Guidelines on admission to and discharge from Intensive Care and High Dependency Units

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1. Introduction

1.1 A challenge for intensive care and high dependency care is to identify early on which patients are most likely to benefit from the interventions that can be offered. These guidelines set out the main issues to be considered when deciding which patients should be admitted to intensive care and high dependency units. This follows a growing awareness that there is a lack of consensus about the best use of these high cost facilities as well as widely differing definitions of what constitutes an intensive care or high dependency bed and thus a lack of comparability between units. These guidelines aim to define these terms more precisely. The aim is to make the decision-making processes more explicit. There may be scope for the more efficient use of resources by excluding patients who are not ill enough to require intensive care as well as those unlikely to benefit because they are too ill. It is essential in considering whether or not a referral for intensive care is appropriate that, where possible, the patient and the patient’s family or partner are fully consulted and informed and their wishes taken into account.

1.2 Local protocols, acceptable to all involved staff, should be devised based on these recommended guidelines. These national guidelines together with the local protocols should be circulated regularly to all appropriate grades of medical and nursing staff. Circulating these guidelines more widely than to staff working in intensive care or high dependency care will help to ensure that severely ill patients are identified and referred early to intensive care/high dependency care since it is often essential for patients to be admitted without delay to gain optimum benefit and minimise morbidity. Indeed intensive care is most cost-effective when applied early enough to prevent the development of multiple organ-system failures. Medical and nursing staff in general wards should take early decisions as to whom to refer for intensive and high dependency care.

1.3 It must be emphasised that these guidelines define categories of care rather than geographical areas in the hospital. Depending on local circumstances, on the predicted clinical course and on the facilities available, it may be appropriate to provide high dependency care in an intensive care unit.

1.4 These guidelines have been produced by a Working Group set up with the following terms of reference:

“To produce national guidelines which are evidence-based (or based on a clear professional consensus) and which set out specific indications for admission to and discharge from intensive care; to produce clear and practical definitions of intensive care and high dependency units and other levels of care above that expected on a general hospital ward; and to cover in the guidelines the nature of the relationship which should exist between different levels of such care.”

A list of members is set out in Annex A.
2 Definitions of Intensive Care, High Dependency Care and Post-Operative Recovery Care

2.1 These definitions of intensive and high dependency care apply mainly to general medical and surgical patients; however, the principles apply equally to cardiac and neurosurgical intensive care. Other specialized areas such as renal units, coronary care units, paediatric and neonatal intensive care units are outside the scope of these guidelines.

2.2 Intensive care may be defined as "a service for patients with potentially recoverable conditions who can benefit from more detailed observation and invasive treatment than can safely be provided in general wards or high dependency areas". The characteristics of intensive and high dependency care are described in Tables 1 and 2. Intensive care is usually reserved for patients with threatened or established organ failure which may have arisen as a result or complication of an acute illness, trauma, or as a predictable phase in a planned treatment programme. Intensive care can therefore be either emergency or elective treatment.

2.3 High dependency care provides a level of care intermediate between that on a general ward and intensive care. High dependency care monitors and supports patients with, or likely to develop, acute (or acute-on-chronic) single organ failure (see Table 3). It should not manage patients requiring multiple organ support nor patients requiring mechanical ventilation. High dependency care can act as a ‘step-up’ or ‘step-down’ between the level of care delivered on a general ward and intensive care. Chronic impairment of an organ system sufficient to restrict daily activities (co-morbidity) may convert a patient’s need for high dependency care to a need for intensive care.

2.4 High dependency care provided in a unit adjacent to intensive care provides a better level of medical care than an isolated unit without access to specialist cover from the intensive care team. In areas where high dependency care is provided with no intensive care unit in the hospital, patients may need to be referred earlier to an intensive care unit than they would otherwise be.

2.5 All patients recovering from anaesthesia and surgery should be nursed by trained recovery room staff working in a fully equipped recovery room. Post-operative patients requiring ventilation should be referred for intensive care.
<table>
<thead>
<tr>
<th>Intensive Care should provide:</th>
<th>High Dependency Care should provide:</th>
</tr>
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<tbody>
<tr>
<td>a designated area where such care is provided</td>
<td>a designated consultant as director with continuous consultant cover from either the admitting specialty or intensive care</td>
</tr>
<tr>
<td>a clear operational policy based on a background of multidisciplinary care and effective communication</td>
<td></td>
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<tr>
<td>a designated consultant as director, supported by consultants with allocated intensive care sessions sufficient to provide continuous (non-resident) availability</td>
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<tr>
<td>a minimum nurse:patient ratio of 1:1 throughout the 24 hours of the day, together with a nurse-in-charge plus additional nurses according to patient needs, the total number of beds and geographical arrangements within the unit. The skill-mix of nurses should reflect the physiological instability of the patient</td>
<td></td>
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<tr>
<td>24-hour dedicated cover by resident trainee medical staff</td>
<td>continuous availability of trainee medical staff from either the admitting specialty or from intensive care</td>
</tr>
<tr>
<td>the ability to support common organ system failures, in particular, ventilatory, circulatory and renal failure</td>
<td>appropriate monitoring and other equipment</td>
</tr>
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<td>a sufficient caseload to maintain skills and expertise</td>
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<td>administrative, technical and secretarial support</td>
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<td>continuing education, training and audit</td>
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<tr>
<td>Intensive Care is appropriate for:</td>
<td>High Dependency Care is appropriate for:</td>
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<tr>
<td>----------------------------------</td>
<td>------------------------------------------</td>
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<tr>
<td>patients requiring or likely to require advanced respiratory support alone*</td>
<td>patients requiring support for a single failing organ system, but excluding those needing advanced respiratory support*</td>
</tr>
<tr>
<td>patients requiring support of two or more organ systems*</td>
<td>patients who can benefit from more detailed observation or monitoring than can safely be provided on a general ward</td>
</tr>
<tr>
<td>patients with chronic impairment of one or more organ systems sufficient to restrict daily activities (co-morbidity) and who require support for an acute reversible failure of another organ system*</td>
<td>patients no longer needing intensive care, but who are not yet well enough to be returned to a general ward</td>
</tr>
<tr>
<td>post-operative patients who need close monitoring for longer than a few hours</td>
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</table>

* see Table 3 for the categories of organ system monitoring and support
### Categories of Organ System Monitoring and Support

1. **Advanced Respiratory Support**:  
   - mechanical ventilatory support (excluding mask continuous positive airways pressure (CPAP) or non-invasive, e.g. mask ventilation);  
   - the possibility of a sudden, precipitous deterioration in respiratory function requiring immediate endotracheal intubation and mechanical ventilation

2. **Basic Respiratory Monitoring and Support**:  
   - the need for more than 40% oxygen via a fixed performance mask;  
   - the possibility of progressive deterioration to the point of needing advanced respiratory support (see above);  
   - the need for physiotherapy to clear secretions at least two-hourly, whether via a tracheostomy, minitracheostomy, or in the absence of an artificial airway;  
   - patients recently extubated after a prolonged period of intubation and mechanical ventilation;  
   - the need for mask CPAP or non-invasive ventilation;  
   - patients who are intubated to protect the airway, but needing no ventilatory support and who are otherwise stable

3. **Circulatory Support**:  
   - the need for vasoactive drugs to support arterial pressure or cardiac output;  
   - support for circulatory instability due to hypovolaemia from any cause and which is unresponsive to modest volume replacement. This will include, but not be limited to, post-surgical or gastrointestinal haemorrhage or haemorrhage related to a coagulopathy;  
   - patients resuscitated following cardiac arrest where intensive or high dependency care is considered clinically appropriate

4. **Neurological Monitoring and Support**:  
   - central nervous system depression, from whatever cause, sufficient to prejudice the airway and protective reflexes;  
   - invasive neurological monitoring

5. **Renal Support**:  
   - the need for acute renal replacement therapy (haemodialysis, haemofiltration or haemodiafiltration)

Other forms of support will largely be subsumed by the above.
3. Guidelines for admission to Intensive Care
   (see Fig 1)

3.1 The type of patient who needs intensive care is unstable and requires multiple organ monitoring and/or support. Admission may be warranted after evaluation for:

(i) Organ support
(ii) Definitive treatment

where the severity of illness and the dependency of the patient on nursing care precludes its delivery elsewhere in the hospital.
**Figure 1** (see text for explanation)

At all stages appropriate discussion with the patient and/or the patient's relatives should take place.

1. **Consultant to Consultant Referral**
   - **Is the illness reversible?**
     - **NO** → **Continue Ward Care**
     - **YES** → **Does the patient have significant co-morbidity?**
       - **YES** → **Continue Ward Care**
       - **NO** → **Has the patient made a stated or written preference against intensive care?**
         - **YES** → **Continue Ward Care**
         - **NO** → **Does the patient need advanced respiratory support?**
           - **YES** → **Intensive Care**
           - **NO** → **Does the patient need acute organ support?**
             - **NO** → **Does the patient need observation or monitoring that can safely be provided on a general ward?**
               - **YES** → **Continue Ward Care**
               - **NO** → **Does the patient need more than 1 organ supported?**
                 - **NO** → **High Dependency Care**
                 - **YES** → **Intensive Care**
3.2 The sources of referral for intensive care will include Accident and Emergency Departments, other wards within the hospital, operating theatres, other ICUs who may need to transfer patients (see Section 8 on Transfers). These referrals can be either elective (e.g. following planned surgery) or emergency and unplanned.

3.3 Wherever possible, referral of a patient for admission should be by a consultant. Where a referral to intensive care within the same hospital is being considered, the intensive care consultant will in most instances need to see the patient prior to admission to avoid inappropriate transfers. A multi-disciplinary team approach should be fostered in seeking intensive care consultation for a patient perceived as being at risk. Early optimisation of the treatment of such a patient may eliminate the need for intensive care. Nevertheless, some patients deteriorate so rapidly that urgent intensive care is required.

3.4 Decisions on admissions and discharges should rest with consultants or their designates wherever possible. Delegation should be made to trainee doctors only if clear guidelines have been drawn up and appropriate training undertaken.

Reversibility of illness

3.5 A key factor is the consensus view of the intensive care and the referring consultants on the degree of possible benefit weighed against the risks from therapy. This will depend on whether or not the patient has a reversible condition. In some instances it is difficult to assess whether the patient will benefit from intensive care and the only appropriate course will be to admit the patient and to assess the response after an appropriate period. However, since organ-system support often defers but does not always prevent death, it is important that patients should not be offered treatment inappropriately. Intensive care can infringe the dignity of the patient and, where the outcome is poor, can prolong the suffering for patients and their families. These considerations should be taken into account in discussions with a patient and his/her family about the continuation of treatment.

3.6 Patients who can be expected to receive sustained benefit from intensive care in terms of quality and length of life should be admitted. All decisions should be made jointly by the patient and/or the patient’s family/partners (where possible), the intensive care team and the referring team after evaluation of the patient’s pre-existing functional health status.

3.7 Patients with persistent vegetative state should not be referred to intensive care; neither should competent patients who refuse such care.

3.8 The practice of interventional ventilation, commonly referred to as “elective ventilation” - that is, subjecting a patient who is expected to die shortly to mechanical ventilation and invasive procedures which are not for that patient’s own benefit but for the purposes of organ donation - is not permitted.¹

Co-morbidity

3.9 Co-morbidity is a chronic impairment of one or more organ systems sufficient to restrict daily activities. When considering the potential for the patient to benefit from intensive care, staff will need to take into account any existing co-morbidity, the patient’s pre-existing physiological reserve and his/her biological age which, individually or together, may make recovery highly improbable. It is clear that intensive care cannot generally replace lost reserve and reverse chronic ill health. Limited physiological reserve is known to be an important determinant of mortality.²
3.10 Existing co-morbidity, such as metastatic malignancy, is likely to reduce the chance of a good outcome.

Patients’ stated or written advance statements (alternatively called “living wills”) 

3.11 A patient’s stated or written preference against intensive care should be taken into account. The lack of documentation of the patient’s stated wishes where these have been obtained may lead to undesirable treatment such as inappropriate cardiopulmonary resuscitation. Decisions about treatment limitation should be made by consultant staff after discussion with relatives and this should be recorded in the patient’s notes and reviewed frequently. Where there is uncertainty regarding the wishes of the patient, doctors should err on the side of providing rather than withholding treatment.

Advanced Respiratory Support (see Table 3) 

3.12 The decision as to whether or not advanced respiratory support is needed rests with the intensive care doctor and should be based on the clinical condition of the patient and any associated co-morbidities.

Other acute organ support (see Table 3) 

3.13 Intensive care should be provided for patients who, although not needing ventilatory support, require acute support for two or more other organ systems.

Dependency 

3.14 The level of dependency of the patient is an important factor in determining the appropriateness of intensive care. A key distinguishing feature between intensive care, high dependency care and ward care is the nursing activity required. Patients with acutely life-threatening conditions and with high dependency should be admitted to intensive care. Dependency is commonly measured using the Therapeutic Intervention Scoring System (TISS), which quantifies the therapeutic interventions applied to the patient. It does not quantify all aspects of nursing workload, for example the support of relatives and junior staff and the overall coordination of care activities.

Objective criteria to determine the benefit of admission to intensive care 

3.15 To date, the outcome measure that has been used to audit intensive care is hospital mortality, defined as the proportion of patients who die before discharge from hospital following intensive care. Age, pre-existing disease, severity of illness and surgical status are amongst the risk factors which have been identified for hospital mortality. A number of risk adjustment methods have been developed for intensive care, the best known being APACHE, SAPS and MPM. These can be used to estimate the expected hospital mortality for a group of patients admitted to intensive care; the ratio of the observed mortality:expected mortality is termed the Standardised Mortality Ratio (SMR).

3.16 Ideally, to be able to use a risk adjustment method to help determine whether admission to intensive care would benefit an individual patient, an accurate prediction of outcome is needed. In practice, we are some way from achieving such a prediction for the reasons given in Annex B. At present, therefore, the evidence to support the use of risk adjustment methods to decide whether or not to admit an individual patient for intensive care is weak. Risk adjustment methods can, however, support the decision-making process and are a useful audit and research tool.
4. Guidelines on admission to High Dependency Care

(see Fig 1)

4.1 The appropriateness of admission to intensive care will depend partly on what other levels of care are available. If available, high dependency care can provide a level of care above that provided by a general ward. High dependency care can facilitate appropriate earlier discharge from intensive care. Research suggests that establishing an intermediate level of care reduces ward mortality rates by 25% and cardiac arrest by 39%. ICUs in hospitals without HDUs may have to admit patients who need only high dependency care. Where there is an HDU, the policies of the two units should be complementary. These admission guidelines will therefore depend to some extent on local arrangements which will need to be reflected in local protocols.

Other acute organ monitoring and support
(see Table 3)

4.2 Patients requiring support of one organ system (excluding advanced respiratory support) should generally receive high dependency care. However, patients requiring just renal support will not usually require high dependency care but can be treated in a renal unit, which can be regarded as a specialised high dependency unit.

Dependency

4.3 A key distinguishing feature between intensive care, high dependency care and ward care is the nursing activity required. Nursing activity will vary with patient dependency and there is usually an association between patient dependency and nursing activity. As a result, in general, intensive care patients require the highest nursing activity. There are times, however, when a patient who has a lower dependency requires greater nursing activity, such as the spontaneously breathing, hypoxic patient who is admitted to high dependency care for close observation and may require more nursing activity than the fully ventilated and sedated patient in intensive care.

4.4 High dependency care may be warranted for a patient who is not undergoing medical intervention but needs to be closely monitored (see Table 3).
5. Guidelines on discharge from Intensive Care and from High Dependency Care

5.1 A patient should be discharged from intensive care when the condition which led to referral for intensive care has been adequately treated and reversed or when the intensive care consultant considers that the patient can no longer benefit from the treatment available. So that other patients are not denied admission, stringent discharge criteria need to be developed and applied locally. The bed management policies throughout the whole hospital require careful co-ordination if patients are not to be inappropriately detained in intensive care or high dependency care. It is good practice to have bed managers to supervise these arrangements.

5.2 The availability of an HDU within the hospital has an important influence on the decision to discharge. Many patients remain on an ICU longer than necessary in the absence of any ‘step-down’ level of care. Discharge from intensive care may be either to high dependency care or direct to a general ward. Patients should only be referred from intensive care to high dependency care when they still require a higher level of care than can be offered on a general ward.

5.3 The decision to discharge a patient from intensive care or high dependency care will depend partly on the level of care available in the unit or ward to which the patient is to be discharged. Hospital mortality following intensive care is reported at 6-16%, but the risk of death may be reduced if high dependency facilities are available. Discharge should be considered in the event of:

(1) the patient having been stabilised and no longer requiring either mechanical ventilation or active support of more than one organ;

(2) the patient no longer benefiting from the treatment available (in such patients organ system support can defer death without correcting the underlying pathophysiological processes);

(3) the patient (or the family or partner) wishing for the patient to be transferred elsewhere in the hospital where palliative care can be provided;

(4) information coming to light about the patient’s pre-existing functional health status as determined by the patient or the family or partner;

(5) the patient having entered the persistent/permanent vegetative state.

If it is not possible to wean the patient from the ventilator, then discharge from intensive care may not be practical.
Treatment Limitation/Withdrawal

5.4 Assessment of the continuing appropriateness of intensive care should be made as soon as practicable after admission and at least daily thereafter and the level of intensity of the care assessed.

5.5 A decision to limit further treatment should be made after discussion amongst the intensive care team and the referring team and should have the full acceptance and understanding of the patient and his/her family/partner.

5.6 A patient who has stayed in intensive care for several days and who it is clear on clinical grounds has only a minimal chance of survival, still less of survival with a good quality of life, needs careful review. Discharge may be more appropriate. It is important to discuss the care of such a patient with all concerned, particularly when treatment might otherwise have to be escalated, for example, if dialysis or another surgical procedure is required.\(^{17}\)

5.7 When it is decided to limit treatment, the aims of intensive care should be altered so that the patient is made comfortable. The difficulty for both the family and the staff concerned of moving a patient in these circumstances out of an intensive care or high dependency care area, where the patient may have been looked after for some time, should not be underestimated. However, unless a patient's death is imminent, transfer to another area of the hospital where a patient can die with dignity is appropriate. Occasionally, it may be appropriate for the patient to be allowed to die in intensive care without being transferred. The views of the relatives and nursing staff will be an important factor in reaching this decision.

Discharge to another specialist unit

5.8 Patients may require specialist care not available in the unit in which they are presently being treated. Examples include the transfer of patients between cardiac or neurosurgical units and general intensive care units. Close collaboration between the senior medical staff of both units is required to ensure the appropriate timing of the transfer.

Transfers between ICUs in different hospitals

5.9 Patients may have to be transferred to another unit in a different hospital either to receive further specialist care or because demand upon intensive care resources exceeds capacity. This should not be an ad hoc arrangement but a planned procedure developed between ICUs after close discussion (see Section 8 on Transfers).

Organ donation

5.10 Patients who become brain-stem dead and are organ-donors should remain in intensive care on full support until the organs can be retrieved. The resource implications of this in terms of providing intensive care for these patients are significant (see paragraph 3.8).

Ventilator dependency

5.11 Patients who have become permanently ventilator dependent, for example those who are in end-stage respiratory failure and who cannot be weaned to spontaneous ventilation following surgery or an acute infection, need careful review. A decision may have to be made to withdraw ventilator support and allow the patient to die, or arrangements may be made for long term ventilator support elsewhere, possibly at home. The latter has significant resource implications.

Discharge from high dependency care

5.12 As with discharge from intensive care, it is important that policies are in place to expedite timely discharge from high dependency care to general wards.
6. Consultant Sessional Allocation

6.1 Adequate consultant sessions are a pre-requisite for the provision of effective intensive care and high dependency care. The Intensive Care Society recommends that, for units of up to 10 beds, there should be a minimum of 15 consultant sessions shared between 3 or 4 individuals and similar recommendations have been made by the Association of Anaesthetists. Such a consultant sessional allocation would meet the need for senior input into decisions and arrangements concerning the admission, discharge and transfer of critically ill patients. There is evidence to suggest that the appointment of a full-time intensive care specialist makes a significant impact on both unit and hospital mortality.

6.2 A number of studies have shown that many ICUs do not meet the sessional allocation referred to above. For example, one study found that in a one day census of all ICUs, there was no consultant presence at all during the 24 hour period surveyed in almost 40% of units. This issue needs to be considered in discussions by both purchasers and providers.
7. Nurse staffing

7.1 Adequate nurse staffing is a pre-requisite for providing intensive care and closure of beds is frequently attributable to a shortage of trained nursing staff. The nurse-patient ratio of 1:1 throughout the 24 hours of the day referred to in Table 1 is essential for delivering the quality of care which is a feature of intensive care in the UK. The standard nurse-patient ratio adopted in the UK is generally higher than in other European countries. Data have recently been published from a collaborative study sponsored by the European Commission (EURICUS-I). The study shows that the 8 English hospitals - 4 in and around Newcastle-upon-Tyne and 4 in and around Sheffield - had the highest nurse to patient ratio. This ratio was entirely compatible with the nursing workload in the other participating centres(25) (Annex C).

7.2 The reasons for this proportion of nurses with appropriate specialist training include:

- the need to manage patients who are physiologically unstable.
  Contemporary medical practice in intensive care requires nurses to make minute-to-minute clinical decisions to implement medically prescribed treatment and to react to sudden changes in the patient's condition which may be life-threatening. For example:-

  a) titration of fluid and drug therapy according to patient response, within the boundaries of the medical prescription.

  b) preferred practice in many units is for patients to be lightly sedated, easily aroused and to have periods of sleep. This demands continuous assessment of sedation levels to ensure patient safety.

- the need to manage the psychological needs of patients and their families.

- the principle of 1:1 supervision of unconscious, intubated, ventilated patients, which has long been regarded as the norm in operating theatres, applies equally to intensive care.

7.3 Appropriate post-registration/post-graduate education is required by all nurses specialising in this field. Qualified nursing staff new to the specialty should be supervised and supported by an experienced intensive care nurse.

7.4 Policies and procedures should be in place to evaluate patient dependency and nursing workload and to audit such procedures.
8. Transfers between ICUs

8.1 The transfer of patients between ICUs is an integral part of the intensive care service. Critically ill patients require transfer:
   a) for further specialist care, or
   b) because demand for ICU services exceeds available facilities.

8.2 There are inevitably significant fluctuations in demand for intensive care and high dependency beds given the high proportion of emergency work. This can place a heavy burden on ICUs/HDUs when demand is high. However, it would not be an appropriate use of resources to staff intensive care and high dependency units to cope with peak demands, as the staff would be undervalued for much of the time.

8.3 Figure 2 illustrates this for one particular ICU in a provincial District General Hospital during 1994/95. Even with an average bed-occupancy of 72% during the year, there were 24 full days when this ICU was unable to accept new admissions. This led to opening unstaffed beds through short term increases in the nursing establishment by using overtime, bank or agency staff. Despite this, it was necessary to refuse 81 requests for admission during the year, the majority of which were for major elective surgical procedures.

8.4 These fluctuations in demand and the consequent level of refused admissions need to be taken into account in planning service provision and in discussions with purchasers, although the number of refused admissions is not an adequate determinant of the availability of treatment. Consequently, there will inevitably be occasions when the demand for intensive care at a hospital exceeds the available facilities, and a patient will need to be transferred to another ICU.

8.5 Transfers should be kept to a minimum because they are potentially dangerous. However, following thorough assessment and stabilisation prior to transfer and using continuous monitoring during the transfer, it is now possible to move critically ill patients without their condition deteriorating.

8.6 To achieve a safe transfer, the aim should be to move the intensive care environment with the patient. Although many ambulances have the necessary facilities on board for the journey, it applies equally when transferring the patient from the ICU of the referring hospital to the ambulance and from the ambulance to the ICU of the receiving hospital.

8.7 Where a bed cannot be made available through the discharge of a stabilised ICU patient to an HDU or general ward, it may be more appropriate to transfer a less sick, more stable patient instead of the new patient requiring admission. This decision should be discussed, wherever possible, with the patient to be transferred, with his/her relatives/partner, and with the consultant(s) responsible for the patient's care before the arrangements for the transfer are made.
Daily number of patients treated on ICU for 1994-95

April 94 to March 95
Figure 3
Transfers between ICUs

Is the new patient appropriate for intensive care?

YES

Does the patient require specialist intensive care only available at another centre?

NO

Is the patient an emergency case?

YES

Empty intensive care bed?

NO

Can an existing intensive care patient be safely discharged to HDU or ward?

NO

Identify closest or most appropriate empty intensive care bed

YES

Can the new patient be safely transferred?

YES

Transfer new patient

YES

Transfer existing patient

NO

Can an existing intensive care patient be safely transferred?

NO

Manage the new patient in temporary facility until bed vacant on ICU

NO

When bed available on ICU

Admit new patient

YES

Stabilise and transfer new patient

Are there sufficient empty intensive care beds to accept an elective case?

NO

Defer procedure

YES

Admit patient to ICU following procedure

see note I

Make alternative arrangements

NOTES

I. The number of beds required will depend on the work pattern of the ICU and its operational policy; in a busy unit with a large number of emergency referrals, it may be advisable to require that at least two staffed, empty beds are available before an elective case is accepted.

II. At all stages it is vital to ensure clear and effective communication with the patient (where possible), the relatives and all those involved in managing the patient at both the referring and the receiving hospital.
• If a pulmonary artery catheter is in situ then continuous monitoring of waveform is necessary;
• Two or more intravenous lines (16 swg or bigger in adults) especially if there is no central venous line;
• Urinary catheter for continuous measurement;
• Body temperature measurement;
• Airway pressure monitoring (if ventilated).

The monitoring requirements may be tailored for each individual patient’s need but comprehensive monitoring is always required.

8.13 Recording of the monitoring of the patient during the transfer process is essential, as is the recording of any interventions required. A standard form for this purpose can be helpful.

Equipment

8.14 The basic equipment of a mobile ICU consists of a vehicle and a purpose built trolley. The two main functions are to provide appropriate respiratory support and a means of cardiovascular monitoring. Nearly all critically ill patients require some form of respiratory support, usually mechanical ventilation. Ventilating adult patients by hand is unsatisfactory even for the shortest journeys.

8.15 The following equipment is needed and should be provided on the trolley:
• Provision for artificial ventilation with continuous positive end-expiratory pressure (PEEP);
• Equipment and drugs for management of the airway;
• Capnograph;
• Portable syringe pumps should be available in preference to drip counters;
• Suction machine (electrically powered for the transfer vehicle but manually operated for the trolley);
• Any chest drainage should be established before transport. Back-up facilities for re-insertion should be available;
• Equipment for inr-a-arterial pressure monitoring;
• Battery powered pulse oximeters;
• Wright’s spirometer or other instrument for measuring the expired tidal volume;
• Heat/moisture exchange humidifier;
• DC defibrillator;
• Warming blanket.

Staff Escort

8.16 The staff who accompany the patient must be familiar with all aspects of care of the critically ill. Training and experience are important for initial triage and for anticipating problems which may subsequently develop en route.
Arranging the transfer

8.8 Transfer should involve formal referral of care from consultant to consultant as well as good communication between intensive care teams. The first step in the transfer is the identification of a suitable bed; a bed bureau or information service, where available, will facilitate this process.

8.9 In consultation with the local ambulance service, a decision will need to be made as to the appropriate vehicle for the transfer. During journeys by ambulance, acceleration and deceleration forces may adversely affect the cardiovascular status of the patient. Air transport has the advantage of speed, but, with fixed-wing aircraft the acceleration and deceleration forces are far greater than transport by road. Air transport requires further land transport if landing facilities are not available at both hospitals.

8.10 The standards of monitoring a patient during transfer must be of the same high quality as within the ICU environment. This means that experienced staff should accompany the patient. Invasive monitoring should be used where possible. Appropriately titrated analgesia and sedation are needed for patient comfort and to avoid changes in physiological parameters such as a rise in intracranial pressure.

The transfer process

**Preparation**

8.11 The patient must be resuscitated adequately prior to transfer particularly:

- **Airway** – this must be secured before embarking as emergency intubation in a moving ambulance is difficult

- **Breathing** – hypoxia and hypercapnia must be avoided

- **Circulation** – movement of patients is frequently associated with periods of hypotension

**Monitoring**

8.12 During transport the patient will require:

- Continuing ECG monitoring;

- Continuous pulse oximetry;

- Systemic blood pressure measurement (preferably with arterial line);

- Capnography;