The Intensive Connection

Organisation and management

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Organisation and management

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Second Edition

Health Service Research and Outcome

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Update Info

Learning Objectives

After studying this module on Organisation and management, you should be able to:

- Understand organisational factors that are associated with improved ICU performance, patient safety and outcome
- Understand the importance of managing and leading in intensive care
- Describe key functions of a physician-manager and physician-leader
- Use leadership and team building to solve problems and improve ICU performance

eModule Information

Expiry date: 10/2020

COBATrICe competencies covered in this module:

Domain : Patient safety and health systems management

Knowledge

- Principles of local / national health care provision; strategic planning of the ICU service (structure, function, financing) within the wider health care environment
- Roles of different members of the multidisciplinary team and local referral practices
- Principles of risk prevention
- Common sources of error and factors which contribute to critical incidents / adverse events (ICU environment, personnel, equipment, therapy and patient factors)
- The non-clinical role of the ICU specialist and how these activities contribute to the efficacy of the ICU, the profile of the ICU within the hospital and the quality of patient management
- Physical requirements of ICU design
- Process and outcome measurement
- Principles of administration and management
- Principles of crisis management, conflict resolution, negotiation and debriefing
- Principles of workforce planning
- Principles of health economics, departmental budgeting, financial management and preparation of a business plan
- Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff
- Local policies and procedures relevant to practice
- Methods of effective communication of information (written; verbal etc)
- Published standards of care at local, national and international level (including consensus statements and care bundles)
- Principles of national / local health care legislation applicable to ICM practice
- Purpose and process of quality improvement activities such as evidence based practice, best practice guidelines & benchmarking and change management
- Purpose and methods of clinical audit (e.g. mortality reviews, complication rates)
- Professional responsibility and duty of care to patients placed at risk by the actions of fellow clinicians
- Plan of action / local procedures to be followed when a health care worker is noticed to be in distress, whether or not patients are considered to be at risk

Skills & Behaviours

- Consult and take into account the views of referring clinicians; promote their participation in decision making where appropriate
- Lead, delegate and supervise others appropriately according to experience and role
- Demonstrate initiative in problem solving

- Organise multidisciplinary care for groups of patients in the ICU
- Collaborate with other team members to achieve common goals
- Listen effectively
- Professional and reassuring approach - generates confidence and trust in patients and their relatives
- Propose realistic initiatives / projects to promote improvement
- Aware of relevant guidelines and consensus statements and apply these effectively in every day practice under local conditions
- Seek expert help to ensure all equipment in the ICU conforms with and is maintained to the relevant safety standard
- Implement and evaluate protocols and guidelines
- Document adverse incidents in a timely, detailed and appropriate manner
- Participate in the processes of clinical audit, peer review and continuing medical education
- Respect, acknowledge & encourage the work of others
- Demonstrate an interest in quality control, audit and reflective practice
- Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives
- Inform colleagues, patients and relatives as applicable, of medical errors or adverse events in an honest and appropriate manner

Attitudes

- Accepts responsibility for patient care and staff supervision
- Recognises impaired performance (limitations) in self and colleagues and takes appropriate action
- Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
- Consults, communicates and collaborates effectively with patients, relatives and the health care team
- Desire to minimise patient distress
- Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff
- Establishes collaborative relations with other health care providers to promote continuity of patient care as appropriate
- Ensures effective information transfer
- Adopts a problem solving approach
- Enquiring mind, undertakes critical analysis of published literature

Faculty Disclosures:
The authors of this module have not reported any disclosures.

Duration: 7 hours

1. Introduction

Traditionally much of the focus in intensive care has been on the clinical aspects, such as novel drugs therapies and technology improvements to facilitate organ support. Yet the goal of delivering high-quality care requires intensive care physicians to engage more broadly in aspects of patient care that go beyond the bedside. This requires a comprehensive understanding of the key principles underlying effective intensive care unit (ICU) organisation and management.

Intensive care is an expensive resource with up to 0.5–1% of gross domestic product and 20% of hospital budgets allocated to intensive care in Western countries. Its high cost means that it is often under scrutiny by governmental and private funding agencies that look to ensure that ICUs are providing best 'value for money'. For example, in the United States key stakeholders involved in intensive care delivery agreed on reform priorities and these included:

- Standardising care by creating practice management guidelines for staffing, training, and work with centralised supervision of compliance.
- Development of incentive-based, performance-related methods of reimbursement.
- Increasing public awareness and understanding of intensive care.
- Regionalisation of the adult intensive care system based on local needs, capabilities, and professional competencies.
- Training of non-intensive care physicians to relieve manpower shortages.

In text References

(Nguyen, Wunsch and Angus. 2010; Barnato et al. 2007; Bagshaw et al. 2009)

The demand for intensive care services continues to rise as complex medical interventions requiring ICU support, life expectancy and patient expectations all increase. Medication costs and health technology costs are also generally increasing and the ability of these items to offset their increased expense by improved efficiency is not always apparent. At a time when most countries are facing a healthcare funding restrictions or even relative contractions, this poses a significant challenge. ICU physician-managers are increasingly being asked to develop process improvements that result in enhanced resource utilisation and better patient outcomes. These 'challenges' are managed more effectively when the workforce has been trained in healthcare management. Healthcare management and leadership training are increasingly being considered as an essential part of under- and postgraduate medical education.

Note

> The need for intensive care trainees to both study and practise the principles of healthcare management and leadership is greater now than in any previous generation of ICU physicians.

This module provides an introduction to ICU organisation and management. It acquaints the reader with generic management and leadership concepts helpful to the understanding of the organisational environment within which the ICU physician-managers or leaders function, provides tools that can used on a day-to-day basis (e.g. planning, organising, decision-making, staffing, controlling, motivating, leading, directing) and offers a basis for further study in the field of healthcare management. Many of the principles outlined in this module relate to generic organisational and leadership practices, with citations from classic healthcare literature. The authors fully acknowledge that cultural differences do exist but these differences should not override universal standards of good healthcare practices that are to deliver safe, effective, efficient, and patient-centred care. Where possible, research studies relating to contemporary healthcare management on pragmatic issues of concern to intensive care physicians have been included. As research into some of these topics still remains 'novel', this module also uses non-healthcare literature to include lessons from industry, which we believe are applicable to intensive care.

This module is divided into key sections.

1. Organisation (national and regional level, local and hospital level)
2. Management including planning, budgeting, control, audit and quality Improvement, managing change, policies, guidelines and procedures, human resource management
3. Other aspects of management such as managing teams, conflict and leadership

Each section is intended to stand alone; sections are not sequential and may be addressed in any order.

References

- Nguyen YL, Wunsch H, Angus DC., Critical care: the impact of organization and management on outcomes., 2010, PMID:20689418
- Barnato AE, Kahn JM, Rubenfeld GD, McCauley K, Fontaine D, Frassica JJ, Hubmayr R, Jacobi J, Brower RG, Chalfin D, Sibbald W, Asch DA, Kelley M, Angus DC., Prioritizing the organization and management of intensive care services in the United States: the PrOMIS Conference., 2007, PMID:17334242
- Bagshaw SM, Webb SA, Delaney A, George C, Pilcher D, Hart GK, Bellomo R., Very old patients admitted to intensive care in Australia and New Zealand: a multi-centre cohort analysis., 2009, PMID:19335921

2. Organisation

2. 1. National and Regional Level

The ICU service cannot be considered in isolation. The ICU service must take into account the needs of other clinical service groupings (e.g. emergency department, medicine, surgery and obstetrics) it supports within the hospital, regional healthcare services and the local population. This is important for planning and operational purposes. For example, an ICU in a hospital that is a regional trauma centre will have different requirements for staff expertise, technology and clinical support (such as interventional radiology, vascular, neuro and cardiothoracic surgery) compared to a general ICU in a hospital not admitting major trauma. Not all hospitals develop their ICU facilities in the same way and ICU must be able to adapt to the needs of the hospital and the population they serve in terms of size, staffing, geographical isolation and technology.

Patients who benefit from ICU admission can be divided into those who are:

- At risk of deterioration of one or more vital organ functions requiring intense monitoring and treatment that cannot be provided on the regular ward.
- Patients who require treatment for established failure of one or more vital organ functions such as cardiovascular, respiratory, renal, metabolic or cerebral function.

2. 1. 1. Levels of ICU care

Traditionally, in the United Kingdom adult ICUs are classified into three levels of care:

- Level I: patients at risk or recovering from vital organ dysfunction necessitating intense monitoring and treatment whose condition is too unstable to be managed on the regular ward. These patients are at risk of developing one or multiple organ failures.
- Level II: patients requiring monitoring and pharmacological and/or device-related support (e.g., haemodynamic support, renal replacement therapy) of one vital organ system with a life-threatening character.
- Level III: patients with multiple (>2) life-threatening vital organ failure. These patients depend on pharmacological and/or device-related organ support (e.g. haemodynamic support, respiratory assistance or renal replacement therapy).

Several levels of care can be integrated into the same ICU in a flexible organisational model providing that the ICU is capable of providing level III care.

2. 1. 2. Structural or organisational requirements of ICUs

Recommendations on basic structural and organisational requirements of ICUs are outlined in the references below.

In text References

(Valentin and Ferdinande P; ESICM Working Group on Quality. 2011; The Faculty of Intensive Care Medicine and Intensive Care 2015; College of Intensive Care Medicine of Australia and New 2011)

Challenge

How does your ICU conform to the basic structural and organisational recommendations in the reference above? Do you have national guidance?

2. 1. 3. Size of the ICU

The number of ICU beds as a proportion of hospital beds is generally calculated as a function of the type of the hospital, case-mix, the geographic location of the hospital and resource availability. Within Europe, the percentage of ICU beds as a proportion of hospital beds varies between 4.4% in Belgium to 1.2% in the United Kingdom.

Table 1: Percentage of ICU beds as a proportion of acute hospital beds and Number of ICU beds per 100,000 population in different countries

Country	Adult ICU beds as a % of all acute care hospital beds	Number of ICU beds per 100,000 population
Australia	3.0	8.0
Belgium	4.4	21.9

Canada	3.4	13.5
France	2.5	9.3
Germany	4.1	24.6
Netherlands	2.8	8.4
New Zealand	1.7	4.8
Spain	2.5	8.2
United Kingdom	1.2	3.5
USA	9.0	20.0

In text References

(Rhodes et al. 2012; Wunsch et al. 2008; Adhikari et al. 2010; Vincent et al. 1997; Organisation for Economic Co-operation and 2014)

ESICM Flash Conferences:

- ESICM/AMIB joint session: Constructing bridges to improve patient care.Hans FLAATTEN. Intensive care practice in Europe, Vienna 2009

2. 1. 4. Regionalisation of ICU services

The concept of regionalisation of ICU services has been explored in some countries. Regionalisation may improve patient outcome by concentrating patients at hospitals with resources and expertise to deliver high-quality care. It may have the additional benefit of cost savings by taking advantage of the economies of scale, as higher case volumes are associated with lower per-patient costs. A successful regionalised healthcare system requires a number of key components:

- Identification of regional centres by location and resources
- A robust system to reliably identify high-risk patients
- Timely and safe transfer to regional centres
- Support for post-acute care, such as access to step-down units or a mechanism to transfer patients back to their hospitals of origin

Disadvantages include the possibilities of:

1. worsening clinical outcomes during transportation of critically ill patients to regional centres particularly if transfer times are long or difficult
2. resources at regional centres becoming overwhelmed and
3. attrition of skills and experience in local centres limiting flexibility and capabilities of staff
4. inequity of access to care, where severity of illness makes the benefit of the intervention less certain and access to the “potential benefit” is afforded to those locally in preference to those further away and a retrieval mission would be necessitated
5. reduced visitation by family and support networks distant to the regional centre
6. worsened economic disruption to families through loss of income and increased travel and displacement expenses
7. increased risk of cognitive dissonance in loved ones separated from patient’s daily progress
8. increased transport costs
9. opportunity costs if expatriation and repatriation carried out by local centre staff rather than dedicated, separate, retrieval service

When considering regionalisation of services, periodic review of the tipping points of economies and diseconomies of scale in terms of patient outcomes, patient volumes, family experience and financial costs, are required as technologies change and treatments become more mainstream. An example of a clinical service often conducted supra-regionally that may become regional is ECMO and of a regional service that may become local is temporary renal replacement therapy. Increased patient expectation of access to these therapies, changes in costs and advances in vascular access devices, membrane oxygenators and haemofilters are gradually changing the health economics of provision.

ESICM Flash Conferences:

- Hans Flaatten - How to organise a safe nationwide inter-hospital transport system, Paris 2013

2. 1. 5. Case mix and volume

ICU beds in hospitals may be organised into separate sub-specialty ICUs such as paediatrics, medical, surgical, burns, neurosurgical and cardiac, or a single general ICU. Most ICUs in Europe (74%) are mixed medical and surgical. Sub-specialty ICUs may improve outcomes by reduction of practice variability and use of specialist skills. However, there is evidence to suggest that risk adjusted mortality and length of stay is similar for patients treated in general and sub-specialty ICUs. As an increasing proportion of ICU patients become multi-morbid, elderly and obese, the possibility of improved efficiency of care when cared for in a general intensive care setting rather than a

specialist one may emerge, as it has done for acute medical inpatients being cared for by hospitalists rather than single system specialists. There is some evidence suggesting that centres that undertake higher volume of similar cases (e.g. ECMO, burns care, haematological cancers, spinal injury, ARDS and sepsis) enjoy better outcomes in these patient groups.

In text References

(Rhodes et al. 2012; Lott et al. 2009; Kahn et al. 2006; Peelen et al. 2007; Lecuyer et al. 2008; Glance et al. 2006; White and Glazier. 2011)

Funding Systems
For the ICU, its financing and funding has many possible sources, mostly determined by the hospital's reimbursement mechanisms. The different examples of how the hospital and its ICU can be financed include for-profit, not-for-profit and government-funded.

Government-funded
Most hospitals in Europe are funded by the government, commonly through taxation. Here, the ICU physician-manager needs to ensure providing care is accomplished within a predefined budget. In most European countries remuneration is for healthcare costs is activity based – commonly on the basis of diagnosis related groups (DRGs). Most DRGs are based on average costs of treating a diagnosis. ICU admission may be included in the DRGs (e.g. Germany, Sweden, Italy, Netherlands, Norway), or countries may have a system for co-payments for ICU care (e.g. France) or use alternative payments mechanisms (e.g. HRG in the United Kingdom or ICU-DRG subgroupings I-IV in Denmark). Some countries exclude ICU from DRGs and use alternative forms of payment such as per diem payments. DRGs generally underestimate costs of ICU treatment because DRG payment is based on the average of costs of a large number of patients with similar diagnoses. As resources used in ICU are higher than average, a hospital that has a greater number of ICU admissions than another, can incur financial losses. ICU patients tend to be 'outliers' whenever their treatment costs have been reimbursed using a DRG method. In some (enlightened) government-funded systems, maintaining efficiency (ensuring costs are below revenue) leads to reinvestment for growth and development. To make matters more complex, consultation by healthcare providers may or may not be included in the ICU budget, as may be the case for laboratory tests or medication.

For-profit

In this example, the payer is usually the commercial insurance industry whose primary responsibility is to their shareholders. Like business, a for-profit hospital cannot survive unless costs are less than charges. In this model, the ICU physician-manager focuses his/her efforts on maximising the unit's revenue and minimising its costs.

Not-for-profit

In a not-for-profit ICU, revenue which exceeds costs is reinvested to support growth and development. Not-for-profit hospitals receive operating funds from two sources, consumers and philanthropy; they usually have tax-exempt status. In this situation, the ICU physician-manager needs to ensure that costs are less than revenue income (which is approved by the hospital's senior management team during the annual budget building process).

There is currently no best model for ICU funding with each having its advantages and disadvantages.

Think

Reflect on the various financing/revenue sources of your hospital. What is the major source of revenue for patient care activities? Does the financing source for the hospital determine patient demographics in the ICU?

In the study below ICU reimbursement practices were evaluated. Only half of the ICUs received detailed financial information with only 15% of ICUs able to identify cost items for each patient. In the majority of cases the ICU reimbursement system was included in the hospital reimbursement. ICU reimbursement systems were most commonly based on previous year's ICU expenditure and diagnosis-related group weights.

In text References

(Bittner et al. 2013; Csomos et al. 2010)

2. 1. 6. Cost Containment and Rationing

All systems for financial management within intensive care need to operate within the resource constraints. In the future, the global demand for ICU services will continue to increase. The reasons for this are multi-factorial and include:

- Ageing population
- Disease co-morbidities
- Greater public expectations
- Technological advancements
- Novel drug therapies
- Changes in disease demographics

This demand is unlikely to be matched by a commensurate increase in healthcare resources. Strategies for dealing with the imbalance between resource and demand include:

- Reduction in demand
- Limiting of supply (rationing)
- Improved efficiency

For most ICUs directly controlled major reduction in demand is unlikely to be achievable. However, new technologies replacing older ones for management of certain diseases will result in reduced demand in specific instances. Examples of reduced demand following the implementation of new technologies include: closed robotic pelvic clearance surgery versus open for gynaecological malignancy in the super-morbidly obese, TAVIs versus open aortic valve replacement in severe aortic stenosis management in very frail and multi-morbid patients, TVARs versus open thoracic aneurysm repairs and the introduction of specific targeted biological chemotherapeutic agents with lower systemic immunosuppression in the treatment of certain cancers.

Other demand management strategies include:

1. Patient care costs attribution to referring services. Where referring services bear the costs of patient care, it is hypothesised that referrals of patients for ICU care that might otherwise be futile will reduce. This hypothesis presents several major ethical dilemmas in relation to the implications that patients are regularly referred who should not be, that intensive care teams regularly admit patients whom they should not and that there is a reciprocal risk that creating a financial penalty to a referring service for inappropriate referral may delay or reduce appropriate referrals resulting in harm to patients.
2. The introduction of patient at risk, ICU outreach, "all acute bed monitoring systems" and medical emergency teams have the potential to:
    - reduce cardiac arrest calls and post-arrest admissions to ICU
    - identify early and reverse or prevent further avoidable in deterioration in at-risk patients, through early identification and aggressive intervention speeding their ward-based recovery and preventing ICU admission
    - identify patients unlikely to benefit from ICU in the event of their deteriorating despite maximal ward-based therapies, facilitating time in a non-emergency situation to discuss care options including palliation or ceilings of care with the patient, their medical team and their family in advance of any severe, acute deterioration occurring – reducing futile admissions, facilitating more appropriate palliative care in the event of deterioration and reducing uncertainty in the event of admission for limited trials of critical care, with ceilings of support and/or time-limited care agreed in advance.
3. Introduction of advanced healthcare plans across cohorts of patients with high risk of hospital admission and ICU admission because of their underlying disease process e.g. advanced cancer, pulmonary hypertension, advanced COPD, severe cardiac failure on maximal therapy. By identifying patient groups with end-stage illnesses at high risk of death, or acute deterioration leading to death and discussing with them their care pathways and treatment options for acute deterioration, it is often possible not only to avoid referrals for ICU care that may offer little long-term benefit, but also to afford patients options to die in their preferred site of care; home, hospice or hospital.

Not uncommonly, in the situation of an acute medical deterioration in a patient with known advanced chronic illness, an emergency service call is placed and an ambulance then retrieves a patient to an emergency room, sometimes even intubating and starting resuscitation en route. The acute care system kicks into place and patients regularly arrive in acute hospital beds and intensive care units for the initiation of excellent but nonetheless, cost-inefficient palliative care. Around the world, systems are now being developed where patients with advanced chronic illnesses register preferred care pathways agreed between themselves, their hospital specialists and their primary care physician. These pathways give residential homes, ambulance services and primary care providers permission not to retrieve a patient in the event of an acute deterioration, but to initiate appropriate treatment in the patients current location with escalation to district nurses, clinical nurse specialists and GPs where appropriate. Where appropriate, palliative care strategies can be implemented in the event of failure to respond to planned therapeutic pathways and care for the patient undertaken in their preferred location. These strategies avoid unnecessary and futile intensive care admissions preventing avoidable interventions to patients and reducing inefficient acute-care bed use in hospitals.

Rather than demand management that requires system-wide change, ICUs have generally focused on various ways of increasing efficiency and cost-reduction internally within the service itself. Such approaches have involved the use of formularies for drug choice, stock lists for disposables and technology that is cheaper but with equivalent benefit, eliminating unnecessary diagnostic tests, the development of agreed ICU polices and procedures and more efficient patient pathways focused on reducing lengths of stay.

Although efficiency in care may decrease the cost-per-admission to some extent, more definitive cost reductions require some degree of 'rationing of ICU services'. In such an approach, intensive care physicians must be able to identify those patients who would not benefit from intensive care before or early in their admission. However, there are several caveats to this approach: (a) most hospital costs are fixed and minimally affected by reductions in ICU length of stay mainly as the costs of the first few days on ICU are highest (b) current prognostic systems lack specificity in the prediction of death, limiting their usefulness in decision-making; (c) limiting care even to those patients with dismal prognosis only accounts for a minority of ICU admissions; and finally it involves (d) complex ethical considerations.

When considering cost-containment and rationing, it is useful to think of the wider economies and diseconomies of scale. Whilst it can appear cost-saving to having more patients per doctor or nurse, there are tipping points in terms of reduced efficiency in terms of increasing length of stay, reduced flows and increased queuing because of delays in patients being seen (single senior intensivist seeing 15-20 patients on a ward round). Factors such as skill-mix and models of care need to be considered too when looking to increase efficiency.

Some degree of rationing is inevitable in any resource-constrained system where demand regularly exceeds supply. Whilst healthcare regulators are increasingly acknowledging the rationing dilemmas faced by their constituents, politicians are occasionally wont to promise what is not deliverable; that everyone should have equal access to healthcare regardless of age, geographical location in a country, co-morbidities or participation in their own well-being.

See the following ESICM Modules for more information

- Quality assurance and cost-effectiveness
- Ethics

Note

Rationing is defined as 'the allocation of healthcare resources in the face of limited availability, which necessarily means that beneficial interventions are withheld from some individuals'

Think

Having a 24-hour discharge capability may facilitate ICU efficiency and reduce costs by decreasing ICU length of stay but what are the potential disadvantages of discharging patients late at night?

For more information on cost containment and rationing:

ESICM Flash Conferences:

- Michael Pinsky. The natural history of cost containment. Berlin 2011.
- Andreas Valentin. Rationing in the intensive care. Berlin 2011.
- Hans Flaatten. Intensive care medicine facing the increasing age of our patients, Barcelona 2014.
- Ethics of Cost Contaiment. TAKALA Jukka. Cost containment and ICU activities, Lisbon 2012

In text References

(Truog et al. 2006; Ward et al. 2008; Luce and Rubenfeld. 2002)

2. 1. 7. Data Registries

There is an increasing commitment from governmental bodies to gather data on activities of individual ICUs using national and international data registries. There are many uses for information collected in these registries, including:

- Types of patients admitted to ICUs (admitting diagnosis and severity of illness).
- Risk adjusted outcomes.
- Intensive care utilisation trends over time.
- Identification of high-risk groups for complications.
- Quality indicators and quality improvement initiatives.
- Patient safety data.
- Conducting research (e.g. clinical trials).

Examples of critical care registries from United Kingdom, Australia and New Zealand and Canada:

- ICNARC
- Australian and New Zealand Intensive Care Society
- CCCTG

Think

Consider the advantages and disadvantages of collecting data in a centralised registry.

Examples of the types of indicators that can be monitored in a national (or international) approach to data collection are shown in the table below.

Table 2: Common quality indicators monitored in national registries

Patient outcomes	• Risk adjusted mortality • Pressure ulcers • Nosocomial infection • ICU readmission rate
Processes	• Nutrition support • DVT prophylaxis • Multi-drug resistant organisms
Utilisation	• Length of stay • Transfer delays (interval between time ready for transfer from ICU to actual transfer) • Occupancy • Low-risk admission rate • Very high risk (or death within six hours) admission rate

Financial	• Patient-care hours compared to workload measure • Total budget
Satisfaction	• Patient/family satisfaction with care • Staff turnover • Absenteeism rate

Data that can be measured and shared between ICUs for the purposes of quality improvement and utilisation/performance management.

2. 1. 8. Benchmarking

By collecting these data, individual ICUs are able to benchmark their activity and outcomes with those achieved by units of similar size and activity.

Note

Benchmarking is the process of measuring the performance of individual ICUs against other reference ICUs. Benchmarking requires effective and objective markers of performance (or quality) that can be used within or between ICUs.

Why benchmark ICUs?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Benchmark analysis allows ICUs to identify their strengths and weaknesses with a view to implementing change (if needed) to improve ICU performance.

Benchmarks chosen must be relevant for health managers, physicians and patients.

List up to five markers of performance (or quality) that can be used to benchmark ICUs

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Examples of performance (or quality) markers include:

- Complication rates related to patient care (e.g. catheter-related blood stream infections, pressure sore development)
- Adherence to guidelines and policies (e.g, surviving sepsis bundles)
- Risk adjusted ICU and hospital mortality
- Risk adjusted length of stay
- Non-clinical transfer
- Rate of catheter related blood stream infections

What are the challenges of benchmarking ICUs and how can they be overcome?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Comparison of unadjusted outcomes among ICUs is unsatisfactory primarily due to differences in ICU and patient characteristics. To adjust for these differences, statistical models can be used to generate predicted outcomes, i.e. case-mix or risk adjusted benchmarks that are compared with observed outcomes.

For more information on benchmarking:

- Clinical outcome
- Quality assurance and cost-effectiveness.

In text References

(Garland 2005; Garland 2005; Woodhouse et al. 2009; Flaatten et al. 2010; Guidet, Valentin and Flaatten. 2016; Zimmerman et al. 2006)

References

- Wunsch H, Angus DC, Harrison DA, Collange O, Fowler R, Hoste EA, de Keizer NF, Kersten A, Linde-Zwirble WT, Sandiumenge A, Rowan KM., Variation in critical care services across North America and Western Europe., 2008, PMID:18766102
- Valentin A, Ferdinande P; ESICM Working Group on Quality Improvement., Recommendations on basic requirements for intensive care units: structural and organizational aspects., 2011, PMID:21918847
- The Faculty of Intensive Care Medicine and Intensive Care Society, Guidelines for the Provision of Intensive Care Services, 2015, https://www.ficm.ac.uk/commissioning-service/guidelines-provision-intensive-care-services
- College of Intensive Care Medicine of Australia and New Zealand, Minimum standards for intensive care units, 2011, https://www.cicm.org.au/CICM_Media/CICMSite/CICM-Website/Resources/Professional%20Documents/IC-1-Minimum-Standards-for-Intensive-Care-Units.pdf
- Rhodes A, Ferdinande P, Flaatten H, Guidet B, Metnitz PG, Moreno RP., The variability of critical care bed numbers in Europe., 2012, PMID:22777516
- Adhikari NK, Fowler RA, Bhagwanjee S, Rubenfeld GD., Critical care and the global burden of critical illness in adults., 2010, PMID:20934212
- Vincent JL, Suter P, Bihari D, Bruining H., Organization of intensive care units in Europe: lessons from the EPIC study., 1997, PMID:9434928
- Organisation for Economic Co-operation and Development, Australian and New Zealand data for ICU beds as percentage of acute hospital beds extrapolated from OECD Health Statistics 2014 and CIA Hospital Bed Density 2010 data for acute beds., 2014, https://data.oecd.org/healtheqt/hospital-beds.htm
- Lott JP, Iwashyna TJ, Christie JD, Asch DA, Kramer AA, Kahn JM., Critical illness outcomes in specialty versus general intensive care units., 2009, PMID:19201923
- Kahn JM, Goss CH, Heagerty PJ, Kramer AA, O'Brien CR, Rubenfeld GD., Hospital volume and the outcomes of mechanical ventilation., 2006, PMID:16822995
- Peelen L, de Keizer NF, Peek N, Scheffer GJ, van der Voort PH, de Jonge E., The influence of volume and intensive care unit organization on hospital mortality in patients admitted with severe sepsis: a retrospective multicentre cohort study., 2007, PMID:17378934
- Lecuyer L, Chevret S, Guidet B, Aegerter P, Martel P, Schlemmer B, Azoulay E., Case volume and mortality in haematological patients with acute respiratory failure., 2008, PMID:18448491
- Glance LG, Li Y, Osler TM, Dick A, Mukamel DB., Impact of patient volume on the mortality rate of adult intensive care unit patients., 2006, PMID:16715030
- White HL, Glazier RH., Do hospitalist physicians improve the quality of inpatient care delivery? A systematic review of process, efficiency and outcome measures., 2011, PMID:21592322
- Bittner MI, Donnelly M, van Zanten AR, Andersen JS, Guidet B, Trujillano Cabello JJ, Gardiner S, Fitzpatrick G, Winter B, Joannidis M, Schmutz A., How is intensive care reimbursed? A review of eight European countries., 2013, PMID:24216146
- Csomos A, Varga S, Bertolini G, Hibbert C, Sandor J, Capuzzo M, Guidet BR., Intensive care reimbursement practices: results from the ICUFUND survey., 2010, PMID:20508915
- Truog RD, Brock DW, Cook DJ, Danis M, Luce JM, Rubenfeld GD, Levy MM; Task Force on Values, Ethics, and Rationing in Critical Care (VERICC)., Rationing in the intensive care unit., 2006, PMID:16484912
- Ward NS, Teno JM, Curtis JR, Rubenfeld GD, Levy MM., Perceptions of cost constraints, resource limitations, and rationing in United States intensive care units: results of a national survey., 2008, PMID:18216601
- Luce JM, Rubenfeld GD., Can health care costs be reduced by limiting intensive care at the end of life?, 2002, PMID:11897638
- Garland A, Improving the ICU: part 1., 2005, PMID:15947333
- Garland A, Improving the ICU: part 2., 2005, PMID:15947334
- Woodhouse D, Berg M, van der Putten J, Houtepen J., Will benchmarking ICUs improve outcome?, 2009, PMID:19633547
- Flaatten H, Moreno RP, Putensen C, Rhodes A, Organisation and Management of Intensive Care, 2010, ISBN:9783941468276
- Guidet B, Valentin A, Flaatten H., Quality Management in Intensive Care: A Practical Guide, 2016, ISBN:9781316218563
- Zimmerman JE, Kramer AA, McNair DS, Malila FM, Shaffer VL., Intensive care unit length of stay: Benchmarking based on Acute Physiology and Chronic Health Evaluation (APACHE) IV., 2006, PMID:16932234

2. 2. Local, Hospital Level

2. 2. 1. Structure of ICUs

Open versus closed ICUs

In the open ICU model, primary admitting physicians direct care of patients with input from intensive care physicians via consultation. In contrast, in the closed ICU model, intensive care physicians are primarily responsible for patient care. Admission, discharge and referral decisions are managed by intensive care physicians in a closed ICU model. Several studies have demonstrated that a closed ICU model of care is associated with better patient outcomes, shorter lengths of ICU and in-hospital stay, improved efficiency and lower costs. Closed units are the norm in Europe.

In text References

(Carson et al. 1996; Multz et al. 1998; Hanson CW et al. 1999; Ghorra et al. 1999)

Challenge

Consider the advantages and disadvantages of a closed versus open ICU model.

2. 2. 2. Staffing

The optimal level of staffing will depend on the type and size of the ICU. There is good evidence that quality of ICU care is strongly influenced by the organisation of medical and nursing staff on the ICU. The ICU team should be led by the ICU Director, a physician-manager, who has the responsibility for the administrative and medical management of the unit and the Head Nurse who is responsible for the functioning and quality of the nursing care.

Medical staff

Physician staffing patterns in ICUs vary markedly between different countries. Most ICUs in Europe have 24-hour intensivist coverage but 25–30% of ICUs still do not. In Europe, Italy and Spain have the highest number of ICUs with full-time intensivist coverage. Only 67% of ICUs have a dedicated full-time ICU physician-manager. In the United States intensivist coverage is provided in only half of ICUs during weekday daylight hours and less outside this period (20% during weekend days, 12% during weeknights, and 10% during weekend nights).

The ratio of medical staff to patients has also been assessed and related to several performance markers including: education, patient care, staff well-being and staff retention. An optimum ratio will vary and depend on several factors including the unit type (general versus specialist), case-mix, care model (open versus closed), other supported activities (outreach, medical emergency teams, retrieval work, telemedicine), the average admission and discharge rates, the ratios of trainee, junior and senior medical staff and patterns of utilisation of support staff such as respiratory therapists and nurse practitioners. In 2013, the Society of Critical Care Medicine released a statement that ratios lower than 1 senior intensivist:14 patients negatively impact performance. One US study suggested a doubling in risk of patient death at this 1:14 and certain professional bodies recommend far higher senior staffing ratios (ICS and FICM, UK 1:8-1:14, CICM 1:8 – 1:15). A UK study suggested optimal ratios of 1:8 with increasing patient mortality at both higher and lower ratios.

In text References

(Miranda, Rivera-Fernández and Nap. 2007; Vincent et al. 1997; Angus et al. 2006; Ward et al. 2013; Neuraz et al. 2015; Gershengorn et al. 2017; Guidet, Valentin and Flaatten. 2016)

Studies have shown that ICUs with daytime high-intensity physician staffing (closed model) have lower in-hospital mortality, iatrogenic complications, lengths of hospital stay, hospital costs and postoperative complications compared to low-intensity physician staffing (open model). Patients receiving care under intensivists are also more likely to receive evidence-based standard care (e.g. deep vein thrombosis and stress ulcer prophylaxis).

Note

The Leapfrog Group, a business consortium of more than 150 private and public healthcare sector purchasers in the United States, recommended that board-certified critical care specialists should be available during daytime hours and be able to return pager calls within five minutes and arrange an ICU physician extender to reach the patient within five minutes. The group estimated that applying ICU physician safety staffing standards could save more than 54,000 lives in the United States each year.

In text References

(Wilcox et al. 2013; Dimick et al. 2001; Pronovost et al. 1999; Pronovost et al. 2002; Kahn, Brake and Steinberg. 2007; Levy et al. 2008)

Review the references cited above and identify at least three outcomes of an intensivist-led ICU model of clinical care delivery that are improved.

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

An intensivist-led model of ICU care has been reported to be associated with:

- Lower risk of cardiac arrest, acute renal failure, septicaemia and reintubation
- Reduced hospital length of stay
- Lower hospital and ICU mortality
- Reduction in resource use
- Patients more likely to receive evidence-based care

With daytime high-intensity physician staffing consistently associated with improved outcomes there has been a call for expansion to be able to offer this service 24/7. Studies have shown improvements in processes of care, staff satisfaction and a decrease in ICU complication rate and hospital length of stay following introduction of 24/7 intensivist coverage. Proponents of 24/7 hour intensivist staffing suggest that night-time intensivist staffing may result in earlier establishment of treatment plans, more timely resuscitation of unstable patients and more consistent bedside medical decision-making at all hours of the day. However, this remains controversial. Some studies found that the addition of night-time intensivist staffing in ICUs with high-intensity daytime intensivist staff, did not lead to a reduction in in-hospital mortality and that the advantage was only in demonstrated in those ICUs with low-intensity staffing during the day.

In text References

(Gajic and Afessa 2009; Arabi 2008; Blunt and Burchett. 2000; Wallace et al. 2012; Kerlin et al. 2013; Kerlin et al. 2015)

Nursing staff

Nursing staff account for the majority of the ICU workforce. There is large variability across ICUs in nurse-to-patient ratios, ranging from 1:1 in some ICUs to as low as 1:4 in other units. The number of intensive care nurses necessary to provide appropriate care in some countries is calculated based on Levels of Care or Therapeutic Intervention Scoring system (or similar instrument). Studies on the impact of nurse-to-patient ratios in the hospitals have suggested that lower nurse-to-patient ratios are associated with higher rates of complications. In addition to the influence of the number of therapeutic interventions a patient is receiving on the workload of the bedside nurse, other factors such as patient delirium, patient weight (obesity), visiting hour policies, unit staffing models (access nurse, physiotherapist and healthcare assistant: patient ratios) and the degree of technological automation in the unit (over-bed hoists, electronic charting, pre-prepared drug delivery) will also significantly influence workload.

In text References

(Moreno and Reis Miranda. 1998; Amaravadi et al. 2000; Kovner et al. 2002; West et al. 2014)

Allied health professionals

ICU staffing needs must also take account of the wider multidisciplinary team including dietitians, physiotherapists, pharmacists and occupational therapists whom are all an integral part of the ICU service. The optimal level of staffing of allied health professionals in an ICU is variable and closely dependent on the needs of the service and culture. For example, the staffing of an academic ICU with a lot of teaching, research and a regional retrieval service may not be the same in a non-academic ICU, even if the number and level of ICU beds is similar. A unit caring for a patient demographic characterised by a higher proportion of morbidly obese patients will require more staff as well as investment in appropriate technologies to facilitate patient turns and mobilisation for reasons of both patient and staff well-being. Similarly, units routinely caring for patients with high ethnic and cultural diversity may require greater support from translation and advocacy services to afford optimum, culturally appropriate care to both the patients and their families.

Note

The presence of a pharmacist on ICU rounds and computerised physician order entry may be associated with a substantially lower rate of adverse drug errors.

In text References

(Maslove, Rizk and Lowe. 2011; Leape et al. 1999; Bates et al. 1998)

Advanced Critical Care Practitioners

Advanced practitioner roles are emerging due to changes in the medical workforce within critical care. The roles offer a different career pathway for experienced nurses and other health professionals. Advanced Critical Care Practitioners (ACCPs) are highly experienced critical care professionals who have developed their skills and theoretical knowledge to a very high standard. As part of their role within the ICU team, ACCPs undertake extensive assessment and management of critically ill patients, prescribe medications and perform invasive interventions. These clinical activities, previously in the domain of medical practitioners, offer a new model of multidisciplinary working. With the new opportunities, new challenges can arise in terms of governance and it is useful to consider these and explore such issues with the multi-disciplinary team in advance of appointments being sought. In particular, lines of responsibility, accountability, line management, performance and appraisal need to be agreed and clearly specified. Where what were previously medical responsibilities are placed upon a different professional group, medical supervision and training is often required and there may be different legislation for countries. Whilst ultimate accountability is to the professional regulatory body of the individual, at a local level, line management may change to a different professional group, remain with the primary professional group or be shared between the two.

In text References

(Landsperger et al. 2016; Squiers et al. 2013)

2. 2. 3. Telemedicine

An overall shortage of intensivists in real numbers and a need to provide at least temporary critical care support in isolated geographical locations with insufficient population bases to support a 24/7/365 critical care service, have also led to the increasing use of telemedicine technology. Telemedicine uses a combination of video-conferencing technology, telemetry and electronic medical records to allow off-site intensivists to assist in the management of critically ill patients. The most comprehensive systems use a team of

physicians and critical care nurses who continuously monitor patients' physiological parameters, order laboratory and radiographic studies, initiate preventive treatments (e.g., stress ulcer prophylaxis), and aid in diagnosis and treatment plans. The effectiveness of telemedicine is closely dependent on:

- The model of service provision by the remote physicians and critical care nurses to alter care in the monitored units.
- Acceptance of the model of working in both the central and hub units.
- The efficacy of the telemedicine technologies employed.

The impact of telemedicine is unclear. Early studies suggested improvements in costs, compliance with care bundles and length of ICU stay. Some more recent studies continue to demonstrate reductions in ICU and in-hospital mortality and lengths of stay, whilst others show no benefit. Barriers include high technological costs, lack of clarity of how, where and which model to apply, resistance to change in established practices and to the adoption of new models of team-working.

In text References

(Thomas et al. 2009; Young et al. 2011; Lilly et al. 2014; Boots et al. 2011)

2. 2. 4. Factors contributing to an improved ICU clinical service

Studies exploring the effects of organisation on effectiveness and efficiency of ICUs in Europe have demonstrated marked variability in practice often resulting in wasted resources and performance inefficiencies.

In text References

(Reis Miranda et al. 1997)

A number of ICU structural and organisational factors have been associated with better ICU performance, patient safety and outcome:

- Effective multidisciplinary teamwork.
- Higher volume of patients coming through the ICU.
- A closed unit model.
- High-intensity ICU physician coverage.
- Presence of a full-time ICU Director.
- Higher nurse-to-patient ratios.
- Having a pharmacist participate in daily rounds in the ICU.
- Reduction in investigations that do not change clinical management.
- Implementation of evidence-based protocols and guidelines.
- Use of computer-based alerting and reminding systems.

In text References

(Randolph and Pronovost. 2002; Zimmerman et al. 1993)

There is some evidence suggesting that those centres undertaking a higher volume of cases have better outcomes. For example, this may include patients who require mechanical ventilation or extracorporeal life support, or patients' with cancer who require intensive care therapy. The magnitude of association is variable and yet to be fully determined.

In text References

(Barbaro et al. 2015; Kahn et al. 2006; Shahin, Harrison and Rowan. 2014; Halm, Lee and Chassin. 2002; Zuber et al. 2012)

Based on data collected on almost 18,000 patients in 42 ICUs, Shortell and colleagues found that superior organisational practices among ICUs were related to four characteristics:

- A patient-centred culture.
- Strong medical and nursing leadership.
- Effective communication and coordination.
- Open, collaborative approaches to problem-solving and conflict management.

From a more traditional outcomes-based assessment of an ICU's performance, Shortell's research also found that promoting good interdisciplinary teamwork, team coordination and conflict management by an ICU's leadership team, was associated with:

- Lower nurse turnover.
- A lower risk-adjusted length of stay.
- A greater ability to meet needs of family members.

In text References

(Shortell et al. 1994)

Whilst not yet widely applied in critical care, there is growing interest in the concept of the value chain in clinical medicine both from patients' and departmental perspectives. From a patient perspective, time spent waiting in a bed for a review, investigation or intervention that will change their management or otherwise hasten their recovery, weaning from ventilation, mobilisation and discharge is wasted time. This wasted time may impede their overall recovery and have adverse socio-economic effects on them and their families. From a hospital perspective, intensive care units have extremely high hourly running costs compared with most other in-patient bed areas of the hospital and time spent in these beds by patients for reasons other than allowing sufficient necessary recovery, to allow gradual reduction and then cessation life-support systems is cost-inefficient, increasing length of stay unnecessarily and reducing potential flow through the bed resource (postponed elective surgery or diversion of local patients elsewhere).

Common examples of poor value management indicating a need for improved organisation in the ICU may include:

1. maintained sedation of a patient whilst awaiting a deferred tracheostomy, dressing change or return trip to the operating room,
2. inappropriately low staffing levels relative to unit workload, leading to deferred weaning or even increased sedation of a patient to avoid confusion, agitation and potential harm during drug withdrawal,
3. deferred procedures owing to failure to stop enteral feeding at the appropriate time
4. deferred decision making whilst awaiting an ECHO, radiological investigation, EEG, expert review or the reporting of tests already conducted
5. protracted and retrospectively unnecessary continuation of antimicrobial therapies whilst awaiting results of PCRs
6. delayed decision making owing to late review on a ward round interrupted by calls to attend the Emergency Department or owing to the duty intensivist being absent to attend meetings.

In short, wherever avoidable delays occur in the progress of patients' care pathways, the value chain can be said to be impeded. Waiting per-se does not imply poor value chain management – we often must wait for the inflammatory processes to abate and healing to occur once we have established a patient on their optimal care pathway. However, unnecessary and avoidable waiting is inefficient both from a patient and an organisational perspective.

A patient value chain may view priorities differently to a department's or organisations, but it is by focussing on the competing value chains of different patients and optimising systems around these, that we can best improve overall organisational efficiency. Simplistically, if we can demonstrate that over a two month period, four patients were kept intubated and sedated for a total of an additional 144 hours whilst awaiting MRI scanning owing to a limited hours service, this equates to an additional avoidable 5 day ICU bed blockage. From a patient perspective, valuable time to making definitive treatment decisions and earlier extubation was lost and the risk of acquiring VAP was increased. From an organisational perspective, there is a direct financial cost of approximately 5 (days) x €3500 (ICU bed cost/day) and potentially an indirect financial cost to the organisation too, e.g. one elective cardiac surgery case postponed owing to lack of ICU beds during the period of a patient awaiting an MRI, with consequent under-utilisation of a fully staffed theatre (5 hours x € 1500/hr) and lost potential revenue of the postponed case (1 case x €20,000). The total financial costs are therefore around €45,000.

From the perspective of the radiology department, there may have been a prioritisation of keeping out-patient MRI scan waiting times under a certain threshold and prioritising out-patient scans to within this target maximises their financial stability avoiding a penalty fine. However, when considered from a patient value-chain perspective, the lost revenue of €45,000 becomes apparent; money that might more usefully be spent on employing more MRI radiographers who could not only undertake ICU MRIs on the day of request but also reduce the backlog in out-patient scans too.

References

- Kahn JM, Brake H, Steinberg KP., Intensivist physician staffing and the process of care in academic medical centres., 2007, PMID:17913772
- Vincent JL, Suter P, Bihari D, Bruining H., Organization of intensive care units in Europe: lessons from the EPIC study., 1997, PMID:9434928
- Kahn JM, Goss CH, Heagerty PJ, Kramer AA, O'Brien CR, Rubenfeld GD., Hospital volume and the outcomes of mechanical ventilation., 2006, PMID:16822995
- Guidet B, Valentin A, Flaatten H., Quality Management in Intensive Care: A Practical Guide, 2016, ISBN:9781316218563
- Carson SS, Stocking C, Podsadecki T, Christenson J, Pohlman A, MacRae S, Jordan J, Humphrey H, Siegler M, Hall J., Effects of organizational change in the medical intensive care unit of a teaching hospital: a comparison of 'open' and 'closed' formats., 1996, PMID:8656546
- Multz AS, Chalfin DB, Samson IM, Dantzker DR, Fein AM, Steinberg HN, Niederman MS, Scharf SM., A closed medical intensive care unit improves resource utilization when compared with an open MICU., 1998, PMID:9603125
- Hanson CW 3rd, Deutschman CS, Anderson HL 3rd, Reilly PM, Behringer EC, Schwab CW, Price J., Effects of an organized critical care service on outcomes and resource utilization: a cohort study., 1999, PMID:10075049
- Ghorra S, Reinert SE, Cioffi W, Buczko G, Simms HH., Analysis of the effect of conversion from open to closed surgical intensive care unit., 1999, PMID:10024095
- Miranda DR, Rivera-Fernández R, Nap RE., Critical care medicine in the hospital: lessons from the EURICUS-studies., 2007, PMID:17562305
- Angus DC, Shorr AF, White A, Dremsizov TT, Schmitz RJ, Kelley MA; Committee on Manpower for Pulmonary and Critical Care Societies (COMPACCS)., Critical care delivery in the United States: distribution of services and compliance with Leapfrog recommendations., 2006, PMID:16505703

- Ward NS, Afessa B, Kleinpell R, Tisherman S, Ries M, Howell M, Halpern N, Kahn J; Members of Society of Critical Care Medicine Taskforce on ICU Staffing., Intensivist/patient ratios in closed ICUs: a statement from the Society of Critical Care Medicine Taskforce on ICU Staffing., 2013, PMID:23263586
- Neuraz A, Guérin C, Payet C, Polazzi S, Aubrun F, Dailler F, Lehot JJ, Piriou V, Neidecker J, Rimmelé T, Schott AM, Duclos A., Patient Mortality Is Associated With Staff Resources and Workload in the ICU: A Multicenter Observational Study., 2015, PMID:25867907
- Gershengorn HB, Harrison DA, Garland A, Wilcox ME, Rowan KM, Wunsch H, Association of Intensive Care Unit Patient-to-Intensivist Ratios With Hospital Mortality., 2017, PMID:28118657
- Wilcox ME, Chong CA, Niven DJ, Rubenfeld GD, Rowan KM, Wunsch H, Fan E., Do intensivist staffing patterns influence hospital mortality following ICU admission? A systematic review and meta-analyses., 2013, PMID:23921275
- Dimick JB, Pronovost PJ, Heitmiller RF, Lipsett PA., Intensive care unit physician staffing is associated with decreased length of stay, hospital cost, and complications after esophageal resection., 2001, PMID:11373463
- Pronovost PJ, Jenckes MW, Dorman T, Garrett E, Breslow MJ, Rosenfeld BA, Lipsett PA, Bass E., Organizational characteristics of intensive care units related to outcomes of abdominal aortic surgery., 1999, PMID:10208147
- Pronovost PJ, Angus DC, Dorman T, Robinson KA, Dremsizov TT, Young TL., Physician staffing patterns and clinical outcomes in critically ill patients: a systematic review., 2002, PMID:12413375
- Levy MM, Rapoport J, Lemeshow S, Chalfin DB, Phillips G, Danis M., Association between critical care physician management and patient mortality in the intensive care unit., 2008, PMID:18519926
- Gajic O, Afessa B, Physician staffing models and patient safety in the ICU., 2009, PMID:19349399
- Arabi Y, Pro/Con debate: should 24/7 in-house intensivist coverage be implemented?, 2008, PMID:18557996
- Blunt MC, Burchett KR., Out-of-hours consultant cover and case-mix-adjusted mortality in intensive care., 2000, PMID:11085695
- Wallace DJ, Angus DC, Barnato AE, Kramer AA, Kahn JM., Nighttime intensivist staffing and mortality among critically ill patients., 2012, PMID:22612639
- Kerlin MP, Small DS, Cooney E, Fuchs BD, Bellini LM, Mikkelsen ME, Schweickert WD, Bakhru RN, Gabler NB, Harhay MO, Hansen-Flaschen J, Halpern SD., A randomized trial of nighttime physician staffing in an intensive care unit., 2013, PMID:23688301
- Kerlin MP, Harhay MO, Kahn JM, Halpern SD, Nighttime intensivist staffing, mortality, and limits on life support: a retrospective cohort study., 2015, PMID:25321489
- Moreno R, Reis Miranda D., Nursing staff in intensive care in Europe: the mismatch between planning and practice., 1998, PMID:9515853
- Amaravadi RK, Dimick JB, Pronovost PJ, Lipsett PA., ICU nurse-to-patient ratio is associated with complications and resource use after esophagectomy., 2000, PMID:11271096
- Kovner C, Jones C, Zhan C, Gergen PJ, Basu J., Nurse staffing and postsurgical adverse events: an analysis of administrative data from a sample of U.S. hospitals, 1990-1996., 2002, PMID:12132597
- West E, Barron DN, Harrison D, Rafferty AM, Rowan K, Sanderson C, Nurse staffing, medical staffing and mortality in Intensive Care: An observational study., 2014, PMID:24636667
- Maslove DM, Rizk N, Lowe HJ., Computerized physician order entry in the critical care environment: a review of current literature., 2011, PMID:21257633
- Leape LL, Cullen DJ, Clapp MD, Burdick E, Demonaco HJ, Erickson JI, Bates DW., Pharmacist participation on physician rounds and adverse drug events in the intensive care unit., 1999, PMID:10422996
- Bates DW, Leape LL, Cullen DJ, Laird N, Petersen LA, Teich JM, Burdick E, Hickey M, Kleefield S, Shea B, Vander Vliet M, Seger DL., Effect of computerized physician order entry and a team intervention on prevention of serious medication errors., 1998, PMID:9794308
- Landsperger JS, Semler MW, Wang L, Byrne DW, Wheeler AP, Outcomes of Nurse Practitioner-Delivered Critical Care: A Prospective Cohort Study., 2016, PMID:26836900
- Squiers J, King J, Wagner C, Ashby N, Parmley CL., ACNP intensivist: a new ICU care delivery model and its supporting educational programs., 2013, PMID:24218198
- Thomas EJ, Lucke JF, Wueste L, Weavind L, Patel B., Association of telemedicine for remote monitoring of intensive care patients with mortality, complications, and length of stay., 2009, PMID:20040555
- Young LB, Chan PS, Lu X, Nallamothu BK, Sasson C, Cram PM., Impact of telemedicine intensive care unit coverage on patient outcomes: a systematic review and meta-analysis., 2011, PMID:21444842
- Lilly CM, Zubrow MT, Kempner KM, Reynolds HN, Subramanian S, Eriksson EA, Jenkins CL, Rincon TA, Kohl BA, Groves RH Jr, Cowboy ER, Mbekeani KE, McDonald MJ, Rascona DA, Ries MH, Rogove HJ, Badr AE, Kopec IC, Society of Critical Care Medicine Tele-ICU Comm, Critical care telemedicine: evolution and state of the art., 2014, PMID:25080052
- Boots RJ, Singh S, Terblanche M, Widdicombe N, Lipman J., Remote care by telemedicine in the ICU: many models of care can be effective., 2011, PMID:22067879
- Reis Miranda D, Ryan DW, Schaufeli WB, Fidler V., Organization and Management of Intensive Care. A Prospective Study in 12 European Countries., 1997, ISBN:9783642643286
- Randolph AG, Pronovost P., Reorganizing the delivery of intensive care could improve efficiency and save lives., 2002, PMID:11882096
- Zimmerman JE, Shortell SM, Rousseau DM, Duffy J, Gillies RR, Knaus WA, Devers K, Wagner DP, Draper EA., Improving intensive care: observations based on organizational case studies in nine intensive care units: a prospective, multicenter study., 1993, PMID:8403951
- Barbaro RP, Odetola FO, Kidwell KM, Paden ML, Bartlett RH, Davis MM, Annich GM., Association of hospital-level volume of extracorporeal membrane oxygenation cases and mortality. Analysis of the extracorporeal life support organization registry., 2015, PMID:25695688

- Shahin J, Harrison DA, Rowan KM., Is the volume of mechanically ventilated admissions to UK critical care units associated with improved outcomes?, 2014, PMID:24504638
- Halm EA, Lee C, Chassin MR., Is volume related to outcome in health care? A systematic review and methodologic critique of the literature., 2002, PMID:12230353
- Zuber B, Tran TC, Aegerter P, Grimaldi D, Charpentier J, Guidet B, Mira JP, Pène F; CUB-Réa Network., Impact of case volume on survival of septic shock in patients with malignancies., 2012, PMID:21926606
- Shortell SM, Zimmerman JE, Rousseau DM, Gillies RR, Wagner DP, Draper EA, Knaus WA, Duffy J., The performance of intensive care units: does good management make a difference?, 1994, PMID:8182978

3. Management

3. 1. Planning

Planning is an important activity that an ICU physician-manager undertakes. To be successful, an ICU physician-manager must develop and hold a clear vision of the short-, medium and long-term plans for the ICU. Planning for the ICU involves determining its direction by:

- Creating shared objectives with the team
- Designing and implementing strategies to achieve the objectives.

Planning for the ICU is important because it:

- Makes the physician-manager focus on outputs. This means that all ICU activity should be directed to achieving predefined objectives (or outputs).
- Enables the ICU physician-manager to develop priorities and make better decisions about allocating available resources.
- It enables the ICU physician-manager to both measure progress and determine whether expected results are being achieved.

Warning

The ICU physician-manager should not decide what the ICU needs (e.g. staff, consumables) until decisions have been made about what the ICU's objectives are.

Figure 1: Planning cycle

Note

Planning cycle. Good planning requires focus on what the ICU wants to do (also referred to as 'outputs'). For example, outputs could relate to changes in patient care pathways, educational activities, and/or creating a 'world class' programme in health services research. Once a plan has been developed to describe what the ICU team wants to achieve, inputs and processes are linked with goals. Importantly, constant evaluation (the feedback loop) is maintained to ensure that pre-specified goals are being accomplished.

Planning is never complete. Once created, ongoing surveillance is maintained by the physician-manager to identify factors that might be considered as necessitating a change in the plan. Stated differently, a successful physician-leader understands that adaptive change is critical to his/her success and to the success of the ICU team.

Describe examples of inputs and processes controlled by the ICU physician-manager to achieve desired outputs.

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Inputs include resources such as device technology (monitoring, mechanical ventilators, dialysis machines), number of beds, laboratory space for research, educational centre, appropriately trained staff, support services (blood gas laboratory, stat laboratory), organisational characteristics, (nursing skills, 'open' versus 'closed' ICU status, composition and experience of the ICU team).
Processes include how communication occurs in the ICU, how the team is formulated, how decision-making is formulated and conflict is managed.

'Strategic' versus 'business' planning

There are three types of planning which are differentiated by their time frames.

The ICU's business plan is short-term, usually developed on an annual basis to cover the next one to two-year period. To create an annual budget, the ICU physician-manager should take his staff and colleagues through a process of determining goals and objectives for that year in the business plan after which the budget is developed to support the short-term goals.

The ICU's medium-term strategic plan typically covers the next two-five years, and affords medium-term goals and objectives. This is usually certain as within that time-frame, it is often understood which members of staff will be retiring, what organisational developments are anticipated that will impact the ICU service and also the direction of travel of the macro-economic and political environments in which the organisation and service operates.

The long-term strategic plan is often less certain as within that time-frame unexpected new technologies may emerge, political and economic environments may radically alter with changes of government and global events such as wars and pandemic flu. Nonetheless, some long-term strategic planning is not only possible but advisable based on population demographic trends (rising age, multi-morbidity, obesity, cancer surgery and major fractures) – purchasing decisions on equipment that may have a 10+ year life-expectancy (bariatric beds, commodes, hoists) as well as staffing models for the additional burden of care are best considered well in advance rather than in a reactive manner. Additionally, long-term service developments such as positioning to become an academic centre in a specific subspecialist area of ICU through strategic recruitment, or a teaching centre for ICU ultrasound may well take 5-10 years to realise and early planning to place appropriate foundations in place is advisable.

3. 1. 1. Strategic planning

Strategic planning is used to set priorities, focus energy and resources, strengthen operations, and to ensure that staff and stakeholders are working toward common goals. There should be established agreement around expected outputs with assessment and adjustment of the direction of travel of the ICU's strategic vision in response to the changing environment. Strategic planning is both externally and internally focused. Outcomes of strategic planning may include development of a shared vision, a mission statement, objectives, policies and procedures and an assessment matrix to track the delivery of the plan. Strategic planning involves three steps, which are undertaken in sequence:

- A strategic assessment
- Formulating objectives
- Making strategic choices

A strategic assessment

Strategic assessment involves gathering information from several sources, compiling and evaluating this information allowing informed assumptions about the future to be made.

Generally, strategic assessments are carried out using two perspectives – an outward looking perspective assessing the macro-environment in which the ICU operates regionally, nationally or even globally, and an inward looking assessment that considers the micro-environment of the department, hospital and immediate local healthcare providers. Optional tools from the world of business are available to assist these assessments – a PESTEL analysis assesses the political, economic, sociological, technological, environmental and legal issues of the macro-environment, whereas a SWOT analysis assesses the strengths, weaknesses, opportunities and threats of the microenvironment.

As a strategic assessment examines both the macro and micro-environments in which the unit operates, it is also often referred to as an 'environmental analysis'. This first step forces the physician-manager to analyse and understand trends, both internal and external to the ICU. For example, a macro-environmental analysis ten years ago would have considered the impact of information technology on intensive care in ten years as it would again today. However, it might have considered it in relation to charting technologies and electronic patient record functions then as opposed to considering the rise of artificial intelligence analysing and integrating continuously outputted and evolving data points for individual patients possibly integrated with genotyping profiles in ten years time.

This analysis is useful when it comes to considering the micro-environmental analysis of the existing ICU – depending upon the staff skills, existing IT infrastructure etc., the ICU may be in a position of strength to move ahead seizing opportunities as they arise and already have a huge database of patient data that lends itself to retrospective analysis using AI or relative weakness without either a data collection portal or anyone who understands these issues nor interest in learning about them. Opportunities may exist to mitigate some of these risks through partnering synergistically with another healthcare provider or IT organisation, innovating or using future planned recruitment. Opportunities can turns relative weaknesses into newly developing strengths and mitigate future threats.

'Threats' identified in the environmental analysis are events that could adversely impact on the different aspects of the ICU's future and its viability in different domains.
Examples might include:

1. national financial austerity at a macro-environmental level leading to changes in reimbursement at local one
2. changes in national employment legislation reducing maximum permitted weekly working hours or increasing fully-paid parental leave to 18 months or
3. continuing the illustrative example above, governmental signalling that all ICUs will be required to contribute to regional big-data centres by some future date within a two to five year time-frame and to feed ICU patient records into a national, secure, data-server as part of a national quality framework without any additional funding for those ICUs who have not been steadily investing in IT solutions and reduced remuneration rates to non-complying units.

Think

> Consider your strategy – how would you plan for the changes in working hours as a result of the European Working Time Directive. How do you ensure that the ICU remains adequately staffed, patient safety is maintained and training of future intensive care physicians is supported?

In the strategic assessment, the ICU physician-manager also tries to identify future 'opportunities'. Addressing the threats from existing weaknesses often also leads to new strengths developing. Examples, of opportunities may include:

1. changes in research funding opportunities through industry might cause you to consider a strategy that emphasises recruitment of new ICU staff physicians with expertise in clinical trials in a specific growth field.
2. new technologies may be transitioning into intensive care that require special skill sets for clinicians using these technologies. An example would be echocardiography. A strategic plan for a unit with limited ECHO skills may consider recruiting an ICU physician who has been trained in the use of echocardiography or better still someone accredited as a trainer to propagate these skills to the wider team.

When undertaking the environmental analysis, the ICU physician-manager must make a candid examination of the ICU's strengths (for example, national level of accreditation as a training centre, the qualifications of its professional and clinical staff, its capacity to do research, and the range of life-support programmes it provides) and weaknesses (for example, does the ICU have outdated equipment, a poor reputation for doing industry-related research, or excessive physician attrition?). The physician-manager must ensure that the strengths are maintained or further re-inforced whilst weaknesses and threats are mitigated and ideally used as opportunities to secure momentum for change, that may allow an area of weakness to be transformed into one of relative strength in the medium and long-term strategic planning cycles.

Formulating objectives

After completing a S.W.O.T. and P.E.S.T.E.L or equivalent analyses and concluding the necessary direction of travel for the unit, the planning process may include the creation of mission and/or vision statements or updating of existing ones to summarise the strategic medium and long-term aims. Following this, specific key goals and objectives for the ICU are formulated, responsibilities and accountabilities for individual goal deliveries are designated, time-frames for realisation of these are set and a matrix developed that allows on-going assessment of success or failure of delivery. Setting all these at the outset facilitates ease of management of the delivery process. Publishing mission or vision statements without the subsequent work outlining designated responsibilities and a timeline for a transparent delivery process, risks losing staff confidence with goals being seen as non-deliverable aspirations. This can damage the credibility of a physician manager, lead to team disengagement and, if the pattern is repeated, lead to cynicism and charges of a leader lacking authenticity, competency or both.

A mission statement describes the purposes for which the ICU exists. It summarises what the ICU team aspires to achieve – and the vision of what their future should be. A compelling mission statement mobilises and motivates the ICU team in focusing their activities, collectively, in support of the mission. It helps translate energies into a team-based approach where the team's futures are considered more important than the individuals. Essential elements that a mission statement needs to capture include:

- What is the ICU?
- Why does the ICU exist?
- Who is the ICU's constituency?

An example of a mission statement from an oncological ICU might be:

'Our primary goal is to provide safe, effective, patient-centred, high-quality care to all cancer patients suffering from critical illness.'

Goals are simply a clearer statement of the vision, specifying the accomplishments to be achieved if the vision is to become real.

Objectives are statements of the results that an ICU seeks to achieve. They are the steps required to be filled if the mission is to be accomplished and give direction to the ICU's activities. As outlined above, objectives must be 'S.M.A.R.T.': specific, measureable, achievable, relevant and timely. They should also:

- Enable the physician-manager to work toward specific endpoints or key performance indicators (KPIs).
- Provide prioritising criteria for decision-making around the ICU's clinical and academic programmes.
- Give ICU colleagues and co-workers a sense of direction as this creates a sense of stability, which is particularly important in the turbulence of the current economic climate and during times of major change.

Stakeholders should be included by the physician-leader when developing both long-term and annual ICU objectives. Broadly speaking, the typical ICU has three types of stakeholders:

- Internal (e.g. the ICU staff).
- Interface (e.g. patients' families, other clinical departments in the hospital).
- External (e.g. agencies funding the ICU's activities, such as government and private insurers).

Making strategic choices

After creating the ICU's mission statement, setting the goals and objectives, the planning process next needs to identify strategies that will lead to achievement of the unit's objectives. Strategies are broad general programmes designed by the ICU to meet its objectives, and generally require a commitment of resources. Examples include:

- Changing the scope of ICU services. For example, this could include adding echocardiography services to the ICU teams' skills (contrasted with obtaining echocardiography through consultation with Cardiology).
- Diversifying services the ICU provides. For example, the ICU planning process might identify opportunities in providing pre-operative evaluation of patients projected for admission to the ICU.
- Integrating ICU activities within other programmes. For example, the ICU planning process might identify opportunities for sharing staff in strategies with other special care units in the hospital, such as step-down units, outreach services, medical emergency teams, acute pain services and operating theatre recovery areas.

3. 1. 2. Business planning

The budget describes, for example, expenses relating to staffing, equipment and operating technology and is reflective of the annual business plan. To be successful, ICU physician-managers need to participate in business planning, even if they are not directly accountable for the budget.

How does an annual operating budget relate to the business plan? It translates objectives identified in an annual business plan to operational implementation, thereby creating a financial roadmap of its activities. For example, the ICU's strategic plan might have identified the addition of non-invasive ventilation services to its patient care activities by the end of the year. The budget would then 'translate' this objective into the expenditure required to train staff, purchase necessary equipment and cover the costs of consumables at the projected work volumes.

When developing the business plan, the ICU physician-manager needs to forecast demand for the new service and will do so on the basis of informed assumptions. For example, the number of cases likely to be referred to the ICU for care should be considered, using consultation with other services and monitoring from historical trends. The hospital's senior management team is a good place to begin, asking them to project the anticipated ICU activity levels for the budgetary year under consideration. Consultation with other services, for example, the Department of Respiratory Medicine, should identify the number of cases they anticipate might be referred to the ICU for non-invasive ventilation.

One way to do this is to create a survey document for circulation to stakeholders before the business planning process begins. The document should ask groups such as:

- Senior Management if the hospital is planning the addition of new programmes or services that might impact on the ICU (e.g. regional centre for trauma, neurosurgery).
- Clinical departments whose patients are admitted to the ICU, if they have added any new staff whose skills include the provision of procedures that might require ICU care (e.g. new appointment of vascular surgeon, interventional radiologist).

The business planning process is also the time when cost pressures need to be identified and assumptions made regarding the total impact. For example, contract negotiations with the hospital's nursing service might raise staff wages. Other sources of cost pressures that need to be identified in the business planning process include:

- Anticipated changes in drug prices
- Anticipated changes in reimbursement from insurers (government and/or private)
- Anticipated changes in physician remuneration levels
- The cost of investing in new technologies
- Repairs and renewal of service contracts for existing equipment

Think

> Consider that you are asked to develop business plan for the ICU. Think of assumptions you would make to your ICU budget if the hospital's management team said they would provide resources to add two more beds to the total ICU bed complement.

It is also good practice during business planning to think about cost efficiency and potential savings. ICU costs may be reduced by providing more activity for the same budget or providing the same amount of activity at lower costs. Cost improvement programmes encourage physician-managers to develop new ways and techniques to provide care. This may involve looking at ways to streamline processes, decrease inefficiencies and improve pathways of care for critically ill patients. In some hospitals, an incentive programme is employed to encourage innovative thinking in this area. For example, strategies to reduce unit costs, if successful, might lead to senior management returning to the ICU some of the savings for activities such as purchase of new technologies and educational programmes for the staff.

It is important to be aware of false economies. Arguments are often forwarded in ICU whereby if we follow a new process at slightly higher expense than the old one, then time will be saved and that will translate into cost-savings. An example might be the production of pre-filled syringes of drugs by a pharmacy department or purchase of these from an external agency. The costs of these drugs may be higher than the "cost" of a bedside nurse making up the syringes him or herself in the ICU. An argument is often proposed that the cost of the nurse's time in making the drugs up is more expensive than the additional cost of purchasing these from an external supplier who makes them in bulk for many different institutions. In absolute terms, this argument is probably correct. However, unless the aggregated

time saved by all the nurses in the unit who are no-longer making up the syringes is translated into alternative productive work that was not previously being done (mitigating a previous need for more staff) or results in an overall reduction in staffing, the unit's costs will rise without any increase in productivity. Such a change in process may be validated based on quality improvement, or risk reduction or in aggregate through reduction in expensive litigation at a national level by infrequent but potentially catastrophic drug preparation errors, but at a local level, such investment is usually a false economy in a financial sense.

Savings through technology:
Provided savings in staff time can be translated into either reduction in man-power or reductions in the growth rate of demand for increased man-power, the employment of new technologies in a workplace environment can be a very useful way to increase productivity with either a fall in overall costs or fall in cost-per patient activity despite rising activity. Examples might include:

1. the purchase and installation of electric, multi-adjustable ceiling hoists above all patient ICU bed-spaces in response to an increased demand for staffing (nursing, physiotherapy and healthcare assistants) to facilitate routine patient turns and mobilisation of a rising proportion of overweight patients. With suitable investment, the same or higher work-rate and higher work in terms of the physics of moving body mass can be undertaken using a similar or in certain instances even a reduced number of staff. Time saved in fetching floor hoists from storage facilities and returning them can be re-distributed to assisting other bedside staff to place their patients into the standing hoist safely. In larger units individually and in smaller units in aggregate, reduction in absenteeism through back injuries might be expected
2. the purchase and installation of a haemofiltration machine for a small rural hospital ICU with regular but infrequent urgent referrals for acute dialysis in a regional major centre 300km away where the regional dialysis centre is based. At a given tipping point (around 8-10 cases per year), the costs of machine purchase, staff-training and haemofiltration fluid will offset and make savings against the need to fly patients acutely by helicopter to the regional centre. In certain instances, transfer will be avoided altogether and in others the metabolic emergency such as hyperkalaemia or acidaemia driving the need for emergency transfer by air can be managed locally and a far less expensive road transfer be undertaken electively when the patient is more stable.

The increase in work-output at lower cost/case through the advent of technology is well recognised in economics and is described in the production function curve looking at output as a function of inward capital flows (shown in the graph below). When using the original models of care, reduced inflow of capital results in a fall in production (A to B. When a new technology or model of working is adopted with greater efficiency, productivity increases again, even at the lower inward capital flow rate (X1a to X1b).

Figure 2: Impact of savings through technology

Savings through management of the patient value chain:
As described previously, in addition to improving patient experiences, flow and quality, assessment of unit processes from the perspective of the patient value chain can also lead to real savings and improved cost-efficiency facilitating higher throughput at the same or lower costs. One example of this comes from the work of the Institute for Healthcare Improvement and Intermountain Healthcare, Utah, USA. By reducing unnecessary time on a ventilator following cardiothoracic surgery (time spent on a ventilator for system convenience rather than patient benefit), overall ventilation time of patients following open heart surgery was reduced by 60%, reducing length of stay in the cardiothoracic ICU by 30%, improving flow, access and reducing overall costs per operation by around 10%. Such system changes allow more work to be done for the same overall costs and enhance the value chain to the patient through reduced waiting to proceed to the next stage of their recovery.

In text References

(Martin et al. 2009; Moseley GB 2018)

Think

Consider approaches to providing care in your ICU that would allow you to reduce costs, while keeping the same patient throughput as in the previous year and maintaining high-quality care.

Describe examples of ICU cost improvement initiatives

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

1. Flexible working and facilitating personal development to increase permanent staff retention thus reducing the dependence on temporary staff (who may be more expensive).

2. Flexible staff rotas dependent on ICU activity.
3. Re-negotiation of service contracts for medical equipment.
4. Review of stock and equipment.
5. Bulk or shared contracts with other service areas e.g. Department of Surgery.
6. Change in skill mix of staff (e.g. use of health care assistants).
7. Increase cost awareness (e.g. price labelling of stock).

References

- Martin LA, Neumann CW, Mountford J, Bisognano M, Nolan TW., Increasing Efficiency and Enhancing Value in Healthcare., 2009, https://cdn2.hubspot.net/hub/276565/file-410068373-pdf/docs/856157170.pdf
- Moseley GB III, Managing Healthcare Business Strategy. 2nd Edition, 2018, ISBN:0763734160

3. 2. Budgeting

3. 2. 1. Managing the ICU budget

Budgets serve a dual purpose. They are numerical expressions of business/strategic plans and they are also control standards against which results can be compared. The ICU operating budget describes expenses required to achieve annual objectives and cover a given case volume. This means an ICU budget is a statement of expected revenues and expenses over a defined time.

Note

Budgeting is part of managing: it involves allocating resources deliberately and prudently to achieve objectives outlined in the annual business plan. This includes specific projects and activities, staffing, and procurement of resources.

Describe the objectives of an ICU operating budget

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Objectives of a budget are to:

- Numerically describe its annual business plan.
- Create a basis for evaluating its financial performance.
- Create control standards against which results can be compared.
- Create cost awareness by the ICU staff.

3. 2. 2. Types of ICU budgets

Revenue

A revenue budget describes revenue generation from patient care (revenue from patient billings and government funding), education (revenue for teaching students) and research (revenue from research agencies and industry).

Operating expense
An operating expense budget includes costs of day-to-day ICU operations, for example wages, equipment and supplies. Recurring costs such as staff wages, drugs and consumables are often described as revenue expenditures; the expenditures related to care for specific revenue generating activities i.e. caring for patients. Non-recurring expenditures on items of equipment such as a ventilator or patient bed and building of physical infra-structure for patient care or administrative support areas that are expected to remain productive and functional in the long-term are termed capital expenditures. As capital expenditures will eventually recur (a ventilator will usually require to be replaced after 7-10years of service), it is usual and generally considered good practice to amortise the cost of replacement by adding 10% of the total capital equipment budget to the revenue expenditure each year and to replace equipment on a rolling basis.

Expenses in ICU operating budgets can be divided into direct (i.e. directly related to individual patient care and running of the ICU) or indirect (i.e. 'central expense' shared by all departments in the hospital). An alternative way of analysing expenses is to consider fixed and variable costs. Fixed costs exist no matter how many patients are treated and thus are unrelated to ICU activity (e.g. staff wages,

contracts, equipment maintenance) whereas variable costs are influenced by the activity of the ICU (e.g. disposable equipment, drugs). Staff wages account for 60–70% of direct costs in the ICU.

For more information on costs, see the e-module on Quality assurance and cost effectiveness.

Budget monitoring

Monitoring the budget is an important activity for the physician-manager. The hospital usually establishes a process by which necessary data are collected, distributed and evaluated by patient care unit managers. The hospital generally identifies what it considers to be key performance indicators and measures variance (actual performance versus what was planned).

- Financial, e.g. cost per unit of service.
- Staffing, e.g. cost per unit of service or staff paid hours as a percentage of total paid hours, staff sickness rates and additional payments for cover of sickness.
- Workload.
- Productivity, e.g. staff productivity index.
- Utilisation, e.g. workload per patient or activity.

The physician-manager will then be required, following review of the data, to identify reasons for variance and the type of activities that will be instituted to bring the budget back in line with what was predicted in its initial development.

An example of the types of data and the processes used for this type of analysis is shown below.

Table 3:Monthly variance analysis report

Table 3:Monthly variance analysis report

Describe some of the causes of variance that might be found when monitoring the ICU budget.

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

- New or discontinued technology or procedure.
- Change in number of cases referred from the operating or emergency room.
- Change in procedures and technology e.g. TAVI versus open aortic valve replacement
- Service expansion by a stakeholder service without adequate consultation e.g. new cardiothoracic surgeon appointed and an additional 100 open heart surgeries per year planned
- Unexpected repairs to equipment.
- Unexpected change in service providers, for example leading to increased orientation costs. Changing physician practice patterns, for example use new/different antimicrobial agents.
- An increase in the number of patients admitted with high illness severity.
- Unexpected increase in number of vacancies because of illness or maternity.

- Rising BMI of patients with rising length of stay and increased staff requirements for pressure care, mobilisation etc.

The variable budget concept may be extended to an internal trading account such that referrers hold a budget to buy the ICU service they need. What are the advantages of such a system?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Shifting the financial responsibility for referral to the referrer allows:

- The financial risk of longer stay patients or increased activity following, for instance, a new consultant appointment, is moved to the source of such activity rather than the ICU.
- Financial management is focused on balancing income and expenditure rather than simply containing expenditure.
- In larger hospitals where close liaison between cost centres may be difficult, interaction is made more explicit. Developments in all interacting cost centres are forced to take account of the implications for the ICU.
- Clearly the overall financial risk to the hospital does not disappear but it makes explicit the requirement to think through at a proper strategic level the impact and cost of ICU services.

3. 3. Control, Audit and Quality Improvement

3. 3. 1. Control

Control refers to the processes an ICU physician-manager sets up to ensure that what is planned actually occurs.
Audit is part of the control process and involves the: 'gathering of information about and the monitoring of activities, comparing actual with expected results and, intervening to take corrective action by changing inputs or processes when actual results are not what was predicted or planned'.

Control is one means by which the physician-manager is assured that the ICU achieves its objectives. Thus, ICU managers continuously monitor and evaluate their programmes and, they intervene with change strategies when needed to ensure the unit's objectives are reached. For example, the ICU physician-manager needs to monitor unit utilisation activity (such as admissions, discharges, length of stay) on a regular basis. If such monitoring identifies that an activity, such as bed days used, is greater than assumed when the operating budget was designed, the physician-manager needs to identify strategies that either reduce unit activity or, increase the unit's budget (to cover the increased workload required by greater than anticipated utilisation).

There are three different types of control: output (outcome) control; process control; input (structural) control.

Figure 3: Control cycle

Output (outcome) control

Output control is also called feedback control. This is a retrospective process that involves measuring issues such as quantity and quality of care in the ICU. An example of output control would be the length of stay or mortality risk adjusted for illness severity.

Process control

Process control monitors integrative conversion processes that generate outputs. With regard to quality improvement, monitoring the use of clinical practice guidelines by clinicians or adherence to care bundles would be an example of process monitoring.

It is important to acknowledge that there are always the tensions in any system between controls (adherence to guidelines) to reduce variance with the aim of standardising around good outcomes versus productive innovation and experimentation which may vary treatments from standard pathways with the aim of finding better outcomes. The latter are usually best reserved to the domain of randomised clinical trials. Where there is no definitive evidence base for best practice, unit guidelines or protocols that allow for some agreed, pre-determined variation in management pathways, may overcome resistance of clinicians to adhering to guidelines.

Input (structure) control

Input control is also called feed-forward control. With input control, the manager measures ICU inputs as a means of controlling ICU objectives. An example is the application of research that shows physicians with intensive care medicine training provide better ICU outcomes. In comparing outcomes from different ICUs, utilisation would be expected to be different from those that employ only ICU physicians (inputs) for care provision.

For each step in the control process there are clearly defined indicators. Functions of indicators include measurement of current status (evaluation), description of changes (monitoring) and triggering of events that require intervention (alarm). Indicators should be:

- Important: link to clinical relevant outcomes.
- Valid: refers to the degree to which an indicator reflects what it is supposed to measure.
- Reliable: refers to the extent to which an indicator achieves the same result when assessed by different raters (inter-rater reliability) or the degree to which repeated measurements provide the same result (intrarater reliability).
- Responsive: refers to whether the indicator is sensitive to change introduced by a quality improvement process.
- Interpretable: refers to whether the indicator is easily understood by the key stakeholders.
- Feasible: refers to whether the indicator can be collected with available resources.

In text References

(Berenholtz et al. 2002; Guidet, Valentin and Flaatten. 2016; Rubin, Pronovost and Diette. 2001; Rubin, Pronovost and Diette. 2001; Frutiger et al. 1998; Brook, McGlynn and Cleary. 1996)

ESICM Flash Conferences:

- Andreas Valentin. Quality Indicators in the ICU, Berlin 2011.
- Hans Ulrich Rothen. How to keep quality of care while saving money. Berlin 2011.
- Information Technology, Quality Improvement and Cost Saving, Anna-Maria KAISER,Development of a Trigger Based Automated Nosocomial Infection Surveillance, Paris 2013
- Ethical issues in clinical trials?, Andrej MICHALSEN, Research disguised as quality improvement, Berlin 2011
- Organisation & environmental hazards. Hans FLAATTEN. Quality markers in intensive care, Vienna 2009
- Quality indicators for the ICU. Bertrand GUIDET. Are quality indicators useful in the audit of ICUs?, Vienna 2009
- Quality indicators for the ICU. Maurizia CAPUZZO. What defines the quality of a quality indicator?,Vienna 2009
- Quality indicators for the ICU. Francesca RUBULOTTA. What is quality from the patient's perspective?, Vienna 2009
- Quality indicators for the ICU. Andreas VALENTIN. Which quality indicators are helpful in daily practice?, Vienna 2009

You are asked by your local health authority to create 'indicators' for all ICUs in the region, focusing on process control and input control. By asking ICUs to regularly report on indicators, their goal is to determine if compliance with such indicators improves outcomes.

- Define 'indicator'
- Identify a 'process' control indicator
- Identify an 'input' control indicator

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

- An indicator is a measure of a specific component of a health improvement strategy. An indicator can reflect an activity implemented to address a particular health issue, for example, the number of regional ICUs that are 'closed' versus 'open'.
- An indicator reflecting 'process' control would be the number of regional ICUs that have developed a process which leads to adoption of 'evidence-based' guidelines/pathways to improve quality and safety of patient care.
- An indicator reflecting 'input' control would be the number of regional ICUs that are 'closed' versus 'open' with regard to supervision of patient care by a qualified intensivist.

It is worthwhile noting that useful monitoring of control processes is far from easy and can prove time-consuming and laborious. Caution should be applied to the use of simple markersto collect surrogates or indicators as outlined above. Assumptions that the presence of the surrogate marker means the optimum benefit normally associated with that marker is being realised should be routinely challenged. For instance one might assume that by having a senior intensivist team of fully trained and accredited intensivists, patient outcomes, length of stay and educational satisfaction amongst trainees would all be good or excellent. However, the use of such surrogates is overly simplistic and inappropriate. Several healthcare scandals have arisen globally where "accountability matrices" of surrogate markers for quality were employed and resulted in ratings of excellent being awarded to organisations, research groups or departments that were shortly thereafter to be found severely wanting. One common example of this is the existence of copious policy documents that are regularly updated in a department or unit being used as a surrogate indicator that the policies are actually followed and policed. Having an excellent anti-bullying policy is quite different from fully implementing it.

3. 3. 2. Quality improvement

Quality improvement activities are also part of the control mechanisms used by an ICU physician-manager. Quality improvement has been associated with increased compliance to care bundles and improved patient outcomes. Quality improvement is described as 'the implementation of systematic, data-driven interventions designed to bring about an immediate improvement in healthcare in a specific practice setting'. Processes of care that are part of quality improvement include evaluation of patients for thromboembolic prophylaxis, steps to reduce catheter-related bloodstream infections, and ventilator-associated pneumonia. Initiating a new quality improvement programme or improving a pre-existing programme requires a number of steps to ensure the programme is successful. Good foundations for a successful quality improvement programme include strong motivation, teamwork and leadership.
Information technology and checklists are useful tools providing clinical reminders, facilitating the use of clinical practice guidelines and reducing errors. A systematic approach to setting up a quality improvement programme is outlined below:

- Identify opportunities and resources.
- Develop a project plan including key stakeholders, resources, a task list, budget and timeline.
- Collect information on the current care being delivered and the potential barriers to an effective quality improvement programme.
- Generate a data collection system.
- Generate a data reporting system.
- Implement strategies to change behaviour: a multifaceted approach using reminders, prompts and educational tools is useful. Targeting barriers to change (**see Table 4: Barriers to change**) while adapting to the local setting are the most effective means of inducing and sustaining change.
- Evaluating and sustaining the quality improvement programme: modify behaviour change strategies, sustain interdisciplinary leadership and collaboration and obtain support from hospital management.

In text References

(Curtis et al. 2006; Guidet, Valentin and Flaatten. 2016)
Another commonly used methodology is Plan, Do, Study, Act (PDSA) cycle for quality improvement.

Challenge

Review the two articles below to determine the impact of quality improvement initiatives in the ICU.

In text References

(Garrouste-Orgeas et al. 2012; Scales et al. 2011)

Pay for performance initiatives are increasingly being linked with quality measures and improvement in intensive care. Challenges include selecting evidence-based and feasible quality measures, integrating multifaceted behaviour change strategies, and developing sophisticated informatics infrastructure for timely audit and feedback. There is a lot of debate as to whether pay for performance does really improve outcomes.

In text References

(Khanduja, Scales and Adhikari. 2009)

Quality control involves inspecting for problems in the ICU service. For example, a statistically appropriate sample would be inspected (e.g. the last 25 patients discharged from the ICU) to determine readmissions (also called 'feedback control'). Such audits should be undertaken on a regular basis. It must be remembered that stopping poor practice (inappropriate discharges) usually requires a follow up intervention if the audited practice is felt to be inadequate.

Quality assurance encompasses control beyond just inspection. It is a structured approach to preventing quality problems through planned and systematic activities that include: planning, reviewing, monitoring and documentation ('feed-forward control'). An example of quality assurance is the regular assessment of ICU stat lab equipment, also called monitoring of technical standards for testing performance, to show suitable accuracy of the results provided.

Continuous quality improvement promotes continuous improvement through the application of group decision-making methods and statistical tools. A goal of an ICU's quality improvement programme might be to meet and exceed patient and patient family satisfaction by examining and improving systems and work processes.

In text References

(Thijs 1997)

For more information on these topics see the e-module on Quality assurance and cost-effectiveness.

References

- Guidet B, Valentin A, Flaatten H., Quality Management in Intensive Care: A Practical Guide, 2016, ISBN:9781316218563
- Berenholtz SM, Dorman T, Ngo K, Pronovost PJ., Qualitative review of intensive care unit quality indicators., 2002, PMID:12040543
- Rubin HR, Pronovost P, Diette GB., From a process of care to a measure: the development and testing of a quality indicator., 2001, PMID:11769752
- Rubin HR, Pronovost P, Diette GB., The advantages and disadvantages of process-based measures of health care quality., 2001, PMID:11769749
- Frutiger A, Moreno R, Thijs L, Carlet J., A clinician's guide to the use of quality terminology. Working Group on Quality Improvement of the European Society of Intensive Care Medicine., 1998, PMID:9757933
- Brook RH, McGlynn EA, Cleary PD., Quality of health care. Part 2: measuring quality of care., 1996, PMID:8782507
- Curtis JR, Cook DJ, Wall RJ, Angus DC, Bion J, Kacmarek R, Kane-Gill SL, Kirchhoff KT, Levy M, Mitchell PH, Moreno R, Pronovost P, Puntillo K., Intensive care unit quality improvement: a "how-to" guide for the interdisciplinary team., 2006, PMID:16374176
- Garrouste-Orgeas M, Soufir L, Tabah A, Schwebel C, Vesin A, Adrie C, Thuong M, Timsit JF, Outcomerea Study Group., A multifaceted program for improving quality of care in intensive care units: IATROREF study., 2012, PMID:21963581
- Scales DC, Dainty K, Hales B, Pinto R, Fowler RA, Adhikari NK, Zwarenstein M., A multifaceted intervention for quality improvement in a network of intensive care units: a cluster randomized trial., 2011, PMID:21248161
- Khanduja K, Scales DC, Adhikari NK., Pay for performance in the intensive care unit--opportunity or threat?, 2009, PMID:19237887
- Thijs LG, Continuous quality improvement in the ICU: general guidelines. Task Force European Society of Intensive Care Medicine., 1997, PMID:9037654

3. 4. Managing Change

Controlling the ICU frequently involves change. Examples of change may include introduction of a central line care bundle, an enhanced recovery programme or responding to an increase in service capacity. Change is an active process in which it must be anticipated that 'resistance', which can include questioning the need for the change, will be encountered. Without understanding and managing in advance the effect(s) of proposed change on the ICU staff, a physician-manager will find it difficult to achieve the benefits of the change proposed. Barriers that may resist change are outlined below.

Table 4 : Barriers to change

Barriers	Description
Structural barriers • Resources • Leadership • Scientific	• Staff/time/financial/educational • Lack of support, reinforcement and control • Not all recommendations are applicable
Personal barriers • Intellectual • Perception • Attitude • Motivation	• Lack of knowledge or insufficient knowledge to apply it correctly • Lack of confidence in evidence for change • Politically or economically motivated resistance • Confusion over purpose of change • Doubts that it will improve outcome • Fear of the unknown/new additional work • No benefit to change
Organisational barriers • Political • Economic • Social and cultural	• Power relation between organisations/teams • Lack of internal culture to promote change • Implementation is expensive – staff/time/facilities • Sense of security and habit in the past • Team does not share the ambition

Successful adoption of a change in practice or working requires appreciation of the barriers and an implementation plan.

The paper below describes one model for implementing change.

In text References

(Grol 1997; Institute for Innovation and 2012)

Anecdote

The above model could be used to implement a new protocol for the holding of daily sedation in the intensive care unit. There is a good evidence basis for the intervention and it is likely to be relevant to the local ICU population. Exclusion criteria for a 'sedation hold' would need to be clearly documented and agreed upon. A protocol would need to be designed regarding timing and nature of how the sedation hold was to be performed, and the subsequent actions in accordance with the clinical response. Following this, barriers to implementation would be identified and targeted which might include nursing and physician staff reluctance. An educational programme could be established to highlight the benefits to patient care and reductions in length of mechanical ventilation, and intensive care stay that may occur secondary to introduction of the proposed change. Following introduction, there would be ongoing review of acceptance and uptake of the intervention and whether it was achieving the desired outcomes. Ongoing barriers to change would be highlighted and additional interventions designed to improve compliance with the desired goal of a daily sedation hold in all patients in whom it is not contraindicated.

In text References

(Grol and Grimshaw. 2003)

Outline effective strategies you can use to change physician behaviour?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

- Mini sabbaticals that allow clinicians to spend time in other critical care units learning how to practise evidence-based healthcare.
- Personalised feedback (also called 'audit') on performance, either in comparison with that of others or against explicit standards.
- Computer-assisted decision-making, that provides reminders and easy access to evidence-based guidelines.
- On-the-job training of practical skills.
- Use of opinion leaders or 'educational influentials' (colleagues whose performances are respected).

A single approach to changing behaviour is unlikely to be effective. Changing behaviours and practices requires a combination of different strategies to be used simultaneously.

In text References

(Berenholtz and Pronovost. 2003)

Challenge

The rationale for computerised physician order entry (CPOE) is strong, particularly the conclusion that improved patient safety results from this technology. As the ICU physician-manager, your colleagues are diverse in both age and knowledge of computers and information technology. This means that introducing CPOE could be met with significant resistance from ICU physician co-workers because the new technology will require that they do things differently, which can be uncomfortable. If you do not create a change management strategy, successful implementation of CPOE may not happen. Think about the challenges you would meet, if you were asked to institute a CPOE system in your ICU.

In text References

(Ash et al. 2003)

One means by which to improve adoption of a change in practice is an agreement at the outset to revert to the former practice if desired by the team, once adoption has been secured and assessed if no benefits are realised. The Shewhart and Deming Cycle in Quality Improvement describes the process of implementing a potentially temporary change in practice (often a variant on a previous practice)

in a small group usually in order to reduce variation in practice conduct and outcomes and then scientifically tests the new practice against the previous one. The process steps of a Shewart cycle are PDSA – Plan the change, Do it in a small group, Study its performance against the previous practice and Act to discard or implement the change dependent upon its success. There are a number of advantages to small scale testing:

- Involves less time, money and risk.
- Promotes staff learning and analysis.
- Motivates staff through involvement with idea development.
- Problems are identified and resolved prior to full roll-out, thus achieving 'buy-in' from less enthusiastic staff.

This model has been used successfully for a number of intensive care interventions, such as implementation of care bundles for central lines and ventilator-acquired pneumonias. A group of intensive care medicine trainees used a repetitive PDSA cycle to design and modify a checklist for use prior to emergency out-of-theatre intubations to reduce associated complications.

In text References

(Institute for Healthcare 2018; Institute for Innovation and 2012; Koll et al. 2008; Bonello et al. 2008)

Think

Think about how you might start a patient improvement programme to improve glucose control on the ICU. Questions to think about might include, what are you trying to accomplish, how will you know if the change is an improvement, what changes can be made that will result in improvement?

References

- Grol R, Personal paper. Beliefs and evidence in changing clinical practice., 1997, PMID:9277610
- Institute for Innovation and Improvement, Plan, Do, Study,Act (PSDA), 2012, https://webarchive.nationalarchives.gov.uk/20120901100556/http://www.institute.nhs.uk/quality_and_service_improvement_tools/qu
- Grol R, Grimshaw J., From best evidence to best practice: effective implementation of change in patients' care., 2003, PMID:14568747
- Berenholtz S, Pronovost PJ., Barriers to translating evidence into practice., 2003, PMID:12883289
- Ash JS, Stavri PZ, Dykstra R, Fournier L., Implementing computerized physician order entry: the importance of special people., 2003, PMID:12810127
- Institute for Healthcare Improvement, How to Improve, 2018, http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx
- Koll BS, Straub TA, Jalon HS, Block R, Heller KS, Ruiz RE., The CLABs collaborative: a regionwide effort to improve the quality of care in hospitals., 2008, PMID:19119725
- Bonello RS, Fletcher CE, Becker WK, Clutter KL, Arjes SL, Cook JJ, Petzel RA., An intensive care unit quality improvement collaborative in nine Department of Veterans Affairs hospitals: reducing ventilator-associated pneumonia and catheter-related bloodstream infection rates., 2008, PMID:19025084

3. 5. Policies, Guidelines and Procedures

Policies and guidelines are developed to describe best practice and help clarify decision-making in the ICU. The term guidelines and policies are often used interchangeably but are clinically distinct. Policies are rules set by organisations that must be adhered to whereas guidelines are sets of best practices that are supported by consensus opinion. You will find reference sources for some examples of key guidelines developed by the European Society of Intensive Care Medicine.

Challenge

Well-implemented guidelines can impact on patient outcome. Review the articles below and determine the impact of successful implementation of these guidelines.

In text References

(Ferrer et al. 2008; Levy et al. 2010; Pronovost et al. 2006)

Guidelines: The ICU physician-manager should ensure guidelines are updated regularly according to the best available evidence and regularly audit adherence to guidelines. Despite good evidence of best practice, some studies have shown consistently poor adherence to guidelines. Studies in the United States and Netherlands suggest that at least 30–40% of patients do not receive care according to current scientific evidence, and that up to 20% of care is either not needed or potentially harmful. Furthermore, even when we think we are delivering good healthcare according to evidence, we are frequently not doing so. In a study of German ICUs, perceived adherence to low-tidal volume ventilation (6 mL/kg) for ARDS/ALI was 79.9%. When practice was observed, 80.3% were receiving tidal volumes >8 mL/kg.

In text References

(McGlynn et al. 2003; Brunkhorst et al. 2008)

Not all guidelines are successfully implemented. List five reasons for poor adherence to guidelines?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Reasons may include

- Lack of enforcement
- Lack of knowledge
- No incentives
- Lack of resources/time/administrative support
- Lack of strong leadership

Anecdote

As part of a regular audit, Dr Red, the director of an ICU, discovers that Dr Pink is not using guidelines adopted by the ICU team to ensure 'best practices' are used with regard to enteral feeding. Dr Red had previously empowered a multidisciplinary ICU team to review literature and determine evidence to recommend a 'standard' approach to enteral feeding after admission to the ICU. During an annual performance review, Dr Red discusses with Dr Pink his failure to use the enteral feeding guideline. While acknowledging an ICU team has recommended it as a unit guideline, Dr Pink replies it is not consistent with his training and he does not believe it.
Dr Pink was not part of the original multidisciplinary team that produced the guideline. In order to encourage his participation Dr Red suggests that Dr Pink lead another multidisciplinary team to update the guideline. Dr Red asks Dr Pink to update the literature review, critically appraising the evidence and bringing further new evidence to the basis of the guideline. Dr Pink is also asked to ensure colleagues have an adequate chance to discuss the evidence before the new guideline is launched.
Dr Pink states he is not sure how to set about a systematic critical appraisal. Dr Red suggests critical appraisal skills training as part of Dr Pink's personal development plan for the year. As a result of being asked to lead the guideline development and receiving skills training to assist in the analysis of the evidence Dr Pink successfully delivered a new guideline that he and his colleagues could agree to. A subsequent audit showed all were complying.

ESICM Flash Conference:

- Julian Bion. Why and when should care be guideline directed? Barcelona 2010.

Policies: Every ICU should have clearly defined policies. These responsibilities are defined in documents referred to as hospital bylaws or policy documents. Policies should be standardised and periodically reviewed and updated by staff. Hospital bylaws/policy documents govern the transition between the organisation's objectives and its daily operation. Examples of hospital bylaws/policies may include:

- Policies for granting of specific clinical privileges (the process of reviewing a physician's credentials to determine the authority and responsibility to be granted to a physician for making independent decisions to diagnose, initiate, alter, or terminate a regimen of medical care) for physicians working in the hospital.
- Policies directly relating to direct patient care (e.g. end-of-life care, admission and discharge, infection control, blood product administration).
- Operational policies (e.g. health and safety, complaints, flexible working, major incident planning).

Challenge

Review your hospital bylaws/policy documents.

Local policy development should include appropriate stakeholders (e.g. senior clinicians, hospital management and other clinical units that could be affected by application of the policy). Employing 'evidence' to support this decision-making ensures the best opportunity for their acceptance. The ICU physician-manager must communicate with multiple stakeholders at different levels of their organisation's hierarchy and structure to groups such as senior management and the medical advisory committee and to other departments who use ICU resources.

Procedures are actions prospectively determined to guide the unit's staff in defined situations. They outline steps that an ICU staff member must take to perform a task, and provide them with direction in the performance of their duties.

Challenge

Review the guidelines and procedures for critical care on the following website, CCTC Resources for Health Professionals. Identify where similar guidelines and procedures that have been recorded for your ICU.

References

- Ferrer R, Artigas A, Levy MM, Blanco J, González-Díaz G, Garnacho-Montero J, Ibáñez J, Palencia E, Quintana M, de la Torre-Prados MV; Edusepsis Study Group., Improvement in process of care and outcome after a multicenter severe sepsis educational program in Spain., 2008, PMID:18492971
- Levy MM, Dellinger RP, Townsend SR, Linde-Zwirble WT, Marshall JC, Bion J, Schorr C, Artigas A, Ramsay G, Beale R, Parker MM, Gerlach H, Reinhart K, Silva E, Harvey M, Regan S, Angus DC; Surviving Sepsis Campaign., The Surviving Sepsis Campaign: results of an international guideline-based performance improvement program targeting severe sepsis., 2010, PMID:20035219
- McGlynn EA, Asch SM, Adams J, Keesey J, Hicks J, DeCristofaro A, Kerr EA., The quality of health care delivered to adults in the United States., 2003, PMID:12826639
- Brunkhorst FM, Engel C, Ragaller M, Welte T, Rossaint R, Gerlach H, Mayer K, John S, Stuber F, Weiler N, Oppert M, Moerer O, Bogatsch H, Reinhart K, Loeffler M, Hartog C; German Sepsis Competence Network (SepNet)., Practice and perception--a nationwide survey of therapy habits in sepsis., 2008, PMID:18766100
- Pronovost P, Needham D, Berenholtz S, Sinopoli D, Chu H, Cosgrove S, Sexton B, Hyzy R, Welsh R, Roth G, Bander J, Kepros J, Goeschel C., An intervention to decrease catheter-related bloodstream infections in the ICU., 2006, PMID:17192537

3. 6. Human Resource Management

Physician-managers should work closely with their hospital's human resource department. Human resource management includes staff recruitment, selection, performance reviews, development and training, understanding and implementing employment legislation, pastoral care and welfare.

Hiring

ICU staffing needs are determined by demand for ICU services and employee turnover. Each member of the ICU workforce should have a job description. This includes a job title as well as a description of the individual's duties and responsibilities. A suitable candidate is selected from a pool of applicants using job qualifications as a guide and due diligence should be applied in seeking not only someone with appropriate qualifications but also someone who will "fit" well within the ICU team and who has the potential to address specific weaknesses identified in the team (see Section 3). Training, experience and ability of potential candidates must be considered. The following are used when selecting new staff:

- Application forms – provide historical and background information about the applicant such as education, training, previous jobs.
- Testing is not widely conducted as part of medical job application processes but psychometric responses and presentation skills may very be reasonably be tested and are routinely conducted amongst major corporations making senior appointments.
- Interviewing
- Stakeholder meetings
- References and letters of recommendation.

Orientation

The physician-manager needs to ensure that new ICU employees are provided with an orientation programme that includes:

- Information about the ICU and its organisational structure, the hospital's fire and safety programme, employees' health service and assistance programmes, and services provided by the human resource department.
- Explanation of key policies and guidelines.
- Information about the philosophy, mission, vision, values of the hospital and the ICU (ideally, these will be documented in a hospital handbook or intranet).

Retention

It is not enough to simply select and recruit new staff. The ICU physician-manager must also pay attention to retention activities, some of which include:

- Appraising each employee's job performance.
- Developing, supporting and promoting employees according to identified needs.
- Administering compensation and benefits.
- Providing employee assistance and career counselling.
- Ensuring health and personal safety.
- Mentoring and provision of or direction to appropriate pastoral care

Performance reviews, Job planning, Appraisals

Review of staff performance is an important role of the ICU physician-manager. A job plan should be agreed for each ICU physician during the hiring process then reviewed and agreed annually. This establishes a contract for the delivery of work between the employer and employee. In addition to the job planning process, the physician-manager should undertake or oversee regular appraisals.

Job planning is a systematic activity designed to produce clarity of expectation for the ICU physician and their employer about the use of time and resources to meet individual and service objectives. A job plan should include the ICU physicians' main duties and responsibilities, the scheduling of commitments, the support needed in fulfilling the job plan, and personal objectives, including any continuing medical education and training, and their relationship with wider service objectives.

Doctors commonly remain in the same post for 20 or more years and with this comes a risk of boredom, loss of interest, disengagement and a failure to maintain less commonly used skills or to acquire new ones that become essential for the maintenance of high quality practice or norms of modern practice e.g. use of ultrasound for central line insertion, in-putting into electronic records or prescriptions requiring the routine use of a computer interface, basic ECHO skills. As a physician manager, in caring for your patients and colleagues it is important to facilitate and ensure both the maintenance of currently appropriate skills and also the maintained interest and engagement of colleagues. Periodic changes in administrative, non-clinical and clinical portfolios amongst team-members helps bring new perspectives to the portfolios, presents new challenges to colleagues to maintain and rekindle their work interests and builds redundancy and resilience into the team in the longer term, so that the unplanned absence of a colleague is less destabilising with others being able to pick up work portfolios with relative ease.

Figure 4: An example of a job plan (a)

Figure 5: An example of a job plan (b)

Appraisals provide feedback to the physician about progress on the team, identify opportunities where coaching for improvement may be required and allow opportunities to discuss future professional development progress. The main objectives for appraisals are to:

- Optimise the skills and knowledge required to maintain and improve performance – to identify the 'professional development' needs of the physician.
- Consider changes or developments in the fields in which the physician wishes to participate – to identify the 'personal development' needs of the physician.
- Provide adequate evidence to allow revalidation by national medical regulatory bodies in some countries (e.g. United Kingdom).

Figure 6: Example of a personal development template that can used as part of the appraisal process

As part of an appraisal review, a multisource feedback may be performed.

There are common elements between these two processes and some information may be duplicated. There are, however, differences between the two processes that are outlined in the table below.

Note

Multisource feedback, also known as 360 feedback, provides a sample of attitudes and opinions of colleagues on the clinical performance and professional behaviour of the individual. It may also include feedback from external sources, patients and a part on self-evaluation. Its main objective is to help the person receiving the feedback to plan and map specific paths in their personal and professional development.

Table 5: Differences between job planning and appraisal

	Job Planning	Appraisal
Driver	Employer	Regulator, Employer & Personal Effectiveness
Present at meeting	Physician and medical manager (+/- non-medical manager)	Physician and appraiser (usually a physician)
Emphasis	Service delivery and patient care. The job plan review is performance assessment of recent past and the job plan is a forward plan for future performance	Personal and professional standards and development framework in the local/national/international context
Framework	Physician job planning – Terms and Conditions of Service	National regulatory body (in some countries)
Atmosphere, ethos	Business-like	Developmental, supportive, creative
Standard Benchmark	Commitments and duties to employer	Professional and regulatory standards and requirements
Outcome	Timetable and agreed service/patient objectives	Personal development plan – improved skills and personal effectiveness to deliver care

Providing opportunities for physicians to learn new skills is important for a high performing ICU. With any performance review, development plans for individual physicians can be identified and training proposed. Given the increasing importance of management and leadership, the ICU physician-manager should consider management development as a type of training; this increases the capabilities of physicians by developing skills such as leadership, motivation, communication and problem-solving.

In text References

(Conlon 2003; Etherington et al. 2000)

Employee assistance programmes

Employee assistance programmes (EAPs) help employees with problems that adversely affect their work. They include help for substance abuse, legal, financial and emotional problems. Employee assistance can also be provided by career counselling, and health education and promotion. Educating employees can enable them to better manage their own health. Some health education and promotion services are: stress management, nutrition counselling and weight reduction, and smoking cessation. By implementing health education and promotion programmes, ICU physician-managers improve productivity and contribute to the positive climate required to retain physician colleagues.

Anecdote

You are told by one of your senior nurses that a physician colleague has been behaving erratically when taking calls in the evenings. You are aware that he has been losing weight for a number of months, does not eat with the team and has developed a tremor. You are concerned one of the likely explanations is that he has become dependent on alcohol, following a family tragedy 18 months ago.

What is your responsibility as a physician-manager, as well as a colleague?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Patient safety should come first. The doctor should be removed from clinical duties pending further review and the clinical service will need to be covered. You must get expert advice and assistance at an early stage. Be certain that your hospital has a policy in place for providing you with assistance in identifying and supporting a colleague who may have a dependency problem. Your local or regional physicians' group for monitoring professional standards should also have a process in place to assist you in this task. As a colleague it is important to maintain confidentiality and be supportive.

References

- Conlon M, Appraisal: the catalyst of personal development., 2003, PMID:12919998
- Etherington J, Innes G, Christenson J, Berkowitz J, Chamberlain R, Berringer R, Leung C., Development, implementation and reliability assessment of an emergency physician performance evaluation tool., 2000, PMID:17612448

3. 7. Managing Teams and Teamwork in the ICU

A team can be defined as, 'a distinguishable set of two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission, who have each been assigned specific roles or functions to perform.' (Salas et al. 1992) .

Put more simply, teamwork is a dynamic process involving two or more people engaged in the activities necessary to complete a task.

Why is teamwork important in intensive care?

The ICU team is multi-professional and includes nurses, physicians, and allied health professionals who are all involved in the daily care of the critically ill patient. With high performing teams, a gestalt may be achieved where the ultimate performance of the team is greater than the sum of the individual parts.

Teamwork occurs when members of the ICU work together in such a way that their collective skills are integrated to achieve a common goal. In the successful ICU team, members not only possess complementary skills, they can be collectively held accountable to the goals and objectives of the ICU (or to the specific project on which they are collaborating). Good multidisciplinary teamwork in ICU has been shown to:

- Reduce conflicts.
- Reduce burnout syndrome.
- Improve staff satisfaction and morale.
- Lead to better patient care.

In text References

(Wheelan, Burchill and Tilin. 2003; Azoulay et al. 2009; Poncet et al. 2007; Williams et al. 2010)

ESICM flash conferences:

- Maria Teresa MORENO CASBAS. Interdisciplinary team work for ICU patients' safety, Barcelona 2010
- INTENSIVE CARE IS TEAM WORK!, CAPUZZO Maurizia, Basic principles of team building, Lisbon 2012
- WORKING CONDITIONS OF INTENSIVISTS: AN UNSOLVED CHALLENGE, Hans FLAATTEN,Is burnout affected by different working patterns?, Barcelona 2014
- THE LIFE-PRIORITY SESSION: WHO CARES FOR THOSE WHO CARE? - BENBENISHTY Julie - Risk factors for burnout: The individual/the environment/the institution, Lisbon 2012

The ICU environment is characterised by high levels of complexity, workload and complex decision-making, with errors resulting in potential harm to patients. Recent focus has been on improved outcomes for patients from better teamwork and communication.

In text References

(Lord Darzi of 2013)

Research specific to intensive care, demonstrated that in a study of 2075 critical incidents from 23 ICUs over a period of 24 months, poor teamwork contributed to 32% of the incidents. In addition to improved patient safety, effective team working is associated with better outcomes for patients and better staff satisfaction.

In text References

(Pronovost et al. 2006)

Challenge

In the article below, how was communication improved on the ICU?

In text References

(Pronovost et al. 2003)

Types of teams

Different team types have been identified according to the task to be performed. Medicine has traditionally focused on action teams. Increasingly there is a move towards advice and project teams. One danger of too great a swing away from action teams is the potential for reduced productivity and efficiency through a move to ever wider shared decision-making where the achievement of consensus may become a greater imperative than achieving the overall objective. A balance requires to be achieved between achieving consensus and buy-in to change with an increased chance of success and productivity and efficiency in reaching decisions and effecting change. Efficient, outcome-focused meetings can help achieve this balance.

Table 6: Types of teams

Type of team	Examples	Outputs
Advice	Committee, review panels, boards	Decisions, selection, suggestions
Action	Surgical teams, ICU teams	Operations, patient care
Project	Research groups, planning teams	Plans, designs, investigation reports
Production	Medical manufacturing, hospital receptions	Medical equipment

Motivation

In order to understand how to manage teams effectively, it is important to understand what motivates individuals within a team to perform.

Motivation can be defined as ‘the degree to which an individual wants and chooses to engage in certain specified behaviours’.

In text References

(Mitchell. 1982)

An individual’s motivation to work can be broadly divided into three categories:

- Economic rewards – pay, benefits, pension rights and security. This is an instrumental orientation to work.
- Intrinsic satisfaction – personal growth and development from work. This is a personal orientation to work.
- Social relationships – friendships, group working and status. This is a relational orientation to work.

Figure 7: An individual's motivation to work. Adapted from: Mullins L, Management and Organisational Behaviour. 8th Edition. Prentice Hall; 2008. ISBN-978-0-273-70888-9

The physician-manager needs to be sensitive to the requirement to motivate his/her colleagues. Different individuals will respond to different rewards at different times. The effort an individual expends will depend on his/her perception that it will achieve an intended level of performance, and that attainment of this level of performance will lead to a particular need-related outcome.

Tools such as the "Work Interests Schedule of Prof John Hunt from the London Business School help leaders and team members understand the main motivators for the individuals within a team at a given period in time. Interests evolve over time. Occasionally reviewing and aligning different tasks and portfolios to the strongest interest motivators of the individuals has the potential to improve both work enjoyment and productivity for everyone.

Cohesion

Successful and effective teams are likely to demonstrate cohesiveness. Strong and cohesive groups are likely to have high morale and productivity.

Figure 8: Key factors contributing to team performance and cohesiveness

Team development

A successful team is likely to have passed through several 'stages' in group development and maturity. The model by Tuckman and Jensen identifies five successive stages of group development:

- Forming – orientation stage, establishment of identity in the group.
- Storming – conflict stage, disagreements between individuals on the objectives and how to achieve them.
- Norming – cohesive stage, the members of the team develop ways of working together and establish rules conduct.
- Performing – the team has an effective structure; achievement of objectives is likely to be at its most effective.
- Adjourning – the team may part because the task has been completed.

In text References

(Tuckman and Jensen. 1977; Mullins. 2008)

Characteristics of effective teams

Creating effective teams is an active process. Literature on teamwork suggests a common set of requirements for an effective team:

- Communication
- Leadership
- Coordination
- Decision-making

There is further elaboration on these characteristics in the team performance framework below.

Figure 9: Characteristics of effective teams. Adapted from: Reader TW, Flin R, Mearns K, Cuthbertson BH. Developing a team Performance framework in the intensive care unit. Crit Care Med 2009; 37 (5): 1787-1793. PMID:19325474

Communication strategies to improve teamwork

Poor communication has been shown to be associated with poor teamwork and adverse outcomes in a number of studies. Given the wide range of tasks within the ICU, from admitting patients, diagnosing illnesses, developing treatment plans, performing complex procedures and making end-of-life decisions, it is clear that the communication strategy will vary with the task. Interventions to improve communication using a variety of techniques such as workshops and simulation are being designed and implemented. Examples of interventions to improve communication include SBAR (Situation-Background-Assessment-Recommendation), the 'three Cs of communication' (clear instructions, citing names, and closing the loop) and 'LOVE' – Leadership, Ownership, Values and Evaluation.

SBAR is used to provide a structured and standardised communication between healthcare workers:

- Situation: state who you are, describe the reason for the call and situation of the patient.
- Background: give a brief summary of the background, vital signs, laboratory results.
- Assessment: what do you think is going on? Your clinical assessment.
- Recommendation: clarify what action you expect to be taken.

The 'LOVE' programme is aimed at improving communication inside the team and to patients and their relatives. It is based on factors such as strong and positive leadership, respect for individuals, and a rigorous evaluation of quality of care.

In text References

(Carlet et al. 2010; Haig, Sutton and Whittington. 2006; Smith and Cole. 2009)

For more information read e-module on Communication.

Use of effective leadership to improve teamwork

Effective team leadership refers to the actions undertaken by a team leader to ensure the needs and goals of the ICU team are met. It is a significant factor in securing team success. Team leadership is different from organisational or strategic leadership and relates to responsibility for guiding a team through its work cycle. Physician-leaders should create shared common goals, delegate, empower individuals, supervise decision-making and guide the team to achieving more as a collective than would be possible individually. Outlined in the table below are examples of behaviours used by ICU team leaders to lead teams during both normal and/or emergency situations (functional leadership behaviours) and behaviours adopted to create conditions that enable effective team performance (termed team development behaviours).

Table 7: Leadership and team behaviours that contribute to team success

Functional Leadership Behaviours	Team Development Behaviours
Information gathering	Providing team direction
Planning and decision-making	Establishing team norms (i.e. the rules governing interactions between the team members)
Managing team members	Coaching
Managing resources	Providing organisational support

Coordination strategies used to improve teamwork

Complex and urgent tasks in the ICU require integration of interdisciplinary teams in a rapid, complementary and sequential manner. Coordination may occur through direct verbal communication or through members' situational awareness and shared mental roles/objectives. Team members need to be able to communicate their progress and needs to the rest of the team so it can adapt accordingly.

Effective decision-making strategies to improve teamwork

Decision-making is still often perceived as a hierarchical process with more junior members of the team and other healthcare professionals often reluctant to make or challenge decisions. Collaborative team decision-making has been shown to lead to improved outcomes. The style of decision-making may change in response to the situation, with a more directed approach being used in crisis/emergency situations.

In text References

(Reader et al. 2009; Reader, Flin and Cuthbertson. 2011; Vivian et al. 2009)

See table below for concepts not specific to the ICU, but which feature in organisational team psychology. They include: engendering professional efficacy, creating stable teams and leaders, developing trust and participative safety and encouraging team reflexivity.

Table 8: Behaviours that are conducive to improved teamwork

Term	Description
Professional efficacy	Providing staff with sufficient resources to do their job well.
Create stable teams and leaders	Minimising turnover Encouraging good working relationships
Trust and participative safety	Listening, encouraging and respect of team members. Acting sensitively.
Team reflexivity	Reflecting and assessing performance and progress. Team meetings and 'away days'.

Using teams to solve problems

When using teams to solve problems, researchers have emphasised the collective brainpower of a team exceeds the capability or capacity of one individual or manager. One reason that teamwork is so important in intensive care is the speed at which advances have been occurring in this discipline – working as a team allows members to keep each other up to date in a rapidly changing environment.

Gray states the performance P of an individual or team has a function of three variables, thus: P = M x C/B, where [[M]] is the level of motivation, [[C]] is the level of competency and [[B]] are the barriers needed to be overcome in order to perform well.

In text References

(Muir Gray. 2001)

Despite many reasons for using teams to problem solve, it also usually takes longer to complete than when done by the physician-manager alone. Using a team-based approach is best considered when time is not an issue with regard to the problem requiring a solution, and when the issue is complex.

Table 9: Comparisons of decision-making by groups vs individuals. Adapted from Gordon, JR. Organizational Behavior: A Diagnostic Approach. 6th ed. Prentice Hall; 1998. ISBN-10: 0139228241. Chapter 6, p. 163.

Factor	Group	Individual
Type of problem	When diverse knowledge and skills are required	When efficiency is desired
Acceptance of decision	When acceptance by group members is valued	When acceptance is not important
Quality of the solution	When the input of several group members can improve the solution	When a 'best member' can be identified
Characteristics of individuals	When group members have experienced working together	When individuals cannot collaborate
Organisational culture	When the culture supports group problem-solving	When the culture is competitive
Amount of time available	When relatively more time is available	When relatively little time is available

A team-based, collaborative ward round structure, involving the use of a structured communications protocol conducted daily at each patient's bedside, has been advocated. How might it improve ICU organisation?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

It provides a forum for discussion of team goals and processes and helps to address system-level concerns.

In the reference below, following implementation of collaborative rounds, satisfaction rates improved and furthermore mortality rates of cardiac surgery patients declined significantly from expected rates.

In text References

(Uhlig et al. 2002)

A prospective multicentre evaluation measured changes in errors before and after training on institutionalising teamwork behaviours. A statistically significant improvement in quality of team behaviours was shown between the experimental and control groups following training and clinical error rate significantly decreased.

In text References

(Morey et al. 2002)

References

- Poncet MC, Toullic P, Papazian L, Kentish-Barnes N, Timsit JF, Pochard F, Chevret S, Schlemmer B, Azoulay E., Burnout syndrome in critical care nursing staff., 2007, PMID:17110646
- Salas E, Dickson TL, Converse S, Tannenbaum SI. , Toward an understanding of team performance and trainingrporation, 1992, ISBN: 0893918520
- Wheelan SA, Burchill CN, Tilin F., The link between teamwork and patients' outcomes in intensive care units., 2003, PMID:14619358
- Azoulay E, Timsit JF, Sprung CL, Soares M, Rusinová K, Lafabrie A, Abizanda R, Svantesson M, Rubulotta F, Ricou B, Benoit D, Heyland D, Joynt G, Français A, Azeivedo-Maia P, Owczuk R, Benbenishty J, de Vita M, Valentin A, Ksomos A, Cohen S, Kompan L, Ho K, Prevalence and factors of intensive care unit conflicts: the conflicus study., 2009, PMID:19644049
- Williams M, Hevelone N, Alban RF, Hardy JP, Oxman DA, Garcia E, Thorsen C, Frendl G, Rogers SO Jr., Measuring communication in the surgical ICU: better communication equals better care., 2010, PMID:20123326
- Lord Darzi of Denham , High quality care for all: NHS Next Stage Review final report, 2013, https://webarchive.nationalarchives.gov.uk/20130105053023/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/Public
- Pronovost PJ, Thompson DA, Holzmueller CG, Lubomski LH, Dorman T, Dickman F, Fahey M, Steinwachs DM, Engineer L, Sexton JB, Wu AW, Morlock LL., Toward learning from patient safety reporting systems., 2006, PMID:17175416
- Pronovost P, Berenholtz S, Dorman T, Lipsett PA, Simmonds T, Haraden C., Improving communication in the ICU using daily goals., 2003, PMID:12800116
- Mitchell T., Motivation: New Directions for Theory, Research, and Practice, 1982, http://amr.aom.org/content/7/1/80.abstract
- Tuckman BW, Jensen MC., Stages of small group development revisited. Group and Organization Management., 1977, http://pdfs.semanticscholar.org/82ce/5d6862e726c9221104fe67b0e3c8fe890b9a.pdf
- Mullins L. , Management and Organisational Behaviour. 8th Edition., 2008, ISBN:9780273708889
- Carlet J, Garrouste-Orgeas M, Dumay MF, Diaw F, Guidet B, Timsit JF, Misset B., Managing intensive care units: make LOVE, not war!, 2010, PMID:20189752
- Haig KM, Sutton S, Whittington J., SBAR: a shared mental model for improving communication between clinicians., 2006, PMID:16617948
- Smith JR, Cole FS., Patient safety: effective interdisciplinary teamwork through simulation and debriefing in the neonatal ICU., 2009, PMID:19460662
- Reader TW, Flin R, Mearns K, Cuthbertson BH., Developing a team performance framework for the intensive care unit., 2009, PMID:19325474
- Reader TW, Flin R, Cuthbertson BH., Team leadership in the intensive care unit: the perspective of specialists., 2011, PMID:21460708
- Vivian L, Marais A, McLaughlin S, Falkenstein S, Argent A., Relationships, trust, decision-making and quality of care in a paediatric intensive care unit., 2009, PMID:19554306
- Muir Gray JA. , Evidence-based healthcare: How to Make Health Policy and Management Decisions. 2nd ed., 2001, ISBN:0443062889
- Uhlig PN, Brown J, Nason AK, Camelio A, Kendall E., John M. Eisenberg Patient Safety Awards. System innovation: Concord Hospital., 2002, PMID:12481601
- Morey JC, Simon R, Jay GD, Wears RL, Salisbury M, Dukes KA, Berns SD., Error reduction and performance improvement in the emergency department through formal teamwork training: evaluation results of the MedTeams project., 2002, PMID:12546286

3. 8. Managing conflict

Conflict in the ICU has been defined as ‘a dispute, disagreement, or difference of opinion related to the management of a patient in the ICU involving more than one individual and requiring some decision or action’. ESICM Ethics Committee

Conflict is common within the ICU. Variable rates of conflict have been reported. In a large multinational study, 72% of ICU staff reported a perceived conflict in their previous working week. Moreover, 83% of these conflicts were deemed harmful and 53% as severe or dangerous.

In text References

(Azoulay et al. 2009)

Conflict in the ICU may be intra-team, inter-team, team–family, intra-family, patient–team or patient–family in nature – outlined in the figure below. Team– family and intra-team conflict account for the majority.

Figure 10: Types of conflict on the ICU. Adapted from: Fassier T, Azoulay E. Conflicts and communication gaps in the intensive careunit. Curr Opin Crit Care. 2010; 16 (6): 654-665. PMID:20930623

In text References

(Studdert et al. 2003; Fassier and Azoulay. 2010)

The most common source of conflict is related to disagreements about the goals of treatment and end-of-life care.

Table 10: Common sources of conflict in the ICU

Team	Cause of conflict
Inter-team	• Delayed appropriate admission • Inappropriate referrals • ICU life-sustaining care unlikely to be beneficial and palliative care more appropriate
Intra-team	• Failure to develop consistent goals • Change in management plans with staff rotation • Poor communication • Ongoing active life-sustaining treatment felt to be inappropriate by some ICU team members
Team–family	• Undue pressure from families to continue active life-sustaining treatment despite professional view of futility or against perceived patient's wishes • Cultural, linguistic and religious barriers • Concerns regarding discharge timing • Unrealistic expectations provided by referring team

What is the potential impact of ICU conflict on the Patient and their families

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

The impact of conflict on patients and their families has been shown to result in:

- delayed treatment
- delayed transition from active life-sustaining treatment to comfort care
- misunderstandings
- decreased patient/family satisfaction
- depression, anxiety and complicated grief for patients and their families

What is the potential impact of ICU conflict on the ICU team

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

The impact of conflict on the ICU team has been shown to:

- increase burnout
- increase staff turnover, sickness
- compromise team cohesion
- lead to poor staff morale

What is the potential impact of ICU conflict on the Organisation

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

The impact of conflict on the hospital has been shown to:

- increase medical errors
- increase complaints, litigation
- result in worse outcomes for patients

Dealing with conflict is a critical skill. Effective management of conflict can aid patients, clinicians and family members through difficult situations and lead to personal and professional satisfaction. Principles of conflict management are reviewed in the citations below.

In text References

(Key 2000; Marcus 1999)

In dealing with conflict, the ICU physician-manager must be action-oriented. As soon as a problem is identified, the ICU physician-manager should investigate the background to the problem and begin its resolution process. Emphasis needs to be placed on being objective in the review of circumstances surrounding the conflict issue. While sometimes difficult, it is vital for the physician-leader to remove emotion from the problem's analysis. The following are guidelines to consider in conflict resolution:

- Minimise defensiveness, because it only serves as a barrier to communication.
- Separate fact from emotion, because individuals in conflict need to verbalise their version of the events.
- Gather facts from both sides of a conflict situation. Remember that conflict often arises from a simple misunderstanding.
- Deal with conflict in a timely manner. If left alone, a small misunderstanding might build into a substantial problem that will distract the entire ICU team.

In text References

(Back and Arnold. 2005)

Table 11: Step-wise approach to managing conflict

1. Explain the concerns around the detrimental effects of unresolved conflict on individual and team performance, patient care and workspace culture, thus clarifying that the conflict creates problems wider than the individuals involved.
2. Explain process of intended conflict resolution including escalation steps open to all parties if resolution cannot be reached informally – (a) personal (b) departmental, (c) divisional (d) local facilitated using Human Resource/mediator, (e) formal disciplinary process, (f) tribunal (g) judicial
3. Secure agreement of the parties to participate with a nominated mentor if required
4. Establish the conflicted parties concerns and grievances through listening
5. Summarise and check
6. Get the parties to document their concerns/grievances
7. Triangulate where possible to establish the objective from the subjective (ideally with the conflicted parties agreement)
8. Identify areas of agreement and disagreement
9. Triage the areas for resolution and set a time-frame before escalation to next stage required
10. Resolve each point if possible
11. Set agreement of how future potential conflicts will be avoided or managed with explicit consequences for any on-going poor behaviours
12. Stick to deadlines and manage the process including escalation if resolution not achieved.

See the e-module on Communication.

Conflict in the ICU can be costly. Some problems are obvious, for example, when quality problems arise as physician colleagues act on anger rather than acting cooperatively. For instance where disagreements exist between colleagues over the necessity for a whole-body CT scan versus more specific focussed scanning in patients with intermediate trauma and mildly impaired GCS 13 pre-intubation, one doctor may insist on a repeat CT scan on every patient and the other, to make their point, insists of focussed scans to areas of concern. Many patients end up being scanned twice. Other costs are hidden, for example the impact of conflict on decision-making. It is not unknown for admission to ICU to be requested in part to defuse a family-physician team conflict rather because the patient is expected to do well. A referring team may request a “trial of ICU” in preference to facing conflict with the family who are struggling to accept their loved one is dying. Refusal to accept the patient by an ICU team results in deflection of anger to that team and acceptance by the ICU team to avoid a family conflict with them results in direct avoidable costs of care and also opportunity costs of the care that might have been provided to a different patient.

While conflict is commonly considered to be negative and dysfunctional, functional conflict can also exist. This can be useful for generating ideas, stimulating creativity and bringing people closer together. An organisation with no conflict is characterised by no change and little motivation of the individuals.

ESICM Flash Conference

- Elie Azoulay. Managing staff conflicts. Vienna 2009

References

- Azoulay E, Timsit JF, Sprung CL, Soares M, Rusinová K, Lafabrie A, Abizanda R, Svantesson M, Rubulotta F, Ricou B, Benoit D, Heyland D, Joynt G, Français A, Azeivedo-Maia P, Owczuk R, Benbenishty J, de Vita M, Valentin A, Ksomos A, Cohen S, Kompan L, Ho K, Prevalence and factors of intensive care unit conflicts: the conflicus study., 2009, PMID:19644049
- Studdert DM, Mello MM, Burns JP, Puopolo AL, Galper BZ, Truog RD, Brennan TA., Conflict in the care of patients with prolonged stay in the ICU: types, sources, and predictors., 2003, PMID:12879243
- Fassier T, Azoulay E., Conflicts and communication gaps in the intensive care unit., 2010, PMID:20930623
- Key MK, A method for mediating conflict among different mindsets., 2000, PMID:11186039
- Marcus L, Renegotiating health care. Interview by Richard L. Reece., 1999, PMID:10557480
- Back AL, Arnold RM., Dealing with conflict in caring for the seriously ill: it was just out of the question, 2005, PMID:15769971

3. 9. The Role of the Physician-Manager

The role of a manager is to facilitate the work of a department being achieved as smoothly and efficiently as possible. This requires that the department has the necessary human, technological, financial and procedural resources or assets in place. “The right resources, in the right place at the right time”. The oversight of administrative procedures and processes designed to maintain efficient performance and the investigation and/or correction of things that have gone wrong usually falls to a manager. When changes are proposed, it usually falls to a manager to work out the resource implications of those changes and to write and implement any associated business cases.

A physician with a management role is generally appointed by a hospital's management structure (for example, by the Chief Executive Officer) although sometimes (especially for Clinical Director roles) they are appointed democratically by mutual agreement of a group of senior clinicians within a department. Historically, a physician selected for the role has been assumed to bring management and leadership skills to the position because of previous academic or clinical successes. However, achievements in these fields do not guarantee competency in leadership and management. .

When appointing to managerial roles, it is wise to understand what motivates the candidates. There is some evidence that those motivated by being liked will prioritise their own popularity ahead of their organisation's goals, reducing their effectiveness in role. Others, motivated by setting and achieving specific goals and the recognition by others of these achievements tend to be less concerned by their popularity but very concerned about the attribution of achievement to themselves. These individuals often micro-manage and this can result in an increasingly disempowered and frustrated workforce that in turn reduces the achievements that might otherwise have proven possible. A third group of people, perhaps the most effective managers in the long-term, seek to build power through influencing those around them – delegating responsibilities to others, assisting them if requested and holding them to account for delivery but attributing success to the team and individuals involved rather than themselves.

The power that arises with growing organisational influence wielded by an effective manager should be stewarded wisely – it can become the end rather than the means through which to deliver change to the benefit of patients and the healthcare system. As power corrupts, the ability to achieve falls. Recognising all these patterns in others or yourself prior to seeking or appointment to a management role may help to predict suitability and success.

In text References
(McClelland and Burnham 2003; Keltner 2013)

Successful performance in the physician-manager role does not require superlative clinical skills but rather the respect of colleagues and effective managerial and leadership skills. Unlike general managers, most ICU physician-managers have not followed traditional business training, such as studying for degrees such as a Master of Business Administration, Master of Finance or Master of Healthcare Policy & Administration. This is likely to change and appointment to future intensive care management roles may require formal demonstration of competence in healthcare management and leadership. Unfortunately, there is little evidence to suggest that completion of post-graduate management training leads to sustained improvement in leadership skills. Whilst technical skills and knowledge may rise, completion of degrees such as the MBA may increase hubris and be associated with poorer behaviours when in positions of authority. Equally, despite an estimated global spend of $356 USD on leadership training in 2015 alone, there is little evidence that it produces lasting positive change in the organisations of those trained.

In text References
(Beer, Finnstrom and Schrader 2016)

In being appointed, the ICU physician-manager should be provided with a job description and resources to manage tasks identified in the job description. The physician-manager should agree on specific responsibilities, such as: overseeing clinical governance of the ICU; ensuring all medical staff fulfil their regulators current requirements for licensing and practice; that guidelines, standards and protocols are current; training accreditation requirements are met; stakeholder needs are met etc.. In addition, the physician-manager must ensure that the ICU contributes to the hospital's overall objectives.

The physician manager must not only implement hospital-set goals for the critical care service, they must also present the needs of the service to the wider management team. This may be a specific resource, process or structure needed to facilitate the goals of the hospital for a service in which ICU is a stakeholder e.g. the provision of a digital image intensifier to move the radiology service onto digital portable imaging. From time to time, the manager must also forewarn of increased resource requirements that the service may need to fulfil changing standards set by regulating and accrediting bodies e.g. if an educational body such as the Faculty of Intensive Care Medicine UK signals it is going to set a new standard of no more than one trainee to 6 patients on overnight duties in order to accredit as a teaching unit, and the ratio is currently 1:8, then additional resource must be obtained through restructuring existing resource or adding new resource.

Without agreement about what the hospital wants a physician-manager to accomplish, agreement and setting of achievable milestones, and regular review of progress by a line-manager, disagreements may arise over the success or failure of the physician-manager. If unambiguous objectives are not clearly set out at the start of the journey, reaching the expected milestones is likely to prove unnecessarily challenging.

The job description of an ICU physician manager
A Job Description for an ICU Chief of Service (or Director or Department Head) integrates the roles and functions described above. An example is provided below.

Note

If a job description is not provided– ask for one

An example of a job description for an ICU physician-manager
The physician-manager/leader of the Critical Care service (which could also be referred to as a Programme or Department or Division) will be accountable to the hospital's Chief of Staff, and will

1. Determine clinically related and administrative activities of the ICU service including, but not limited to, the quality of patient care provided by members of the ICU staff.
2. Where ICU 'Rules and Regulations' are desired, the physician-manager will develop and implement these 'Rules and Regulations' and ensure they both meet national standards of best practice and support the hospital's performance improvement plan.

3. Recommend with justification the number of qualified and competent physicians required to provide ICU clinical service needs.
4. Recommend the criteria for clinical privileges that are relevant to the care provided in the ICU.
5. Determine qualifications and competence of ICU personnel who are not licensed independent practitioners (for example, postgraduate trainees) who provide patient care services.
6. Transmit recommendations concerning appointment, reappointment, delineation of clinical privileges, and disciplinary action with respect to members of the critical care service, to appropriate hospital authorities.
7. Develop and implement programmes for: orientation of new members; credentials review and privileges delineation for appointment and reappointment; continuing medical education; utilisation review; and evaluation of practice.
8. Maintain continuing review of the professional performance of physician members with clinical privileges in the ICU, and maintain appropriate documentation.
9. Assess and recommend to the relevant hospital authority, space issues for patient care services and technology provided by the ICU.
10. Assist in the development and enforcement of hospital policies and Medical Staff Bylaws, Rules and Regulations, especially as they apply to the ICU.
11. Perform such other duties commensurate with his/her office, as may from time to time be assigned by the Chief of Staff or the hospital and mutually agreed.

3. 9. 1. Roles and functions of an ICU physician-manager

3. 9. 1. 1. Roles

The ICU physician-manager has three primary roles: interpersonal; informational; decisional.

3. 9. 1. 1. 1. Interpersonal

In this role, the ICU physician-manager is a 'figurehead' for the ICU team, liaising with stakeholders internal and external to the ICU, and influencing decision-making. For example, the physician-manager will represent the ICU at hospital and national/regional meetings or may delegate another to do so on his/her behalf.

3. 9. 1. 1. 2. Informational

In this role, the ICU physician-manager monitors activities that are important to the ICU, disseminates knowledge to the ICU team (and other relevant stakeholders), and acts as a spokesperson for the ICU. For example, the physician-manager will communicate within the ICU deliberations from hospital committees and consensus conferences.

3. 9. 1. 1. 3. Decisional

In his/her decision-making role, the physician-manager manages conflict, allocates resources to support the ICU's objectives and negotiates with other decision-makers both inside and outside the hospital.

What role is the ICU physician-manager providing in the following circumstances? a)Attends a local health authority meeting that is discussing clinical and academic ICU needs for the future. b)Chairs a meeting to discuss and decide on the amount of resources that will be allocated to purchasing information technology for the ICU. c)Attends a meeting with the hospital's senior management team to describe the ICU's clinical activities for the last year and anticipated stresses on the ICU's budget in the coming year.

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

- a) Informational
- b) Decisional
- c) Interpersonal

Challenge

Attend a senior hospital management meeting and observe the different roles individuals take.

3. 9. 2. Functions

The ICU physician-manager is responsible for seven principal functions: planning; organising; staffing, directing; controlling; decision-making; and problem-solving.

3. 9. 2. 1. Planning

Every physician-manager must ensure the ICU has both strategic and operational plans describing 'where the ICU is going' and 'how the ICU intends to get there'. As a roadmap for managing daily issues, a plan prepares the ICU to deal with future challenges (having thought about key issues in advance results is better responses when they occur). Good planning begins with an analysis of issues relevant to

the ICU service, for example, how trends in service delivery and financing are affecting the ICU. A completed plan includes objectives, policies and procedures to guide the ICU's daily activities.

Challenge

Set aside time to speak to the ICU Physician-Manager and/or Nurse Manager to discuss the future plan of your ICU

3. 9. 2. 2. Organising

The ICU physician-manager horizon scans with stakeholders including clinical and management colleagues internally and professional bodies externally and determines what activities should be carried out in the ICU, how they should be delegated and who has the responsibility for doing them. Organising involves the determination of how clinical authority and responsibility are divided between different ICU professionals (e.g. physicians, nurses, respiratory therapists, physiotherapists). Organising also requires creation of a formal communications procedure, so that everyone understands 'who does what'.

See the e-module on Communication.

3. 9. 2. 3. Staffing

The ICU physician-manager hires and manages people for the tasks required by the ICU on behalf of the hospital. Common examples of this function are the hiring of intensive care physicians and ICU resident doctors. However, in an optimally functioning team structure, the ICU physician manager would also be closely involved and liaising with other professional groups to ensure that there is optimal nursing and allied health staffing of the unit too. The physician-manager should expect to be involved in such appointments are the nurse educators, outreach service personnel, retrieval service personnel, ICU pharmacists and physiotherapists

3. 9. 2. 4. Directing

The physician-manager is intimately involved in the directing of the objectives of the entire ICU team towards a common set of goals and objectives. Whilst normally establishing/communicating and monitoring the ICU physicians' duty call schedules, portfolios of clinical and non-clinical responsibilities (e.g. research governance, risk management etc.) he or she should also be involved in the provision of opportunities for professional development for the ICU staff, appraisals, review of job plans, staff motivation and counselling.

3. 9. 2. 5. Controlling

The ICU physician-manager is responsible for ensuring that processes and procedures are in place to measure and report on the ICU's clinical, educational, behavioural/cultural, operational and academic performance. Accounting, planning, budgeting, quality control, clinical governance and utilisation management are important parts of the controlling function.

Notes

- Clinical governance is used to describe a systematic approach to maintaining and continuously improving the quality of patient care within a health system. Clinical governance enjoys several definitions. In a more complex descriptions, it is composed of the 7 key elements: education and training, audit, clinical effectiveness and research, risk management, patient and public involvement, information management, and staff management. In a simpler and more readily implemented format it involves three key steps that can be applied over all 7 of the previous elements. The three steps are:
  - the agreement of a set of minimum acceptable standards of care/performance
  - the attribution of accountability and responsibility for delivering (or clearly demonstrating why delivery is not possible) to at least these minimum standards to an individual or group
  - the establishment of an audit or monitoring process to ensure that the standards are being delivered with feedback, process adjustment and performance management as required to ensure their delivery.

Failure of clinical governance may arise as a result of lack of support, understanding or resource from "business stakeholders" such as Human Resources or Finance Department. The authors recommend that wherever possible, clinical governance meetings should take the form of integrated governance meetings with attendance by hospital finance and HR managers in addition to the clinical service team and administrator(s). Where issues of performance management or recruitment are involved in governance issues, HR is often able to assist and synergies across specialties may be realised that were unknown to the individual service. Likewise, having the finance manager present affords increased understanding of the context of a business case or contingency funding request when this comes to be considered and prioritised in the hospital's finance meetings.

In text References

(Scally and Donaldson. 1998)

Define the meaning of clinical governance and list five managerial activities consistent with this objective.

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Clinical governance means that you will strive to create in your ICU 'the culture, the systems and the support mechanisms' supporting good clinical performance and ensuring that quality improvement is embedded into your unit's routine. You ensure:

- All clinicians have the right training, skills and competencies to deliver the care needed by patients.

- Processes to improve the quality of care are in place throughout the unit.
- Techniques are established to anticipate and prevent potential problems.
- A comprehensive risk management system is in place.
- Mechanisms which monitor and improve existing practices are in place.
- Systems to recognise and act on poor performance are developed.

One of the key components of clinical governance is risk management.

Patients admitted to ICU are at particular risk of medical errors due to the severity of their illness, large workload, time constraints, high complexity of interventions and the multitude of healthcare professionals involved in patient care. The Sentinel Events Evaluation study documented the number of critical incidents that occurred during a 24-hour shift in ICUs across 29 countries. In this study of nearly 2000 patients, critical incidents were found to affect approximately 20% of patients. The most frequent errors were associated with medications, lines, catheters and drains, equipment, airway and alarms.

Note

Risk management is about identifying, assessing, analysing, understanding and acting on risk issues in order to reach an optimum balance of risk, benefits and costs.

Note

A critical incident is an occurrence that harmed, or could have resulted in harm to a patient.

Notes

- Much of the knowledge around patient safety has been drawn from the aviation industry.
- The goal of aviation is safe, efficient, and predictable travel from one point to another.
- In ICUs we should similarly promote safe, efficient, and predictable care from admission to discharge.

Medical errors are usually more often attributed to deficiencies in systems and organisational design, rather than to individual employees. In the past, too much individual accountability and a “blame culture” was associated with a failure to report mistakes and loss of ability to learn from these. As the culture of many workplaces has improved along with system design that aims to reduce the opportunity for error and enhanced reporting obligations, certain errors may arise that highlight individual failures to work within the systems in place or individual failures of knowledge. Investigation must always seek to understand why there were failures to follow procedures or of knowledge and to support those involved. Findings should seek to improve systems so that similar errors cannot arise again. Nonetheless, on occasion, individuals rather than systems may be found to have failed and some professional accountability may result. In this context, we seek a just and equitable culture rather than a “blame-free” one.

Patient safety research has demonstrated that poor teamwork, high workload, burnout, lack of clear leadership, and communication errors are important causal factors in critical incidents, including those where the final common pathway was an individual. Learning from all errors, sharing the knowledge gained from these lessons and an organisational commitment to promoting safe practice is an integral part of good risk management and has been shown to improve patient outcome.

More recently some of the focus in the field of Patient Safety has moved to examining how systems worked when things went well in complex and dynamically changing situations, identifying, analysing and emulating the behaviours and practices that made the scenario turn out well rather than only retrospectively analysing what went wrong in situations that are identified to have gone poorly. This change in philosophy results in positive feedback and enforcement of good practice rather than criticism of poor practice and is reported to enjoy high levels of support in units that employ it and to life team morale. If patient and/or team outcomes are shown to benefit in studies currently being undertaken, it is likely that both forms of patient safety management will run concurrently in the years ahead.

Finally, it is important to note that hospitals have an obligation to make the reporting or errors easy not just in terms of creating a culture where self-reporting of errors has an expectation of support rather than punishment, but also in terms of making the reporting system simple. One of the authors works in an institution where a cumbersome new electronic system was introduced that increased the average time to complete an incident form from 6 minutes to 35 minutes; the number of incidents reported fell dramatically and this was misinterpreted by the executive as an indicator or improving quality with fewer adverse events.

In text References

(Institute of 2000; Valentin et al. 2006; Donchin et al. 1995; Garrouste Orgeas et al. 2008; Brindley 2010)

Hugonnet and colleagues found that a higher staffing level was associated with a 30% reduction in infection risk in critically ill patients. Similarly, in a study of ICU residents, reducing the number of work hours per week and limiting extended work shifts reduced serious errors by 26%. As yet, no research has clarified the tipping point at which the reductions in hours worked and errors of fatigue are counterbalanced by increased rate of information loss and error rate associated with increased frequency of handover. This tipping point is likely to vary within different operational systems as electronic systems that maintain key facts, problem lists, sentinel events and task lists (both completed and incomplete) can reduce information attrition through handover.

In text References

(Hugonnet, Chevrolet and Pittet. 2007; Landrigan et al. 2004)

Who is responsible for reporting critical incidents?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

Critical incidents can be reported by anyone in the organisation. All have a responsibility for reporting incidents that could have or did result in harm to a patient.
Examples of evidence of a good safety culture in the ICU include:

- ICU staff are vigilant and aware of potential hazards
- All levels of the hospital organisation promote safe practice, direct the resources to address safety issues and encourage reporting of hazards and incidents
- Reports are addressed openly and fairly
- A comprehensive risk management system is in place that undertakes swift and thorough systematic investigations
- A proactive rather than a reactive approach to risk management
- High levels of reporting with sharing of the lessons learnt across the organisation
- Staff receive feedback regarding any findings from incidents they have been involved in or reported themselves
- Good communication across professions and grades – 'flat hierarchy'
- Visible leaders ('champions') of patient safety within the ICU
- Review of morbidity and mortality

Challenge

Identify a recent critical incident that has occurred in your ICU. Identify factors that contributed to the incident and look at measures that could be put in place to prevent the incident from re-occurring.

ESICM Flash Conferences:

- A FOCUS ON PATIENT SAFETY, Julian BION, A key issue: Safety climate, Barcelona 2014
- A FOCUS ON PATIENT SAFETY, Andreas VALENTIN, How to minimise medication errors, Barcelona 2014
- A FOCUS ON PATIENT SAFETY, Hans FLAATTEN, Running morbidity and mortality rounds, Barcelona 2014
- A FOCUS ON PATIENT SAFETY, Rui Paulo MORENO, The hidden problem: Diagnostic errors, Barcelona 2014
- A FOCUS ON PATIENT SAFETY, Bertrand GUIDET, The safe ICU: Dream and reality, Barcelona 2014
- A FOCUS ON PATIENT SAFETY, Andrew RHODES, Workforce and infrastructure: A system error?, Barcelona 2014
- Andreas Valentin. How to improve safety in the ICU. Berlin 2011.
- Jean-François Timsit. Impact of medical errors on mortality. Berlin 2011.

3. 9. 2. 6. Decision-making and problem-solving

This function requires that the physician-manager identify and analyse situations that require a decision. The physician-manager also needs to evaluate alternative solutions to address the problem, choose alternatives, implement solutions and evaluate results following implementation.

3. 9. 3. Relationships of an ICU manager

An ICU physician-manager has distinct relationships within a hospital's administrative structure:

3. 9. 3. 1. Vertical relationship

In a vertical relationship, the ICU physician-manager works in an established hierarchy, e.g. reporting to the hospital's Chief Medical Office.

3. 9. 3. 2. Horizontal relationship

An example of a horizontal relationship is when the ICU physician manager collaborates with another physician-manager who possesses similar authority (e.g. the physician-manager of an emergency service or surgery). A horizontal relationship is created, for example, when the ICU and Surgery physician-managers collaborate to facilitate enhanced or fast track post surgical recovery programmes.

Note

The term 'dyadic' is derived from the Greek word 'dyad' meaning a group of two people. A dyadic relationship occurs when two people link as a pair for the purposes of providing management expertise. In the ICU, for example, this might involve physician and nurse leaders

Note

A horizontal relationship requires that the physician-manager be particularly adept with inter- and intra-professional collaboration

A horizontal relationship can also describe a co-managing relationship e.g. between a physician-manager, nurse manager and departmental administrative manager. In a 'dyadic' approach, managerial roles may be shared between such a physician and nurse manager. Physician and nurse co-managers might have different reporting relationships, for example, the physician-manager to the Chief Medical Officer and the nurse manager to a Chief Nursing Officer.

What type of relationship, horizontal or vertical, exists between an ICU physician-manager and a trainee who is doing a research elective on patient safety in the ICU?

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

The ideal relationship is a dyadic one where the physician-leader spends time coaching the trainee, who is given latitude in the research project identified through specific goals and objectives. In this approach, the trainee is more satisfied and is more likely to perform at a high level.

References

- Donchin Y, Gopher D, Olin M, Badihi Y, Biesky M, Sprung CL, Pizov R, Cotev S., A look into the nature and causes of human errors in the intensive care unit., 1995, PMID:7867355
- Valentin A, Capuzzo M, Guidet B, Moreno RP, Dolanski L, Bauer P, Metnitz PG; Research Group on Quality Improvement of European Society of Intensive Care Medicine; Sentinel Events Evaluation Study Investigators., Patient safety in intensive care: results from the multinational Sentinel Events Evaluation (SEE) study., 2006, PMID:16874492
- McClelland DC, Burnham DH, Power is the Great Motivator, 2003, https://hbr.org/2003/01/power-is-the-great-motivator
- Keltner D , Don't let power corrupt you, 2013, https://hbr.org/2016/10/dont-let-power-corrupt-you
- Beer M, Finnstrom M, Schrader D, Why leadership training fails and what to do about it., 2016, https://hbr.org/2016/10/why-leadership-training-fails-and-what-to-do-about-it
- Scally G, Donaldson LJ., The NHS's 50 anniversary. Clinical governance and the drive for quality improvement in the new NHS in England., 1998, PMID:9651278
- Institute of Medicine, To Err is Human: Building a Safer Health System., 2000, ISBN:0309068371
- Garrouste Orgeas M, Timsit JF, Soufir L, Tafflet M, Adrie C, Philippart F, Zahar JR, Clec'h C, Goldran-Toledano D, Jamali S, Dumenil AS, Azoulay E, Carlet J; Outcomerea Study Group., Impact of adverse events on outcomes in intensive care unit patients., 2008, PMID:18552694
- Brindley PG, Patient safety and acute care medicine: lessons for the future, insights from the past., 2010, PMID:20236461
- Hugonnet S, Chevrolet JC, Pittet D., The effect of workload on infection risk in critically ill patients., 2007, PMID:17095946
- Landrigan CP, Rothschild JM, Cronin JW, Kaushal R, Burdick E, Katz JT, Lilly CM, Stone PH, Lockley SW, Bates DW, Czeisler CA., Effect of reducing interns' work hours on serious medical errors in intensive care units., 2004, PMID:15509817

3. 10. Hierarchy of Hospital Management

Regardless of the model for organising intensive care services in the hospital (for example, as a Department, as a Programme or as a Division within a Department), the physician appointed as leader/manager for the ICU works in a hierarchy of management levels, as outlined in the table below.

Examples of levels of management in a hospital
Physician Directors can have more extensive authority if they assume responsibility for a wider field – for instance, all acute services.

Table 12: Hierarchy of hospital management

Management level examples	Type	Position level in the hospital hierarchy	Degree of authority & scope of responsibility
• Chief Executive Officer • Chief Medical Officer	Senior	High	Large

• Medical Director, • Clinical Director	Middle	Middle	Medium
• Patient Care Manager • Intensive Care Services	Front line	Low	Small

3. 11. Leadership

All senior doctors in charge of an ICU should display qualities of leadership on a day-to-day basis in their clinical and managerial working lives. In addition to leading by example in their conduct and behaviours, they lead a team of clinicians in co-ordinating the care and investigations of patients and in listening to and communicating with patients and their families. In addition to these generic responsibilities of leadership incumbent upon all senior ICU clinicians, individuals within the team will be responsible for leading different portfolios of the ICU's work – research, education, pastoral care, audit, quality, safety, equipment etc.. Co-ordinating, over-seeing and leading the wider team sits a Departmental Head, Leader or Director.

Part of the responsibility of the Head of Department is strategic leadership developing and creating a shared vision for the ICU's future – and garnering the support needed from the ICU's stakeholders to implement changes to achieve the vision. Success is more likely an outcome, if the vision has been co-developed and is therefore co-owned and shared by the wider ICU team. Other important leadership activities include motivating the ICU's multi-professional team, as well as building enthusiasm and creating momentum in moving the team towards its agreed vision for the ICU.

Management and leadership are not the same thing although the terms are often misused interchangeably. Leadership is just one of the many facets a successful ICU physician-manager needs to demonstrate. The aim of a physician-manager is to maximise the output of the ICU through excellent and efficient administration. To achieve this, the ICU physician-managers must plan, organise, staff, direct, control and problem solve. In contrast, physician-leaders roles include creating a vision for the future, motivating and inspiring the ICU team and assuming responsibility for ICU performance. It is important to recognise that the ICU Clinical Director role requires respect and support from colleagues if it is to enjoy maximum success and efficacy. Therefore, team-inclusive strategies such as co-developing services, co-creating vision and listening are more likely to prove successful in the longer-term than ego-centric imposition of one person's vision. This role ideally requires to be filled by someone with both high IQ and high emotional intelligence.

Some of the differences between a manager and a leader are suggested in the table below. A single person can exhibit management and leadership skills and there is crossover between the two. The role of an ICU Clinical Director ideally requires both effective management and leadership. However, a leader who lacks management skills and has insight into this may still prove successful by delegating, supporting and empowering others in the team who enjoy greater strength in managerial tasks.

Table 13: Differences between management and leadership

Management	Leadership
• Planning and budgeting • Establish agendas • Set timescales • Allocate resources	• Establishing direction • Create a vision • Set strategies
• Organising and staffing • Providing structure • Recruitment • Establish rules and procedures	• Aligning people • Communicating goals • Seek commitment • Build teams and coalitions
• Controlling and problem-solving • Incentivise • Generate creative solutions • Take corrective action	• Motivating and inspiring • Inspire and energise • Empower individuals • Satisfy unmet needs

In text References
(Kotter. 1990)

Challenge

Determine which of the following tasks require leadership skills and management skills:

1. Writing a business case for additional intensive care beds
2. Auditing adherence to ICU guidelines
3. Creating a five year strategic plan for the intensive care unit
4. Supporting the ICU team in developing a new service
5. Ensuring the medical staff rotas are written
6. Recruitment of a dedicated intensive care pharmacist

Note

There are a myriad of definitions of leadership, with the concept meaning different things to different people. Some common themes are that leadership involves: an Individual influencing a group of people towards a common goal.

3. 11. 1. Leadership in context

The traditional view of the leader at the top of the organisation with followers below is outdated. In healthcare there is recognition that leadership skills should be developed in everyone and shared leadership is more effective. An open leadership culture is required, where people are encouraged to take personal responsibility and are not afraid to speak up with ideas. This 'horizontal authority' creates a culture that empowers younger or more inexperienced colleagues to speak up and encourages older or more senior colleagues to listen.

In text References
(Künzle et al. 2010; Brindley and Reynolds. 2011)

Psychology research studies have shown that the skills and behaviours of team leaders predict team performance. There is increasing evidence from the healthcare sector and ICU literature, of leadership and management effecting unit performance. Stockwell et al. demonstrated that the ability of senior physicians to effectively lead and communicate with the ICU team, manage resources, set high standards and provide support on issues of performance and team development was associated with the number of patient goals being completed.

In text References
(Boyle et al. 1999; Stockwell, Slonim and Pollack. 2007)

3. 11. 2. Approaches to leadership

A number of different approaches to leadership have been described over the years and there is considerable overlap between the different approaches. Highlighted below are some of the principal leadership traits, styles and preferred behaviours.

3. 11. 3. Trait

This is the concept of being 'born to lead'. This is based upon the idea that the characteristics of a good leader are innate and cannot be learnt. While research has failed to demonstrate specific skills sets restricted to leaders, some common themes of self-confidence, initiative, emotional intelligence and belief in one's actions appear.

3. 11. 4. Situational

This is based on the work of Hersey and Blanchard and implies that effective leaders need to adapt their style of leadership to the situation and the competency and commitment of their followers. Despite its widespread use, there has been relatively little research to justify the theory and some studies have not bourne out its assertions.
In essence the theory states that the best style of leadership is contingent on both the situation and who is being led. It also assumes that the leader knows best or at least better than those being led.

1. Coaching leadership is employed in a situation where instantaneous decision making is not required and the leader seeks the participation of those being led in the decision making process directing them towards the "correct answer" e.g. a Clinical Director may be leading a newly appointed supervisor of training through a performance management pathway of a struggling trainee where detailed processes of both support for the trainee and patient safety safeguards exist and need to be implemented correctly.
2. Supporting leadership is employed when those being led have both the technical skills and knowledge to complete allocated tasks but may lack the confidence or commitment to perform them reliably. The leader effectively checks up on task performance, timeliness, quality etc. and offers encouragement or correction as required e.g. a consultant may check up on and lend support to the progress of an audit that is being undertaken by a senior trainee who has successfully completed four previous audits in their training but is struggling to secure access to case records.
3. Delegating leadership is employed when those being led have maturity, expertise and capability to complete tasks and run projects or systems themselves. The leader may remain involved in or monitor the projects but delegates responsibility and part of the accountability for delivery to the individual or team e.g. a Clinical Director may pass on the role of research supervisor to another consultant who is responsible for overall research governance, compliance, conduct, participation and delivery.

Figure 11: Hersey-Blanchard Situational Leadership Theory. Adapted from: Hersey P, Blanchard K, Johnson D. Management of Organizational Behavior: Leading Human Resources. 9th Edition. Upper Saddle River, NJ: Pearson Education; 2008. ISBN-0-13-017598-6

Considering the quadrants of the above figure, indicate the different leadership styles (directing, coaching, supporting, delegating) taken by the ICU physician-manager in the following scenarios: 1. New junior intensive care doctor doing his/her first central venous line insertion procedure 2. Supporting the physiotherapists, occupational therapists, dieticians, psychologists in developing a post ICU rehabilitation service 3. Implementation of a new governmental policy in the ICU 4. Supervising an ICU resident in their postgraduate research project

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

1. S1: Directing – characterised by one-way communication in which the leader defines the roles of the individual or team and provides direction.
2. S4: Delegating – the leader is still involved in decisions but the responsibility is largely passed onto the individual or team.
3. S3: Supporting – shared decision-making about aspects of how the task is accomplished and the leader is providing less task behaviours while maintaining high relationship behaviour.
4. S2: Coaching – the leader is providing direction, using two-way communication and providing the socio-emotional support.

In text References

(Hersey, Blanchard and Johnson. 2008)

Given the lack of evidence for Situational Leadership models working as predicted in studies, many proponents of Situational Leadership have adopted a less well-defined model of "Contingency Theory". This specifies that the best style of leadership in any given situation is determined by the qualities of the leader, the qualities of the followers and the exact situation faced within the context of the time and cultural norms of that time. In exactly the same situation of challenge, a different leader, group of followers, or place in time and cultural norms has the potential to change the best leadership approach to facing the challenge.

3. 11. 5. Transformational and transactional leadership

Transformational leadership has been widely adopted in the healthcare setting with some success. The difference between transformational and transactional leadership are highlighted in the table below.

Table 14: Transformational versus transactional leadership

Transformational	Transactional
• Idealised influence • Strong emotions in followers	State what is expected of followers
Intellectual stimulation	Explain how to meet expectations
Individualised consideration Support and encouragement	Clearly state criteria for performance evaluation
Inspirational motivation Communicate the vision	Provide objective specific feedback
	Allocate rewards based on objective achievement

Research suggests that an effective leader should have both styles of leadership available to them and change according to the situation and context.
Transformational leadership may lead to dependence on a leader, this has led to the theory of post-transformational leadership. This focuses on creating a climate of organisational learning.

A transformational leader establishes a vision that guides the manager in achieving three things. What is NOT one of them?

- Quality
- Performance
- Productivity
- Efficiency

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

'Efficiency'. The transactional leader focuses on compliance with existing organisational roles and trades reward for agreement with the leader's wishes to do such things that would improve efficiency.

Different leadership approaches
The different leadership approaches can be simplified into four basic styles:

- Autocratic – the 'do as I say' style. Good in crisis situations, not good for staff commitment and productivity long-term.
- Democratic – emphasises teamwork and allows followers to contribute and take ownership of organisational objectives. Good for staff commitment, job satisfaction and productivity.
- Laissez-faire – 'hands-off style', good for highly trained and motivated staff who know what they are doing.
- Situational – use of one of the above methods as appropriate to the context encountered.

In text References

(Yukl. 2006; Goodwin. 2006; Hartley and Bennington. 2010; Mullins. 2008; Northouse. 2009)
As highlighted already, a wide variety of skills are required to be an effective leader. Effective leadership in healthcare focuses on the:

- Delivery of safe, high-quality and effective healthcare – 'service excellence'.
- Future strategic vision – 'future focus'.
- A core set of personal qualities and attributes to support this – 'personal qualities'.

Particular focus is made of the personal qualities, and these are illustrated in more detail in the Personal Qualities figure which relates to the UK National Health Service (NHS). Leadership Qualities and Behaviours

Leadership attributes that contribute to success

To be effective, an ICU physician-leader needs to:

- Articulate a clear vision for the ICU and achieve buy-in from stake-holders and co-workers.
- Create priorities and direction. This ensures focus for all the ICU's activities, clinical and academic (the latter including both teaching and research).
- Identify problems. The successful leader will then use evidence, where applicable, to develop and implement solutions.
- Encourage and support efforts of the ICU staff to improve their skill sets through activities such as continuing education. The effective leader provides opportunities for members of the ICU staff to gain skills, especially ones relevant to the ICU's objectives.
- Constantly learn. As the environment in which critical care operates is rapidly changing, a constant awareness of new knowledge is required for the ICU to maintain success. This should ideally come from the whole team rather than solely from the physician-leader. Dependence on the leader alone for the introduction of innovations and knowledge reduces overall resilience in the team and can lead to peculiarities of practice as well as reduced team cohesion.
- Balance the interests of all stakeholders … and be especially sensitive to maintaining a commitment of the ICU for the public's benefit.

In text References

(Starkweather and Shropshire. 1994) As a new physician-manager, you discuss with colleagues different approaches to including the public's perspective in the ICU's activities. One colleague suggests that you consider creating an ICU Community Advisory Board. Think about an advisory board's role in the ICU and discuss what purpose it might serve.

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

A community advisory board could help in a two-way communication process. It might keep the community informed of the goals and objectives of the ICU and be a forum for open discussion of relevant significant issues, for example, changing attitudes to end-of-life care. Local citizens are appointed to represent the community, to act as liaison, to identify areas of concern to the community and to communicate the ICU's activities to the community. It is important to recognise that single individuals may not accurately represent concerns of the wider patient/family community and wider engagement on specific issues of concern may be required. The engagement with a community advisory board rather than a single patient advocate should reduce this risk.

3. 11. 6. Using power effectively and judiciously

If an essence of leadership is the ability to influence followers, power is the potential to exert influence. Power is the 'ability (or potential) to exert actions that either directly or indirectly caused the change in the behaviour and/or attributes of another individual or group.'

In text References

(Shortell, and Kaluzny. 1997)
For the formally appointed ICU physician-leader, power means that she/he is in a position of relative ability to carry out his/her own will, despite resistance from other members of the ICU team. Nonetheless, without the support of the team, the ability to exercise power can be severely curtailed. The term, "In office but not in power", describes the scenario when someone holds high office or rank but is unable to command the respect or loyalty of those they are supposed to lead and so is thwarted in their efforts to direct change by either covert or overt opposition. The injudicious use of "hard power" and failure to engage with stakeholders can rapidly lead to schism, dysfunction and reduced efficiency within units, teams and services.

One classification of sources of power of one individual over another or over a team or organisation follows:

- **Legitimate power** exists when it is derived from an administrative position in an organisation.
- **Reward-based power** exists when an individual is able to reward desirable behaviours, for example, by changing physician remuneration.
- **Coercive power** exists when an inidividual has the ability to prevent another from achieving rewards they want.
- **Expert power** exists when someone holds knowledge valued by an organisation that is not easily accessible for other sources and that is considered important to the organisation's objectives. In order to secure the input of the expert, a transaction of benefit to the expert may be necessary – this negotiation position of strength affords them power.
- **Referent power** results when an individual creates admiration and loyalty, to the extent that power is thereby gained to influence others.

Successful physician-leaders usually exhibit explicit or implicit understanding of the importance of developing power. This happens through a leader's ability to create opportunities, control resources and/or assist the hospital in successfully dealing with challenges faced by the hospital's administration. Utilising opportunities to assist individuals and departments within an organisation is often associated with a gradual increase in influence and respect within the organisation. Using that influence to the benefit of the leader's own department is best reserved for issues of high priority (where the greatest benefits can occur from its application). Stated differently, the effective ICU physician-leader knows how to use his/her power and influence judiciously.

As stated previously, it is well recognised that the desirable qualities of managers and leaders that are attributed to their rising to positions of power are often noted to diminish once they are established in such positions. This may gradually erode the power and the leader's organisational effectiveness. A wise leader seeks not to lose touch with those they lead nor to ignore them or take them for granted….. a very wise one may succeed.

Give an example of each of reward-based, expert and coercive power, from the perspective of an ICU physician.

COMPLETE TASK THEN CLICK TO REVEAL THE ANSWER

- Reward-based power, exists when an ICU physician-leader provides a colleague with support to attend a national meeting on quality improvement, acknowledging the colleague's leadership in developing a quality improvement project.
- Expert-based power exists when a physician-leader has studied and published on health services research, and is asked by the hospital to develop a comprehensive programme on effective utilisation of ICU services.
- Coercive power exists when a physician-leader has the capacity to negatively reflect on the appropriateness of promoting a physician colleague.

References

- Mullins L. , Management and Organisational Behaviour. 8th Edition., 2008, ISBN:9780273708889
- Kotter JP. , A Force for Change: How leadership differs from management., 1990, ISBN:0029184657
- Künzle B, Zala-Mezö E, Wacker J, Kolbe M, Spahn DR, Grote G., Leadership in anaesthesia teams: the most effective leadership is shared., 2010, PMID:20472572
- Brindley PG, Reynolds SF., Improving verbal communication in critical care medicine., 2011, PMID:21482347
- Boyle DK, Bott MJ, Hansen HE, Woods CQ, Taunton RL., Managers' leadership and critical care nurses' intent to stay., 1999, PMID:10553177
- Stockwell DC, Slonim AD, Pollack MM., Physician team management affects goal achievement in the intensive care unit., 2007, PMID:17906596
- Hersey P, Blanchard K, Johnson DE. , Management of Organizational Behavior: Leading Human Resources. 9th Edition., 2008, ISBN:0130175986
- Yukl G., Leadership in Organizations. 6th Edition., 2006, ISBN:0131494848
- Goodwin N. , Leadership in Health Care: A European prospective., 2006, ISBN:0415343275
- Hartley J, Bennington J. , Leadership for Healthcare., 2010, ISBN:9781847424860
- Northouse P. , Leadership: Theory and Practice. 5th Edition., 2009, ISBN:1412974887
- Starkweather DB, Shropshire DG. , Management Effectiveness., 1994, ISBN:0834203634
- Shortell, SM, Kaluzny AD. , Essentials of Health Care Management: Delmar series in health services administration., 1997, ISBN:0827371454

4. Conclusion

Healthcare organisations of the future are imposing greater demands for accountability and performance that require physician-managers to become familiar with new roles, and to demonstrate skills that have not been traditionally included in an intensive care physician's postgraduate training. This module has described how intensive care physician-managers need to:

- Understand quality improvement in a manner that is consistent with the new demands for clinical governance.
- Learn about healthcare funding and how to use budgets for business planning and monitoring.
- Know about problem-solving, conflict resolution, mentoring and coaching.
- Be lifelong learners, to provide transformational leadership and create visions to move their ICU in new directions.

APPENDIX

Table of Contents

4. 1. Additional resources

If you wish to learn more about management and leadership in healthcare, here are extra resources.

4. 1. 1. Textbooks

The following are textbooks the authors consider to be excellent in content development for physicians during career training in management and leadership.

In text References

(Shortell and Kaluzny 1999; Guidet, Valentin and Flaatten. 2016; Kotter. 1996; Maxwell. 2002; Sperry. 2003; Hammon. 2000; Yukl and Lepsinger. 2004; Dye. 2000; Gabel. 2001; Zuckerman. 2005)

References

- Guidet B, Valentin A, Flaatten H., Quality Management in Intensive Care: A Practical Guide, 2016, ISBN:9781316218563
- Shortell SM, Kaluzny AD, Health Care Management: Organization Design & Behavior. 4th edition., 1999, ISBN:0766810720
- Kotter JP. , Leading Change. 1st edition, 1996, ISBN:0875847471
- Maxwell JC., Leadership 101: What Every Leader Needs to Know., 2002, ISBN:0785264191
- Sperry L. , Becoming an Effective Health Care Manager: The Essential Skills of Leadership. , 2003, ISBN:1878812866
- Hammon JL., Fundamentals of Medical Management: A Guide for the New Physician Executive. 2nd edition., 2000, ISBN:0924674660
- Yukl G, Lepsinger R., Flexible Leadership: Creating Value by Balancing Multiple Challenges and Choices. , 2004, ISBN:0787965316
- Dye CF. , Leadership in Healthcare: Values at the Top., 2000, ISBN:1567931146
- Gabel S. , Leaders and Healthcare Organizational Change: Art, Politics and Process., 2001, ISBN:0306465574
- Zuckerman AM. , Healthcare Strategic Planning. 2nd edition, 2005, . ISBN:1567932371