

Comprehensive Critical Care

A REVIEW OF ADULT CRITICAL CARE SERVICES

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Foreword

In reviewing the organisation and delivery of adult critical care services, the Expert Group was determined that their proposals should describe a service which would meet the needs of patients and be delivered by professions and specialties working in partnership. While no patient would wish to need critical care, those who experience the service, and their relatives, should be confident that they have received the best possible care. Staff also should be able to work with enthusiasm, knowing that they are being enabled to give their best for their patients.

We have therefore described a service which focuses on the needs of patients and how they can be met through partnership between professions and specialties. We considered that the service must be comprehensive – encompassing the whole of the patient’s pathway through care, and inclusive – involving all professions and specialties caring for the critically ill. We have not described separately arrangements and standards for different specialties, believing that the severity of illness should determine standards of care which are universally applicable.

Our proposals set out a modernisation programme which is far-reaching. We propose that patients’ needs are determined according to the level of care which their condition requires, rather than according to the designation of the bed in which they happen to lie. We propose that the planning of the service is based on an assessment of the needs of the population, and that responsibility is placed with health authorities and NHS Trusts to ensure that services are developed to meet the needs of the critically ill. We believe that our proposals describe a service which is appropriate for those who are, for a time, the sickest patients being cared for by the NHS.

We have tested our emerging findings through regional workshops where we have been able to explore the concerns of NHS staff. We believe that our proposals set out an agenda which will be warmly welcomed and fits within the challenges set for the modernisation of the NHS.

The contribution of each member of the Expert Group has been substantial. My thanks are due to them all, and to all those who have contributed to our work.

DR VALERIE DAY
on behalf of the Expert Group

Executive Summary

In April 1999, the Department of Health established a review of adult critical care services, and invited an expert group to develop a framework for the future organisation and delivery of critical care. The membership of the Expert Group included experienced practitioners from relevant professional bodies.

This report by the Expert Group outlines a far-reaching modernisation programme for the development of critical care services that are consistent and comprehensive. The Expert Group believes that, while the development of additional beds and services are essential, the final shape and size of the service can only be determined through evaluation of the impact of the proposed changes, supported by assessment of need.

Early in their work, the Expert Group identified that in-depth work was needed on a range of nursing issues. The Review of Adult Critical Care Nursing has addressed these, and key recommendations from their work are included in this Report.

Comprehensive critical care is not simply a new name for intensive care, but is a new approach based on severity of illness. Services delivered in accordance with this report will be comprehensive, inclusive and take responsibility for the critical care needs of their population. This is essential to the modernisation of the service, and to ensuring that patients, their families and friends receive first class critical care wherever they live.

The report recommends that the existing division into high dependency and intensive care beds be replaced by a classification that focuses on the level of care that individual patients need. Staff numbers, skills and expertise should depend on the workload and complexity generated by the condition of individual patients.

Comprehensive critical care must be planned and delivered systematically across the whole health system. The characteristics of such a service should ensure:

Integration – A hospital wide approach with services which extend beyond the physical boundaries of intensive care and high dependency units, making optimum use of available resources including beds

Networks – A service that is provided across NHS Trusts, working to common standards and protocols, taking responsibility for all the critically ill in all specialties within a geographical area

Workforce development – A planned approach to workforce development including the recruitment, training and retention of medical and nursing staff, and balancing the skill mix so that professional staff are able to delegate less skilled and non-clinical tasks.

A data collecting culture promoting an evidence base – A service underpinned by reliable information which will ensure the delivery of effective clinical care, demonstrated through comparative audit.

The proposals made in the report are grouped as follows:

- Organisation within NHS Trusts
- Organisations between NHS Trusts
- Human resources
- Standards and guidance

Supporting information including details of our work, case studies, and further examples of good practice are available at www.doh.gov.uk/nhsexec.comcritcare.htm

Comprehensive Critical Care

Introduction

1. In April 1999, the Department of Health established a review of adult critical care services, and appointed an expert group to develop a framework for the future organisation and delivery of critical care. This Report sets out the key findings and recommendations of the Expert Group. It makes proposals for the development of a consistent and comprehensive critical care service throughout the NHS in England. Background evidence and opinion considered by the Group, together with further examples of good practice, may be found at www.doh.gov.uk/nhsexec.compcritcare.htm
2. Comprehensive critical care is the complete process of care for the critically ill which focuses on the level of care that individual patients need rather than on beds and buildings. It is a 'whole systems' approach, which encompasses the needs of those at risk of a critical illness, and of those who have recovered from such illnesses, as well as on the needs of patients during the critical illness itself. Its delivery depends on the availability of a continuum of expertise and facilities, both within and between hospitals. It should be delivered to uniform standards throughout the NHS, regardless of location or specialty.
3. The current provision of critical care is characterised by considerable variation in organisation and delivery, quality, funding and effectiveness. This situation is largely the product of historic legacy and ad hoc development. It is compounded by difficulties in the recruitment and retention of the necessary trained staff and in professional training and development programmes that do not match the needs of individuals or the service; this is particularly the case for nursing staff.
4. This Report outlines a modernisation programme that is likely to take three to five years to complete. This timescale recognises the need for the necessary changes in professional development and training, workforce planning and recruitment and retention to become established and to take effect. The Expert Group believes that, while the development of additional beds and services is crucial, the final shape and size of the service can only be determined through evaluation of the impact of the proposed changes, supported by the assessment of need. However, the change in the nature of the service to one that is comprehensive, inclusive and takes responsibility for the critical care needs of populations is urgent, and critical to modernising the service and gaining best value from any additional resources. The proposed reforms will ensure that patients, their families and friends will receive first class critical care and support wherever they live.
5. The proposals in this Report set out a new way of thinking about critical care which will impact not only on intensive care and high dependency units as they currently exist, but will affect the delivery of acute care as a whole. Comprehensive critical care is not simply a new name for intensive care, but is a new specialty based on severity of illness – caring for those who are critically ill or vulnerable to critical illness. As such, the proposals represent a substantial change in direction. Successful implementation depends on breaking down the barriers between specialties and professions, to focus on the needs of patients. We have found a recognition amongst critical care professionals that the doors of the intensive care unit need to be unlocked, and partnership between professionals and patients form the basis for the service. These changes build on the pool of skills and expertise of those currently working in intensive care, and of the various specialties looking after acutely ill patients. The success of the change agenda

will depend ultimately on the enthusiasm and commitment of all those involved in caring for the critically ill, and those who manage and commission services.

6. The Expert Group acknowledges the valuable contribution of the Audit Commission and their report 'Critical to Success'. Our work builds on this to look beyond individual NHS Trusts and see what more can be done. The recommendations made by the Audit Commission must be addressed, but in considering their view that 'it is not simply a question of more beds' the Expert Group has identified a wider spectrum of need for modernisation and change which it considers fundamental to the provision of a critical care service for the 21st Century.

Background

7. Intensive care has developed largely as a response to developments in medicine and surgery. Historically, this is demonstrated most graphically by the polio epidemic in Denmark in 1952, when there were too few 'iron lungs' available. Mortality was dramatically reduced by the use of life support techniques normally used in operating theatres, combined with the constant attendance of medical staff and the concentration of these patients in a specific area of the hospital. Increasingly complex interventions have been made feasible by the ability to take over the role of a failing organ until recovery occurs.
8. As medicine and surgery have developed, general intensive care services have developed in response. In addition some specialties, in particular, neurosciences, cardiac and burns which have a high demand for critical care beds, have developed units specifically for their own patients. High dependency beds have been introduced to provide a step between intensive care and ward care, sometimes in dedicated units and sometimes associated with particular specialties. Overall development has been unplanned and haphazard and has largely relied on the interest of local clinicians to develop it. There is no consistency in the organisation and capacity of critical care services, with wide variation between NHS Trusts particularly in the proportion of acute beds designated for critical care. On average, one percent of acute hospital beds are designated for general critical care, but the ratio varies widely, with the top quarter of NHS Trusts having at least twice as many as the bottom quarter. The average number of beds in an intensive care unit is six, but the range is at least from 2 to 22. Some NHS Trusts have several units, which may have separate management arrangements. One third of NHS Trusts did not have any identified high dependency beds in 1999.
9. Whilst direct comparisons with Europe are difficult, studies show the relatively low proportion of beds allocated to critical care in the UK; the number of acute hospital beds allocated to general and specialist intensive care varied with the United Kingdom having 2.6% while Denmark had the highest proportion at 4.1%. In Europe 18% of units had less than 6 beds whereas in the UK, 48% had less than 6 beds. The Medical Economics and Research Centre, Sheffield prepared a report on the international perspective on critical care for this review which can be accessed at www.doh.gov.uk/nhsexec/compcritcare.htm

The Expert Group

10. In March 1999 an Expert Group was established by the Department of Health to propose a framework for the future organisation and delivery of adult critical care services. The Group, (membership at Annex A), had the remit:

to produce a national framework for Adult Critical Care Services which is evidence-based (or based on a clear professional consensus) and which sets out operational standards for staffing and transfer levels in intensive care and high dependency units and makes recommendations about the level, configuration and mix of provision of general adult and neurological adult intensive care and high dependency care services.

11. Membership of the Expert Group was drawn from a number of organisations including the Intensive Care Society, The Royal College of Nursing, The Royal College of Anaesthetists, British Association for Accident and Emergency Medicine, Society of British Neurological Surgeons, Neurosciences Anaesthetics Society, the Intensive Care National Audit and Research Centre and from the Department of Health and Regional Offices of the National Health Service Executive. The Group has also drawn on work undertaken by the Audit Commission, the London Health Economics Consortium and the University of Birmingham, the Institute of Modelling for Healthcare at the University of Southampton, the Medical Economics and Research Centre, Sheffield (MERCs) and the Intensive Care National Working Group on Costing.
12. The Expert Group met on five occasions between April 1999 and April 2000 with further meetings of sub-groups. Having reviewed the evidence, two pieces of work were commissioned – a comparative study of international critical care and a modelling tool that would be capable of being made available to all users to aid discussions on the pattern of service delivery. Further information on this work is available at www.doh.gov.uk/nhsexec/compcritcare.htm
13. As a result of early concerns about the complexity of the nursing issues, the Chief Nursing Officer established a Committee to look in more depth at the implications for nursing of the themes being pursued by the Expert Group. The Review of Adult Critical Care Nursing was asked to provide a report for use by the profession and key recommendations that could be incorporated into the final report of the Expert Group. Their work is summarised in this Report and available in full at www.doh.gov.uk/nhsexec/compcritcare.htm
14. In spring 2000, workshops were held in each of the eight NHS Regions to debate the emerging proposals. Representatives from critical care units within each region were invited in order to test the extent of professional consensus and support for the proposals. Our final Report takes account of the issues and concerns raised in the workshops, which were attended by more than 600 doctors, nurses, hospital managers and commissioners.

The Vision for the Future

15. Comprehensive critical care should be delivered locally to a consistent vision and standards whether in a general or specialist context. It aims to meet the needs of all patients who are critically ill including those with specialist needs rather than just of those who make it into the beds currently designated as either intensive care or high dependency care. Critical care must be patient focused, putting the patient at the centre of the service and with the means to respond to peaks in demand for the service.

Classification of Critical Care Patients

16. Critical care is provided within the continuum of primary, secondary and tertiary care with the majority of services delivered in the secondary care setting. We **recommend** that the existing division into high dependency and intensive care based on beds be replaced by a classification that focuses on the level of care that individual patients need, regardless of location. This is an important addition to existing methods that classify patients by the level of organ support received or simply the type of bed they occupy. This approach should enhance our understanding of the provision of critical care in the NHS.

Level 0	Patients whose needs can be met through normal ward care in an acute hospital.
Level 1	Patients at risk of their condition deteriorating, or those recently relocated from higher levels of care, whose needs can be met on an acute ward with additional advice and support from the critical care team.
Level 2	Patients requiring more detailed observation or intervention including support for a single failing organ system or post-operative care and those 'stepping down' from higher levels of care
Level 3	Patients requiring advanced respiratory support alone or basic respiratory support together with support of at least two organ systems. This level includes all complex patients requiring support for multi-organ failure.

17. A supplementary classification is proposed in order to identify those patients requiring specialist investigation and treatment such as is usually provided at tertiary referral hospitals. Where patients are cared for by specialist services, one additional letter (reflecting the most significant disorder) should be applied to a patient's level of acuity as follows:
- N patients requiring neurosurgical care
 - C patients requiring cardiac surgical care
 - T patients requiring thoracic surgical care
 - B patients requiring burns or plastic surgery care
 - S patients requiring spinal unit care
 - R patients requiring renal care
 - L patients requiring liver care
 - A patients requiring other specialist care
18. The extent to which any individual hospital provides increasing levels of care, or supplementary specialist care, depends on the skills, expertise, specialties and facilities available within the hospital. Services provided should be based on the principle of moving upwards from level 0, to the level which is appropriate to the complexity of patient care needs. For some patients it will be necessary to be transferred to another hospital where more complex clinical needs can be met.
19. All acute hospitals carrying out elective surgery must be able to provide level 2 care. They should either have level 3 care available on site or they should have protocols in place to arrange transfer to a suitable unit. Hospitals admitting emergencies should normally have all levels of care available, although in a limited number of cases, protocols may be agreed for safe transfer to an adjacent hospital for level 3 care.
20. These classifications of levels of care underpin all the recommendations made in this Report.

Characteristics of the service

21. The comprehensive critical care service must be planned and delivered systematically across the whole health system. The characteristics of the modernised service should be:
- **Integration** – A hospital wide approach to critical care with services that extend beyond the physical boundaries of intensive care and high dependency units that house designated beds to provide support to and to interact and communicate with the range of acute services including specialist services.

- **Networks** – A service that is provided within the context of an integrated network involving several Trusts working to common standards and protocols, providing a comprehensive range of critical care services, and taking responsibility for all the critically ill in all the specialties within a geographical area.
 - **Workforce development** – A planned approach to human resources, workforce planning, recruitment and retention issues and education and training for medical, nursing, therapy professions, technical, administrative and clerical staff and other support staff.
 - **A data collecting culture promoting an evidence base** – A service underpinned by good information that will ensure the delivery of an effective service in terms of outcomes for patients, will support clinical governance and will enable critical care services to move from being reactive to being proactive with a firm evidence base.
22. The proposals made in this document are in line with and underpinned by the modernisation of the NHS as a whole. While implementation will need to be staged some benefits can be achieved during the course of 2000/2001 and increasing benefits will be seen as the programme develops momentum.
23. Our proposals are set out below, grouped as follows:
- Organisation within NHS Trusts
 - Organisation between NHS Trusts
 - Human resources
 - Standards and guidelines
24. Further details of our work including case studies and examples of good practice, may be found at www.doh.gov.uk/nhsexec.compcritcare.htm

Organisation within NHS Trusts

Introduction

25. Critical care services within NHS Trusts should form part of a comprehensive acute care pathway that integrates pre-hospital care prior to admission and primary and community care following discharge. These services should meet the needs of all critically ill and potentially critically ill patients in the hospital, working in partnership with the accident and emergency department, general and specialist wards and post-operative recovery. All adult critical care beds and services, whether general or specialist, should work together to ensure the flexible use of available capacity and enable delivery of both emergency and elective care services without delay. All critical care services, whether general or specialist, should operate to the same common core of standards and protocols although specialist units will necessarily generate additional “specialist” standards, protocols and staffing policies for their specific patient population.
26. In order to deliver integrated and flexible services, we **recommend** that each NHS Trust establish a Trust-wide Critical Care Delivery Group including the key professions and specialties which use and deliver the service; and that a designated Executive Director takes lead responsibility for critical care services on behalf of the NHS Trust Board.

Critical Care Delivery Group

Guy's and St Thomas's Hospital NHS Trust has a Critical Care Advisory Board which arose from the need to take a strategic overview of all critical care services in all locations – general and specialist intensive care and high dependency on wards – during the process of Trust reconfiguration. The Group is concerned to ensure safe and acceptable services and to find pragmatic solutions to issues identified. The focus of the Group is to maintain a strategic overview rather than to address day-to-day problems and they have, for example reviewed the Audit Commission report and its implications for future services in the Trust.

The Chair of the Group is the Director of Quality and Nursing. The membership of the Group includes the Clinical Director and Directorate Manager for Anaesthetics & Theatres, two critical care physicians, a thoracic surgeon, an obstetrician, a microbiologist, a senior finance manager, the Assistant Director of Nursing for Acute Services, a general and a renal physician, a cardiac anaesthetist, a general surgeon and a physiotherapist as well as senior nurses from Intensive Care and the Renal Units. The Chair provides a direct line back to the Trust Board ensuring that colleagues are clear about risks and costs of decisions made by the Group. Members of the Group act as champions for the decisions made by it.

Contact: Wilma MacPherson, Director of Quality & Nursing. 020 7928 9292 Ext. 3037

Information for Management, Clinical Governance, Audit and Research

27. The Group strongly believes that assessment of current workload and future needs requires the collection of robust data and appropriate analysis reflecting activity, casemix adjusted outcome and cost. The extension of existing datasets, and a requirement to demonstrate their use to justify investment and evidence of a high standard of clinical care, is essential. Data collection and analysis must be recognised as an integral part of the delivery of critical care, and an essential part of the Trusts' clinical governance

and risk management programme. Sufficient clerical and administrative support for data collection is a key part of the human resource needs. While some data items require clinical input scarce medical and nursing time should not be used for the collection of data where clerical staff can be trained to undertake this work. Existing work in these areas which should be supported and developed is described below.

Activity

28. Detailed analysis of the Augmented Care Period (ACP) dataset should be undertaken at Trust level to support assessment of need and service planning, as well as nationally to inform future development. We **recommend** that necessary modifications to the ACP dataset including its extension to all patients receiving level one care throughout the hospital, should be identified and expedited.

Estimation of the critical care bed requirement for a Trust with three general adult ICUs serving a population of approximately 600,000.

$$\begin{aligned} \text{Basic Number of Beds} &= \frac{\text{Annual admissions} \times \text{Average length of stay}}{365 \times \text{ideal occupancy}} \\ &= \frac{1250 \times 4.17}{365 \times 0.7} \\ &= 20.40 \end{aligned}$$

Assuming a Poisson distribution, the number of beds required to accept 95% of referrals at all times:

$$\begin{aligned} &= 20.4 + (1.64 \times \sqrt{20.4}) \\ &= 27.8 \end{aligned}$$

Using ACP data for the same period, the ratio of all intensive care days (INTDAYS) to high dependency days (DEPDAYS) on all three units was 3:2.

Therefore, the anticipated bed requirements will be 17 intensive care beds and 11 high dependency beds. (The existing complement of this Trust is 14 ICU beds and 4 HDU beds with a peak refusal rate in the winter period of 46 appropriate referrals).

Contact: Dr John Morris, Consultant, Intensive Care Unit, William Harvey Hospital, Folkestone 01233 616041

29. Collection of ACP data is mandatory and must be supplied to the Department of Health for incorporation in Hospital Episode Statistics. We understand that only 63% of relevant Trusts submit these data at the current time. We **recommend** that action is taken to ensure complete collection. Trust Chief Executives should ensure that sufficient trained clerical and clinical time is available to collect these data accurately. The Department of Health should analyse data centrally and provide guidance to NHS Trusts on collection and analysis.

Casemix

30. Intensive care medicine has a strong history of comparative audit, with the establishment of the Intensive Care National Audit and Research Centre (ICNARC) and its Case Mix Programme. The wide range of conditions and variation in severity of illness which are managed within critical care services, as well as the high cost of many interventions, makes it essential to collect data which can be analysed taking account of casemix and severity of illness to provide direct comparisons of outcome between units. Currently only 59% (127) of intensive care units in England are involved in the ICNARC Case Mix Programme. We **recommend** that all units should be required to participate in this programme and that the costs of collection and data analysis should be recognised as a legitimate part of the cost of provision of the critical care service. Observational research based on the high quality database developed by

ICNARC and its participants will provide a powerful resource for research on national critical care issues, and we **recommend** that the opportunities for analytical research be further explored.

31. We welcome the inclusion of critical care in the National Casemix Office Acute Healthcare Resource Group Project and we **recommend** that this work be completed and implemented as soon as possible.

Organisation and Cost

32. The Audit Commission have developed a tool for examining the requirements for critical care services as part of its local audit toolkit which was included in the “Critical to Success” work programme. We **recommend** that all NHS Trusts use this toolkit or a similar instrument to analyse their local service.
33. The Intensive Care National Working Group on Costing, sponsored by the Intensive Care Society, currently involves 55 units that are supplying detailed cost data in the first year. We **recommend** that all units are encouraged to participate in this project.
34. The Group believes that leadership and direction on critical care data collection and analysis is crucial. We **recommend** that a National Critical Care Data Steering Group be established to include membership from the Department of Health, the NHS Information Authority, current experts working in this field and professional representatives.

The Content of the Service

35. Our vision for future critical care services includes the establishment of an outreach team to provide and support the care of level one patients on general wards, critical care facilities to meet the needs of level two and level three patients including those recovering from surgery, appropriately sited adjacent to relevant services and enabling flexible use of beds and provision of support services for long term patients and those requiring follow up. The service needs to be set within an effective whole hospital bed management system which ensures that every patient is in an appropriate location to meet their needs for staffing and equipment to support their care.

The Expert Group makes recommendations for the organisation of services within Trusts in four key areas:

- Outreach
- Facilities
- Whole hospital bed management
- Long-term support and follow-up of patients

Outreach

36. Outreach services are an integral part of comprehensive critical care. They have three essential objectives:
- **to avert admissions** by identifying patients who are deteriorating and either helping to prevent admission or ensuring that admission to a critical care bed happens in a timely manner to ensure best outcome.

- **to enable discharges** by supporting the continuing recovery of discharged patients on wards and post discharge from hospital, and their relatives and friends.
 - **to share critical care skills** with staff in wards and the community ensuring enhancement of training opportunities and skills practice and to use information gathered from the ward and community to improve critical care services for patients and relatives.
37. Outreach services should be provided by a team trained not only in the clinical aspects of care, but also in effective ways of sharing their skills so that ward staff feel supported and not diminished. The outreach team should be multidisciplinary and led by a qualified critical care clinician. We **recommend** that these services are established.

Patient At Risk Team (PART)

The Royal London Hospital established a Patient At Risk Team to respond to patients admitted from wards in the hospital to prevent further physical deterioration and to improve outcomes in intensive care. The PART assessed patients who fulfilled certain physiological criteria as well other patients who were causing concern to medical and nursing staff. The PART aimed to improve care for these patients by providing advice and support to those responsible for them on the wards, by facilitating early intensive care unit admission when appropriate, and by preventing unnecessary ICU admissions thereby releasing valuable beds for use by patients in greater need.

Contact: Dr David Goldhill, Director, Intensive Care Unit, The Royal London Hospital. 020 7377 7725

Modified Early Warning System (MEWS)

Queen's Hospital, Burton on Trent, has developed a Modified Early Warning System (MEWS) to provide an early accurate predictor of clinical deterioration. "At risk" patients are scored and additionally any members of the multidisciplinary team (doctors, nurses, physiotherapists) can trigger MEWS for any other patients. Ward nurses have been keen to work with the intensive care team to improve their recognition skills and to make appropriate judgements about patients requiring intensive monitoring. Senior nurses from intensive care provide education and contact points for queries about patient management – this has had the additional benefit of fostering closer working relationships.

Contacts: Sandra Coates, Clinical Nurse Specialist and Dr Craig Stenhouse, Queen's Hospital, Burton on Trent. 01283 566333. Information also available at www.wmicg.org

Facilities

38. Beds should be staffed flexibly according to workload generated by individual patients. We **recommend** a move away from the use of rigid ratios to determine nurse staffing for patients requiring level 2 and 3 care to the use of more flexible systems for assessing nursing workload using tools such as the System Of Patient Related Activity (SOPRA). Further work is needed to explore the core competencies necessary for doctors in critical care, and to identify the opportunities for the changes in skill mix which healthcare practitioners could offer. We **recommend** that this work is commissioned as a matter of urgency,
39. Where the opportunities exist or can be created within current buildings, we **recommend** that all critical care beds (intensive care, high dependency, specialist beds, post-anaesthetic recovery, etc.) should be in adjacent locations and that in the longer-term future estate planning should take account of the benefits of locations associated with other parts of the emergency services.
40. Health Building Note 27, The Intensive Care Unit, covers intensive care only. We **recommend** that its remit should be reviewed and extended so that its standards apply to all critical care areas and that it also takes account of the requirements for larger, more complex units and for specialist units. Any such review should also take account of the resource required to support critically ill patients, their families and friends.

41. All beds within an acute Trust designated for critical care are potentially available for a critically ill patient to be cared for at levels 2 and 3 and we **recommend** that they be equipped accordingly with the appropriate infrastructure including monitoring and other life support equipment. This would allow beds to be used flexibly by patients with varying acuity of illness at times of peak demand.
42. A review by each Trust of its provision of post anaesthesia care is **recommended** to ensure that patients who need more than standard post-operative recovery can be cared for appropriately within the comprehensive critical care service. Whilst primary responsibility for care of the patient must initially be with the operative team, input may also be provided by the outreach team and appropriately trained recovery staff. Where capacity exists, there may be a dedicated facility for critically ill patients in their immediate post-operative phase providing short term support on a 24 hour basis.

Whole hospital bed management

43. Effective whole hospital bed management is key to the successful management of the critical care service. We **recommend** that the Bed Manager for the hospital/NHS Trust includes responsibility for critical care services within the context of the whole hospital, thereby ensuring that:
 - discharge from critical care beds can take place at an appropriate time and to an appropriate location.
 - critical care services are considered within the assessment of pressure for admissions.
 - a clinician in overall charge of critical care services is well advised about the whole hospital situation and has the authority to expand and contract the number of critical care beds at speed.
 - actions undertaken are in accordance with escalation policies and contingency plans agreed by the Trust-wide Critical Care Delivery Group.

Long-term support and follow up

44. Patients in intensive care may have been extremely ill and received care costing tens of thousands of pounds. However, support and follow up after discharge from hospital other than for their original diagnosis are still rare despite there being compelling evidence to show that there are often significant psychological and physiological problems. Follow up support has been demonstrated as helping to complement the work of the intensive care unit and improve the speed and quality of recovery. We **recommend** that NHS Trusts review the provision of follow-up services and ensure that there is appropriate provision for those patients who will benefit either within individual NHS Trusts or between networks of NHS Trusts.

Follow up Clinics

Queen Elizabeth Hospital, Birmingham established a follow up service for patients and their relatives who have been on the ICU for more than 4 days two years ago. The service involves providing an information booklet on discharge to the ward, extending care onto the wards to follow their progress and offering an appointment to a follow up clinic for counselling and advice where appropriate. The information from the follow up clinic was evaluated to see how nursing practice impacts on patients and their families.

Contact: Dr David Rosser, Consultant, Queen Elizabeth Hospital

email: David.Rosser@university-b.wmids.nhs.uk

Follow up Clinics (continued)

Southampton General Hospital has established a nurse – led clinic that reviews patients who have been in intensive care for longer than 5 days. Patients are usually seen on the ward before being discharged home and are then invited back for an outpatient appointment two months after discharge from the intensive care unit. They are then usually invited to attend further appointments six and twelve months after discharge. If patients are not able to get into hospital, staff will visit them at home. The purpose of contact is to identify major problems, physical and psychological, and to offer help or referral elsewhere as appropriate. Practice has been reviewed and has led to changes on the unit. Patient and relatives literature helps to support the follow up process.

Contact: Clare Sharland, Sister, Intensive Care Unit, Southampton General Hospital. 0203 879 6117

Whiston Hospital in Prescot, Merseyside has a well-established follow-up clinic that operates as a full outpatient clinic in combination with ward visits. The unit has undertaken much research showing the relationship between a stay in intensive care and subsequent physical and psychological problems experienced by patients. The unit also runs training sessions and workshops for those establishing and running clinics.

Contact: Dr Christina Jones, Intensive Care Research Group, Department of Medicine, University of Liverpool. 0151 426 1600 Ext. 2382

45. The effectiveness of specialist weaning and progressive care programmes for long term ventilation of patients had been demonstrated by research. NHS Trusts are **recommended** to review the need for the provision of these services for those patients who will benefit.

Respiratory Support and Sleep Centre

The Respiratory Support & Sleep Centre at Papworth Hospital in Cambridge provides a Progressive Care Programme for ventilator dependent patients. The Programme aims to wean patients as far as possible from mechanical ventilation for at least part of the day and to provide necessary support including domiciliary ventilation, respiratory support and nasal ventilation working in liaison with other specialties and services. This service is concentrated in one centre as extensive medical and nursing skills are required to provide this service. There is, however, good evidence of the cost effectiveness of a specialist weaning programme.

Contact: Dr John Shneerson, Director, Respiratory Support and Sleep Centre, Papworth Hospital, Papworth Everard, Cambridge, CB3 8RE.

Currently this is the only centre of its kind in England. The relatively small number of patients who can potentially benefit from such a service would suggest that this service should be provided on a supra-regional basis.

Organisation between NHS Trusts

46. Individual NHS Trusts, no matter how well resourced, cannot meet all peaks in demand. Patients do not arrive at regular intervals and stay for equal lengths of time. Several patients arriving at once or one patient staying weeks rather than days will have a big impact on what is a relatively small service. No individual NHS Trust can expect to manage every peak of pressure or have the expertise to meet every need for specialist care.
47. The Expert Group therefore **recommend** that Regional Offices work with NHS Trusts to form networks with the objective being for providers and commissioners to work together to meet the needs of all critically ill patients in their geographical area. Whilst the size of networks is not prescribed, whole Regions should not be designated as a single network. Networks should cross Regional boundaries where it is appropriate to do so and should include both NHS and private providers of critical care services.
48. Each network will be responsible for:
- assessing the needs of the critically ill and planning services to meet those needs
 - encouraging the development of general and specialist critical care services
 - agreeing common standards and protocols and the means for undertaking comparative audit
 - commissioners should be responsible for assessing need and ensuring that appropriate resources are available to match the need identified within the context of Health Improvement Programmes, Service and Financial Frameworks and other relevant NHS guidance.

Clinical networks

The Mid Trent network currently has 48 general critical care beds in 5 Trusts. Neurological services are included but currently have different network boundaries. All general and specialist services in the network will be expected to develop and work to common protocols and standards. Priorities for protocol development are admissions and discharges, and transfers. The network is led by a clinician and a network manager.

Contact: Anne Heast, Trent Regional Office, Intensive Care Lead. 0114 263 0300

49. One of our objectives in recommending networks is as a means of reducing the numbers of long distance transfers that take place for non-clinical reasons. We **recommend** that networks ensure transfers for non-clinical reasons are contained within the network and only occur following consultant-to-consultant discussion and agreement. All transfers, including repatriations from overseas and from out of network units, should be recorded but transfers that have to be sent outside the network should be regarded as an adverse incident and appropriately investigated. Special agreements should be reached for transfers between hospitals at the borders of adjacent networks.
50. Standards for safe transfer must be agreed with each network drawing on guidance published by professional groups. The means of achieving these standards may vary depending on geography and unit size but dedicated retrieval teams have been shown to be effective.

Human Resources

51. Comprehensive critical care is a 24-hour a day, 7-day a week service that requires the deployment of a sufficient number of appropriately trained and experienced specialist and support staff. Competencies are more important than professional boundaries in the delivery of a safe, efficient and cost-effective service. Recruitment and retention, education and training, workforce planning and leadership are issues that affect all categories of staff working in critical care. Human resource issues lie at the very heart of the provision of critical care services. No amount of equipment can compensate for the lack of appropriately trained staff. We believe that there are a number of key issues that need to be addressed:
- The recruitment, training and retention of staff at all levels of the service;
 - A recognition of the need to have a pool of staff with relatively high levels of competence at all levels of the service;
 - A need to respond to the increasingly modular nature of training within the NHS and to remove disincentives to training from the system;
 - To design training packages that enhance core skills and competencies across different professional boundaries;
 - To enable all staff to take advantage of training and development opportunities at appropriate points in their careers – with concomitant benefits for the whole of the health care delivery system;
 - The provision of support staff outside of normal office hours to free up specialist staff for direct patient care.

Nursing staff

52. The Review of Adult Critical Care Nursing concluded that each critically ill patient, wherever they are located in the hospital should have skilled critical care nursing available either to care directly for them, or to advise on the care required to meet their needs.
53. Currently, even where there is physical capacity to provide critical care beds, a shortage in the supply of experienced and trained critical care nurses has led to difficulties delivering services across the country. All Regional Offices have identified availability of staff as being key to the ability to provide an adequate service to meet the demands of the past two winters. Regional Offices and the Audit Commission have also identified variations in the levels of staffing between units and in the employment of temporary staff aimed to maintain bed availability.
54. Staffing costs account for 50–60% of the total costs of critical care and of this nursing is a substantial proportion. No single combination of factors could explain the variations in staffing between units. Some units, however, maintain staffing at the ratio of one nurse per bed, even when patient dependency does not warrant it. More economical units were more likely to use flexible shift arrangements. The

small size and high individual patient costs within critical care means that the effects of variation can be much larger than in other parts of the hospital.

55. Key recommendations of the Review of Adult Critical Care Nursing include:
- Staffing in critical care units should be based on patient dependency rather than bed numbers. Action research should be urgently commissioned to underpin the implementation of this recommendation.
 - Each local health economy should produce an integrated strategy for retention and recruitment of critical care nurses by September 2000.
 - A modular continuous framework of courses should be developed based on the continuum of critical care provision. This should include modules on high dependency care for all ward staff working in acute hospitals as well as an incremental programme of development towards higher levels of critical care practice. Competence based high dependency care training for ward staff should be set up: 50% by the March 2002 and 100% by March 2004.
 - The impact of other staff deficiencies particularly administrative, clerical, technical and cleaning staff has a major effect on all professional staff including nurses. Trusts should review staffing within critical care and ensure that there is an appropriate mix of staff to undertake the various tasks required of the service.
56. The Review of Adult Critical Care Nursing is available at www.doh.gov.uk/nhsexec/compcritcare.htm

Medical Staff

57. Within a critical care service, consultant medical staff will have responsibility for directing the overall plan of patient clinical care, direct supervision and teaching of trainee medical staff, internal and organisational (non-clinical) management and leadership of the service. The breakdown of time spent in each role will be dependent upon the nature of the critical care unit, other consultant and non-consultant medical staffing and upon case-mix, throughput and the range of services provided. The need to oversee or provide informal advice in other acute care areas also affects the work pattern.
58. The provision of high quality critical care services is, overall, dependent upon the availability of appropriately trained consultant staff and on recognition of the need to provide training for the future which is based on core competencies necessary to meet the needs of the critically ill patient, regardless of their background diagnosis. Training will need to address the changing nature of the hospital population which will increasingly focus on the acutely ill, and on the need to provide pastoral care and psychological support to patients and relatives.
59. The number of critically ill patients a single medical team is able to manage will also affect the numbers of consultant staff required; professional judgement indicates the number to be about 8 patients requiring the equivalent of full intensive care.
60. Doctors practising Intensive Care Medicine (ICM) have knowledge and expertise in addition to their primary "parent" specialties of Anaesthesia, General Medicine and Surgery. In June 1999 the Specialist Training Authority granted Intensive Care Medicine specialty recognition (as a dual CCST with Anaesthesia, or General Internal Medicine, or Surgery).

61. The medical workforce requirements for critical care are currently unclear. The Audit Commission noted that less than half the ICUs in the UK had a consultant presence in the unit on every weekday session. This and the progressive increase in size of units will lead to the need for additional manpower. Our proposals mean that there will be an increasing need for full time intensivists, at least in large NHS Trusts. We **recommend** work is commissioned to assess the medical workforce needs in the context of comprehensive critical care, and not just intensive care medicine.
62. We **recommend** that in the medium term every critical care service should be led by a doctor with training in Intensive Care Medicine. In the longer term, we **recommend** that all consultants in Intensive Care Medicine should have undertaken specialist training and possess the competencies recommended by the Royal Colleges.
63. The Expert Group believes that the number of consultant sessions must relate to clinical workload and **recommends** that Trusts undertake a review to establish this requirement taking account of published standards, and of the relative size and casemix of units. In the short term we **recommend** that every critical care service should ensure that every weekday session is covered by a consultant.

Support staff

64. The Expert Group is clear that an appropriately balanced team of staff including therapy professions and support staff is essential to the effective delivery of critical care services. The nature of the critical care service and its need to operate on a 24 hour, 7 day a week service, requires that support staff must be available on a similar basis to professional staff, according to workload and patient need.
65. Appropriate levels of support staff will also have an impact on the ability to retain specialist staff. Support staff are required to undertake a range of activities that include data collection and analysis, the input of health care assistants, ward clerks and secretarial support, portering, catering, cleaning, equipment support and maintenance, estates and maintenance. We **recommend** that each NHS Trust reviews the balance of staffing in the critical care service and ensures work is undertaken by appropriate staff. The Audit Commission collected data which demonstrates some of the variation in support staff available to the service.

Therapy staff

66. Therapy staff are key to the delivery of an effective and efficient service and again illustrate the breakdown of barriers between professions and the importance of having regard to competencies rather than professional qualifications. Physiotherapy is particularly central to this approach and we **recommend** that developments in competency based modular training should encompass physiotherapy and other therapy professions as appropriate.
67. Other services including pathology, pharmacy and radiology have an impact on the delivery of critical care services. Planning of all services must take account of the impact of developments on related services.

Standards and guidelines

68. The use of guidelines, standards and protocols, developed by multi-professional and interagency collaboration and monitored through the clinical governance agenda is supported and **recommended**. All recommendations made in the Report apply to specialist as well as to general critical care services. Drawing on standard guidance provided by the Department of Health and organisations like the Intensive Care Society, the Association of Anaesthetists of Great Britain and Ireland and the Royal College of Nursing and the UKCC, NHS Trusts should develop policies, guidelines and protocols appropriate to the critical care service being provided to cover the following areas:
- Admissions and discharges
 - Transfer and transport of critically ill patients
 - Information for patients, relatives and friends
 - Organisation of organ donation

Admissions and Discharges

69. “Guidelines on admission to and discharge from intensive care and high dependency units”, is the current guidance on admission and discharges. We **recommend** that a working group be established to review and revise the guidelines that will include development of guidance on consistency in thresholds for admission and discharge.
70. The current guidelines should continue to form the basis for management of admissions and discharges in individual NHS Trusts. It is **recommended** that local policies/protocols for the application of the guidelines should be reviewed or developed where none exist. Local guidance should include:
- Identification of who has day-to-day powers to make decisions that follow the guidelines.
 - Mechanisms for ensuring that decisions are implemented and a means of monitoring this, including mechanisms for the review of rare and difficult cases and ethical decision making.
 - Methods for ensuring that it is clear within the hospital/NHS Trust who has responsibility for these decisions.
 - Guidance developed with clinicians on ethical policy as to who should or should not enter critical care units, when patients should be discharged and when the aims of treatment should be changed.
 - Ensuring that all patients needing level one, two or three care are identified throughout the hospital.
 - Mechanisms for supporting clinicians in making difficult and stressful decisions without interfering with clinical autonomy.

- Clarity about the links with local escalation policies and contingency plans including trigger points, means of communication, and an explicit statement regarding the right of intensive care staff to refuse admission if the patient is assessed as not being suitable for admission.
 - Integration of local guidance for admissions and discharges with existing hospital care plans.
71. Management of patients who will not benefit from admission to critical care units or from continuation of treatment once admitted is difficult. It is **recommended** that current guidance from professional bodies such as the British Medical Association and the Royal College of Nursing and appropriate legislation including the Human Rights Act should be used when developing local policies for the care of such patients. Such guidance needs to take account of the need for a mechanism for the review of decisions made by clinicians in individual cases, for the management of the expectations of the public about the appropriateness of the deployment of critical care resources and of the likelihood of legal challenge of decisions by individual clinicians.

Transfer and Transportation of Critically Ill Patients

72. Guidelines on the transfer and transport of critically ill patients are published by a number of professional groups including the Intensive Care Society. We **recommend** these are used in developing local policies. Consideration will need to be given to the geography and the size of local units when deciding the need for a dedicated retrieval team.
73. We **recommend** that staff engaged in transfer should be appropriately trained. Head injuries and other identifiable specialist cases should be directed to the appropriate hospital in the first instance whenever possible.

Information for Patients, Relatives and Friends

74. The intensive care environment can be extremely distressing for both relatives and conscious patients. The high mortality and morbidity of patients requires considerable psychological and emotional support. Medical, nursing and other staff in conjunction with chaplains and professional and lay counsellors provide this. Such support is difficult and time consuming and should involve senior staff.
75. We **recommend** that the Trust-wide Critical Care Delivery Group should review the requirements for display material within the critical care unit to describe the service, and to explain the purpose and operation of common pieces of equipment, for example, ventilators and monitors. The Group should also take responsibility for ensuring a means of providing written information covering topics such as general information about the critical care service, facilities available, descriptions of the staff likely to be involved in care, important telephone numbers, relevant local and national organisations, chaplaincy services. There are many good examples of such material produced by professional bodies and individual NHS Trusts and units and we **recommend** that reference be made to such material in the course of review.

Organisation of organ donation

76. The Intensive Care Society has published guidance on the donation of organs for transplantation and the management of the potential organ donor. The Transplant Co-ordinator attached to each transplant centre will provide considerable help and advice on all aspects of care of both the donor and relatives, including follow-up and bereavement care. The European Donor Hospitals Education Programme (EDHEP) trains staff to deal with relatives and friends of patients in the context of organ donation. We **recommend** that the Trust-wide Critical Care Delivery Group reviews standards and protocols in this area taking account of the guidance available and of relevant legislation.

Summary of recommendations

Our report has examined the evidence from a variety of sources and sought out the best available professional guidance on the organisation and delivery of critical care services. We believe that the recommendations made are bold and far-reaching. An ambitious agenda for change has been proposed. Change will not be without its problems and will depend ultimately on the enthusiasm and commitment of all those involved in the delivery, provision and organisation of critical care services.

The timescale set for the achievement of the recommendations for modernisation of critical care services recognises the need for the necessary changes to take place in professional development and training, workforce planning and recruitment and retention to become established and take effect. We expect that the complete programme will take three to five years to achieve.

The recommendations are summarised below. They are categorised according to their timescale for implementation.

The following recommendations can be implemented immediately:

The existing division into high dependency and intensive care based on beds be replaced by the classification recommended in the report focussing on the level of care that individual patients need, regardless of location. **[Paragraph 16]**

Trust-wide Critical Care Delivery Groups should be established to deliver integrated and flexible services and an Executive Director designated to take lead responsibility for critical care services on behalf of the NHS Trust Board. **[Paragraph 26]**

Action should be taken to ensure complete collection of ACP data. **[Paragraph 29]**

A National Critical Care Data Steering Group should be established. **[Paragraph 34]**

Within the context of effective whole hospital bed management, the Bed Manager for the hospital/NHS Trust should take responsibility for critical care services. **[Paragraph 43]**

Regional Offices to work with NHS Trusts to form networks with the objective being for providers and commissioners to work together to meet the needs of all critically ill patients in their geographical area. **[Paragraph 47]**

Networks should work to ensure transfers for non-clinical reasons are contained within the network and only occur following consultant-to-consultant discussion and agreement, transfers outside the network being regarded as adverse incidents. **[Paragraph 49]**

A working group should be established to review and revise as necessary “Guidelines on admission to and discharge from intensive care and high dependency units”. These guidelines should continue to form the basis for management of admissions and discharges in individual NHS Trusts and local policies/protocols for the application of the guidelines reviewed or developed where none exist. **[Paragraphs 69 and 70]**

The following recommendations should be implemented within the medium term:

A data collecting culture promoting an evidence base will be enhanced by the detailed analysis of the Augmented Care Period dataset. This would support assessment and needs and service planning at NHS Trust level, as well as nationally to inform future development. The dataset should be extended to include patients receiving level one care throughout the hospital. Participation of all units in the Case Mix Programme of the ICNARC will also support this data collecting culture as will the inclusion of critical care in the National Casemix Office Acute Healthcare Resource Group Project. **[Paragraphs 28, 30 and 31]**

The local audit toolkit developed by the Audit Commission and included in the “Critical to Success” work programme or similar instrument should be used in the analysis of local services. **[Paragraph 32]**

Units are encouraged to participate in the Intensive Care National Working Group on Costing, sponsored by the Intensive Care Society. **[Paragraph 33]**

Outreach services need to be developed as an integral part of each NHS Trust’s critical care service and will have three essential objectives:

- to avert admissions
- to enable discharges
- to share critical care skills

[Paragraph 37]

Flexible use of staff is recommended with a move away from the use of rigid ratios to determine nurse staffing for patients requiring Level 2 and 3 care to the use of more flexible systems for assessing nursing workload. **[Paragraph 38]**

To promote the flexible use of beds recommendations are made that all beds within an acute NHS Trust potentially available for the care of Level 2 and 3 critically ill patients be equipped accordingly with the appropriate infrastructure to allow beds to be used flexibly by patients with varying acuity of illness at times of peak demand. Where the opportunities exist or can be created within current buildings, critical care beds should be in adjacent locations and in the longer-term future estate planning should take account of the benefits of locations associated with other parts of the emergency services. **[Paragraphs 39 and 41]**

A review of Health Building Note 27, The Intensive Care Unit is recommended to extend its remit to all critical care areas and to allow it to take account of the requirements for larger, more complex units and for specialist units as well as the resources to support critically ill patients, their families and friends. **[Paragraph 40]**

Services for patients who need more than standard post-operative recovery form part of the review of local services. **[Paragraph 42]**

Follow up support has been demonstrated as helping to complement the work of the intensive care unit and improve the speed and quality of recovery and NHS Trusts will need to review the provision. **[Paragraph 44]**

The effectiveness of specialist weaning and progressive care programmes for long term ventilation of patients has been demonstrated by research and a review of need is recommended. **[Paragraph 45]**

Networks should ensure transfers for non-clinical reasons are contained within networks and only occur following consultant-to-consultant discussion and agreement. **[Paragraph 49]**

Work should be commissioned to assess medical workforce needs for comprehensive critical care, and not just intensive care medicine. **[Paragraph 61]**

A doctor with specialist training in Intensive Care Medicine should lead every critical care service and, in the longer term, all consultants in Intensive Care Medicine should possess the competencies recommended by the Royal Colleges. **[Paragraph 62]**

The number of consultant sessions must relate to clinical workload and NHS Trusts should undertake a review to establish this requirement taking account of published standards, and of the relative size and casemix of units. **[Paragraph 63]**

Provision of appropriate levels of support staff have an impact on the ability to retain specialist staff and are required to undertake a wide variety of activities to ensure the provision of critical care services. NHS Trusts will need to review the balance of staffing in the critical care service and ensure particular tasks are undertaken by appropriate staff. **[Paragraph 65]**

Therapy staff including physiotherapists should be included in the approach to developments in competency based modular training. **[Paragraph 66]**

Guidelines, standards and protocols, developed through multi-professional and interagency working and monitored through the clinical governance agenda are supported. Local policies and protocols for critical care services including admissions and discharges drawing on appropriate general advice should be reviewed or developed where none exist. **[Paragraphs 68, 70 and 71]**

Guidance from professional bodies and appropriate legislation including the Human Rights Act should be used to review and develop local policies for the management of patients who will not benefit from admission to critical care. **[Paragraph 71]**

Standards for transfer and transport of critically ill patients should be agreed, based on guidance produced by the Intensive Care Society and other professional bodies. **[Paragraph 72]**

Staff engaged in transfer should be appropriately trained. **[Paragraph 73]**

Recognising that the intensive care environment can be extremely distressing for both relatives and conscious patients, their experience of critical care services can be influenced by support from staff and the provision of literature, other materials and displays. Support is recognised as being difficult and time consuming and recommendations are made for the involvement of senior staff in this process and for the use of appropriate materials. **[Paragraph 75]**

The Trust-wide Critical Care Delivery Group should review guidance on the donation of organs for transplantation and the management of the potential organ donation taking account of the guidance available and of relevant legislation. **[Paragraph 76]**

Annex A**Membership of the Expert Group**

Dr Valerie Day, Chair	Health Services Directorate, NHS Executive
Sheila Adam	Clinical Nurse Specialist, Intensive Care Unit, Middlesex Hospital, London
Jonathan Asbridge	Chief Nurse, Barts & The London NHS Trust
Simone Bayes (to June 1999)	Policy Officer, Health Services Directorate, NHS Executive
Dr Pat Blain	NHS Executive Northern & Yorkshire
Andrew Brogan	NHS Executive North West
Philip Brown (from March 2000)	NHS Executive London
Dianne Conduit	NHS Executive Trent
Dr Bruce Court (to December 1999)	NHS Executive West Midlands
Claire Dascombe	Director of Anaesthesia, Plymouth Hospitals NHS Trust
Deborah Dawson	Directorate Nurse Manager, St George's Hospital, London
Dr Peter Duncan	Department of Anaesthetics, Royal Preston Hospital
Dr David Edbrooke	Clinical Director, Intensive Care Unit, The Royal Hallamshire Hospital
Dr Ruth Endacott	Adviser in Critical Care, Crediton, Devon
Professor Tim Evans	Consultant in Intensive Care and Thoracic Medicine, Royal Brompton Hospital
Dr Christopher Garrard	Director of Intensive Care, John Radcliffe Hospital, Oxford
Chris Garrett	NHS Executive London
Pam Gazeley	NHS Executive Trent
Dr David Goldhill	Director, Intensive Care Unit, The Royal London Hospital
Julie Hartley-Jones	Nursing Officer, Department of Health
Anne Heast	NHS Executive Trent
Elaine Inglesby	Director of Nursing, The Walton Centre for Neurology & Neurosurgery
Patrick Irwin (from June 1999)	Policy Manager, Health Services Directorate, NHS Executive
Verity Kemp	Project Support, Review of Adult Critical Care Services
Dr Paul Lawler	Clinical Director, Intensive Care Unit, South Cleveland Hospital
Susan Macfarlane	Project Manager, West Midlands Intensive Care Group
Mr Henry Marsh	Consultant Neurosurgeon, Atkinson Morley's Hospital, London
Barbara McDermott	NHS Executive Northern & Yorkshire

Dr Giles Morgan	Consultant Anaesthetist, Royal Cornwall Hospitals NHS Trust
Dr John Morris	Consultant Anaesthetist, William Harvey Hospital, Ashford
Trevor Neatherway	NHS Executive South West
Mr Patrick Nee	Consultant in A&E Medicine, Whiston Hospital, Merseyside
Dr Mick Nielsen	Director, Intensive Care Unit, Southampton General Hospital
Dr John O'Dea	Consultant in Anaesthesia & Intensive Care, City Hospital NHS Trust, Birmingham
Brian Mackness (from June 1999)	NHS Executive South East
Danny Palnoch (from September 1999)	Economic Adviser, Department of Health
Catherine Paxton (to June 1999)	NHS Executive South East
Kate Phipps	NHS Executive Eastern
Dr Saxon Ridley	Consultant in Anaesthesia & Intensive Care, Norfolk & Norwich Health Care NHS Trust
Dr Kathy Rowan	Scientific Director, Intensive Care National Audit & Research Centre
Caroline Simpson	Commissioning Manager, Tees Health Authority
David Sissling	Hospital Director, Leicester Royal Infirmary site, University Hospitals of Leicester NHS Trust
Dr Martin Smith	Associate Director, Clinical Neurosciences, National Hospital for Neurology & Neurosurgery, London
Dr Anne Sutcliffe	Lead Clinician, Neurocritical Care Unit, Queen Elizabeth Hospital, Birmingham
Dr Julia Watson (to September 1999)	Economic Adviser, Department of Health
Dr Sheila Willatts	Consultant Anaesthetist, Bristol Royal Infirmary

Bibliography

- Adam S, Forrest S. ABC of intensive care: other supportive care. *BMJ* 1999;319 175–178
- Aps C. Fast-tracking in cardiac surgery. *British Journal of Hospital Medicine* 1995; 54: 139-142
- Association of Anaesthetists of Great Britain and Ireland. Intensive care services – provision for the future. London: Association of Anaesthetists of Great Britain and Ireland, 1988
- A strategy for adult critical care nursing: report to the Chief Nursing Officer of the Review of Adult Critical Care Nursing. Department of Health, 2000
- Beddow T. Frozen assets. *Health Service Journal*, 9 September 1999: 24–25
- Bellairs H. Commissioning adult intensive care services – presentation given to a workshop held by NHS Executive North West, May 1999, unpublished
- Bennett D, Bion J. ABC of intensive care: organisation of intensive care. *BMJ* 1999; 318: 1468–1470
- Bion J, Wilson I, Taylor P. Transporting critically ill patients by ambulance: audit by sickness scoring. *BMJ* 1998; 296: 170–172
- Blok G, van Dalen J, Jager K, Ryan M, Rene M, Wight C, Morton J, Morley M, Cohen B. Overview: the European Donor Hospital Education Programme (EDHEP): addressing the training needs of doctors and nurses who break bad news, care for the bereaved, and request donation. *Transplant International* 1999; 12: 161–167
- British Medical Association. Guidelines on Treatment Decisions for Patients in Persistent Vegetative State. BMA, 1996
- British Medical Association. Withdrawing and Withholding Treatment: a Consultation Paper from the BMA's Medical Ethics Committee. BMA, 1998
- Bull A. Rationing intensive care. *BMJ* 1995; 310:1010
- Critical Care on a Hospital Wide Basis – a Five Year Strategy. ICS 2000 unpublished
- Critical to Success, The place of efficient and effective critical care services within the acute hospital, Audit Commission, London, October 1999
- Cronin E, Edwards N, Nielsen M. Health Care Needs Assessment Reviews Project Third Series: Adult Critical Care. Unpublished draft, London Health Economics Consortium, July 1999
- Crosby D, Rees G. Provision of postoperative care in UK hospital. *Annals of the Royal College of Surgeons of England* 1994; 76: 14–18
- Edbrooke D, Hibbert C, Corcoran M. An international perspective: review for the NHS Executive of Adult Critical Care Services. Medical Economics & Research Centre, Sheffield (MERCs), August 1999
- Edbrooke D, Hibbert C, Ridley S, Long T, Dickie H. The development of a method for comparative costing of individual intensive care units. *Anaesthesia* 1998; 54: 110–120
- Euricus. Field Research Manual 2. Groningen, 1998
- Evans T, Bennett D, Bion J, Little R, Young D. A series of expert reviews: intensive care medicine. *British Medical Bulletin* 1999; 55

- Goldfrad C, Rowan K. Consequences of discharge from intensive care at night. *Lancet* 2000; 355: 1138–1142
- Goldhill D. Introducing the postoperative care team. *BMJ* 1997; 314: 389
- Goldhill D, Singh S, Tarling M, Worthington L, Mulcahy A, White S, Sumner A. The Patient At Risk team: identifying and managing critically ill ward patients. Paper presented to the conference of the Intensive Care Society, Blackpool 1998
- Grant I, Andrews P. ABC of intensive care: neurological support. *BMJ* 1999; 319: 110–113
- Griffiths R, Jones C. Recovery from intensive care. *BMJ* 1999; 319: 427–429
- Guidelines on the Admission and Discharge from Intensive Care and High Dependency. London: Department of Health, 1996
- Gunning K, Rowan K. ABC of intensive care: outcome data and scoring systems. *BMJ* 1999; 319: 241–244
- Health Building Note (HBN) 27: Intensive Care Unit. Department of Health & Social Services, London 1993
- Hensher M, Edwards N, Stokes R. International trends in the provision and utilisation of hospital care. *BMJ* 1999; 319: 845–848
- Hinds C, Watson D. ABC of intensive care: circulatory support. *BMJ* 1999; 318: 1749–1752
- Intensive Care Society. The intensive care service in the UK. London, ICS, 1990
- Intensive Care Society. Standards for intensive care units. London: ICS, 1997
- Intensive Care Society. Guidelines for bereavement care in intensive care units. ICS, May 1998
- Intensive Care Society. Guidelines for transport of the critically ill adult. ICS, November 1997
- Intensive Care Society. Donation of organs for transplantation the management of the potential organ donor. ICS, June 1999
- Intensive Care Society. Fire Safety in intensive care units. ICS, November 1998
- Inpatient admissions and Bed Management in NHS acute hospitals: report by the Comptroller and Auditor General. NHS Executive; The Stationery Office; HC 254 Session 1999–2000
- Intensive Therapy Services. Report from the Intensive Therapy Services Think Tank. South East Thames Regional Health Authority January 1994
- Intercollegiate Board for Intensive Care Medicine: a guide for trainers. IBTICM January 2000
- Introduction of the Augmented Care Period dataset. Executive Letter, Department of Health, Leeds, 1997
- Jones C, MacMillan R, Griffiths R. Providing Psychological support for patients after critical illness. *Clinical Intensive Care* 1994; 5: 176–179
- Jones C. Intensive care recovery manual. Whiston Hospital, 1998
- Jones C, Griffiths R. Identifying post intensive care patients who may need physical rehabilitation. *Clinical Intensive Care* 2000;11(1): 35–38
- Kilpatrick A, Ridley S, Plenderleith L. A changing role for intensive therapy: is there a case for high dependency? London: Anaesthesia 1994; 49: 666–670
- King's Fund Panel. Intensive care in the United Kingdom: report from the King's Fund Panel. Anaesthesia, London: The King's Fund, 1989

- Langham J. The effect of socio-economic status on outcome for adults admitted to intensive care units in England and Wales. Unpublished MSc thesis submitted to the London School of Hygiene & Tropical Medicine, September 1998
- Larsen H. A preliminary report on the 1952 epidemic of poliomyelitis in Copenhagen with special reference to the treatment of acute respiratory insufficiency. *Lancet* 1953; ii. 37–41
- Lee A, O'Connell T. Letters – quality of care before admission to intensive care. *BMJ* 1999; 318: 195
- Lyons R, Wareham K, Hutchings H, Major E, Ferguson B. Population requirements for adult critical-care beds: a prospective quantitative and qualitative study. *Lancet* 2000; 355: 595–598
- Mackenzie P, Smith E, Wallace P. Transfer of adults between intensive care units in the United Kingdom. *BMJ* 1997; 314: 1455–6
- Manra A, Pittman J, Braddon F. Reasons for withdrawing treatment in patients receiving intensive care. *Anaesthesia* 1998; 53: 523–528
- Mercer M, Fletcher S, Bishop G. Medical emergency teams improve care. *BMJ* 1999;318:54
- McQuillan P, Pilkington S, Allan A, Taylor B, Smith G, Nielsen M, et al. Authors' reply. *BMJ* 1999; 318: 54–55
- McQuillan P, Pilkington S, Allan A, Taylor B, Short A, Morgan G, et al. Confidential inquiry into quality of care before admission to intensive care. *BMJ* 1998; 316: 1853–1858
- Shelly MP, Nightingale P. ABC of intensive care: respiratory support. *BMJ* 1999; 318 1674–1677
- McPherson K, Metcalfe A. Inadmissible evidence. *Health Service Journal* 2000; 30 March 2000: 26–27
- Metcalfe A, McPherson K. Study of provision of intensive care in England, 1993, revised report for the Department of Health, London: London School of Hygiene & Tropical Medicine, 1995
- Metcalfe M, Sloggett A, McPherson K. Mortality among appropriately referred patients refused admission to intensive care units. *Lancet* 1997; 350: 7–11
- Miranda D, Ryan D, Schaufeli W, Fidler V. *Organisation and Management of Intensive Care: a prospective study in 12 European countries*. Berlin: Springer-Verlag, 1998
- Miranda D. Critically examining intensive care. *International Journal of Technology Assessment of Health Care* 1992; 9: 444–456
- Modern Standards and Service Models: Coronary Heart Disease – National Service Framework for Coronary Heart Disease. Department of Health 2000, London
- Monkhouse D, Clarke F, Lawler P. When is intensive care workload excessive? A telephone survey of the views of senior house officers from the Northern Region. Intensive Care Unit, South Cleveland Hospital, Marton Road, Middlesbrough 1999
- Morgan G. Audit of use of Royal Cornwall Hospital ICU, using ACP definitions, 1999; unpublished
- Morgan R, Williams F, Wright M. An early warning scoring system for detecting developing critical illness. *Clinical Intensive Care* 1999; 8: 100
- Paediatric Intensive Care: a framework for the future. London: Department of Health, National Co-ordinating Group on Paediatric Intensive Care, 1997
- Parker A, Wyatt R, Ridley S. Intensive care services; a crisis of increased expressed demand. *Anaesthesia* 1998; 53: 113–120
- Purchase of adult intensive care in North West Region: service specification. North West Region Intensive Care Working Group 1999

- Report of the Joint Working Party on Graduated Patient Care. Royal College of Anaesthetists, 1996
- Ridley S, Jackson R, Findlay J, Wallace P. Long term survival after intensive care. *BMJ* 1990; 301: 1127–30
- Ridley S, Jones S, Shahani A, Brampton W, Nielsen M, Rowan K. Classification trees: a possible method for iso-resource grouping in intensive care. *London: Anaesthesia* 1998; 53: 833–840
- Royal College of Nursing Critical Care Forum. The nature of nursing work in intensive care. RCN, 1997
- Rowan K, Kerr J, Major E, McPherson K, Short A, Vessey M. Intensive Care Society's APACHE II study in Britain and Ireland – 1: variations in casemix of adult admissions to general intensive care units and impact on outcome. *BMJ* 1993; 307: 972–7
- Short A, Cumming A. ABC of intensive care: renal support. *BMJ* 1999; 319: 41–44
- Shneerson J. Editorial: is chronic respiratory failure in neuromuscular diseases worth treating? *Journal of Neurology, Neurosurgery & Psychiatry* 1996; 61: 1–3
- Shneerson J. Editorial: the changing role of mechanical ventilation in COPD. *Eur Respir J*, 1996; 9: 393–398
- Shneerson J. What next after ICU for the COPD patient? *Monaldi Arch Chest Dis* 1995;50:2, 79-80
- Smith I, Shneerson J. A progressive care programme for prolonged ventilatory failure: analysis of outcome. *British Journal of Anaesthesia* 1995; 75: 399–404
- Soni N, Wyncoll D. Intensive care medicine comes of age. *BMJ* 1999; 319: 271–272
- Stott S. Recent advances in intensive care. *BMJ* 2000; 320: 358–361
- The high dependency unit – acute care in the future. London: Association of Anaesthetists of Great Britain and Ireland, 1991
- Treasure T, Bennett D. Reducing the risk of major elective surgery: optimising oxygen delivery before surgery does work; now we have to implement it. *BMJ* 1999; 318: 1087–1088
- Tzabar Y. Cancellation of major elective surgery due to lack of ITU beds. *Anaesthesia* 1999; 53: 407
- Vella K, Tran K, Bellingham G, Rosser D, Rowan K. The emerging specialty of intensive care medicine: will there be enough recruits and will they have consultant posts. Unpublished draft. Intensive Care National Audit & Research Centre, London 2000
- Volans A. Letters: trends in emergency admissions. *BMJ* 1999;319:1201
- Waldmann C, Gaine M. The intensive care follow-up clinic. *Care of the critically ill*, 1996; 12: 118–121
- Wallace P, Ridley S. ABC of intensive care: transport of critically ill patients. *BMJ* 1999; 319: 368–371
- Wallace P, Lawler P. Regional intensive care unit transfer teams are needed. *BMJ* 1999; 318: 54–55
- Wells W. Investigation into neurosurgery patient transfers. London: South Thames Regional Health Authority, 1995
- Wilson J, Woods I, Fawcett J, Whall R, Dibb W, Morris C, et al. Reducing the risk of elective surgery: randomised controlled trails of preoperative optimisation of oxygen delivery. *BMJ* 1999; 318: 1099–1103



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