oxygen, and warming devices for lengthier transfers.

Research

Clinical studies directly relevant to the UK setting are few, in part due to the relatively small numbers of patients with significant burn injuries who present in more affluent countries. A collaborative approach to research with multi-centre trials is be encouraged.

Further information

Further detailed recommendations on the management of burn injured patients can be found in the 2023 document produced by the British Burn Association: Burn Care Standards and Outcomes[3].

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4.12 Care of the Critically Ill Pregnant (or recently pregnant) Person

Authors: Steve Cantellow, Katie Cranfield & Deborah Horner with contributions from Alison Blair, Nuala Lucas, Lucy MacKillop, Yavor Metodiev, Cathy Nelson-Piercy & Arlene Wise

INTRODUCTION

The term 'maternity patient' refers to anyone who is pregnant or has been pregnant within the last 42 days, including those who have experienced pregnancy loss or miscarriage. While the terms woman and women are used in this document, we recognise that these guidelines may also apply to people who do not identify as women.

Evidence to support this document comes from a variety of national reports and guidelines based predominantly on expert opinion and consensus. It is important to note that Level 1 care, enhanced maternal care (EMC), is increasingly being provided in a maternity setting. In areas where Level 2 or 3 care is being provided, GPICS will apply.

Whether in the delivery suite, medical ward, or ICU, no single location or team can address all needs. Consequently, effective care requires a collaborative approach, uniting services at the patient's location with patient-centred management strategies that are tailored and adaptable to their evolving needs.[1-4]

MINIMUM STANDARDS

1. ICUs admitting maternity patients must be prepared for obstetric emergencies such as unplanned birth, postpartum haemorrhage, and maternal cardiac arrest.[5]
2. All intensive care services (including outreach) caring for maternity patients must appoint a named lead clinician and a lead nurse for maternal critical care.[1, 3, 6]
3. All maternity patients admitted to intensive care must have evidence of a clearly documented, multidisciplinary, intensive care, obstetric and anaesthetic consultant-led review at least once every twenty-four hours.[3]
4. Intensive care services must establish a clearly defined 24/7 escalation route for maternity patients to access intensive care, including from enhanced maternal care units when they have separate oversight.[2, 6, 7]
5. Local measures must be in place to promote and facilitate breastfeeding, including milk expression, and to ensure routine contact between woman and newborn whilst receiving intensive care.[2, 3]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Critical Care Operational Delivery Networks (ODNs) or their equivalent should develop a strategy for regional maternal critical care provision.[3, 7]
2. Each Critical Care ODN, or their equivalent, should appoint a clinical lead for maternal critical care to liaise with the regional Maternal Medicine Network (regional lead clinicians for maternal medicine where unavailable), assist in developing escalation pathways, support coordinated quality improvement and educational initiatives.[3]
3. For maternity admissions to intensive care expected to exceed 48 hours, a documented multidisciplinary discussion should involve regional expertise in maternal medicine and maternal critical care, through the Maternal Medicine Networks (or regional lead clinicians). [2, 3, 7]
4. Local policies should be developed for the care of critically unwell maternity patients.
5. Consultants in intensive care should have an active role in multidisciplinary discussions and meetings concerning the pre-conception, antenatal, peri and post-partum care of women with significant pathology, especially those likely to require ICU admission.[2]
6. The transfer of critically ill maternity patients should follow the specific guidance for this patient group.[8]
7. Allied health professionals in intensive care, and intensive care pharmacists should establish clearly defined pathways for accessing experienced support from regional/supra-regional colleagues experienced in maternity care.[2]
8. Intensive care and outreach from intensive care services should contribute to maternal critical care and enhanced maternal care training for doctors, nurses, midwives, and the broader multidisciplinary team.[3]
9. Local training should be regularly reviewed to ensure that competencies and exposure to the management of maternal critical care align with up-to-date clinical guidance and practice.[1, 9]
10. When inclusion criteria are met, ICUs should actively promote the inclusion of maternity patients in clinical research trials and studies.[1, 2]
11. Data relating to enhanced maternal care and maternal critical care should be routinely collected and reviewed to enable benchmarking and improve outcomes, with insights disseminated to the wider multidisciplinary team.[6]

BACKGROUND AND EXPLANATION

Despite the UK's low maternal mortality, recent trends show a rise that may be linked to factors such as increased maternal age, diabetes, obesity, and hypertension. Significant disparities in outcomes persist across different ethnic and socioeconomic groups.[1, 2, 3] Delivering care to critically ill maternity patients presents additional challenges given variations in team skill-mix, resource constraints, and the distances between maternity units and intensive care facilities.[4, 10] Nevertheless, these logistical challenges need to be seen as obstacles to overcome rather than justifications for inequitable care.

Clear escalation routes to both enhanced maternal care and intensive care are paramount along with the early recognition of maternal deterioration. The adoption of nationally agreed maternity-specific early warning scores, already in use in Scotland and being introduced in England, is vital wherever a woman receives care.[6, 11] When needed, intensive care input cannot be delayed. If immediate transfer to an ICU is not possible, staff with the necessary expertise need to provide the required level of care at the patient's current location until transfer is possible.[2, 6, 12]

ICUs admitting critically ill maternity patients need to be prepared for severe maternal morbidity and potential adverse events with relevant protocols, equipment, drugs, and trained staff promptly accessible. In maternal cardiac arrest, there needs be immediate access to resuscitative hysterotomy and neonatal resuscitation. Ensuring the availability of emergency equipment and using checklists is invaluable for confirming that the wider multidisciplinary team is informed of a maternity patient's admission. The neonatal team need to be informed about all patients who have reached a viable gestation.

Local policies for the care of critically unwell maternity patients would ideally cover topics such as: maternity-specific reference ranges for physiological parameters (aligned with the Maternity Early Warning Score), maternity-specific admission checklists, the promotion of family-centred care, follow-up that includes a review of psychological well-being, and signposting to pre-conception counselling for all women of childbearing capacity recovering from any critical illness.[2, 3, 7]

Critically ill maternity patients require regular multidisciplinary review. The team attending the patient must include an intensive care consultant and an obstetric consultant and will ideally also include an anaesthetic obstetric consultant and a senior midwife. In gestations under 20 weeks, obstetric review may be substituted by gynaecology review depending on local arrangements. Input from an obstetric physician can be sought where available, and from the relevant organ specialists where appropriate. When care needs cannot be met locally, transfer should be arranged and conducted according to the latest guidance, which includes specific advice for critically ill maternity patients.[8] In particular, patients with refractory hypoxaemia need to be promptly referred for consideration of ECMO, with indications for ECMO in pregnancy being the same as for general adult patients and outcomes being comparable or superior.[2]

When clinical condition permits, the woman needs to be supported in providing routine newborn care in the intensive care unit, encouraging partner and family involvement. Breastfeeding support must be available, and any unavoidable separation from the newborn needs to be minimised, with facilitated visits to the NICU or vice versa. Virtual contact between woman and baby using videoconferencing software may be offered where physical reunification may be delayed. Follow-up care for maternity patients needs to include screening for psychological harm such as PTSD and arranging specialist help as needed. There is an increased risk of mortality and hospital readmission within one year among women who have been admitted to intensive care.[13] Women of

childbearing capacity recovering from any critical illness need to have the opportunity to discuss the impact of pregnancy on their health and be referred to specialists in maternal medicine for advice on future pregnancy.[7]

Improving the quality of care for critically ill maternity patients requires strong leadership in ICUs and Critical Care ODNs (or equivalent). Aligning with experts in maternal medicine at a regional level, such as through the Maternal Medicine Networks in England, supports effective management of high-risk patients, whether their deterioration is anticipated or unexpected. Systematic data collection is essential for benchmarking and enhancing the quality of care for this patient group. Through joined-up care, good communication, and effective multidisciplinary working, we can make a significant difference to outcomes while ensuring that the voices of women who acquire severe morbidity are heard.

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4.13 Care of the Critically Ill Child in an Adult Intensive Care Unit

Authors: Peter Donnelly, Ged Manning & Donna Webb

INTRODUCTION

In line with Paediatric Critical Care Society, we refer to Paediatric Critical Care for children.

Children requiring intensive care support should be looked after in a Paediatric Critical Care Unit (PCCU). It is not unusual however, for children to require input from adult teams to provide initial support, resuscitation and stabilisation depending on the resources available within each hospital. Additionally, in 'surge' conditions, an adult ICU may be asked to provide a longer period of care for paediatric patients due to local bed pressures and/or availability of paediatric critical care transport teams. Within specialist hospitals, consideration needs to be given to the appropriateness of patients cared for within an adult setting in respect of their age and pathology.

The 6th edition of the Paediatric Critical Care Society (PCCS) Quality Standards (2021) outlines the expected standards which apply to services providing paediatric critical care support in an adult ICU. This chapter highlights the key standards required to provide safe and high-quality care for this patient group.

MINIMUM STANDARDS

1. Critically ill children under 16 years old must only be admitted to and stay on an adult ICU if a PCCU bed is unavailable.
2. Admission must be discussed and agreed by the local adult intensive care consultant, the admitting local consultant (e.g. paediatrician or paediatric surgeon) and the PCCU consultant (this may be the regional paediatric transport team consultant) at the time of admission and daily thereafter.
3. A local consultant paediatrician or PCCU consultant and a paediatric nurse must be available for advice at all times.
4. A nominated lead intensive care consultant and lead nurse in the adult ICU must be responsible for intensive care policies, procedures and training related to the care of children.
5. Protocols for resuscitation, stabilisation, accessing advice, maintenance and transfer of critically ill children and the provision of paediatric critical care must be available.
6. An adult ICU that may provide care for critically ill children must have drugs and equipment appropriate to the age of the children who may be admitted available and checked in line with local policy.
7. Escalation, end of life and organ donation decisions must be discussed in collaboration with the regional PCCU consultant (this may be the regional paediatric transport team consultant), under

a shared care and shared responsibility model.

8. There must be collaborative working between the adult ICU and the regional PCCU to ensure that staff are supported to work outside their normal core competencies.
9. There must be 24-hour access for parents/carers to visit their child.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. The child should be reviewed by a local consultant paediatrician and paediatric nurse twice a day during their stay on the adult ICU.
2. An onsite anaesthetist, intensivist, paediatrician or other healthcare professional with up-to-date competencies in advanced paediatric resuscitation and life support and advanced airway management should be immediately available at all times.
3. A consultant anaesthetist, intensivist, paediatrician with up-to-date competencies in advanced paediatric resuscitation and life support and advanced paediatric airway management, who is able to attend the hospital within 30 minutes should be available at all times.
4. There should be access to specialist paediatric healthcare professionals, allied health professionals and pharmacy advice at all times.

BACKGROUND AND EXPLANATION

The landscape of Paediatric Critical Care has changed over the last few decades and now consists mainly of centralised PCCUs and regional transport services. Approximately 18,300 children are admitted to paediatric critical care every year and the demand for beds is increasing by approximately 5% year on year due to a number of factors such as advances in medical technology, improvements in neonatal care, and increasing education and knowledge[1,2]. A recent NHS England review recommended the creation of Operational Delivery Networks across England with the hope of reducing demand on Level 3 beds by delivering Level 1 and 2 care outside of a PCCU.[1] Despite the increase in demand, there has been no year-on-year increase in capacity within the paediatric critical care national footprint with reports finding that there are too few Level 2 beds across England to reduce demand on Level 3 beds and deliver care closer to the family home.[1] As a result of this centralisation of services, and other factors such as workforce planning/succession, it is recognised that some clinicians may feel inadequately trained to care for paediatric patients in certain settings.[3]

In order to assist the adult intensive care teams who find themselves in this position, the PCCS guidelines 2021 set out clear guidelines for the care of children within the general intensive care environment with a series of quality standards describing recommendations in areas such as nursing and medical training and staffing, environment and family support[4]. The PCCS standards recommend that advice from the PCCU within existing referral pathways must be available where

children are not under the care of a paediatrician, and that adult ICUs have appropriate guidelines in place.

Critically ill children under 16 years old must only be admitted to and stay on an adult ICU if a PCCU bed is unavailable. Exceptions to this, for reasons of bed capacity, patient physiology or social circumstances need to be agreed and clearly documented by both the adult ICU and PCCU consultant at the time of admission. Children over the age of 16 may occasionally be admitted to PCCU on a case-by-case basis; for example, a 17-year-old with a complex background who has not yet transitioned to adult services.

Every year there are seasonal winter pressures in paediatric critical care where capacity is more likely to be stretched. Teams are required to make decisions to ensure an appropriate critical care bed is found for each individual patient and in some circumstances this might require utilisation of a neonatal or adult intensive care bed. The PCCS has written guidance on such circumstances to provide colleagues with a framework to support the decision-making processes [5].

The COVID-19 pandemic has shown that both adult and paediatric staff have transferrable skills and are able to support each other with mutual aid. Accepting the potential for further surges in paediatric critical care demand, we need to ensure that appropriate surge education and training is available to all staff within the adult intensive care community. Escalation pathways and creation of local surge protocols can ensure that continuous robust structured support and advice is available to provide safe, high-quality care for paediatric patients.

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4.14 Care of the Chronically Critically Ill Patient

Authors: Zudin Puthucheary, Polly Fitch, David Griffith, Kate Tantam & Paul Twose

INTRODUCTION

A significant number of patients admitted to ICU will require a prolonged period of organ support and a protracted ICU stay; these patients can be described as 'chronically critically ill'. Whilst underlying drivers of prolonged admission vary (e.g. underlying diagnosis, persistent critical illness, persistent inflammation, immunosuppression and catabolism syndrome)[1], these patients face common specific challenges during their ICU admission and post-ICU recovery that exceed the complex rehabilitation needs of all ICU patients considered in Chapter 3.6 Rehabilitation. In the absence of consensus definition of the chronic critically ill, we suggest any patient with an ICU length of stay of greater than 10 days is managed according to the following minimum standards and recommendations.[2,3]

MINIMUM STANDARDS

1. A robust process must be in place within each ICU to identify patients with, or at risk of, chronic critical illness.
2. A named senior member of the clinical team must be identified to coordinate and lead a multidisciplinary team, responsible for the care of chronically critically ill patients.
3. Resource demands and needs of chronically critically ill patients must be audited in line with departmental clinical governance frameworks.
4. A weekly multidisciplinary patient review must occur using a standardised clinical tool.
5. Goals and care plan aims from the multidisciplinary patient review must be clearly recorded in the medical notes.
6. There must be documented discussions with the patient and their nominated family and friends on expected prognosis, outcomes and the degree of associated morbidity and with the referring clinical team.[4]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. A personalised rehabilitation plan, informed by a standardised clinical tool, should be available.
2. A copy of the rehabilitation plan should be provided at the point of ICU discharge to the receiving team, patient and their family and friends[3,4].
3. Services should utilise recognised key performance indicators which include both patient-reported outcome measures and patient/family and friends reported evaluation measures.
4. Visits from the ward multidisciplinary team and visits to receiving clinical areas should be considered to support the transition from ICU areas after discharge.[5]

5. Prior to ICU discharge, a decision reached in discussion with the patient and their family and friends regarding readmission to ICU should be recorded and communicated as part of handover.[4]

BACKGROUND AND EXPLANATION

Improvements in diagnostics and treatments have led to improved survival rates, resulting in an increasing number of long-stay patients with significant ongoing physical and psychological care needs.[2] Careful attention to the management of pre-existing comorbidities for the care of the chronically critically ill during transitions of care may help reduce healthcare utilisation after intensive care discharge.[6] Though a relatively small cohort, those with chronic critical illness can account for significant proportion of intensive care capacity.[3] Whilst the majority of ICU patients will have complex rehabilitation needs, this group faces some very specific additional challenges around coordination of care related to issues including (but not limited to) exacerbation of chronic diseases by critical illness, muscle wasting, delirium, pain, secondary complications and the expectations of the patient, their family and friends and the referring team.

A weekly multidisciplinary patient review is needed to identify patient needs and the resources required and improve outcomes.[7] This needs to be regularly documented, audited, and processes be in place to evaluate patient and service level outcomes, including patient reported outcome measures (e.g., EQ-5D-5L, PICUPS) amongst other evaluation measures for early identification of rehabilitation needs.[8,9] Interviews with patients, their family and friends may also be of benefit.[10]

Learning from major trauma has demonstrated the benefits of involving patients, with their families, friends and carers (as appropriate), in assessments, in planning their coordination of care and in making decisions at all stages of the rehabilitation process, including decisions around readmission in the event of deterioration[11]. It is particularly important in this patient group because of the potential conflicting opinions on realistic outcomes between patients, their family and friends, referring teams and the intensive care team.[4]

Individualised rehabilitation plans should be available and updated throughout the recovery continuum; these provide the patient with a summary of their ongoing rehabilitation needs and planned interventions. [11,12] Standardised rehabilitation assessments such as the PICUPS can aid the recognition of ongoing needs, and potential disciplines required.[11] Visits out of ICU can be very beneficial to patients and their family and friends in preparation for discharge.[5]

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4.15 Managing Acute Severe Behavioural Disturbances

Authors: Tim Wenham, Molly Chibvuri, Linda Monk & Monika Beatty with contributions from FICM Legal and Ethical Policy Unit

INTRODUCTION

Acute severe behavioural disturbance is an umbrella term with no formally agreed consensus definition. Broadly speaking, it refers to individuals with acute severe agitation and abnormal physiology and encompasses (but is not limited to) conditions currently, or previously described as acute behavioural disorder and agitated, or excited delirium[1]. Patients, and occasionally relatives, displaying acute severe behavioural disturbances place themselves, staff and other patients at risk and often require significant resource utilisation. Rapid tranquilisation may be required in patients displaying extreme agitation, violence and aggression, who do not respond to verbal de-escalation techniques or oral agents, to ensure that the patient, staff, and others are safe, and to achieve appropriate clinical investigation and management within the ICU.

Violence and aggression in healthcare settings, including in ICU, is common. This may be displayed by visitors, in addition to patients. The Health and Safety Executive defines work-related violence as "*any incident in which a person is abused, threatened, or assaulted in circumstances related to their work*"[2]. The remit of this chapter therefore extends beyond the management of patients alone and encompasses standards and recommendations for *any* instances of violence and aggression within the ICU.

MINIMUM STANDARDS

1. ICUs must have a guideline for the management of patients with acute severe behavioural disturbance, including rapid tranquilisation.
2. ICUs must have policies in place for the management of visitors to the unit who display violence and aggression.
3. ICUs must have written guidance for the use of patient restraint[3].
4. Appropriate patient monitoring must be used when rapid tranquilisation methods are deployed [1,4].
5. ICUs must have 24/7 immediate/rapid access to personnel who have training in de-escalation and, where appropriate, physical restraint.
6. A capacity assessment must be undertaken on a patient, in accordance with the relevant UK Home Nation's capacity legal framework, prior to the administration of rapid tranquilisation and/or restraint[5-7] and recorded in the medical records at the earliest opportunity.
7. ICUs must have 24/7 access to emergency mental health services.

RECOMMENDATIONS FOR A QUALITY SERVICE

1. All senior medical and nursing staff should receive de-escalation training.
2. ICUs should consider training senior medical and nursing staff in the use of safe physical restraint in the clinical setting.
3. All ICUs should have personnel trained in supporting staff who have been involved in caring for patients/relatives with acute severe behavioural disturbances.
4. ICUs should be able to surge their staffing capacity to 2:1 or even 3:1 nursing/HCA capacity when managing patients with acute severe behavioural disturbance.

BACKGROUND AND EXPLANATION

A recent modified Delphi study identified patients with acute severe agitation, who are at particular risk of physiological deterioration (including cardiac arrest), as those who display the triad of: tactile hyperthermia (being hot to touch), exhibiting constant or near-constant activity, and extreme agitation or aggression[8]. Other factors indicative of severity included progressive physiological derangement and a requirement for doses of sedation that may result in respiratory depression, or airway compromise. Intubation and ventilation may need to be considered for patients most at risk.

Although commonly related to recreational drug use or withdrawal, a wide range of clinical conditions can cause acute severe behavioural disturbance and may need to be included in the differential diagnoses. Specific treatments need to be considered where appropriate e.g. management of alcohol or drug withdrawal, or serotonin syndrome.

Restraint techniques should only be used for patients who lack capacity, or if consent has been given by patients who have capacity (the caveat to this being that if steps are immediately necessary to protect others from the risk of significant harm, then proportionate restraint can be used, irrespective of the patient's capacity). For all modes of restraint, a risk assessment needs to be undertaken. Physical restraint may increase the risk of complications in patients with acute severe behavioural disturbances[9]. Restraint techniques need to be deployed in accordance with the relevant UK Home Nation's capacity legal framework (i.e. following an assessment of best interests, or overall benefit), by appropriately trained staff[7]. If the patient lacks capacity to consent to being restrained, restraint is lawful if it is necessary and proportionate to the risk of harm they would suffer otherwise. That harm can include not receiving the treatment required to address the causes of their acute behavioural disturbance. In emergency life-threatening situations, a deprivation of liberty situation is unlikely to occur [10,11]. However, where ongoing restraint is required, attention does need to be paid to deprivation of liberty safeguards[3,11] (at the time of writing, these only apply to England & Wales and Northern Ireland, as no directly equivalent safeguards currently exist in Scotland).

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4.16 Major Trauma

Authors: Adam Wolverson, Dean Kerslake & Ronan O'Leary

INTRODUCTION

The management of major trauma has been transformed in the UK by the development of major trauma networks centred on regional Major Trauma Centres (MTC) acting as a hub for the associated Major Trauma Units (TU) located in peripheral hospitals[1,2]. When measured by excess survivors, these structural changes have led to significantly improved outcomes for patients who sustain life-threatening traumatic injuries[3].

Intensive care has been central to that transformation and represents the nexus for the co-ordination of high-quality interventions following major trauma. It is therefore essential that each ICU develops strong, productive, and collaborative links with the relevant specialties and with the wider regional trauma and critical care networks.

This chapter is focussed on providing standards and recommendations that enhance team working, collaboration, and resilience within this demanding clinical sphere. As such, it articulates a framework for infrastructure, staffing, and operational pathways as the key components for a high-quality intensive care service treating patients suffering from major trauma.

MINIMUM STANDARDS

1. Patients accepted to an MTC must not be delayed due to lack of intensive care capacity.
2. Each MTC ICU must have a nominated lead consultant and lead nurse for major trauma.
3. Each MTC ICU must have guidelines for the multi-specialty and multi-professional management of major trauma as determined by the major trauma network.
4. ICUs caring for major trauma patients must facilitate appropriate multi-professional services for trauma focussed care and rehabilitation. (See Chapter 3.6 Rehabilitation)

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Each critical care network or equivalent should develop and implement a trauma intensive care clinical advisory service, led by the MTC, where the intensive care clinicians at the MTC can support the care of patients with traumatic injuries admitted to TUs.
2. Each TU should have named link consultant intensivist and senior ICU nurse to facilitate liaison and other interactions with the MTC ICU.
3. Nurses caring for major trauma patients in intensive care should have undertaken the appropriate trauma focussed training and achieved the required competencies.
4. There should be a specific intensive care trauma quality improvement programme within each MTC.

5. Movement and positional restrictions and advice, for example following spinal or pelvic fractures, should be reviewed daily by the relevant specialist team with the objective of relaxing the restrictions as early as possible.
6. Trauma patients in intensive care should be considered for recruitment into trauma-specific research studies.
7. Patients should be repatriated from the MTC to their local TU, between ICUs, when the acute phase of trauma care has been completed.
8. Where ICU to ICU repatriation is appropriate, it should be completed within 48 hours of referral.
9. ICUS should participate in local and regional Emergency Preparedness, Resilience and Response (EPRR) planning.
10. ICUs should be able to demonstrate participation in simulations and exercises focussed on major incidents involving multiple trauma causalities.

BACKGROUND AND EXPLANATION

Following a series of reports which articulated clear deficits and unwarranted variations in major trauma care that had been associated with poor outcomes, NHS England established 22 major trauma networks centred on Major Trauma Centres (MTC) acting as a hub around the clustered Major Trauma Units (TU) in peripheral hospitals.[1,2] Subsequently, this system has become established throughout Wales, Scotland, and Northern Ireland.

The core aspects of high-quality provision of intensive care for major trauma patients are described in a variety of commissioning standards or specialist guidelines. These include the NHS England major trauma service specification[4], the NICE major trauma service delivery standard[5], NICE head injury guidance[6], GIRFT and the critical illness[7] and trauma rehabilitation standards[8]. Relevant guidelines include the American College of Surgeons Trauma Quality Improvement Programme (TQIP), the European guidelines on the on management of major bleeding and coagulopathy following trauma[9], and the Western Trauma Association guidelines to reduce venous thromboembolism in trauma patient[10], amongst many others.

Conceptually, major trauma may be considered as a multi-system, systemic pathological syndrome within which the patient is subject to the consequences of the initial injuries and then the complications and sequalae of those injuries. The most severe patients, judged by Injury Severity Score, have to be admitted to a MTC ICU where management spans three overlapping phases: resuscitation and injury management, avoidance of secondary complications, and recovery and rehabilitation.

The multi-system nature of trauma care requires a multidisciplinary approach comprising medical and nursing specialties with physiotherapy, occupational therapy, dietetics, trauma psychology (where families and staff are also supported), speech and language therapy, and rehabilitation. Such efforts are supported by local and regional multidisciplinary trauma education (such as the

NMAHP framework in Scotland), trauma clinical governance, within trauma focussed quality improvement and research landscapes.

The consultant intensivist's role is to conduct the procession of interventions, monitoring, and treatments in the most effective and efficient way possible by balancing the need for physiological optimisation with the pressing requirements for imaging and surgery. ICUs need to develop a shared ethos with their partner specialties, which is reflected in local policies, that reduce variation in care and decrease the accumulation of secondary insults, for example by encouraging shorter, less invasive approaches for the management of long bone fractures in the presence of severe traumatic brain injury[11].

Finally, in any resource constrained system, intensivists will need to balance the demands on the service with the available capacity. Patients are likely to benefit the most from specialist intensive care during the earliest phases of treatment following injury and, once accepted to an MTC admission must not be delayed. In contrast, it may be necessary to balance the population need to provide a high tempo of admissions with the capability to repatriate patients to TUs, in line with ICS transfer guideance[12], providing that there is sufficient infrastructure at the receiving hospital to ensure that the patient's recovery and rehabilitation will not be compromised.

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Section 5 | **SERVICE DEVELOPMENT**

5.1 Research

Authors: Bronwen Connolly, Ben Creagh-Brown & Charlotte Summers

INTRODUCTION

Observational data clearly demonstrate the high costs (at personal, service, and societal level) associated with critical illness during the acute hospital stay, but also over time horizons extending many years after acute hospital discharge. The National Institute for Health and Care Excellence (NICE) recommends implementing and funding new treatments and interventions based on clinical and cost-effectiveness from an NHS perspective. Alongside the NHS's commitment to delivering continual clinical improvements, participation in research is a core component of delivering high-quality intensive care. This is also now highlighted by the General Medical Council in the Duties of a Doctor (2024).[1]

MINIMUM STANDARDS

1. All individuals participating in research activity must have completed Good Clinical Practice (GCP) training for research and keep this up to date.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. All ICUs should participate in research.
2. ICUs should have a nominated research lead (usually, but not necessarily, a medical consultant) who coordinates activity and is the principal liaison with Trust/Health Board Research and Development (R&D) departments and the National Institute of Health and Care Research (NIHR) Regional Research Delivery Network (RRDN) Critical Care Lead, or equivalent in the Devolved Nations.
3. The nominated research lead should have dedicated and funded time within their job plan or equivalent to perform this role.
4. ICUs should participate in research networks, which are organised through the NIHR RRDN or equivalent in the Devolved Nations.[2]
5. All research studies should be registered on the NIHR Critical Care Research Portfolio (overseen by the Critical Care National Specialty Group[3]) whenever they fulfil eligibility criteria.
6. ICUs participating in research should provide information to patients, relatives, and surrogate decision makers (SDMs) about ongoing research, for example through posters, leaflets, or within generic intensive care information resources.
7. ICUs participating in research should have clear procedures for approaching patients, families, and SDMs in a manner that minimises stress and/or burden, but that also provides adequate information in a timely manner.

8. ICUs delivering multiple studies should implement processes to support co-enrolment including patient tracking, and clear communication between individuals taking consent.[4]

BACKGROUND AND EXPLANATION

Research is the mechanism by which new knowledge is acquired to develop diagnostics, treatments, therapies, and services, and to provide evidence that these are clinically and cost effective. High-quality evidence is needed to justify widespread adoption, and to ensure all NHS patients can benefit from new therapies. The NHS is committed to supporting research activity. All patients have the right to participate in this activity, including when they are critically ill. Offering the opportunity to participate in clinical research is integral to the duties of a medical doctor.[1]

The NIHR is the national organisation that oversees research funding, governance, and delivery in the NHS. In the UK, ethical research approvals are managed through the NHS Health Research Authority's national gateway (Integrated Research Application System: IRAS (https://www.myresearchproject.org.uk/) following recommended guidelines.[5]

National Institute for Health and Care Research

The NIHR research delivery infrastructure includes research delivery networks (RDN), of which England is divided into 12 regional RDN (RRDN) each with distinct geographical boundaries and a lead organisation.[2] Each RRDN receives government funding to support research delivery within its hospitals and healthcare organisations, for example, through staffing provision such as research nurses and pharmacy, or protected research time within job plans. Similar networks are present in Scotland, Wales and Northern Ireland, and all four nations are participants in the NIHR National Specialty Group for Critical Care.

For the intensive care specialty, each RRDN has a research lead whose remit is to promote and coordinate regional activity. Devolved nations have different structures and funding organisation in place. RRDN and intensive care leads meet with the National Specialty Lead for Critical Care regularly, as members of the National Specialty Group (NSG), to coordinate and develop intensive care clinical research activity and manage the UK Critical Care Research Portfolio. The Critical Care NSG contributes to developing, promoting, and delivering patient pathway research in partnership with other cogent hospital and community-specialty groups.

Critical Care Research Portfolio

Research funded competitively by 'eligible' funding organisations, 'adopted' commercial research, and other 'adopted' research (for example international trials) comprise the UK critical care research portfolio. Eligibility criteria and adoption processes are available via the NIHR website.[6] Intensive care studies are regularly reviewed by the RRDN teams to ensure appropriate support is provided and the study is successfully delivered. Studies on the NIHR research portfolio are eligible for support (for example, by research nurses) through RRDNs, and are the priority for the NIHR.

Funding research activity

Funding for research studies in the NHS is divided into NHS support costs, direct research costs, and excess treatment costs.[7] A description of these as they relate to ICUs, and where funding can be sought, has been published.[8] Support for screening and consent processes (for example, research nurse time), which is labour-intensive and time-critical for many intensive care studies, is an NHS support cost and needs to be sought through RRDNs or local R&D departments. Continual improvements for supporting and embedding research into clinical practice and engaging health and social care clinicians, patients, and other stakeholders are central to the NIHR ethos, enabling research delivery.[9,10]

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5.2 Audit and Quality Improvement

Authors: Kevin D Rooney & Irfan Chaudry

INTRODUCTION

Quality healthcare is defined by the Institute of Medicine as care that is "safe, effective, efficient, equitable, timely and patient centred"[1]. Clinical audit is a means to find out if the healthcare provided is in line with agreed and proven standards, helping professionals and patients identify how their service is performing, and where improvement could be made[2]. Quality Improvement (QI) completes the audit cycle and has been described as the "combined and unceasing efforts of everyone – to make changes that will lead to better patient outcome (health), better system performance (care) and better professional development (learning)".[2]

MINIMUM STANDARDS

1. ICUs must have a structured and planned clinical audit programme to compare practice to published standards.
2. ICUs must participate in a national patient outcome benchmarking audit.
3. There must be an identified lead for the audit programme, with appropriate time allocation for the role.
4. ICUs must have a QI programme to support the processes of care.[3,4]
5. ICUs must be able to clearly evidence change as a result of audit, QI and measured patient outcomes.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Staff should be encouraged and supported to train in QI methodology.
2. QI projects should be multi-professional where possible.
3. ICUs should have robust data-collection systems in place that support the collection of activity and quality data for local and national audit, and QI programmes.

BACKGROUND AND EXPLANATION

Recognised national audits, together with the collection of nationally mandated datasets such as the Intensive Care National Audit and Research Centre (ICNARC) and the Scottish Intensive care Society Audit Group (SICSAG) provide information for both quality assurance and QI.

Measurement is an integral part of both clinical audit and QI. As such, it is important that ICUs monitor key measures of:

- Structure (e.g. nurse staffing and skill levels in intensive care)
- Process (e.g. night-time discharges from intensive care)

- Outcome (e.g. standardised mortality ratio).

When undertaking both audit and QI, the focus of the project are best served by looking at structure, process and outcome measures in one of the domains of healthcare recommended by the Institute of Medicine or other UK regulatory bodies; namely safe, effective, efficient, equitable, timely or person-centred care.[1]

To best support audit and QI, ICUs will benefit from having robust data-collection systems. These systems need to be easy to use, secure and resilient. It is important that resources are identified to employ staff to facilitate data collection and input.

QI can be supported by regular measurement, e.g. monthly review of patients readmitted after discharge from ICU. Charts can be simple 'run charts', and the construction and display of such charts can form an integral part of a QI process. Results can be shared with staff, patients, and carers.

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5.3 Clinical Governance

Authors: David Sperry & Suman Shrestha

INTRODUCTION

Clinical governance is the system through which NHS organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which clinical excellence will flourish[1].

Clinical effectiveness is the application of the best knowledge, derived from research, clinical experience and patient preferences to achieve optimum processes and outcomes of care for patients. The process involves a framework of informing, changing, and monitoring practice[2].

Clinical governance ensures that care is safe, effective, person-centred and assured[3]. Demonstration of safe care includes reporting and investigation of incidents, regular review of morbidity and mortality (including structured case review of deaths[4]) and maintenance of risk registers. Effective care encompasses the availability and use of guidelines, standards and quality service improvement. Person-centring covers patient and family involvement in services including service planning, incident and complaint investigation. Assurance comes through external health care inspection (e.g., CQC) and may be evidenced by membership of national audit groups (ICNARC, SICSAG) for quality benchmarking.

MINIMUM STANDARDS

1. There must be an appropriately trained intensive care consultant and senior nurse identified as leads for clinical governance.
2. Clinical governance processes must be fair, transparent and free from bias and discrimination as well as being supportive of staff, patients and their families.
3. There must be regular multidisciplinary governance meetings where progress and completion of incidents, risks, complaints, regular audits and learning from governance is discussed.
4. All intensive care services must maintain and regularly review a risk register.
5. There must be a robust system for reporting, investigating and learning from all patient safety incidents which includes a clear pathway to the hospital board level.
6. ICUs must hold regular structured and minuted, multidisciplinary morbidity and mortality meetings in which clinical staff will discuss learning from deaths, incidents, good practice and risks.
7. Key performance indicators (KPIs) must be identified, both locally and according to national benchmarking audits
8. Local and relevant national guidelines must be readily available to clinicians.
9. All staff must receive training (ideally at induction) on access to relevant patient care information.

10. Regular quality of care feedback must be obtained using (i.e. using safety surveys[7] and relatives' questionnaires[8]) and the results shared.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. There should be a robust system for identification of cases requiring structured mortality review, which includes significant incidents, concerns on the part of patients, families, clinicians, medical examiners or coroners/procurator fiscals and written complaints.
2. Staff undertaking structured mortality review should be adequately trained, of sufficient seniority and have appropriate time to complete the process.
3. A programme of quality service improvement should be in place with close links to governance as a source of targeted improvement.

BACKGROUND AND EXPLANATION

It is important for leadership teams to create a culture where intensive staff are comfortable reporting incidents, feel listened to when issues arise and are open and honest with patients when things go wrong. Staff need to feel supported through governance processes and specific support is needed for staff involved in safety incidents or patient mortality. Governance staff conducting incident investigation and duty of candour processes need to be trained to deliver sensitive and constructive reviews and medical staff aware of GMC guidance around engagement with the governance processes and CQC reviews.

The consultant identified as lead for governance cannot be the clinical lead or director for intensive care and both he and the nursing lead require adequate time for their roles included in their job plans. It would be beneficial for intensive care governance staff to work with other clinical teams in the Trust/Health Board and region to share learning from incidents and mortality review, disseminate best practice and enhance quality improvement. Training in clinical governance and structured mortality review needs to be provided for intensivists in training.

It is important that patients and families are encouraged to raise issues, complaints or compliments, and are supported through governance processes, with investigations and replies completed in a timely fashion. ICUs need to regularly review guidelines from professional organisations to ensure up to date best practice, along with updated evidence being translated into comprehensive local guidelines or standard operating procedures; these will require regular review and update Incident reporting, duty of candour (jurisdiction dependent) and appropriate action plans need to be documented and completed in a timely manner, with ICUs able to demonstrate learning and change from both significant incidents and good practice[5].

Data from key performance indicators needs to be reviewed, understood and shared. ICUs need to submit timely, good quality data to national benchmarking audits including ICNARC or SIGSAG. Data collection for national audits needs to be funded.

Clinicians need to be able to demonstrate that they can access relevant guidelines and unit policies, including medication policies.

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5.4 Patient Safety Standards

Authors: Peter Hersey, Peter Bamford, Gary H Mills & Clare Windsor

INTRODUCTION

Adherence to the standards in this chapter will not remove all risk from ICUs. They have been selected as uncontroversial, evidence based, auditable safety standards that every unit must adopt. Most are not new or novel, but this doesn't devalue their importance. While some of the standards overlap with other chapters they are brought together here for emphasis and auditing purposes.

MINIMUM STANDARDS

1. Waveform capnography must be used to confirm endotracheal tube placement and continuously monitored for patients who are invasively ventilated.[1]
2. Patients must be assessed for risk of thromboembolic disease and receive appropriate prophylaxis.[2]
3. The type and placement of nasogastric feeding tubes (NGTs) used for enteral feeding, hydration and/or drug administration, must comply with National Patient Safety Agency guidelines.[3]
4. There must be a robust system for reporting, investigating and learning from all patient safety incidents which includes pathways to Trust/Board-level governance committees (see Chapter 5.3 Clinical Governance).
5. Regular handwashing audits must show compliance with the WHO '5 moments of hand hygiene' and standard infection control precautions.[4]
6. Two-dimensional (2-D) imaging ultrasound guidance must be used where cannulation of the internal jugular, axillary or femoral vessels is undertaken.[5]
7. Each ICU must use local safety standards for invasive procedures (LocSSIPs), adapted from national safety standards for invasive procedures (NatSSIPs) where available.[6,7]
8. Units must follow an evidence-based guideline for the prevention of ventilator associated pneumonia.[8] (See Chapter 4.2 Respiratory Support)
9. Rates of bloodstream, catheter associated, and ventilator associated infections must be monitored as part of a nosocomial infection surveillance system.[9]

BACKGROUND AND EXPLANATION

Patient safety is an easy mantra to quote but complex to achieve. GPICS standards and recommendations are limited in their contribution to a true safety culture as they are unavoidably focused on process and outcomes. The ethos of this chapter however is to ensure that the basics are known to be done well. From this foundation, we hope that a quality improvement approach can be adopted, whereby ICUs are always mindful of areas of risk, and steps are taken to try and reduce those risks. It is equally important to be conscious of the near misses that can go unnoticed.

Intensive care services should strive to adopt practices that are safe and work to eliminate common or recurrent issues. Local governance processes will maintain an awareness of risks, supported by resources such as the FICM Safety Bulletin and recurrent incidents report.[10]

While there is naturally an emphasis on investigating and learning from when things go wrong, there is an increasing recognition of the benefits of recognising and learning from things that go well.[11]

The NHS Patient Safety Strategy[12] is a useful resource for further guidance and background information.

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5.5 Environmental Sustainability

Authors: Sam Clark, Eleanor Damm, Rosie Cervera-Jackson, Heather Baid & Hugh Montgomery

INTRODUCTION

The Intergovernmental Panel on Climate Change (IPCC) has warned "there is a rapidly closing window of opportunity to secure a liveable and sustainable future for all" and warns "the choices and actions implemented in this decade will have impacts now and for thousands of years"[1].

Current intensive care practice consumes large amounts of natural resources and generates high volumes of waste. The environmental footprint of an ICU is three times greater than a general ward[2].

Intensive care services have an obligation to mitigate pollution, biodiversity loss and climate breakdown, which threatens human health and survival. These actions are mandated by legal duties and strategic delivery plans, which inform organisation-level Green Plans[3-6].

Environmental sustainability requires a holistic view of the interconnectivity between ecological, financial, and social resourcing. This means adopting the principles of sustainable clinical practice to meet the present population's health needs, without compromising the ability of future generations to meet theirs[7].

MINIMUM STANDARDS

1. Environmental sustainability must be included at all stages, from construction to operation, when planning or redeveloping an intensive care area.
2. Statutory standards, such as the NHS Net Zero Building Standard (or equivalent standards)[8] must be followed.
3. The environmental cost of equipment and consumables must be included in all procurement evaluations and decisions.
4. Intensive care services must demonstrate compliance with current NHS standards for waste management[9].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. Intensive care services should have a clinical lead (from within any clinical profession in intensive care) for environmental sustainability.
2. Environmental sustainability should be a regular and fixed agenda item in intensive care service quality meetings.
3. The topic of environmental sustainability should be included in departmental inductions and ongoing education programmes, accessible to all intensive care staff.

4. All quality improvement initiatives in ICUs should include an evaluation of sustainable value, which considers the environmental, social, and financial impacts of change, along with patient and population outcomes[7].
5. Intensive care services should demonstrate integration of evidence-based practices which avoid waste, whilst delivering safe and high-quality care in their daily routines[10].
6. Intensive care services should actively engage in initiatives to support the appropriate use of PPE, such as gloves awareness campaigns[11].
7. Evidence of adherence to the NIHR Carbon Reduction Guidelines should be sought as part of the approval process for research carried out in intensive care[12].
8. ICUs should collaborate at a regional level in support of efforts to improve environmental sustainability.

BACKGROUND AND EXPLANATION

Sustainability is an integral component of modern definitions of quality of care[13,14].

One method for planning sustainability interventions is to follow the four principles underpinning sustainable clinical practice: disease prevention and health promotion; patient education and empowerment; lean service delivery; and low carbon alternatives[15]. Achieving sustainable practice in intensive care will require multiple strategies[2].

1. Disease prevention and health promotion

Prevent, identify, and intervene in disease processes early by considering the three underlying determinants of health – social, economic, and environmental.

Example one: Optimise rehabilitation pathways to support better health for intensive care survivors and reduce dependency on others, limiting lost days of employment and lessening the medium to longer term social and economic impacts of critical illness.

2. Patient education and empowerment

Empower patients in the management of their health and healthcare, to reduce disease incidence, progression, and complications.

Example Two: Adopt shared decision-making models in intensive care, such as Advance Care Planning protocols, to better align clinical decisions and interventions with the patient's goals and values[16].

3. Lean service delivery

Improve clinical decision-making in the selection and targeting of interventions and planning of care, to reduce lower value activities and their associated environmental impacts.

Example three: Obtain diagnostic tests in response to specific clinical questions, rather than as routine orders[10]

4. Low carbon alternatives

Include sustainability measures in the evaluation of medical technologies, allowing service planners, clinicians, and patients to choose clinically effective treatments with the best environmental profile, and encourage their further development.

Example four: Switch the prescribed route of medicines administration from intravenous to oral, when the route is available and appropriate, such as for paracetamol.

These principles and strategies, facilitated by regularly embedding sustainability into education, quality improvement, and research activity, ought to be the standard approach to planning and delivering intensive care.

Example actions based upon the above minimum standards and recommendations to provide a quality service include:

- Having a clinical lead to direct sustainability initiatives within their ICU, who can engage with internal and external stakeholders and contribute to the local organisation's Green Plan.
- Regular discussion points for the topic environmental sustainability in quality meetings include planned or ongoing sustainable quality improvement work; review of updated policy, guidelines and procedural documents with a sustainability lens; and involvement in strategies beyond the unit, while pursuing the local organisation's Green Plan.
- Following sustainable procurement guidance such as NHS England's 'Applying net zero and social value in the procurement of NHS goods and services'[17] (or equivalent standards).
- Keeping staff up to date with current waste prevention programmes at organisational level and across the NHS; and ensuring that waste is identified and segregated correctly.
- Avoiding waste, whilst delivering safe and high-quality care in daily routines, including using minimal sedation and performing daily sedation breaks; and adhering to antimicrobial stewardship principles[10].
- Providing training and support to assist intensive care team members to undertake an informed risk assessment for selecting appropriate PPE, aligning with national infection prevention and control standards[18].

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Section 6 | **EMERGENCY PREPAREDNESS**

6.1 Surge and Business Continuity Planning

Authors: Andrew Johnston, Ascanio Tridente & Peter Shirley

INTRODUCTION

There is a requirement for surge and business continuity planning (BCP) for intensive care services. ICUs are high users of pharmaceuticals, oxygen, power, and consumables, and dependent on high levels of staffing for effective function. Any surge on service demand puts effective operational function at risk, where there may be interruptions in supplies, damage to (or unavailability of) infrastructure, or staffing shortages due to numerous possible incidents; hence reliable business continuity planning is essential. Rarely, the adult intensive care service may also be required to support paediatric units with capacity and need to be adequately prepared for this demand.[1]

This chapter must be read in conjunction with other NHS guidance produced nationally in the various jurisdictions of the UK, including the Emergency Preparedness, Resilience and Response Framework and other relevant policy documents.[2,-5] The aim of BCP for intensive care is to provide timely access to an appropriate level of care for patients to prevent avoidable mortality and morbidity and maximise capability within the system in a coordinated approach, until all potential escalation options have been exhausted. It sits in tangent with emergency preparedness, resilience and response (EPRR).[6]

MINIMUM STANDARDS

1. Hospitals with an ICU must have their own escalation plan and BCP.
2. Multi-site hospitals running more than one ICU must have flexible cross-site planning to help with surge and continuity planning.
3. Adult Critical Care Networks, Health Boards and Regions must have oversight to assist in the event of surge and BCP being activated.
4. ICUs must have local SOPs (including action cards and checklists) for disruption of business continuity including fire and evacuation surge, IT system failures and downtime, and major incidents.
5. ICUs must use recognised escalation scales to communicate resource strain either in the ICU or within the wider hospital (e.g. CRITCON and OPEL)[7,8].

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. As lack of intensive care capacity is frequently the rate-limiting factor surge events, Trusts/Health Boards should prospectively identify areas within their acute hospital sites to allow for expansion of intensive care capacity.

2. If increased activity is anticipated, the increase in requirement for consumables, including medical gas supplies, should be quantified in advance using the concept of 'days of supply'.

BACKGROUND AND EXPLANATION

The objectives of surge and business continuity plans are to deliver a resilient intensive care service. They aim to target efforts to optimise safety to both staff and patients and to support clinicians by responding through clinical joint planning, information, intelligence, communication, resource identification, resource sharing, robust representation, or other influences. Plans will also aim to maintain equity of access for resource-utilisation and mutual-aid options for intensive care services across all sites, within networks and beyond. Escalation processes need to be coordinated through local area, regional and national teams and management structures (e.g. NHS England).

Mitigations may include the use of operating theatres, recovery, and augmented higher care areas, or upgrading Level 1/2 intensive care areas to permit mechanical ventilation and Level 3 care.[9] Intra-and inter-hospital capacity transfers are covered in GPICS Chapter 3.2 Capacity Management. Mitigations and expansion of capacity may also require consideration of essential equipment (and its procurement) and possible alternatives. Checklists need to include, for example, which drugs and consumables would run out first if supplies are disrupted.

The use of recognised escalation scales such as CRITCON (real-time observation and assessment of strain by clinical leaders in both routine circumstances and rapidly evolving situations, into a succinct communication score) for ICUs and OPEL (Operational Pressures Escalation Level) across wider NHS organisations enables the rapid communication of stresses and strains on organisations and links into local, regional and national escalation and action plans.[7,8] Communication and clinical response intelligence needs to be shared between clinicians and take place across sites to support sound decision making.

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6.2 Major Incidents

Authors: John Butler, Bernard Foëx & Joanne Thompson

INTRODUCTION

The NHS needs to be able to plan for and respond to a wide range of incidents and emergencies which could affect health or patient care. These could be anything from extreme weather conditions, an infectious diseases outbreak, a major transport accident, a cyber security incident or a terrorist attack.[1]

A major incident is 'any occurrence that presents serious threat to the health of the community or causes such numbers or types of casualties, as to require special arrangements to be implemented.' Major incidents are exceptional events and often lead to an increase in demand for healthcare and intensive care services.

All acute healthcare organisations will have major incident response plans which set out how the organisation plans for, responds to, and recovers from major incidents and threats to business continuity. These plans need to be tested and regularly updated, and are underpinned by legislation contained in the UK Civil Contingencies Act (CCA) 2004, the NHS Act 2006 and the Health and Care Act 2022.[2] This planning is referred to in the health service as emergency preparedness, resilience and response or EPRR. The plans dictate that all acute hospitals must have an Accountable Emergency Officer (AEO) responsible for EPRR. The AEO will be a Board level Director and must publicly state the organisation's readiness and preparedness activities in the annual report.

MINIMUM STANDARDS

1. Acute hospital major incident plans, , must encompass intensive care medicine.
2. All hospitals designated receiving hospitals with Level 3 intensive care capability must have a plan to double their normal Level 3 ventilated capacity and to maintain this for up to 96 hours.
3. Clinical standards must be maintained during a major incident.[3]
4. All hospitals must have an evacuation and shelter plan that includes evacuation and shelter of highly dependent patients, including, but not exclusively, intensive care patients, if the intensive care areas become unusable for any reason.[4]
5. All hospitals must have a lockdown plan that includes all intensive care areas, to prevent unauthorised access.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. The local intensive care leads should be involved in the formulation of acute hospital major incident plans.

2. Intensive care should have access to emergency planning and response training including strategic/crisis leadership.
3. Intensive care staff should participate in the local and regional multidisciplinary exercises including 'table-top' and 'live' exercises to further refine local and regional plans and communication routes between organisations and networks.
4. Intensive care leads should work with their EPRR team to facilitate exercises in the evacuation of very dependent patients from any part of their hospital.
5. Action cards should be available for all staff to use on activation of the plan, which include information and communication routes that are to be used.
6. Advance consideration of staff workforce requirements, including mutual aid from colleagues in other departments or neighbouring hospitals should form part of the intensive care service planning.
7. Staff welfare should be actively supported during an incident with access to informal, immediate debrief and later formal counselling.

BACKGROUND AND EXPLANATION

Under the NHS Constitution the NHS is there to help people when they need it; this is especially true during a major incident or emergency. The NHS Act 2006 requires NHS England to ensure that the NHS is properly prepared to deal with an emergency.[5] NHS England's EPRR guidance documents set out the legal and statutory responsibilities and includes a framework for mass casualty incidents. The AEO for EPRR will ensure robust and well-tested arrangements are in place to respond and recover from these situations.

Effective command and control are vital; the scale of the major incident determines where the top level sits. For the biggest incidents, (tier 4 - national) NHS England `may enact its powers under Section 252A of the NHS Act 2006 to take national command and control of the NHS'. However, all staff need to be prepared to take on significant leadership roles in all phases of any emergency.

Core to their response is the concept that receiving hospital(s) will accept most of the sickest patients and that supporting hospitals will receive the less injured and may take transfers from receiving hospitals.

In order for receiving hospitals with Level 3 intensive care capability to be able to double their normal Level 3 capability their plan needs to include an inventory of where equipment is to come from, where the beds will be located and who will staff them. Ideally this will be near the permanent intensive care unit, to allow normal functioning of the hospital around it.

Every effort must be made to maintain clinical standards. As such, critical incident reporting must be encouraged, and contemporaneous notes must be kept to facilitate appropriate investigation of such incidents, and communication of lessons learned.

Although workforce planning aims to maintain staffing levels there needs to be an acceptance that when demand outstrips resources, normal staffing levels per patient may have to be compromised. This change in staffing levels needs to be planned or modelled in advance.

In a mass casualty incident, intensive care resources may be overwhelmed, with the requirement for triage, which needs to be considered and agreed nationally. This may lead to complex and difficult ethical decisions.

All staff working in intensive care need to know their specific role in the major incident plan, the command-and-control arrangement and information required. This will ideally be written on an action card to be read when an incident is declared and practised in advance of a major incident taking place. Workforce planning for the likely duration of the incident needs to take place early.

As a major may be an internal disruption intensive care staff need to take part in evacuation exercises of very dependent patients from any part of the hospital. This will include practical skills such as using ski sheets and patient handling aids with adequate rehearsal plus planning in decision making and training for shift leaders making the decision to perform an evacuation.

The intensive care response may be of several weeks' duration and include frequent surgery for patients, as well as transferring patients to other hospitals. Being actively involved in the planning of exercises and having a full part while they are being run is essential.

After a major incident, the capacity of an individual healthcare organisation or site to provide optimal treatment for patients may be impaired for some time. It would be beneficial for organisations to collaboratively develop plans to assist each other under these circumstances.[6]

Staff welfare during and after an incident response is paramount. Some may be affected significantly more than others, and for some weeks after the event. Support for staff is essential.[7]

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6.3 High Consequence Infectious Diseases: Initial Isolation and Management

Authors: Stuart Dickson & Jake Dunning

INTRODUCTION

In the aftermath of the Ebola virus disease epidemic in West Africa and following experience of managing Middle East respiratory syndrome (MERS) cases in the UK, the High Consequence Infectious Diseases (HCID) programme was launched in England in 2015, with the aim of developing an effective and achievable end-to-end patient care pathway for individuals with suspected or confirmed infections due to high consequence pathogens. Additionally, public health agencies across the UK have issued interim guidance on managing specific HCID, such as MERS, avian influenza, and Ebola virus disease. While definitive care for confirmed patients in England will ultimately be delivered by commissioned HCID treatment centres, all acute healthcare organisations in the UK need to have processes in place to isolate and safely manage patients with suspected HCID while awaiting the results of investigations and/or prior to transfer. Contingency planning needs to consider how intensive care can be delivered locally to patients with suspected high consequence infectious diseases. Current high consequence infectious disease threats are described in UK Health Security Agency monthly HCID summaries.[1]

MINIMUM STANDARDS

1. Each ICU must ensure that there are local contingency plans in place for the initial isolation and management of critically ill patients with suspected HCIDs.
2. Local contingency plans must be regularly practised and reviewed, including the use of table-top exercises and simulations.
3. ICUs must liaise with local Directors of Infection Prevention and Control to ensure the correct personal protective equipment (PPE) is procured and sufficient stocks are readily available for use by appropriately trained intensive care staff in the event it is required.

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. An intensive care consultant should have responsibility for intensive care aspects of local emergency planning and resilience preparations, incorporating plans for the appropriate isolation and management of suspected patients with HCID.
2. A clinical area where critically ill patients with a suspected HCID may be isolated, either within the ICU or elsewhere, should be prospectively identified and ideally utilising negative pressure rooms with anterooms where available.

3. All clinical equipment used in the management of a patient with a HCID should be dedicated to that patient alone and be single use where possible.
4. Training should be provided on a regular basis to ensure intensive care staff are familiar with using and safely removing PPE.
5. Staff should undergo annual fit testing of respiratory protective equipment (e.g. FFP3 masks).
6. Intensive care staff providing care for a patient with a suspected or confirmed HCID should be dedicated to the care of that patient on a clinical shift and should not provide concurrent care for other patients, limiting the risk of cross-infection.
7. Contingency planning should incorporate plans for securely holding the large volume of clinical waste resulting from clinical care, including discarded contaminated PPE.Patients with a suspected viral haemorrhagic fever should be risk assessed in accordance with the Advisory Committee on Dangerous Pathogens Viral Haemorrhagic Fever (ACDP VHF) Risk Assessment algorithm,[2] and investigations to exclude malaria promptly undertaken, in keeping with local procedures.
8. Patients with suspected airborne HCIDs should be risk assessed according to national guidelines where they exist (disease-specific, e.g. MERS guidance collections[3,4] or generic airborne HCID guidelines, as appropriate).
9. There should be a standard operating procedure in place to guide the management of a patient with a suspected HCID.
10. ICUs accepting international medical transfers should have a mechanism by which to perform a risk assessment prior to transfer if a patient is being transferred from a country with known HCID outbreaks or countries where there is a significant risk of specific HCIDs; refer to national guidance (disease specific or generic HCID guidance).

BACKGROUND AND EXPLANATION

A HCID is one that may give rise to an acute severe illness with a significant case fatality rate, is highly transmissible from person to person (including healthcare providers), and so is capable of causing an outbreak or epidemic. The causative pathogens may be transmitted by contact (e.g. viral haemorrhagic fevers) and/or by airborne transmission (e.g. MERS coronavirus, avian influenza).

Patients with possible HCIDs may present to any hospital at any time. NHS healthcare organisations need to have in place emergency operational plans to deal with such an incident. Intensive care clinicians may be called upon to provide support to such patients pending results of diagnostics tests and/or transfer to a designated specialist centre (e.g. a commissioned HCID centre, for patients in England). This care may or may not be provided within the intensive care unit. Contingency planning should identify an area that separates the contaminated clinical area from other areas, minimising the risk to patients, staff and the local community.

The local management of patients with a suspected HCID prior to transfer to a designated specialist centre will be dictated by local factors and hospital design. The stated standards and recommendations provide a framework for local contingency planning. There should be a standard operating procedure in place to guide the management of a patient with a suspected HCID. Following recognition of a patient with a suspected HCID:

a. local infectious disease and/or microbiology and virology services need to be notified, and advice sought, including guidance on obtaining appropriate diagnostic clinical specimens.
b. local clinicians need to liaise with the Imported Fever Service (note this service is available to clinicians across the UK) for further clinical advice and to facilitate access to specialist diagnostics as required.[5]
c. all suspected cases need to be reported immediately to local health protection authorities (e.g. the local health protection team).

The patient with a suspected HCID may, of course, subsequently prove to have an alternative diagnosis. Such patients may still be critically ill and are not to be disadvantaged by delays in instituting appropriate intensive care monitoring and support for fear of the presence of a HCID. However, healthcare organisations are obliged to ensure that appropriate infection prevention and control measures are maintained until the possibility of a HCID has been excluded. Therefore, it is vital that ICUs plan how such situations will be managed, minimising the risk of transmission to hospital staff, patients and visitors, while providing appropriate patient care without undue delay.

Healthcare workers in non-specialist hospitals need to rely upon appropriate infection prevention and control measures, including HCID-appropriate PPE, to protect them from the potential HCID pathogen. ICUs must liaise with local Directors of Infection Prevention and Control to ensure the correct personal protective equipment (PPE) is procured and sufficient stocks are readily available for use by appropriately trained intensive care staff in the event it is required. Information about PPE ensembles and other infection control measures for HCID is available in the NHS National Infection Prevention and Control Manual.

PPE has to be worn correctly if it is to provide adequate protection, and it will inevitably become contaminated during patient contact. Safe removal and disposal of PPE is a key skill in order to prevent inadvertent exposure to the infectious pathogen and needs to be practiced. Fit testing of respiratory protective equipment (e.g. FFP3 masks conforming to EN149:2001) needs to be undertaken before use and respiratory protective equipment should be fit-checked annually, and/or every time it is used.

A note on COVID-19 as a high consequence infectious disease

COVID-19 was provisionally made an HCID in January 2020. HCID status was removed in March 2020, following review of accumulated global data and the declaration of a pandemic, with the launch of a larger pandemic response plan for COVID-19.[6]

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6.4 Fire and Evacuation

Authors: Beth Barton, Fiona Kelly, Rowan Hardy, Jeremy Cordingley & Claire Hughes

INTRODUCTION

Evacuation of the ICU may be required due to an emergency such as fire, flood, structural failure of the building, or issues with power supply, oxygen or ventilation systems rendering the unit unsafe. As most patients in ICU are unable to self-evacuate and reliant on continuing organ support, emergency evacuation is particularly challenging and poses significant risks. There are well-documented events that have led to emergency evacuation due to fire both in the UK and abroad.[1,2] Appropriate design, planning and preparation can assist in ensuring the safety of staff, visitors and patients in such emergencies.

MINIMUM STANDARDS

1. All ICUs must have an appropriate number of well-marked and accessible fire call points, fire extinguishers (of appropriate type) and oxygen shut off valves.[2-7]
2. All ICUs must comply with the latest health department regulations in their country regarding the fire-retardant nature of all furnishings, including mattresses, chairs, bedding, flooring and curtains.[3,7]
3. All staff must undertake appropriate fire and evacuation training with regular updates in the clinical areas where they work.[2,3,4,6,7]
4. All ICUs must have an emergency evacuation plan which is regularly reviewed.[2,3,4,6,7]
5. Regional intensive care networks must have an agreed policy on escalation of care and mutual aid to ensure the safe provision of intensive care for all patients who require it in the region, including for a major incident in one ICU.[5]
6. Portable oxygen cylinders must be stored safely in an appropriate holder or other designated storage area with the valve and flowmeter turned off in a location where they are readily available in an emergency but do not compromise potential evacuation routes.
7. Staff must ensure they follow recommendations for the safe use of oxygen cylinders at all times[1,2,4,5,6,7] and that any problem with oxygen cylinders or equipment is reported immediately to both the medical gas supplier and the Medicines and Healthcare products Regulatory Authority (MHRA).[5,7]

RECOMMENDATIONS TO PROVIDE A QUALITY SERVICE

1. ICU fire alarms should be audible throughout the department.
2. Ventilation of ICUs and other clinical areas where high-flow nasal oxygen, facemask continuous positive airway pressure and non-invasive ventilation are in use should be >10 air changes per hour to prevent oxygen enrichment of the ambient atmosphere.[7,8]

3. Action cards should be displayed clearly at fire call points and other relevant places within the ICU, so that they are immediately accessible in an emergency.[4,7]
4. A computerised fire alarm handler system should be installed in hospital switchboards to make it quicker and easier to liaise with the fire and rescue services.[7]
5. All staff should know where to find the evacuation plan.
6. ICUs should have a system whereby staff involved in a critical event (such as a fire and emergency evacuation) receive debriefing and appropriate review for signs of a trauma stress reaction or post-traumatic stress disorder (PTSD).[4,7,9]
7. Each ICU's evacuation policy should link with the hospital major incident plan and be tested regularly, both as tabletop exercises and in simulation scenarios, including at night and out-of-hours.[2,4,6]

BACKGROUND AND EXPLANATION

Emergency evacuation in the intensive care setting is both technically complex and ethically challenging. Patients may be fully dependent on continuous organ support and care from staff, whilst undertaking emergency actions may have multiple repercussions; shutting off the oxygen supply to help prevent the spread of fire may cause critical hypoxia, evacuating an area prematurely puts patients at risk whilst delaying may lead to the injury or death. In some circumstances, staff may be at a greater risk of harm than the patients they are caring for, for example in a smoke-filled room where the patient is intubated with a cuffed tracheal tube connected to a closed ventilator system. Most hospitals will have a phased evacuation plan that allows for certain areas that are most at risk to be evacuated first, ideally to other areas on the same floor ('horizontal' evacuation) which provides a degree of protection from the fire, before undertaking further complex evacuation to alternate floors ('vertical' evacuation) or full evacuation of the building. The hospital layout, evacuation plan and compartment barriers need to be considered when identifying alternative sites for the management of displaced ICU patients within the hospital including the need to negotiate stairs during an evacuation. Suitable alternatives may include PACU, operating theatres or enhanced medical units.

Unfortunately,, these processes have been tested several times in the UK. In 2008 a fire at the Royal Marsden Hospital, London destroyed the ICU and led to a total evacuation with all ventilated patients transferred to a neighbouring hospital.[2] In 2011 in the Royal United Hospital in Bath an oxygen cylinder lying on a patient's bed caught fire as it was turned on, leading to a rapidly spreading fire with dense black smoke. [1,4,10] Both staff and a patient were injured before two doctors extinguished the fire. In 2017 at the Royal Stoke University Hospital, ICU patients were also evacuated to PACU and theatre areas when smoke entered the ICU following a fire. When an air conditioning unit caused a fire in the COVID-19 ICU at University Hospital Hairmyres, Glasgow in 2020 staff successfully evacuated 12 patients within seven minutes prior to the arrival of the Fire and Rescue

Service with no staff injuries reported.[11] The high level of fire awareness and simulation training was cited as one of the key reasons for the positive outcome from this incident.

Multiple lessons from these incidents (and others) are incorporated into the above standards and recommendations. Further examples and details are outlined below:

- The importance of regular staff training in fire safety and oxygen cylinder use.[1,2,3,4,6,7]
  - Follow the correct sequence for turning on a cylinder.
  - Utilise a designated device, such as bed bracket or dedicated holder, for an oxygen cylinder in use. Oxygen cylinders are not to be carried on the patient mattress/bedding when in use.
  - Ensure that cylinders are turned off after use and secured in the appropriate storage location.
  - Undertake regular, basic training in safe use of oxygen cylinders.
- The need for appropriate staff training covering topics such as: [2,3,4,6,7]
  - Location and operation of fire call points
  - Location and appropriate selection of fire extinguishers
  - Location and operation of medical gas shut off valves
  - Location of emergency equipment including portable oxygen cylinders and evacuation equipment
  - For medical and senior nursing staff, training will include the method and implications of activating oxygen shut off valves and the practical use of fire extinguishers.
- Emergency evacuation plans need to cover: [2,3,4,6,7]
  - Triage of patients for evacuation, including consideration of those nearest to the hazard and enacting reverse triage, where visitors and least unwell patients are evacuated first and the most unwell last.
  - Alternative locations within the hospital where intensive care may be provided.
  - Access to emergency equipment and medications (including ongoing supply of medications).
  - An evacuation case at each bed space and consideration of provision of evacuation aids such as ski pads or evacuation sheets.
  - The possibility of co-existent power failure
  - The use of alternative oxygen administration and/or ventilation devices, including the use of high-flow oxygen face masks, transport ventilators and manual ventilation.
  - Evacuation of patients reliant on additional mechanical support, including intra-aortic balloon pumps, renal replacement therapy and extra-corporeal life support (including consideration of temporary discontinuation of therapy, transfer with ongoing support or staff evacuation leaving patients in-situ) and those in bariatric beds that may require the use of alternative exit routes.

- Transfer of hospital notes, especially where electronic monitoring and information systems are in use.
- Relief of intensive care staff who may themselves have been affected by a fire and be unfit to continue to work [1,2,4,7]

- Design of new build or updated ICUs which carefully consider the:[2,3,6,7]
  - Provision of multiple exit routes
  - Separation of clinical and non-clinical areas
  - Adopting small bays with appropriate fire-resistant boundaries to aid compartmentalisation of fire, in preference to large open areas
  - Size of evacuation routes, including doors, to accommodate bariatric beds/chairs and essential medical equipment
  - Active and passive fire protection systems, including low level escape lighting, fire curtains, smoke dampers and automatic fire suppression systems.
- Regional intensive care networks can play a crucial role s in such unusual situations including notifying neighbouring hospitals early, diverting emergency patients and temporary cessation of routine surgery as well as transfer of patients to alternative sites. Support from additional resources could be considered including mutual staff aid from other hospitals, specialist transfer and prehospital teams, and mutual aid from ambulance services including resources such as Hazard Area Response Teams (who may be able to provide additional equipment such as emergency oxygen supplies for multiple patients).[4,7]
- It would be beneficial for regional intensive care networks to develop systems to support the management of a major incident in one intensive care unit within the network, so that critically ill patients can be safely transferred and accommodated at other sites.
- Regular review of the ICU plan alongside the wider hospital major incident and emergency evacuation plans, will ensure integration with the wider command structure in the event of an emergency including liaison with the fire incident commander and other operational (bronze) and tactical (silver) commanders.
- It is vital to ensure that staff members who do suffer a trauma stress reaction receive appropriate care.[4,7,9,11] The value of debriefs, clinical psychologist input and a staff follow-up system to ensure this care is received is not to be underestimated. 77 members of staff required support after the fire in Glasgow[11] and the importance of this input was also noted following the 2011 incident in Bath[4,7,9]. The Trauma Resilience Management (TRiM) system is an example of a peer support tool, used in the military, which has been used successfully in healthcare and may be considered.[9]

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