

**Framework for financial  
management in  
intensive care**

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# Framework for financial management in intensive care

## **1 SUMMARY**

### **1.1 Health service funding**

- 1.1.1 The annual allocation of funds for health care remains based on a system of weighted capitation. In other words, each healthcare purchaser receives its funding allocation based on the numbers of residents within its statutory boundaries. Service Level Agreements (SLAs) have moved healthcare purchasing from an agenda dominated by the detail of activity and finance to one where service standards are at the fore.
- 1.1.2 The majority of SLAs or contracts do not separate critical care from other specialties; critical care is funded mostly as an overhead to these specialties' costs. This important conceptual point mirrors the way many non-intensivists view the service. Prospective payment systems for hospital care may not cover the cost of the critical care component.
- 1.1.3 A variation on the 'overhead' approach is to allow the 'support service costs' to be supplemented by a specific specialty line for critical care. This reflects the component of critical care activity that represents direct admissions or transfers between different units; activity is recorded as either the actual number of admissions or, more usually, the total number of bed days these patients spend in critical care. An increasing minority of SLAs, however, use a more sophisticated cost and volume arrangement which means that the level of funding (and charging) is linked explicitly to the actual level of activity, again usually measured in bed days.

### **1.2 Financial management**

- 1.2.1 All systems for financial management within the critical care unit have to operate within the resource constraints of the overall structure of the NHS and local health economies. Demand for critical care services continues to increase and is not matched by a commensurate increase in healthcare resources.
- 1.2.2 Implicit rationing is already imposed within the NHS, but the degree varies as local priorities determine the proportion of resource allocated to critical care. This is largely a result of the 'overhead' approach to funding and the effect of multiple paymasters.
- 1.2.3 Separation of critical care funding from other specialties' costs and a reduction in the number of paymasters by moving to regional funding could remove some of the inequities of present funding systems.

- 1.2.4 Critical care financial management systems must seek to rationalise expenditure; the only other alternative in a resource limited healthcare system is rationing of the service.
- 1.2.5 Although a trading account allows the critical care unit to increase its income according to demand, that leaves a reduction in resource somewhere else in the healthcare system. This may be appropriate if the priorities of the healthcare system can tolerate that reduction and wider use of trading accounts is one way of matching resource consumption to whole system priorities.
- 1.2.6 The fixed budget model leaves expenditure control as the only way of managing the budget. If the budget was based on system wide priorities this would not matter, although there is little scope for accommodation of changing priorities.
- 1.2.7 It is clear that resource limitation in the healthcare system as a whole must be matched by a reduction in expenditure. This can be achieved by increased efficiency (reduced cost per patient treated) or by reducing demand. For the critical care unit reducing demand is unlikely to be achievable, but reducing access has a similar effect on the budget. Increasing efficiency is difficult as technological advance (in this context technology includes pharmaceuticals) will, in the majority of cases, increase costs.
- 1.2.8 Staff costs make up the major part of all critical care expenditure such that the most effective way of reducing expenditure is to reduce staff costs. This approach is often taken when beds are closed to limit access, although it is least effective in small units where a closed bed may not allow a reduction in staff numbers as a higher proportion of the total is considered as a fixed cost.
- 1.2.9 Non-staff costs may be controlled by formulating agreed policies for admission and treatment taking into account real cost benefits where alternative treatments are associated with differing costs. This approach can most obviously be applied to formularies for drug choice and stock lists for disposables. Use of a high cost technology rather than a cheaper one for an equivalent benefit represents, in economic terms, a lost opportunity.
- 1.2.10 The factors affecting budget management decisions are many and varied. Critical care medicine has struggled to demonstrate its effectiveness and, without doing so, will not achieve adequate funding to meet the demand. Resource movement from other parts of the healthcare system will only become possible where benefits of critical care medicine can be proved worthy of releasing that resource. In the meantime budget management is focused on increasing efficiency. The principles of 'Comprehensive Critical Care', particularly relating to outreach care, may help manage demand. Without these principles of rationalisation the reduction of supply (rationing) becomes the only viable method of containing costs within limited resources.

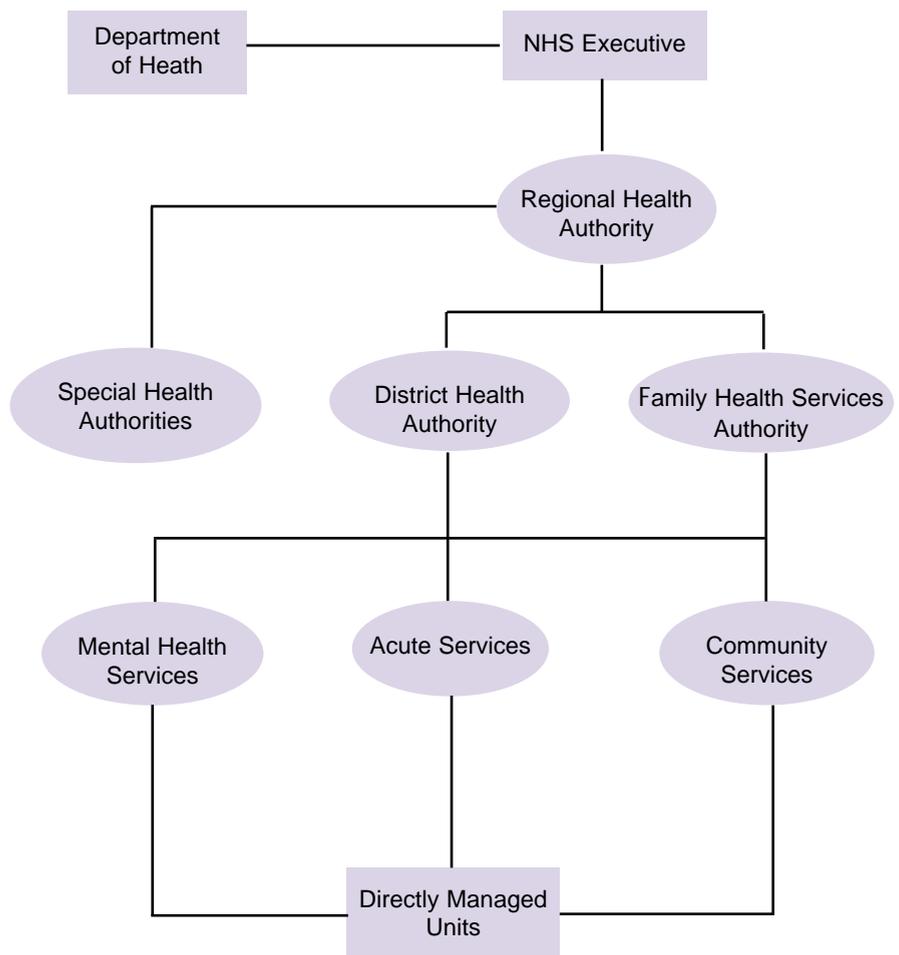
## **2 HEALTH SERVICE FUNDING**

### **2.1 Introduction and national context**

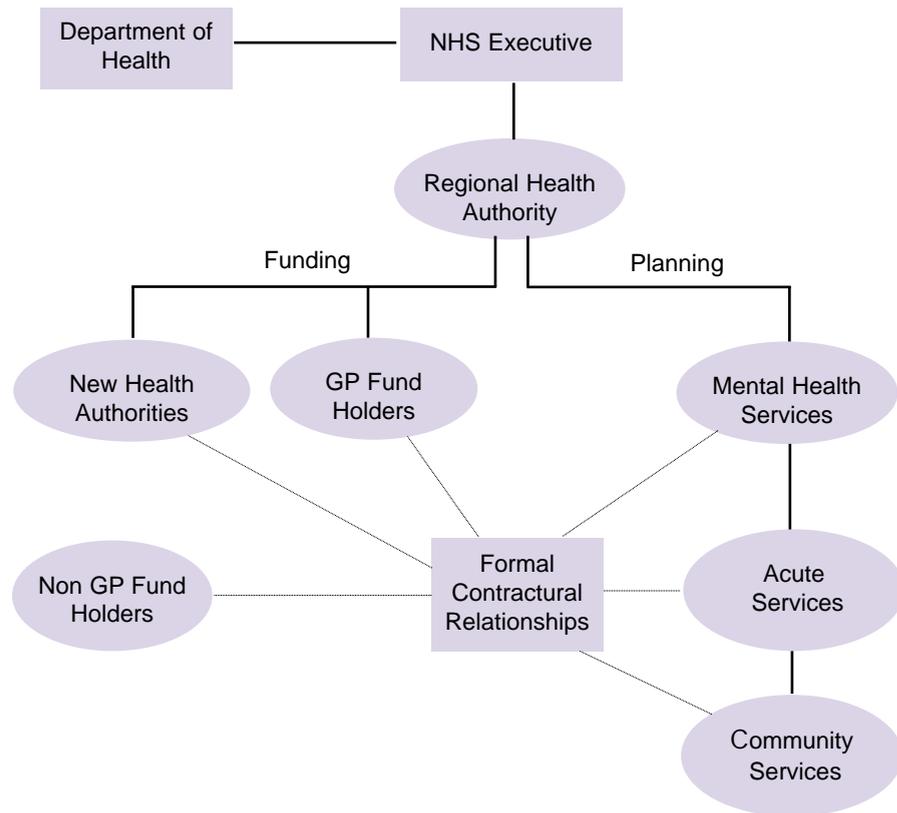
- 2.1.1 'Working for Patients' (1989)<sup>1</sup> and its subsequent implementation through the NHS Act of 1991 marked a significant change in the overall approach to the NHS. Despite a decade of repeated reorganisations within hospitals and health authorities and the dilution of the market in the 1998 amendment to the NHS Act, the principles of the separation of 'purchasing' and 'providing' remain along with many other facets of the market driven economy.

- 2.1.2 With the benefit of hindsight, early claims that ‘Working for Patients’<sup>1</sup> would encourage greater financial efficiency and less government intervention has not always been the experience of those working within the service. Despite greater public awareness and the trend of consumerism evident across all aspects of society, it remains arguable whether or not the range of cultures from competition to partnership has encouraged greater public choice. It is undoubted, however, that many of the business principles implemented during the reforms have influenced the way services are delivered.
- 2.1.3 Prior to the introduction of ‘Working for Patients’<sup>1</sup> the NHS was organised on a formal hierarchical basis (Figure 2.1) which demonstrated the clear managerial line between the government and the Department of Health through regional health authorities, district health authorities down to hospital and community health services.
- 2.1.4 The separation of purchasing and providing, and the creation of self-governing trusts and GP fundholders alongside health authorities (Figure 2.2), brought with it the formal contractual arrangements that drove the internal market. Financially, the reforms introduced the element of competition into health care and, politically, it broke the clear managerial line between the government of the day and the actual provision of services.

**Figure 2.1.** Hierarchical management structure of the NHS prior to the introduction of ‘Working for Patients’<sup>1</sup>



**Figure 2.2.** Separation of purchasing and providing after the introduction of 'Working for Patients'



- 2.1.5 For the contractual relationship between purchaser and provider to function, a pricing system was required and, therefore, a cost had to be ascribed for a given service or specialty. Taking into account the relevant factors of price and quality, the commissioning health authorities would purchase services on behalf of their resident population; in theory they were free to direct their patients within the constraints of access and strategy.
- 2.1.6 It is not the purpose of this introduction to document the history or the structure of the internal market. A key principle of funding the service, however, was that the development or growth of any given service or specialty needed to be linked to explicit levels of investment. This principle of the 'money following the patient' attempted to reverse previous disincentives to increase activity. A cornerstone was the market theorem that good or efficient services would flourish, as the key 'business consequence' of good performance was an increased share of the income. Although services could not profit in cash terms from good business practice the equivalent was seen as growth.
- 2.1.7 The change of government in May 1997 brought further significant changes to the NHS. Acting to carry out pre-election pledges, the government followed its white paper on modernising health services, 'Modern and Dependable'<sup>2</sup>, with further amendments to the NHS Act in 1998. In broad terms the changes were intended to re-introduce partnership – as opposed to competitive practice – across local health economies.

- 2.1.8 The ambition of the new reforms was to replace the internal market with integrated care, an approach which combines efficiency and quality with a belief in fairness and partnership. The assertion was that the market had created an institutionally focused environment, whereas the 'New NHS' was to have the needs of the patient at its centre. It is undoubtedly true that any process which concentrated on the transactions between specialties and hospitals had the potential to create artificial barriers to access to care. An integrated approach, therefore, would replace a model which promoted organisational boundaries.
- 2.1.9 As well as continuing to provide leadership and strategic direction to the local economy, the role of the health authority would move from one of purchaser to performance manager. The abolition of GP fundholding and the creation of primary care trusts was intended to keep the benefit of clinician led commissioning but make it a more equitable process. The role of local authorities in improving health was reinforced and the move towards more collective use of public funds was a clear and key message.
- 2.1.10 Broadly, the annual allocation of funds remained based on a system of weighted capitation. In other words, each healthcare purchaser receives its funding allocation based on the numbers of residents within its statutory boundaries. Since the creation of primary care trusts the capitation system has become based on the numbers of registered patients in constituent practices rather than on a strict residential basis.
- 2.1.11 Contracts were replaced by Service Level Agreements (SLAs) and the intention was to move from an agenda dominated by the detail of activity and finance, to one where service standards were at the fore. Similarly the annual contracting round was perceived to be a short term process; the intention was to initiate Long Term Service Agreements which would provide the stability required to plan and deliver services properly.
- 2.1.12 For acute trusts, in particular, the abolition of the market and the cessation of Extra Contractual Referrals (ECRs), marked a change in the way in which services and capacity were planned. Joint planning and agreement between the trusts and their local health authorities – through a Health Improvement Programme – would drive the development of services rather than market style incentives. Hand in hand with this integrated, strategic approach was the evolving clinical governance agenda to underpin the quality of services.
- 2.1.13 The policy shift hoped to blunt the competitive edges of the market. It accepted, however, that not all of the old system could or should be discarded and, in reality, many of the key principles of managing the service, which had evolved through the 1990s, have remained. Principal among these is the relationship between income and expenditure. More pertinently for hospital and department services, the relationship between income (in a service level agreement the budget for providing services) and expenditure (the cost of treating patients) becomes the key issue that confronts managers and clinicians in planning, funding and delivering services for patients.

## **2.2 The context for critical care**

- 2.2.1 Within hospital services, critical care is regarded as a high resource consumer. This cliché view needs to be played into the context of increasing demand for all aspects of critical care and the high profile difficulties in recruiting the right level of staff to provide the right level of care. Essentially, many trust management executives and commissioning health authorities view the service with some trepidation; a

simplistic view sees critical care as a service that is difficult to deliver and requires significant resources. This dilemma has provided a number of different responses. Some trusts, as they seek the right balance of budgets across their services, seek to limit access to critical care by limiting the number of funded beds (implicit rationing) with a fixed budget for a financial year irrespective of demand changes. Others, particularly when the ECR system allowed trusts to raise additional charges and, therefore, raise additional income, allowed the additional flexibility to increase critical care budgets.

- 2.2.2 These two systems are replicated in the way in which health authorities currently fund the service. The majority of SLAs or contracts do not separate critical care from other specialties; critical care is funded mostly as an overhead to these specialties' costs. This important conceptual point mirrors the way many non-intensivists view the service. Prospective payment systems for hospital care may not cover the cost of the critical care component (explicit rationing).
- 2.2.3 A variation on the 'overhead' approach is to allow the 'support service costs' to be supplemented by a specific specialty line for critical care. This reflects the component of critical care activity that represents direct admissions or transfers between different units; activity is recorded as either the actual number of admissions or, more usually, the total number of bed days these patients spend in critical care. An increasing minority of SLAs, however, use a more sophisticated cost and volume arrangement which means that the level of funding (and charging) is linked explicitly to the actual level of activity, again usually measured in bed days.
- 2.2.4 The systems for funding critical care vary within health authorities and regions. Table 2.1 demonstrates the extent of variation within one region; although the London region may not be totally representative of practice throughout the country the three main variations on SLA or contractual relationships appear. It is worth noting, however, that the group who reported that there were no specific arrangements for critical care represent over a third of the total trust respondents. Given this startling lack of performance and financial framework, it is hardly surprising that, at a strategic level, trust executives and commissioning health authorities seem to fail to grasp the detail of the impact and the scope of critical care services.

## **2.3 Comprehensive Critical Care**

- 2.3.1 The Audit Commission report 'Critical to Success'<sup>3</sup> was published in 1999. In April of that year the Department of Health established a review of adult critical care services supported by an Expert Reference Group. The final report, in effect, extended the government's modernisation programme to this service. It is into this context that the Health Circular (HSC 2000/017) 'Comprehensive Critical Care'<sup>4</sup> was launched in May 2000.
- 2.3.2 As the report itself is at pains to point out Comprehensive Critical Care is not simply a new name for intensive care, but is 'a new approach based on severity of illness'. The report recommended that the existing division into high dependency and intensive care be replaced by a classification that focuses on level and type of care.
- 2.3.3 The report and the accompanying circular provided a definition of adult critical care: '(ICU) covers a range of services and is for very ill patients who can benefit from more detailed observation or treatment than can safely be provided on an ordinary ward'<sup>3</sup>. It also set out four levels of care (Table 2.2) from which levels 2 and 3 can be taken to correspond with previous understanding of high dependency and intensive care.

**TABLE 2.1: Commissioning arrangements for critical care 2000-01**

All 32 trusts and 16 HAs within the London Regional boundaries were written to and responses were received from 22 trusts and 12 HAs. Many responses also provided additional information on specific service difficulties. Perhaps predictably the majority of respondents (both trust and HA) indicated that a mix of commissioning arrangements were in place. Detailed below are the outline results reported:

- 8 trusts and 4 HAs reported that in some SLAs there were **no specific arrangements for critical care** and that the service was contained as an overhead or **hidden block** within the costs of other specialties.
- 16 trusts and 10 HAs reported that in some SLAs the costs of critical care were identified specifically as a separate line but managed within the overall **block** arrangements.
- 6 trusts and 9 HAs reported that some SLAs have provision for separate **cost and volume** arrangements. In all cases these are based on critical care bed days and in 5 reported cases are supplemented by a clinical scoring system such as TISS.
- 1 trust reported an existing **consortium block** SLA which, while it is in place to support specific high cost procedures in another specialties, includes an allocation for use of critical care.

**TABLE 2.2: Levels of care as a framework for Comprehensive Critical Care**

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 from a single failing organ system or postoperative 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 from multi-organ failure.

- 2.3.4 In addition to the above, a new and supplementary classification system is to be introduced to identify patients requiring specialist tertiary investigation and treatment. These include neurosurgery, cardiac surgery, thoracic surgery, burns or plastic surgery, spinal unit care, renal care, liver care and a final category for 'other specialist care'.

- 2.3.5 The implementation of the ‘Comprehensive Critical Care’ agenda is still being thought through. The formal establishment of clinical networks is still evolving – perhaps surprising to those who have felt part of an established network for some time – although the involvement of commissioners and the performance and funding workstreams in such a framework is new. What is abundantly clear, however, is that the issue of how critical care is funded is firmly in the top tranche of NHS priorities.

### **3 COSTING MODELS**

#### **3.1 ICU costing methodology**

- 3.1.1 Many attempts have been made to measure the resources used in critical care. However, as noted in a review by Gyldmark<sup>5</sup>, comparisons between studies are difficult, if not impossible, as different studies have included different elements of resource use. ‘Critical to Success’<sup>3</sup> reported large variations in ICU practice and subsequently costs, questioning the efficiency of ICUs. While this is only a ‘snapshot’ view of critical care, and these data should be interpreted with caution, it demonstrates that resource data collected in a standardised manner is an essential component of modern ICU practice.
- 3.1.2 Two basic methods of costing care were identified from the review, namely the ‘top down’ approach and the ‘bottom up’ approach (Table 3.1).
- 3.1.3 Various hybrid costing methodologies have been used in critical care. Defining patients according to a dependency measure (in its simplest form high dependency or intensive care) attempts to overcome the assumption that resources are distributed evenly between patients in the ‘top-down’ approach. A period of ‘bottom-up’ calculation may be used to define the costs of the high dependency patient assuming remaining costs are distributed amongst the intensive care patients.
- 3.1.4 A further refinement is to apportion costs according to dependency using the Therapeutic Intervention Scoring System (TISS)<sup>6,7</sup>. Some studies have found a significant relationship between daily TISS scores and individual patient costs<sup>8</sup>, yet other studies do not support this hypothesis<sup>9</sup>. TISS was originally described as a method for quantifying therapeutic interventions and has been adapted extensively in individual ICUs to reflect local practice. This clearly affects comparison between different ICUs

#### **3.2 The Cost Block Programme**

- 3.2.1 The Intensive Care National Working Group on Costing convened between 1994 and 1999 to tackle the methodological problems of undertaking cost comparisons of intensive care provided in different hospitals. For intensive care units (ICUs), a standard method for measuring costs of resources did not exist and this made the evaluation of resource use difficult. The Group was multidisciplinary, comprising professional members from the fields of intensive care, health economics and accountancy and health services research.
- 3.2.2 The Group formulated a list of costing-related questions (Table 3.2) and sought answers to these questions from a literature review. Having reviewed those papers published between 1974 and 1994, it was apparent that a suitable method, capable of answering more than two of the costing-related questions, did not exist. It was also

**TABLE 3.1: The main approaches to costing**

<b>Top-down approach</b>	
Definition	The 'top down' approach to costing allocates total hospital costs to a departmental level, using some allocation statistics <sup>5</sup> . Often, total ICU costs are derived from the hospital budget and apportioned by the number of patients to produce an average cost per patient.
Data collection	Total annual hospital costs are collected retrospectively.
Advantages	Avoids laborious costing of individual patients Can be easily implemented into any hospital Can be used for benchmarking
Disadvantages	Not capable of comparing the costs of individual patients or groups of patients as it assumes that individual patients consume identical amount of resource use on a daily basis. Not suitable for some forms of economic evaluation
<b>Bottom-up approach</b>	
Definition	Bottom-up or micro-costing necessitates the accurate measurement of resources at a unit level, for example delivering an analgesic would be costed by measuring the numbers of syringes used, the analgesic itself and the amount of nursing time required to prepare and deliver the drug. Against these values, unit costs are then assigned.
Data collection	Unit costs related to the resources used by individual patients should be collected prospectively.
Advantages	Facilitates costing of individual patients and groups of patients Facilitates economic evaluations alongside clinical trials
Disadvantages	Laborious Complex Development, validation and implementation is time consuming and expensive

clear than none of the methods described in the literature could be deemed appropriate for routine use, due to their complexity and resources required for implementation. The Group therefore developed a standard method of costing to overcome this specific problem and others relating to the heterogeneity of accounting practices employed by individual NHS trusts<sup>10</sup>.

- 3.2.3 The 'top-down' approach was thought capable of providing data that would answer a number of the questions raised by the Group, because it enabled the identification of the major cost components. However, the 'top down' approach would not be useful for providing answers to questions such as 'how does cost per category of patient vary with throughput?' or 'how do we include quality?'. It would have several practical applications. For example, if data were collected annually, it would provide a

**TABLE 3.2: Top ten questions relating to ICU costs**

- What is the cost of opening another ICU bed?
- What is the daily cost per patient?
- How does cost per category vary with throughput?
- How do we include quality?
- What are the budgetary requirements for an ICU?
- Can we link with Healthcare Resource Groups, the Therapeutic Intervention Scoring System (TISS) and the Acute Physiology and Chronic Health Evaluation (APACHE)?
- How can we define fixed, non-fixed and marginal costs?
- How can we weight costs to take into account teaching and research?
- Exactly what should be included in costing?
- Can daily costs be multiplied by length of stay to produce total costs?

means for determining average daily costs per patient and the marginal costs of opening an additional ICU bed.

- 3.2.4 The Group developed their own method, starting with the identification of budgetary components associated with resource use in critical care. The selection of the most important components was based on relevance, data availability and ease of collection. The validity of the data was considered. Proportion of cost contributed by each of the components was considered together with whether the costs were incurred by the ICU. This process led to the definition and grouping of components as 'cost blocks' (Table 3.3).
- 3.2.5 The methodology was piloted in eleven ICUs, after which the definitions were refined; a second pilot study was repeated in twenty-one ICUs. The pilot studies revealed that cost blocks 1-3 (Capital Equipment, Estates and Non-Clinical Support Services) accounted for only 15% of the total cost of the ICU and were difficult to collect, inaccurate and not within the control of the ICU.
- 3.2.6 The Intensive Care National Cost Block Programme was launched in November 1999.

### **3.3 How does the cost block method compare to other methods for costing?**

- 3.3.1 The cost block method was developed with the principle aim of facilitating meaningful comparisons between individual ICUs. It was intended that the method be suitable for use in any ICU. The cost block method determines the total expenditure of an ICU and apportions this by the throughput of the ICU (number of patients and their length of stay) and organisational capacity (number of beds). In this way, average costs per patient, per patient day and per ICU or HDU bed can be deduced.
- 3.3.2 In nine of the studies reviewed by Gyldmark<sup>5</sup>, it was unclear what cost components were included. Of the remaining eleven studies, four excluded medical and nursing staff costs which represented 53% of total ICU costs in cost block pilot studies. Three of the eleven studies excluded the cost of disposables, and one excluded the cost of drugs and fluids. It was often the case that the inclusion of other cost components within the studies reviewed was assumed rather than known.

**TABLE 3.3: Cost components collected within each cost block**

<b>Cost block</b>	<b>Cost components</b>
1. Capital Equipment	Linear standard depreciation Maintenance Annual lease and hire charges
2. Estates	Water, sewerage, waste and energy Building and engineering Maintenance and decoration Rates Building depreciation
3. Non-Clinical Support Services	Administration Management Cleaning
4. Clinical Support Services	Radiology Laboratory services Physiotherapy
5. Consumables	Drugs and fluids Top ten drugs and fluids Disposables Nutritional products Blood and blood products
6. Staff	Consultant medical staff Other medical staff Technical staff Nursing staff Bank and agency nursing staff Administrative staff

3.3.3 There are a number of different ways of arriving at individual patient costs. The ‘top-down’ method has the disadvantage of being inaccurate at the individual patient level but is easy to calculate. The ‘bottom-up’ approach is much more time-consuming as resource costs are summated from individual items of care and then ascribed to individual patients<sup>11,12</sup>. Despite its higher degree of accuracy, it is a difficult method to reproduce in different hospitals.

3.3.4 The ‘bottom-up’ method is used to produce a cost per patient day by adding together the patient’s use of individual resources. The cost block method, on the other hand, is unable to measure differences in resource use incurred by individual or groups of patients. In bottom-up costing, each resource is broken down into its smallest unit and multiplied by the number of units used. For example, if a patient requires a nurse for ten minutes then a cost per minute of a nurse’s time is required in order to produce an accurate total cost.

3.3.5 Micro-costing or activity-based costing are terms frequently used to describe bottom-up costing principles. Activities of care have been used for costing individual intensive care patients since 1995 at the Royal Hallamshire Hospital, Sheffield<sup>12</sup>. The concept behind the activity-based costing methodology is that the clinical care delivered to patients is partitioned into discrete elements (the activities). The cost of patient care is then determined by allocating resources (and therefore costs) against each activity. The total patient-related cost of care for an individual patient is determined from the sum of the costs of the activities delivered to that patient. The disadvantage of this method of costing is that it requires a Patient Data Management System with a computer terminal at each patient's bed-side for the nursing and medical staff to record the clinical procedures and interventions performed on each patient. These data are collected prospectively and have to be checked against the medical records for any omissions. Therefore, the commitment of staff working on the ICU is mandatory to ensure accurate recording of data.

### **3.4 Practical implications of the cost block method**

3.4.1 A number of factors influence the varying degrees of expenditure on intensive care in different hospitals. Technological developments, differences in unit characteristics and differences in methods of costing are thought to be three such factors<sup>5</sup>. Heterogeneous case-mix is another problem. A study of the cost of individual patients admitted to a Canadian ICU found that the 8% of their ICU patients who consumed the highest costs equated to the same amount of resources as the 92% of patients with the lowest costs<sup>13</sup>. The cost block method overcomes the problem associated with different methods of costing, insofar that more accurate study of the costs and consequences of intensive care can prevail. The cost block method takes accounts of the size of the ICU, its geographical location, whether it is located in a university or a non-university hospital and its throughput. The cost comparisons, made possible through a representative sample of ICUs using the cost block method, are very useful to individual hospitals as it allows them, for the first time, to compare their levels of expenditure with other ICUs.

3.4.2 Future research correlating standardised mortality ratios (SMRs) to the cost components of the cost block method should supply further knowledge of the resources required to achieve optimal outcomes.

3.4.3 The cost block method is being collected in approximately one third of hospitals. The investigation of routinely collected data for its ability to explain observed expenditure variation between individual units has identified throughput to be a key factor.

3.4.4 The method has wider implications for the comparison of cost data across Europe. The collection of cost data using a standard method in different European countries would enable inter-country cost comparisons to be made providing adjustments for economic differences between countries were ensured.

## **4 FINANCIAL MANAGEMENT SYSTEMS IN THE CRITICAL CARE UNIT**

### **4.1 Balancing supply and demand**

4.1.1 All systems for financial management within the critical care unit have to operate within the resource constraints of the overall structure of the NHS and local health economies.

- 4.1.2 Demand for critical care services continues to increase and is not matched by a commensurate increase in healthcare resources. The reasons for the increase in demand are multifactorial but include:
- Ageing population
  - Increased public expectation
  - Technological advance
  - Changes in disease demography.
- 4.1.3 Strategies for dealing with the imbalance between resource and demand include:
- Reduction in demand
  - Limitation of supply (rationing)
  - Improved efficiency.
- 4.1.4 Implicit rationing is already imposed within the NHS but the degree varies between health authorities and trusts as local priorities determine the proportion of resource allocated to critical care. This is largely a result of the 'overhead' approach to funding and the effect of multiple paymasters.
- 4.1.5 Separation of critical care funding from other specialties' costs and a reduction in the number of paymasters by moving to regional funding could remove some of the inequities of present funding systems.
- 4.1.6 Critical care financial management systems must seek to rationalise expenditure since the only other alternative in a resource limited healthcare system is rationing of the service.
- 4.1.7 All systems have to function within the design of local trust structures. All have the advantage, however, of making explicit the resources available to the unit and, therefore, allowing clinicians and managers the baseline information they need to lead the unit and to make explicit the service targets that they are expected to deliver.
- 4.2 The fixed budget model**
- 4.2.1 This model focuses on the use of expenditure budgets as the overall control mechanism (as opposed to a financial reconciliation of income and expenditure budgets).
- 4.2.2 Under this model, all income for the trust is centrally pooled and redistributed to cost centres as an allowance, or expenditure budget. Each cost centre is expected to deliver a service to either patients, usually expressed in activity terms, or (for cost centres such as theatres, radiology, pathology and critical care) to support other departments. Targets are set and must be delivered within the scope of the budget allocated.
- 4.2.3 Some flexibility can be built in at trust budget setting meetings. This forum is an opportunity to negotiate an adjustment to the expenditure budget based on known or projected changes in activity, demand or performance. This would normally occur on an annual basis, with ad-hoc meetings during the year if either the directorate or the trust needed to review financial plans. The release of new sources of funding or new demand expectations – such as those in 'Comprehensive Critical Care' – ought to be a catalyst for in year review.
- 4.2.4 The budget for a critical care unit should, as a general principle, reflect the actual make up of the department. That is to say that each component of the service should be represented on the balance sheet just as it is represented in the actual delivery of service (Table 4.1). In a fixed budget, overhead and indirect costs (e.g. cost of main-

**TABLE 4.1: A general model for a fixed ICU budget**

Staff	ICU managerial staff Medical staff Nursing staff Administrative support staff Technical support staff Educational staff Research staff
Equipment	Replacement Maintenance
Supplies	Pharmacy Blood and blood products Disposables Sterile supplies Administrative supplies Catering supplies
Investigation	Laboratory Radiology
Support services	Operating theatre Allied healthcare professionals Chaplaincy Mortuary services

taining buildings, costs of support by other departments) are not attributed to the ICU and are treated as a hospital overhead or as part of another department's budget. Indeed some direct costs (e.g. sterile supplies, laundry of sheets) are often not attributed to the ICU budget. Thus many ICUs are not expected to budget or manage expenditure on many of the items in the table.

- 4.2.5 Within this system, the ICU management team attends a fixed service planning/budget setting meeting. The ICU budget is negotiated in the context of the previous year's performance and an estimate of ICU activity required to support the trust's performance targets for the next year.
- 4.2.6 Throughout the year, the ICU performance is monitored against agreed activity, quality and financial targets. Variances are discussed and explained – for example any resulting from an increase in another directorate's activity. Where expenditure is in excess of budget, the ICU management team would need to negotiate an additional budget allocation. Success is likely to be dependent on whether the trust has obtained additional income for the source of the increased activity.
- 4.2.7 The main advantages and disadvantages of the expenditure budget system in ICUs are summarised below.
- 4.2.8 Advantages
- The cost centres negotiate a financial framework in which to deliver services, based on a discussion around demand, activity and other targets.
  - A fixed budget within a financial framework leaves the cost centres with scope to make incremental or small-scale changes.

- There is relatively little bureaucracy, as there is no cross charging (trading account, internal purchasing). Once the budget is set financial management is focused on containing expenditure.
- A fixed budget helps to focus attention on trust objectives (rather than individual or directorate agendas).
- A fixed budget may promote a culture of mutual co-operation between departments.
- The expenditure-budget system can work extremely well in smaller trusts, where close liaison across cost centres is possible and staff can work together towards common shared goals.

#### 4.2.9 Disadvantages

- Without a cross-charging mechanism, there is no strong incentive to ensure accurate and timely activity monitoring across the trust.
- The ICU is exposed to the risk of increased demand, due to a change in another department's activity.
- It can be difficult for cost centres to make significant service changes, or to develop new services, as there is no direct link between externally-negotiated funding and the budget.
- There is an inbuilt financial disincentive around the care of expensive patients.

4.2.10 Disadvantages can be overcome. Data accuracy can be assured by a strong culture of clinical audit and quality monitoring. The risk to support departments of an increase in activity in another department can be minimised with close liaison between cost centres.

### 4.3 The trading account model

4.3.1 This model recognises that ICU activity is determined by the activity of user departments. A trading account allows the ICU to recoup costs related to patient activity (variable costs) from user departments thus maximising flexibility. User departments gain access to ICU beds that may otherwise be closed to contain expenditure within a fixed budget. A small fixed budget is maintained to cover costs that are not related to patient activity (fixed costs).

4.3.2 The central theme of the trading account is the direct relationship between income and expenditure. It seeks to factor in relevant aspects of providing critical care services: availability of staff, resources for equipment, consumables and drugs and the relationship between referring clinicians and the unit.

4.3.3 The model attempts to match the flexible use of capacity with a parallel flexibility in funding. For ICUs this principle has the added advantage of minimising the financial risk to the department which does not have control of referred activity. For the trust that risk is taken on board elsewhere, for instance within the budgets of referring departments.

4.3.4 Fixed costs of managing the unit remain exactly the same irrespective of the number of beds occupied although extreme changes in activity may require adjustment of the fixed cost budget. Fixed costs include:

- Staff
  - ICU managerial staff
  - Medical staff
  - Senior nursing staff
  - Administrative support staff
  - Technical support staff

- Equipment
  - Educational staff
  - Research staff
  - Replacement
  - Maintenance

Generally, the costs of the above categories are determined by the number of beds expected to be available or the predicted activity. In this respect the fixed costs budget is exactly the same of the fixed budget model.

4.3.5 Conversely the variable costs are those directly associated with activity. These are the costs that will change as a result of one more or less bed day of activity:

- Staff
  - Bedside nursing staff
- Supplies
  - Pharmacy
  - Blood and blood products
  - Disposables
  - Sterile supplies
  - Administrative supplies
  - Catering supplies
- Investigation
  - Laboratory
  - Radiology
- Support services
  - Operating theatre
  - Professions allied to medicine
  - Chaplaincy
  - Mortuary services

The trading account generates an income that is directly related to patient activity and expenditure is managed according to this income.

4.3.6 Because the fixed budget devolved to ICU is a fraction of the total expenditure, each user department is given a budget from which they can purchase their ICU service.

4.3.7 Advantages

- Referring departments have a budget for their use of ICU, shifting the financial responsibility for referral to the referrer.
- The financial risk of longer stay patients or increased activity following, for instance, a new consultant appointment is moved to the source of such activity rather than the ICU.
- Financial management is focused on balancing income and expenditure rather than simply containing expenditure.
- In larger trusts where close liaison between cost centres may be difficult interaction is made more explicit. Developments in all interacting cost centres are forced to take account of the implications for ICU.
- Central to a well run trading account is accurate and timely activity monitoring. Clearly the overall financial risk to the trust does not disappear but it makes explicit the requirement to think through at a proper strategic level the impact and cost of ICU services.

4.3.8 Disadvantages

- Referring departments are exposed to financial risks of increased ICU activity that may not be budgeted. A single long stay patient could wipe out a user's budget.
- The matching of ICU availability to demand may be contrary to trust objectives.
- The need to track activity accurately increases bureaucracy.
- Referrers may view the ICU as unfairly protected from the need to manage expenditure as income increases with activity.

- 4.3.9 Where the ICU accepts direct referrals from outside the trust it can purchase activity from itself against any commissioning model that sets a specialty line for critical care. All users are thus treated equitably.

#### **4.4 Managing the budget**

- 4.4.1 Although the trading account model allows the critical care unit to increase its income according to demand that leaves a reduction in resource somewhere else in the health-care system. This may be appropriate if the priorities of the healthcare system can tolerate that reduction and wider use of trading accounts is one way of matching resource consumption to whole system priorities. A simple example may be the choice between two equally effective antibiotics: one is expensive to purchase but does not require laboratory measurement of levels, while the other is cheap but does require laboratory levels. Using the trading account model the first antibiotic may be the best choice.
- 4.4.2 The fixed budget model leaves expenditure control as the only way of managing the budget. If the budget was based on system-wide priorities this would not matter, although there is little scope for accommodation of changing priorities. Furthermore, using the antibiotic example from above most would select the second antibiotic since the costs of the laboratory measurements come out of another department's budget.
- 4.4.3 It is clear that resource limitation in the healthcare system as a whole must be matched by a reduction in expenditure. This can be achieved by increased efficiency (reduced cost per patient treated) or by reducing demand. For the critical care unit reducing demand is unlikely to be achievable but reducing access has a similar effect on the budget. Increasing efficiency is difficult as technological advance (in this context technology includes pharmaceuticals) will, in the majority of cases, increase costs.
- 4.4.4 Some technological developments may be cost beneficial but the cost is borne by the ICU and the benefit is reaped in another budget. Since there is little scope for horizontal movement of funds in public finance it may be difficult to procure the technology despite its benefit to the healthcare system as a whole. It is hoped that the National Institute for Clinical Excellence will focus on system wide benefits to allow such procurement.
- 4.4.5 Staff costs make up the major part of all critical care expenditure such that the most effective way of reducing expenditure is to reduce staff costs. This approach is often taken when beds are closed to limit access, although it is least effective in small units where a closed bed may not allow a reduction in staff numbers as a higher proportion of the total is considered as a fixed cost.
- 4.4.6 Increased efficiency can be achieved by reducing the average numbers of nurses per patient, recognising that one to one nursing is not a standard in most other Western societies. Alternatively, efficiency in terms of cost per patient may be achieved by reducing the numbers of skilled nurses per patient and replacing them with unskilled (and therefore cheaper) assistants.
- 4.4.7 Non-staff costs may be controlled by formulating agreed policies for admission and treatment taking into account real cost benefits where alternative treatments are associated with differing costs. This approach can most obviously be applied to formularies for drug choice and stock lists for disposables. Use of a high cost technology rather than a cheaper one for an equivalent benefit represents, in economic terms, a lost opportunity.

- 4.4.8 Costs of critical care vary between units and are, in part, dependent on the organisation of the unit. An open unit may have little in the way of treatment or admission policies with little control of expenditure. A closed unit will usually have well developed policies and uniformity of treatment leading to better expenditure control.
- 4.4.9 Since the fixed cost element is not related to patient activity a large ICU will have lower average costs than a small ICU. This is because treatment of a larger number of patients means the fixed costs represent a smaller proportion of the total. Thus a larger unit is more efficient than a smaller unit in economic terms. Similarly, the purchase of revenue items (up to £5000 per item allowed in NHS financial rules) in a larger unit will be associated with a lower proportional increment in costs than in a smaller unit. Table 4.2 compares a unit admitting 1000 patients per annum with one admitting 500. The baseline average cost per patient is higher in the smaller unit because fixed costs are distributed among fewer patients. The impact of a £5000 revenue purchase is seen to increment average costs per patient to a higher degree in the smaller unit.

**TABLE 4.2: The impact of revenue purchases according to unit size**

	Large unit	Small unit
Admissions	1000	500
Average cost per patient	£6000	£6500
Cost of development	£5000	£5000
New average cost per patient	£6005	£6510
Proportional increment	0.08%	0.15%

- 4.4.10 The factors affecting budget management decisions are many and varied. Critical care medicine has struggled to demonstrate its effectiveness and, without doing so, will not achieve adequate funding to meet the demand. Resource movement from other parts of the healthcare system will only become possible where benefits of critical care medicine can be proved worthy of releasing that resource. In the meantime budget management is focused on increasing efficiency. The principles of 'Comprehensive Critical Care', particularly relating to outreach care, may help manage demand. Without these principles of rationalisation the reduction of supply (rationing) becomes the only viable method of containing costs within limited resources.

## 5 PRICING AND CONTRACTING

### 5.1 Definition of prices

- 5.1.1 The link between costs and prices is fundamental to the contractual process. The 'NHS Costing for Contracting Manual' sets principles for NHS pricing.
- 5.1.2 Prices should be based on cost with no intention to make a profit.

- 5.1.3 Prices should be based on a costing process that recovers all costs associated with a given level of activity so that total anticipated costs divided by total anticipated activity gives the unit price.
- 5.1.4 There should be no planned or deliberate cross subsidisation of costs, i.e. prices should not be reduced in one area and subsidised by increases in another.
- 5.1.5 Applied literally this means that all costs are apportioned on a logical basis across all recoverable activities.
- 5.1.6 Costs may be defined as:
- **direct** i.e. directly attributable to a contract activity, e.g. critical care nursing
  - **indirect** i.e. apportionable on the basis of a recognisable activity statistic, e.g. critical care use of physiotherapy
  - **overhead** i.e. more difficult to apportion and not related to patient activity, e.g. corporate management costs, building maintenance
- 5.1.7 An alternative way of analysing costs would be:
- **variable** i.e. moving up and down with volumes of activity, e.g. bedside critical care nursing costs. Variable costs will include some direct costs and should include indirect costs as defined above.
  - **fixed** i.e. not moving with activity, e.g. non-bed side nursing costs, medical staff costs. Fixed costs will include some direct costs and all overhead costs as defined above.
- 5.1.8 For any given size of facility and activity categorising costs as in 5.1.6 or 5.1.7 above will produce identical totals. However, where activity changes the latter analysis will reflect the changes more accurately in the contracting process.

## 5.2 Contracts

- 5.2.1 A contract (known as a Service Level Agreement – SLA) generally contains arrangements to vary the amount paid in accordance with the variation of activity from the contract baseline.
- 5.2.2 As an example, let's say a critical care unit was negotiating one contract which had been set at the level of activity that occurred in the previous year, e.g. 1500 bed days. If the unit of activity was priced at £2000 per bed day (the total cost of providing the service) the income from this contract would be £3 million. If the occupancy to provide 1500 bed days was 68% (a six bedded critical care unit) and this occupancy increased to 80% there would be an additional 252 bed days with associated costs. Costs would not however rise at the full rate of £2000 per day since, for instance, building costs and medical costs (fixed costs) would not rise. However, bedside nursing costs and costs of drugs, consumables, blood etc. would all increase. This is generally covered in contracts by having a marginal (variable) cost clause for variations from target activity. For example, if the marginal costs clause was 50% then the hospital would receive £252,000 (252 days x £2000 x 50%) for the additional activity outlined above.
- 5.2.3 In setting a marginal price it should be noted that the variable cost element of additional activity may be higher than the variable cost element used for the contract. Additional nurses, for example, are often sourced from agencies at costs significantly greater than those of permanent staff on the payroll. The contract would need to take account of the short term effect of these additional costs.

- 5.2.4 In practice, for critical care units (which have significant variable costs) identifying the variable costs properly and incorporating clauses in contracts (SLAs) that appropriately reimburse the department (and therefore prevent overspends) is actually much more important than identifying an absolutely accurate baseline price. It is also of fundamental importance that the definition of activity is understood by both the hospital and purchasing agency. This definition should be a suitable proxy for variable costs.
- 5.2.5 Critical care is by its nature transacted both internally and externally. Internal transactions relate to the costs of a department's use of critical care. This element is usually included in the prices for that department's activities. Depending on the budget model (section 4) used in the hospital this element may be recharged to the user department with a trading account or apportioned to the critical care budget.
- 5.2.6 External transactions are generally taken to mean costs associated with patients who are transferred from another hospital and return back to that hospital after treatment. These are identified as critical care activity in SLAs and the currency of the transaction is usually bed days or patient dependency scored bed days.
- 5.2.7 It is important to recognise the cost differentials that exist between the two types of workload. External referrals are often more complex and, therefore, more expensive than internal referrals. There are also fewer of them. The marginal costs charged on to purchasers should recognise the difference between the two types of activity to ensure purchasers pay appropriately and avoid over-charging.

### **5.3 Specialist commissioning and Critical Care Networks**

- 5.3.1 The above has been written assuming that critical care is supplied as a service within the normal contractual (SLA) arrangements, probably to several or many purchasing agencies. At the time of writing, a debate is taking place as to whether these arrangements should be totally or partially changed so that one purchasing agency would take lead responsibility for purchasing critical care services over a wider area or region. Such an arrangement is called specialist commissioning and is considered appropriate where:
- services are specialised and need to be carried out in a small number of units
  - services would benefit from a planned approach (either relating to rationalisation or expansion)
  - small numbers of expensive referrals would benefit from a shared 'risk pool' of purchaser funding (similar to an insurance policy approach)
- 5.3.2 All three of these criteria apply in some respect to critical care services and, in particular, to those transfers made between hospitals for more specialised care.
- 5.3.3 The merger of health authorities into strategic agencies with purchasing managed by small primary care groups may prove to be a driver for specialist commissioning of critical care.
- 5.3.4 Though the debate over how specialised commissioning will affect critical care continues, what is already clear is that its implementation will lead to a need for more sophisticated activity reporting and with it an even more transparent view of how costs vary with each activity.

- 5.3.5 Running alongside specialist commissioning is the development of local Critical Care Networks. These have developed out of the NHS modernisation plan and the view that collaboration and mutual support between hospitals can reduce the effect that individual hospitals suffer as a result of peaks and troughs of activity. The networks also allow for co-operation on shared protocols, education and other common issues.
- 5.3.6 It is probable that these networks will eventually grow to have a role in the contracting process. One view of the way contracting might work in the future is that a lead purchasing agency works with a Critical Care Network to purchase all the critical care activities within their local area.

## **6 CAPITAL ASSETS, EXPENDITURE AND ASSET ACCOUNTING**

### **6.1 Capital assets and capital charges**

- 6.1.1 The 'NHS Trust Capital Accounting Manual' defines a capital asset as a tangible productive resource with an expected life in excess of one year. Capital assets usually require repair and maintenance and have a cost of £5000 or more (including VAT).
- 6.1.2 Since its inception, the NHS has always received a separate funding stream for the purchase of assets. Until 1991 no revenue charges arose from assets purchased from capital funding, but from April 1991 revenue charging, reflecting use of capital assets, was introduced. These capital charges were designed to:
- Increase awareness of the costs of using assets and provide incentives to use them efficiently
  - Ensure the costs of asset use were included in the calculation of contract prices
  - Promote the forward planning of asset replacement.
- 6.1.3 Capital charges are relevant to all assets owned by NHS trusts except those that are either donated or have a zero (written down) book value. Assets typically are either land, buildings or equipment.
- 6.1.4 Assets are brought into the balance sheet at their purchase cost which is subsequently revalued as a result of either periodic assessment (land and buildings) or annual indexation (equipment).
- 6.1.5 Each asset is given an asset life and a calculation is made which results in a charge to the trust's revenue account. For example, a ventilator costing £20,000 with a ten year life would be written down to a zero book value by 10 revenue account charges of £2000 over a 10 year period (assuming zero inflation). This charge to revenue is termed depreciation. All assets are depreciated in this way except land which is assumed to retain its value through time.
- 6.1.6 As the trust has to take account of all of its costs in contracting, the depreciation charge to revenue forms part of the calculation of prices used in SLAs. In turn this leads to income which is greater than expenditure and, theoretically, provides funds for future replacement purchases. This cash surplus, together with any received through an External Financing Limit (EFL – effectively an overdraft facility) allows the trust to formulate and deliver an annual capital spending plan (Programme).

- 6.1.7 The key word above is theoretically. Theoretically there should be enough money to replace equipment (through depreciation) and buy new equipment (through the EFL). However, a number of factors tend to prevent this being the case. These are:
- Revenue overspends eating into cash reserves
  - New developments exceeding the EFL allowance
  - Replacement equipment costing more than old equipment.

- 6.1.8 This often leads to a bidding process followed by a prioritisation of bids against available funds. Often replacement equipment gets squeezed out leaving departments to manage as best they can.

## **6.2 Alternative funding of capital equipment**

- 6.2.1 There are three alternative routes to increase the availability of funding for capital purchases.
- Increasing the EFL (or other earmarked funds) through a successful business plan application
  - Bids against trust funds
  - Leasing.

## **6.3 Increasing the External Finance Limit**

- 6.3.1 A bid to increase available EFL will need to be made with trust board approval and would usually involve a large sum of money – usually several hundred thousand pounds. The proposal would need to be of strategic significance and be subject to a business plan set out in a prescribed format following a detailed set of rules. So far as critical care is concerned this would only really be relevant where a new unit was being created or an old one completely refurbished.
- 6.3.2 Increasingly bids are now possible against funding earmarked by the Department of Health or regional offices for critical care.

## **6.4 Trust funds**

- 6.4.1 Where hospitals have trust funds then equipment purchases may be possible from them. Each hospital will have its own arrangement. Funds are often left to critical care by grateful relatives and these are often restricted in use to improving the critical care environment.

## **6.5 Leasing**

- 6.5.1 The third alternative is increasingly common although leasing is usually a last resort and offers less good value than straight purchase. Leasing is a way of financing a purchase without using scarce capital funds, but from an accounting point of view it needs to be considered carefully. This is because accounting rules and the instruments of their compliance (the auditors) distinguish between two types of lease: the finance lease and the operational lease.
- 6.5.2 The finance lease is regarded as a simple finance arrangement entered into in order to get something you otherwise would not be able to afford. In such an arrangement leasing charges are typically the total purchase costs plus finance charge with the ownership passing to the lessee from the lessor after the final payment has been made. From the auditor's point of view such transactions are treated as capital purchases and are, therefore, charges against the EFL. They have to be accounted for as though they

were purchased from capital funds. They, therefore, offer no advantage to the trust and should be avoided.

- 6.5.3 An operational lease should be seen as a type of rental agreement. Key features of an operational lease are that ownership does not automatically pass to the lessee at the end of the lease. It is also required that the total paid over the life of the lease (after deducting sums for inflation and for the inherent finance charge) does not exceed 90% of the original purchase price. This is known as the 90% rule.
- 6.5.4 In practice leasing companies and equipment suppliers seem very happy to offer compliant deals. However, it should be noted that there are two transactions from a procurement point of view: the purchase of the equipment (tender 1) and the choice of the best value lease (tender 2). Equipment suppliers often do not provide the most competitive prices for lease tenders. Advertisements for tender 1 should always include wording to make it clear that the intended purchase will be subject to an operational lease. Generally speaking, for best value to be obtained, a lease with the longest period that is also consistent with the 90% rule is most competitive. The life of a lease should reflect the expected life of the equipment, which is often nearer ten years than five, and leasing quotes should be obtained for a number of lease periods, e.g. five, seven and nine years. As specification and evaluation of leases is a technical area many trusts have employed specialist advisors to obtain best value and these advisors often identify options that are worth considering.
- 6.5.5 Because it is like a rental agreement an operational lease payment is charged in full directly to the revenue account. Any lease deal needs provision to have been made in the revenue budget. Rolling forward equipment provision from lease to lease is, therefore, a lot less difficult than obtaining new equipment where the costs of the lease need to be provided in full. However, before re-leasing replacement equipment consideration should always be given to purchasing (or renting for an extended period) the old equipment from the leasing company. It may, after all, not need replacing!

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