

Health

Acute hospital portfolio

 **audit**
commission



**Bed
management**

Review of national findings

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Introduction	2
Patient experience	4
Speed of admission in an emergency	4
Admitting patients to an appropriate ward	7
Single-sex accommodation	9
Cancellations of elective admissions	9
Making the best use of existing beds	10
Day surgery rates	11
Surgical inpatient lengths of stay	12
Emergency medical patients' lengths of stay	14
The effect of day of admission on length of stay	16
Weekend provision of diagnostic and support services	19
Team-based wards	20
Placement	20
Planning bed numbers	23
Delays to discharge and transfer	26
Numbers of beds and admissions	28
Bed occupancy levels	30
Bed numbers and occupancy levels	30
Bed numbers and length of stay	31
Conclusions	33

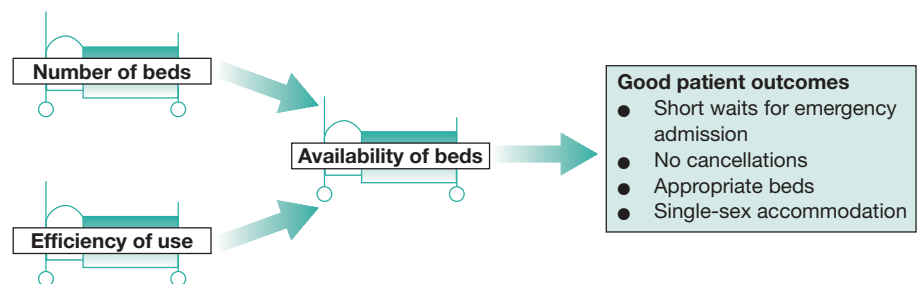
Introduction

- 1 The provision of inpatient beds is central to the acute hospital service. Together with the staff and supplies required, it accounts for much of the most complex and expensive activity in the trust. It is therefore essential that beds are managed well and used efficiently. And from the patient's point of view, it is important that there are enough beds to ensure that, for example:
 - patients do not have to wait when they need a bed in an emergency;
 - planned admissions for surgery are not cancelled because of a lack of beds;
 - patients are admitted to wards that are appropriate to their clinical needs; and
 - patients can be admitted to a single-sex ward if they choose.
- 2 Achieving these outcomes requires a mixture of capacity and process management (**Exhibit 1**). The way the beds are managed affects the way other hospital departments, such as operating theatres, perform since many are dependent on bed availability. These other hospital departments impact, in turn, upon bed usage. Those that are inefficient or have insufficient capacity can lengthen hospital stays and use up beds unnecessarily. Bed management issues therefore warrant consideration at the highest level within an NHS trust. The Government has recognised this and is supporting trusts in improving bed management as part of the provision of emergency services: the Emergency Services Collaborative – part of the NHS Modernisation Agency – is working with all trusts in England in a rolling programme throughout 2003 and 2004.

Exhibit 1

Effective bed management

The right balance of capacity and process management achieves good patient outcomes.



Source: Audit Commission

- 3 When planning capacity, most trusts have to provide both for emergency admissions and elective or planned admissions. Demand for emergency admission varies, albeit with predictable trends. Some spare capacity has to be available to meet the peaks in demand. Otherwise, on busy days, emergency admissions simply displace elective admissions, leading to cancellations, disruption and inconvenience for patients.
- 4 Patients, too, have different needs. They cannot always be placed in the first available bed – it must be on an appropriate ward. Wards generally cater for one or two specialties, which allows clinical skills and experience to be matched to the needs of patients. And patient preference for single-sex wards must be respected. Meeting these patient needs increases the number of beds that trusts must have available. If there are insufficient appropriate beds, patients are sometimes placed inappropriately in the wrong type of ward.
- 5 Acute bed numbers started falling from the 1970s onwards. In England, between 1988/89 and 1999/2000 the number of general and acute beds fell from 123,000 to 107,000 (Hospital Activity Statistics^I) although reductions in lengths of stay meant that the number of admissions rose. Since then, bed numbers have begun to increase again, and the most recent figures available show that there are 108,500 acute beds. In Wales, in 1990/91 there were 12,500 general and acute beds. Ten years later this had reduced to 10,990.^{II}
- 6 Many trusts, though, could improve patient outcomes without the provision of more beds if they managed their existing beds better. This includes ensuring that only the right patients are admitted and that unnecessary delays in diagnosis, treatment and discharge are avoided. Some delays to discharge, though, stem from a shortage of ‘intermediate’ or of other care in the community. This is beyond the power of acute trusts to remedy and requires input from the whole local health economy. In some trusts it can affect a considerable proportion of the available beds. This review though, focuses on the factors that acute trusts themselves can influence.
- 7 The Audit Commission last studied bed management in 1992 (Ref. 1). It identified large variations, both in numbers of beds available and in the efficiency with which beds were being used. Considerable changes have taken place since then, with reductions in lengths of stay, ‘admission avoidance’ schemes, and better discharge planning. Given these changes, it is timely to ask how much has been achieved and what more can be done.

Many trusts, though, could improve patient outcomes without the provision of more beds if they managed their existing beds better.

^I Available on Department of Health website at www.doh.gov.uk

^{II} Available on www.wales.nhs.uk

8 This is one of four national reviews being published simultaneously. The others cover Outpatients, Waiting for Elective Admission and Operating Theatres. Data were collected on all of these topics during 2002, or for the financial year 2001/02, from 94 per cent of acute and multi-service NHS trusts in England and Wales as part of the Acute Hospital Portfolio Project (see back cover for more details). Bed management results are reviewed under three headings:

- patient experience;
- making the best use of existing beds; and
- planning bed numbers.

Figures quoted below are for England and Wales, except where otherwise stated. Mental health, obstetric and day beds have been excluded.

Patient experience

When patients need emergency admission, it is important that they are admitted quickly and to an appropriate bed.

9 When patients need emergency admission, it is important that they are admitted quickly and to an appropriate bed. For patients being admitted from waiting lists for routine surgery, it is important to minimise the number of occasions that admissions are cancelled as a result of there being no bed available.

Speed of admission in an emergency

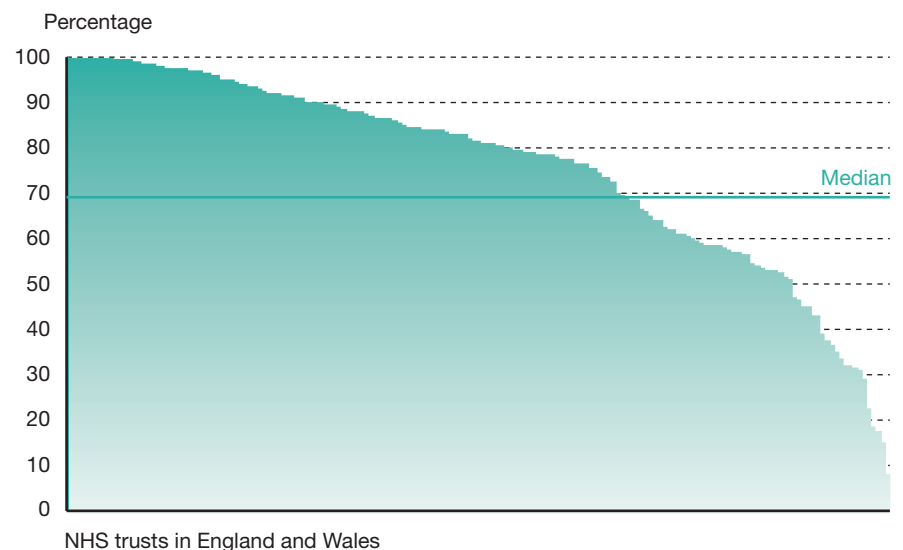
- 10 Patients should not be kept waiting unreasonably. Sometimes, however, patients who are ill enough to need admission are kept waiting on trolleys, perhaps in noisy areas or corridors with little privacy, where lights are left on all night and with no access to a bathroom. The Audit Commission has measured how well trusts are doing in their efforts to avoid this happening.
- 11 Most emergency patients are admitted via accident and emergency (A&E) departments. Following what is, hopefully, a short wait in the A&E department, perhaps punctuated by visits to other departments such as X-ray, they will be admitted to a bed on an inpatient ward. The latest figures (2002) show that the average (median) trust admitted 69 per cent of patients in this way within four hours. The average disguises the fact that, at some trusts, four out of five patients are spending more than four hours in A&E before they are admitted to a bed (**Exhibit 2**).
- 12 The NHS Plan waiting time standard for A&E patients covers all patients who attend the A&E department: those who are admitted, those who are transferred and those who are discharged (**Ref. 2**). The Audit Commission has already recommended that these three groups are monitored separately (**Ref. 3**). If this is not done, there is a danger that the figures for discharge – which are easier to achieve – will mask the admission time target, which is more difficult to achieve.

- 13 While it is important that the great majority of patients are admitted within four hours, a few patients remain in the A&E department, or another assessment area, for genuine and appropriate medical reasons. If trusts feel that they will be penalised if any patients wait longer than four hours for admission then there may be a risk that some patients will be admitted unnecessarily.

Exhibit 2

Percentage of patients admitted via A&E departments within four hours of time of arrival

Some trusts still admit fewer than one in five patients within four hours.



Source: Audit Commission Survey, March 2002 – England and Wales

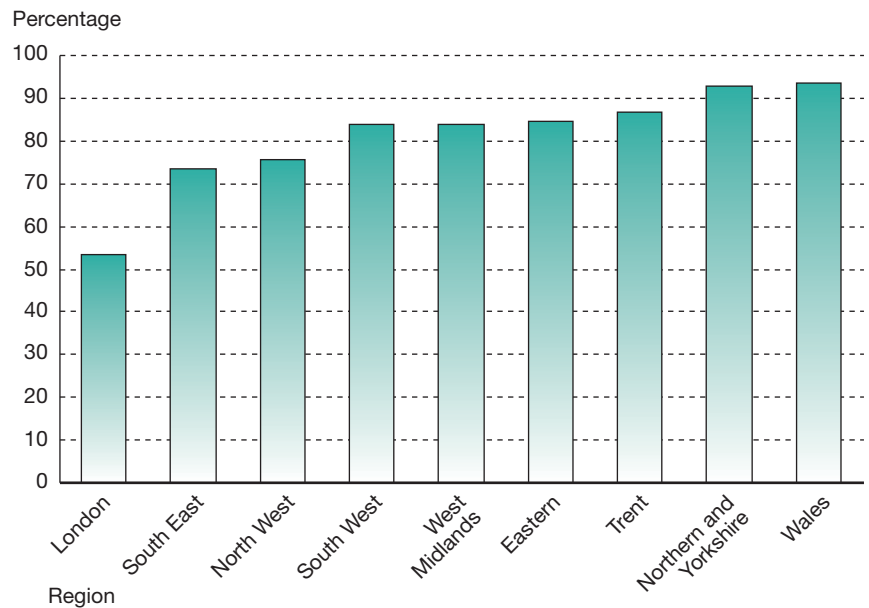
- 14 The figures quoted above, however, are only for patients admitted via A&E departments. Over the last two decades, hospitals have developed a range of other pathways by which patients can be admitted to hospital as an emergency. These include:
- beds in designated areas of A&E departments (sometimes called A&E wards or assessment units);
 - other emergency areas that do not deal with accidents and are not known as A&E departments, but where patients are held either on beds or on trolleys; and
 - direct admission to a bed on a definitive inpatient ward, by arrangement with the GP.

15 Where hospitals have these other routes in operation, data on waits in A&E departments alone do not fully reflect trust performance or patient experience. The Audit Commission has measured the number of patients who wait for more than four hours for admission via any route as a percentage of all emergency admissions to hospitals. Using this measure, in March 2002 the median trust admitted just over 81 per cent of patients within four hours. There were regional differences in performance. Wales and Northern and Yorkshire had the best performance, and London the worst (**Exhibit 3**).

Exhibit 3

Percentage of patients admitted within four hours of time of arrival by region

London and the South East find it most difficult to admit patients within four hours.



Source: Audit Commission Survey, March 2002 – England and Wales

16 The mean waiting time was just over two hours. These figures are better than those purely for patients admitted through the A&E department, reflecting the shorter times often achieved for patients who are admitted directly to wards or other units.

...one in five trusts admitted to having trolleys in areas where waiting times were not recorded, and nearly one in four had beds in areas that had inadequate facilities.

17 But even this measure is currently flawed. If patients are deemed to be admitted, but they are actually waiting on trolleys in places other than an A&E department, or in beds in A&E departments that have little privacy or inadequate facilities, then this measure makes performance seem better than it really is. When asked whether any of their patients waited in these conditions, one in five trusts admitted to having trolleys in areas where waiting times were not recorded, and nearly one in four had beds in areas that had inadequate facilities. The Department of Health has now amended its guidance on patients who are classed as ‘trolley’ waits¹ to include assessment units. Standards for the environment and facilities on admission and observation wards have also been set out.

Admitting patients to an appropriate ward

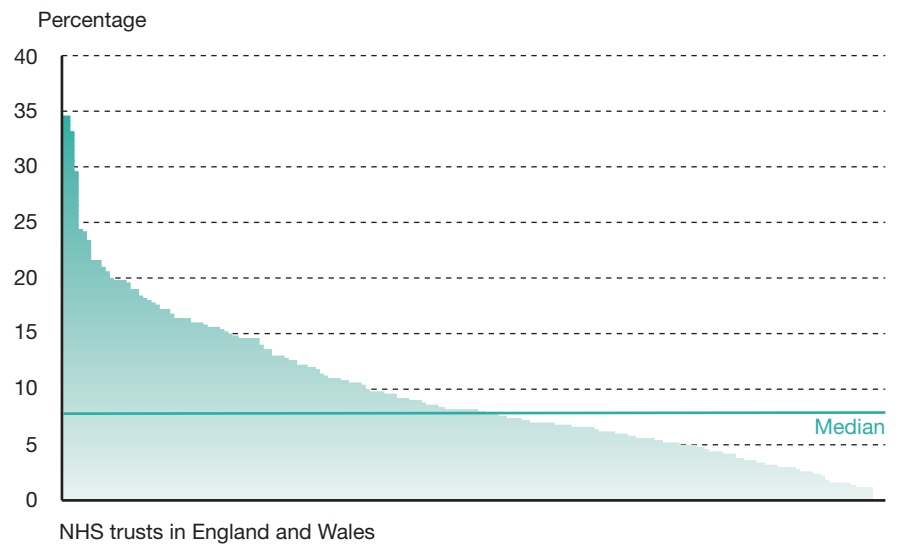
- 18 Wards in trusts are usually classified as medical and surgical with further specialisation reflecting the specialty interest of the consultants to whom the beds are allocated. These classifications are reflected in the skills and experience of the ward’s clinical staff. Trusts strive to admit emergency patients to the ward on which the consultant responsible for their care has beds. But this is often not possible because no bed is available on that ward and patients are placed on the next most appropriate ward. Consultants then have patients on several different wards, and wards have patients under the care of various consultants. This so-called ‘outlier’ phenomenon is inefficient, inconvenient for hospital staff and may adversely affect the quality of care provided.
- 19 There is no routinely available information on outliers so the Audit Commission asked trusts to carry out a survey of their beds at midday on four Thursdays in May 2002. They were asked to count how many of their medical beds were occupied by surgical patients and how many of their surgical beds were occupied by medical patients. On average, 7.5 per cent of surgical beds were occupied by medical patients (**Exhibit 4, overleaf**).

¹ Trolley waits are defined as starting from the decision to admit – not time of arrival.

Exhibit 4

The percentage of surgical beds occupied by medical patients

In the average trusts 7.5 per cent of surgical beds are occupied by medical patients because there are not enough available medical beds.



Source: Audit Commission Survey, 2002 – England and Wales

- 20 In the survey, 58 per cent of adult beds were classified as medical and rehabilitation (this includes admissions, care of older people and interim care wards) and 42 per cent were classified as surgical. National data, though, show that for 2001/02, medical patients took up 63 per cent of the occupied bed days. It is hardly surprising, therefore, that in most trusts there is a net use of surgical beds by medical patients. But trusts with this problem seem reluctant to reallocate beds to reflect usage. The reason normally given is that the threshold for decisions to admit is adjusted to circumstances, so that emergency medical patients will always fill up all available beds and then spill over. If that view is correct, simply allocating more beds will not solve the problem of outliers. The current situation, however, with almost permanent outliers, is inefficient and could lead to cancellations of elective admissions. A more appropriate method of controlling medical bed usage is needed by, for example, controlling admissions or lengths of stay.
- 21 The data collected by the Audit Commission include only the most basic type of outliers – medical patients on surgical wards and vice versa. In many trusts, patients are regarded as outliers if they are in beds classified under one medical specialty but are under the care of a consultant of a different medical specialty. This will also result in consultants having patients on several medical wards. Some trusts are addressing this issue and changing the way that patients are allocated to consultants and wards. This is discussed on page 20.

Single-sex accommodation

- 22 Over the last ten to fifteen years, many wards have become 'mixed sex'. This has been facilitated by the increasing use of wards subdivided into bays, rather than the single room 'Nightingale' style wards that were often built in the past. This is sometimes, though not always, acceptable to patients. Much depends on the level of privacy within bays and the provision of separate and easily accessible bathrooms. The Department of Health has collected its patients' views on this subject in a national inpatient survey but this information has not been made publicly available. Pressure on beds will inevitably make matters worse, since trusts will maximise occupancy levels, rather than keeping patients waiting on trolleys, even if this means that wards or beds with less than adequate facilities must be used. Trusts are now expected to address this issue as part of the NHS Plan, ensuring that all their beds and wards give sufficient privacy for patients and that a patient's choice with regard to single-sex accommodation can be respected (**Ref. 2**). This is part of good bed management.

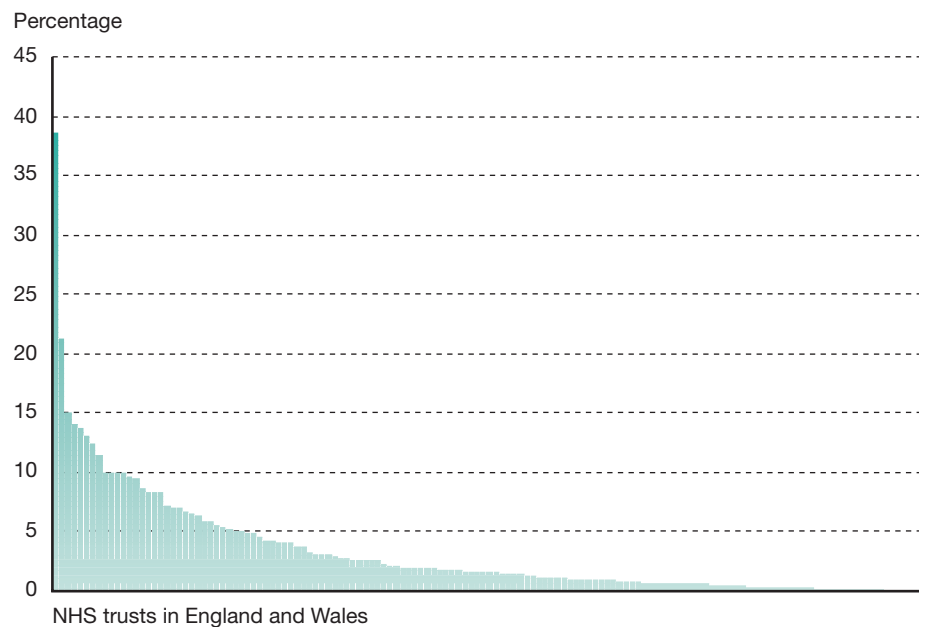
Cancellations of elective admissions

- 23 Sometimes a lack of available beds means that admissions for planned surgery have to be cancelled. Of course, admissions can be cancelled for other reasons, for example, because a trust lacks theatre capacity, surgeons or anaesthetists. Many trusts are now recording the reasons for cancellations to improve planning and co-ordination. The Audit Commission asked trusts to provide information on the number of admissions they cancelled as a result of insufficient beds in the week before the scheduled operation. Although this is a significant issue for some trusts, the median is only 1.4 per cent of admissions cancelled for this reason. Trusts report, however, that one in three admissions cancelled by them rather than the patients are because of a lack of beds (**Exhibit 5, overleaf**).

Exhibit 5

Proportion of elective admissions cancelled for lack of a bed

Trusts record that only a small proportion of elective admissions are cancelled because of the lack of a bed.



Source: Audit Commission Survey, 2002 – England and Wales

Making the best use of existing beds

24 Patients' experiences of admission to an inpatient bed depend not just on the number of (staffed) beds available at a trust, but also on those beds being used efficiently. If patients are admitted unnecessarily – when care could be provided in the community, or when there are delays in the diagnosis, treatment or discharge of patients – valuable resources are wasted and bed shortages occur. Trusts must therefore ensure that existing beds are being used appropriately before they consider making more available. Several aspects of efficiency are reviewed in this section:

- day surgery rates;
- surgical inpatients' lengths of stay;
- emergency medical patients' lengths of stay;
- the effects of the day of admission on length of stay;
- weekend provision of diagnostic and support services;
- team-based wards; and
- placement.

...potential savings in inpatient bed use from the extended use of day surgery are now relatively small in the overall scheme.

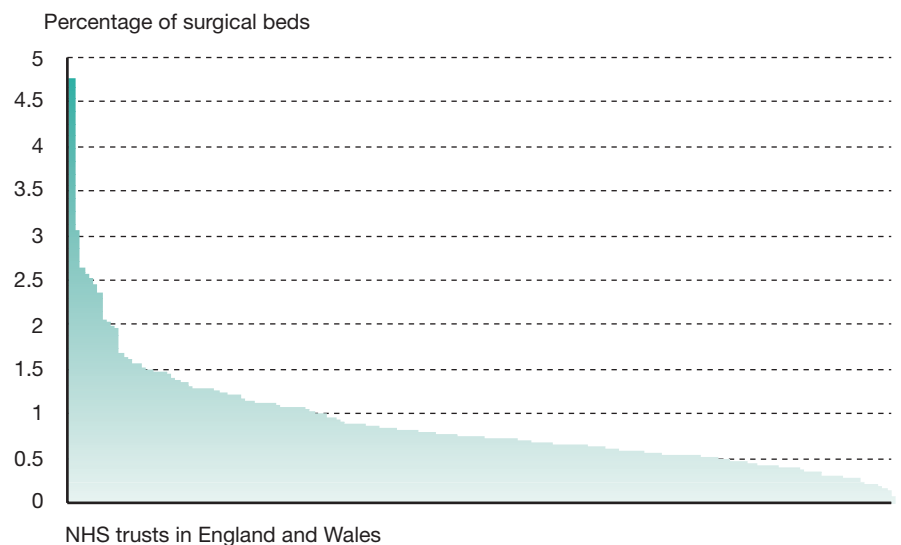
Day surgery rates

25 One way of making more inpatient beds available is by doing more elective surgery as daycases. The Acute Hospital Portfolio review of national findings on day surgery in 2000 concluded that about 120,000 patients who were treated as inpatients could be treated as daycases, based on its basket of 25 key surgical procedures (Ref. 4). Data for 2001/02 show that some progress has been made. The potential to substitute daycases for inpatients has dropped to 105,000. This is still a considerable number, however, and the Audit Commission has already shown that many trusts have capacity within their daycase units to increase throughput. Day surgery has considerable benefits for patients, and efforts to increase the amount done should continue, but this will not, in general, release many inpatient beds (Exhibit 6) (Ref. 5). Bed days that could be released have been calculated using the usual (mode) length of inpatient stay for these procedures within each trust. Using this calculation, an average of only 0.69 per cent of the available surgical beds (that is, one or two in most hospitals) would be released in each trust. There is slightly higher potential in Wales, with an average of 1.24 per cent. While these sorts of saving should not be ignored, and in some cases may make a critical difference, potential savings in inpatient bed use from the extended use of day surgery are now relatively small in the overall scheme.

Exhibit 6

Percentage of surgical beds that could be saved if potential extra day surgery is performed

While increasing the proportion of surgery done as daycases is in the patient's interest, it has limited impact on releasing inpatient beds.



Source: Hospital Episode Statistics (HES) for England and Patients' Episode Database for Wales (PEDW) data for Wales (2001/02)

Surgical inpatient lengths of stay

26 For more major surgical procedures, where daycase treatment is not generally an option, the length of time that patients stay in hospital for a given procedure varies from trust to trust. To assess the impact of this on the number of beds used, a set of six tracer procedures was selected:

- hip replacement;
- appendicectomy;
- mastectomy;
- hysterectomy;
- endoscopic prostatectomy; and
- cholecystectomy^I

27 It is possible to calculate the percentage reduction in bed days needed if each trust reduced its length of stay to that achieved by the best performing trusts^{II}. The longer the lengths of stay, the greater the potential reduction in bed days. There is considerable variation across all trusts in this indicator, and marked variations between trust types (**Exhibit 7**). Some of the difference could be due to variations in case-mix within procedures. For example, 'hip replacement' may include a varying proportion of the more complex revision procedures. This might particularly affect the teaching trusts. The differences between London teaching trusts and teaching trusts outside London, however, and between London non-teaching trusts and the other non-teaching trusts are hard to explain and warrant further investigation.

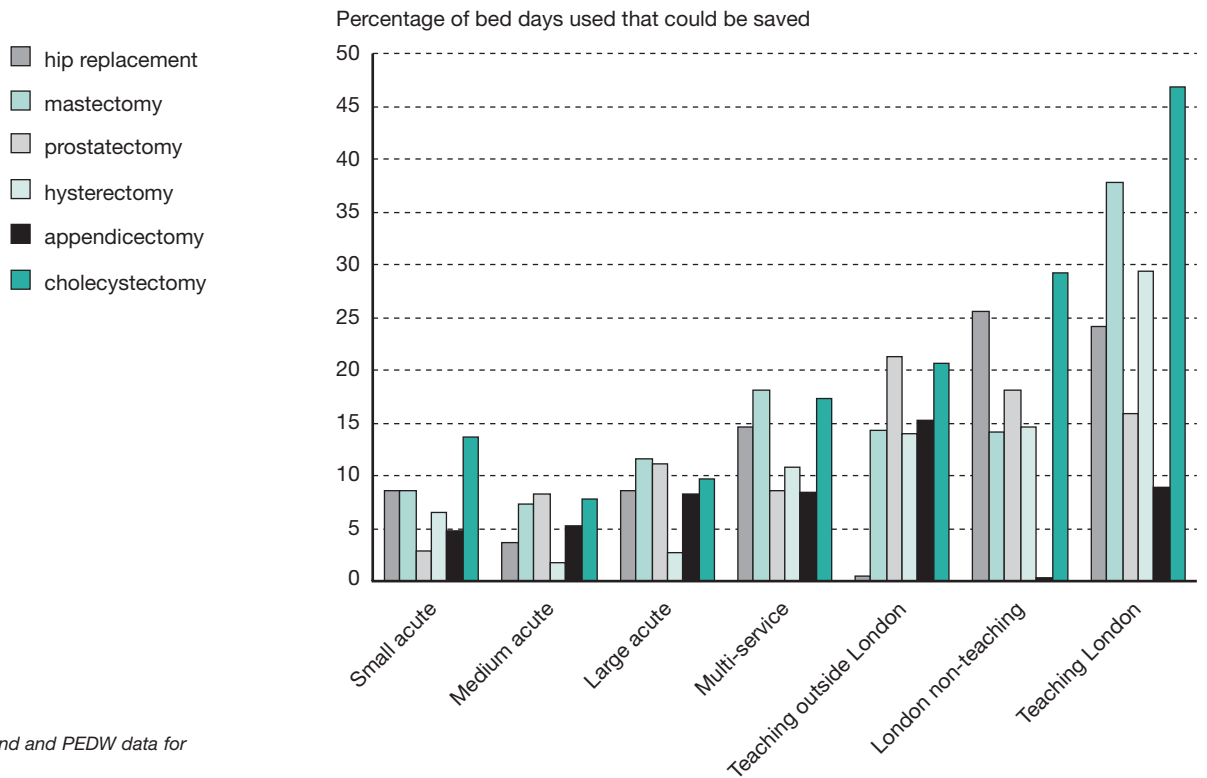
I Cholecystectomy is suitable for day surgery and is included in the list of procedures appropriate for day surgery (basket of 25 procedures – 2000). It is included here because many are still done as inpatient procedures.

II Achieving the lower quartile average length of stay.

Exhibit 7

Potential per cent reduction in bed days used if trusts reduced their surgical lengths of stay to lower quartile level (six procedures)

The longer lengths of stay in London for routine inpatient surgical procedures are hard to explain.



Source: HES for England and PEDW data for Wales (2001/2002)

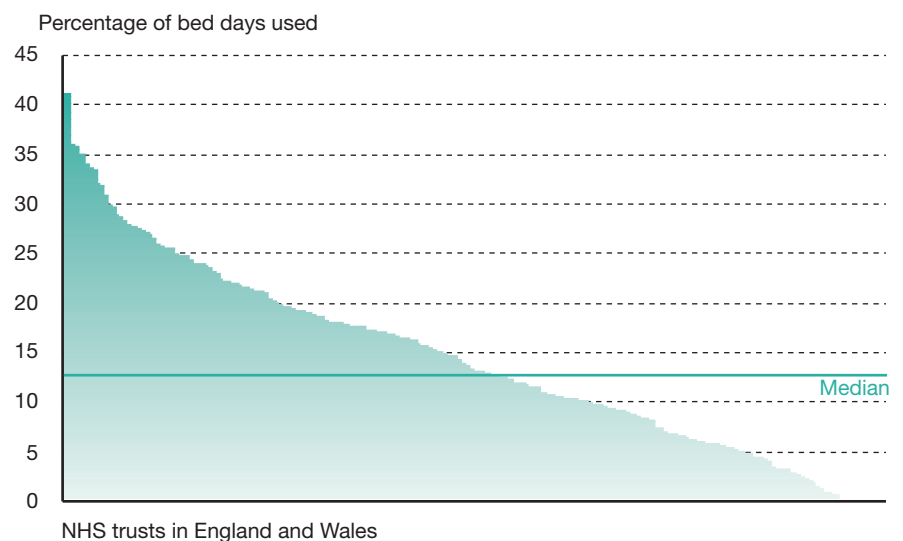
Overall, the impact of reducing surgical lengths of stay to those of the most efficient 25 per cent of trusts is considerable for many trusts.

- 28 Overall, the impact of reducing surgical lengths of stay to those of the most efficient 25 per cent of trusts is considerable for many trusts. The median is 12.4 per cent of the bed days used for these procedures (**Exhibit 8**). If this is representative of all bed usage for inpatient surgery, then the average trust, which has 190 available surgical beds, could release up to 24 beds in this way and most cancellations caused by a lack of beds could be avoided.

Exhibit 8

Potential saving in bed days if trusts reduced lengths of stay for common surgical procedures (six procedures)

The impact of reducing surgical lengths of stay is considerable for some trusts.



Source: HES for England and PEDW data for Wales (2001/2002)

Emergency medical patients' lengths of stay

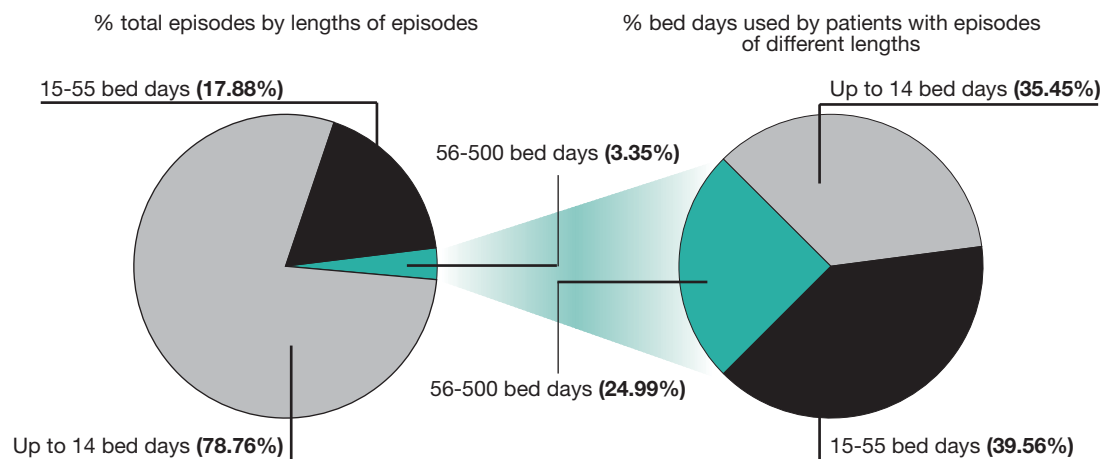
- 29 The process of diagnosis and treatment of acutely ill patients requires the input of many different departments and staff groups. All these resources must be carefully planned, yet retain flexibility to cope with a fluctuating workload and changes in medical practice. When they are not properly planned, bottlenecks develop. Some patients may have to wait for diagnostic tests or for treatment, thereby lengthening their stay, or possibly even causing harm. Others may wait for a doctor to review them and make a decision to discharge them. The effect is proportionately greater for patients with straightforward problems who would have relatively short stays anyway. Delays of even a day or two have a significant impact on patients, and on the use of the beds that they occupy.

- 30 Nearly 80 per cent of patients who are admitted as an emergency stay less than 15 days; this includes 5 per cent who are admitted and discharged on the same day. All of these patients, however, use up only 35 per cent of the available medical and rehabilitation beds.
- 31 By contrast, the 3.5 per cent of patients who stay more than 56 days occupy 25 per cent of the available beds (**Exhibit 9**). It is likely that this group includes many patients whose discharge or transfer is delayed by factors outside the trust's control, such as a lack of intermediate care in the community. This imposes a constraint on the capacity of the trust to meet the demand for care; this is discussed further in the last section of this review.

Exhibit 9

Proportions of patients and bed days by length of stay

Seventy-nine per cent of acute emergency admissions use only 35 per cent of bed days, with the 3.35 per cent who stay longer than 56 days using 25 per cent.



Source: HES for England and PEDW data for Wales (2001/02)

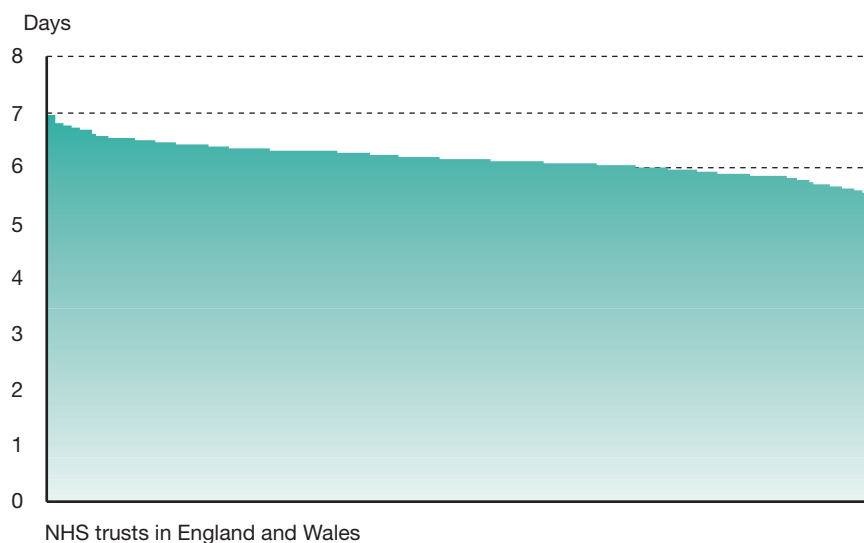
- 32 In order to compare the efficiency with which trusts diagnose, treat and discharge the majority of patients, the distorting effect of long delays that are beyond the control of individual trusts must be excluded. Patients who are admitted and discharged on the same day and patients who stay for one night have also been excluded because trusts record these episodes in different ways. The average length of stay of patients who remain in hospital between 2 and 14 days has therefore been used for comparison.
- 33 The case mix for emergency medical admissions should be relatively independent of the type of trust that admits them, since all acute and multi-service trusts have to take any patient who needs admission. It is more likely to be affected by the age, health and social profile of the population.

34 The median length of stay for patients staying 2-14 days is 6.04 days. The range is from 5.30 to 6.82 days, with the upper quartile being 6.22 days and the lower quartile 5.86 days (**Exhibit 10**). If trusts at or above the upper quartile length of stay reduced to the lower quartile level, the effect would be to release 6 per cent of their medical and rehabilitation beds. In the average trust this would be about 12 beds; this would have a significant impact on trusts' ability to cope with the peaks and troughs in demand and to improve the patients' experience.

Exhibit 10

Trimmed (2–14 days) length of stay for emergency medical admissions

The variation across trusts is not great but it affects many patients.



Source: HES for England and PEDW data for Wales (2001/02)

35 Of course, trusts should also strive to reduce unnecessary delays to the discharge of those patients who stay more than 15 days. Some of this excess delay will also be within the trust's power to remedy through efficient case management, reductions in internal waiting times and early and effective discharge planning.

The effect of day of admission on length of stay

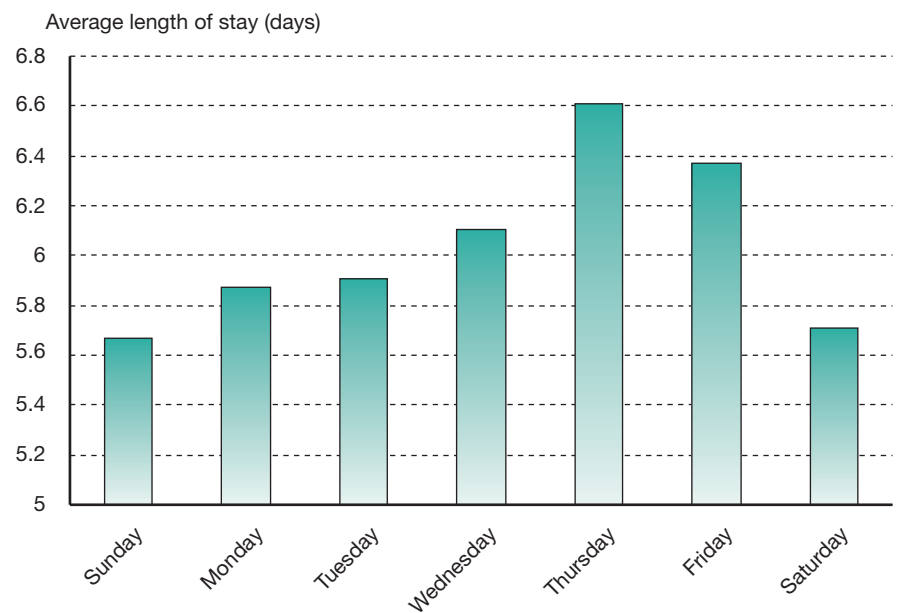
36 There is no justifiable reason why patients who are admitted on one day of the week should stay in hospital longer than those admitted on any other. Yet that is what happens. Patients who are admitted on Thursdays have the longest stay in hospital, while patients admitted on Sundays usually have the shortest stay (5.7 days on Sundays compared with 6.6 days on Thursdays)¹ (**Exhibit 11**).

¹ Episodes included are 2-14 day stays, as used above.

Exhibit 11

Average length of stay by day of week of admission

Patients admitted on a Thursday stay in hospital for longer, though it is unlikely that their cases are more complex.



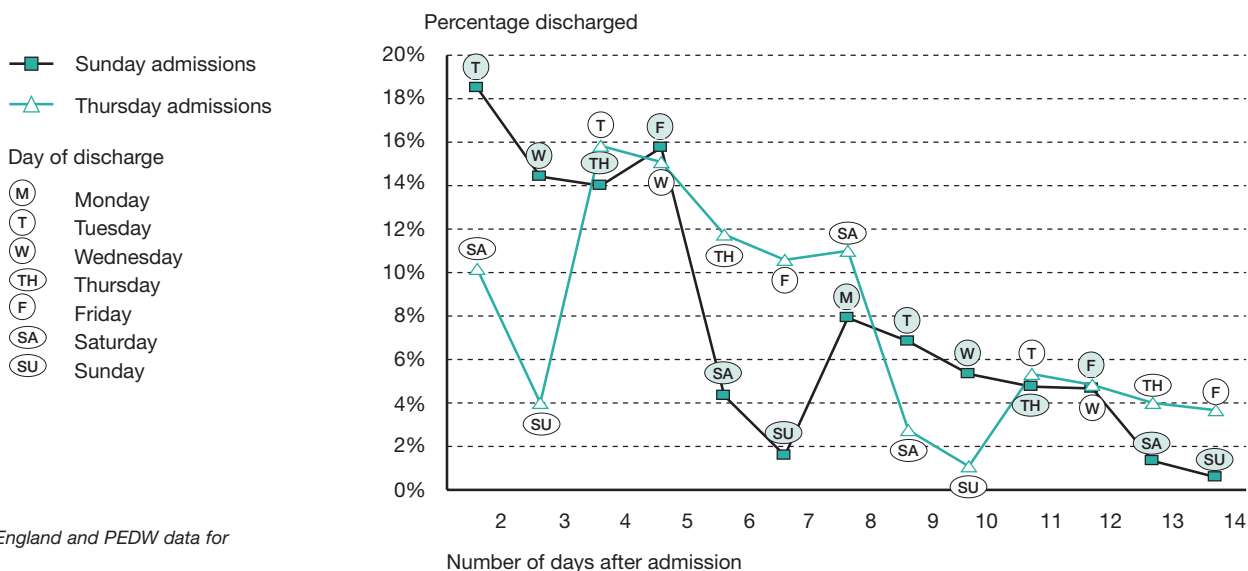
Source: HES for England and PEDW data for Wales (2001/02) 2-14 day stays

- 37 This is partly explained by the marked drop in the number of patients discharged at the weekend. While for patients with complex care needs discharge at the weekend may be undesirable, for the relatively short stay patients reviewed above this is unlikely to be the case. Nevertheless, of patients admitted on a Sunday – the day when patients have the shortest length of stay – 33 per cent are discharged on Tuesday and Wednesday of the same week. Of the patients admitted on a Thursday, however, only 14 per cent are discharged on the equivalent second and third days of care – Saturday and Sunday (**Exhibit 12, overleaf**).

Exhibit 12

Rates of discharge of patients admitted on Thursdays and Sundays

If patients admitted on a Thursday were discharged at the same rate as those admitted on a Sunday 14.5 per cent of their bed days would be saved.



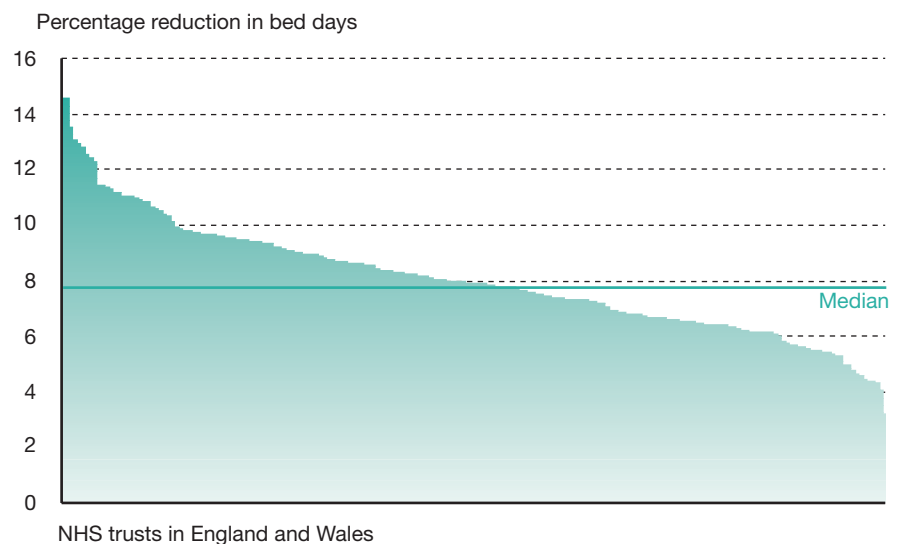
Source: HES for England and PEDW data for Wales (2001/02)

- 38 The most likely explanations for the reductions in discharges and longer lengths of stay are that reduced availability of support and diagnostic departments at the weekend delays diagnosis and treatment, and that fewer and more junior medical staff are available, who may be unable or unwilling to make decisions regarding treatment and discharge of patients. For these reasons, trusts are being encouraged to move to full seven-day-week working, rather than having the reduced levels of support and medical staff currently available at weekends.
- 39 Reducing the average length of stay in a trust to that of the day of the week when its stay is shortest would have a significant impact, even for some of those trusts that already have relatively short lengths of stay. The median reduction in bed days used would be 7.7 per cent (**Exhibit 13**). In the average trust this would release six or seven beds. Such a change would, of course, be hard to achieve. It would carry costs related to increasing medical staffing and the availability of support services; nevertheless it should be investigated.

Exhibit 13

Potential saving in bed days if average length of stay was the same as the day when it is shortest

If trusts reduced these longer lengths of stay to the day when they achieve the shortest length of stay, a significant proportion of bed days could be saved.



Source: HES for England and PEDW data for Wales (2001/02)

Weekend provision of diagnostic and support services

- 40 Data were collected on the availability of some important diagnostic and support services at weekends. A scoring system was devised, awarding points according to the level of availability (**Table 1, overleaf**).¹ While there is considerable variation across trusts in the levels of weekend service provision, it is not clearly linked to length of stay. It is important that trusts understand the factors that delay treatment and discharge at the weekend and are clear about how they interrelate so that investment in improving service provision really does reduce delays.

¹ More information on the scoring system used is available on the Audit Commission's website at www.audit-commission.gov.uk/itc/acuteportfolio.shtml

Table 1**The diagnostic and support services included in the survey**

Biochemistry	Full biochemical profile Troponin
Haematology	Full blood count Coagulation studies
Radiology	Plain X-ray CT – head CT – body MRI – brain MRI – other Angiography – pulmonary, CT or other Ultrasound – doppler Ultrasound – abdominal

Pharmacy**Patient transport****Team-based wards**

- 41 Information was also collected on the method of allocating emergency medical patients to beds and consultants. Some trusts have recently moved to a system of team or firm-based wards. This means that each consultant ‘owns’ specific beds and is responsible for all the patients in those beds regardless of the admitting consultant. The system aims to reduce the extent both to which consultants have patients on several wards, and where all wards have many different consultants’ patients. This should improve communication between doctors and nurses about patient care and mean that patients are seen by doctors more frequently. This could lead to a reduction in lengths of stay but, so far, there is no evidence of a correlation. This may be because any changes are relatively recent and have not yet had an impact. Trusts that introduce such changes should ensure that they can demonstrate, by careful audit, any reductions to length of stay and improvements in patient care.

Placement

- 42 Placement refers to the process of identifying available beds and the allocation of patients who need admission to them. Trusts may have enough empty beds but accurate information on where they are must also be made available. Delays may occur between identifying a vacant bed and transferring the patient. Much effort has been expended by trusts on improving placements to ensure that no beds are empty when there are patients waiting to occupy them. Twenty-four hour bed bureaux or bed management services have been established in many trusts to enable this to happen. This has, by and large, been successful and most trusts have very high occupancy levels with little scope for further improvements.

Trusts that introduce such changes should ensure that they can demonstrate, by careful audit, any reductions to length of stay and improvements in patient care.

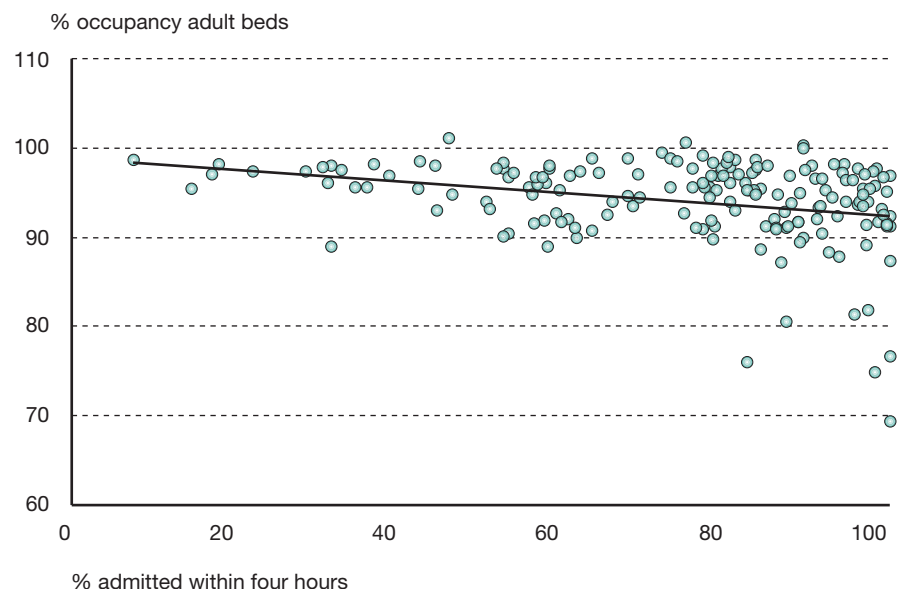
High occupancy levels, while desirable in terms of the use of beds, may be counter-productive in achieving good patient outcomes.

- 43 High occupancy levels, while desirable in terms of the use of beds, may be counter-productive in achieving good patient outcomes. The average trust, with 260 medical and rehabilitation beds, has only eight empty beds at midday, so on days when admissions outnumber discharges by more than eight there are bound to be crises. Moreover, many trusts are only coping by placing medical patients in surgical beds. Anecdotal evidence suggests that particular pressure occurs on those days when batches of elective surgical patients are booked for admission. The smaller numbers of discharges at weekends means that Monday mornings are often particularly problematic, with high numbers of medical patients still occupying beds that are needed for booked surgical patients. Careful planning is necessary to ensure that both emergency and elective needs can be met, while making best use of the beds.
- 44 The data collected in the Audit Commission survey showed that adult bed occupancy and waits for admission to a bed are correlated. As occupancy levels rise, so trusts are able to admit fewer new patients within four hours of arrival. Some trusts, however, appear to combine very high occupancy levels with few, or no, patients waiting more than four hours for admission (**Exhibit 14**). This could be the result of exceptionally efficient placement processes but it seems unlikely that this is the full explanation. It is possible that, at some of these trusts, some patients' waiting times are not recorded or are underestimated. The Audit Commission examined the accuracy of waiting time monitoring in its review of data accuracy in the NHS (**Ref. 6**). It found that fewer than 50 per cent of trusts had completely satisfactory procedures for recording information for the two-hour trolley wait targets. Some trusts themselves identified that the necessary timing information had not been recorded for all patients.

Exhibit 14

Percentage of patients admitted within four hours of time of arrival and percentage adult occupancy

As occupancy levels rise, the percentage admitted within four hours falls.



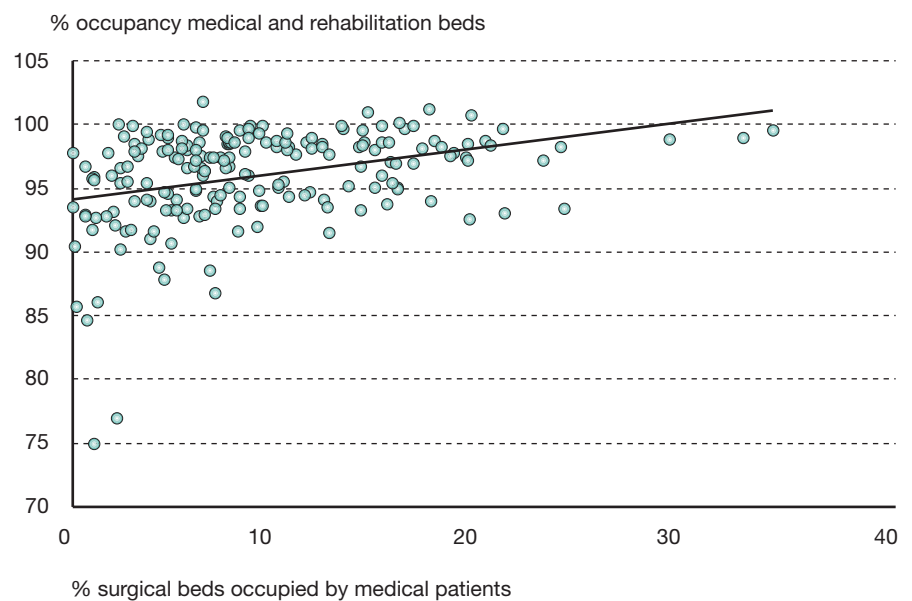
Source: Audit Commission Survey, 2002 – England and Wales

45 Another indicator of the effectiveness of placement is the percentage of beds occupied by outliers (discussed on page 6). Bed managers should always try to place patients on the most appropriate ward. The percentage of surgical beds occupied by medical patients, however, is correlated with occupancy levels. As the occupancy of medical and rehabilitation beds rises, more patients must be placed in surgical beds. The correlation is loose, showing that some trusts with relatively low occupancy levels also have many outliers (**Exhibit 15**). Placing medical patients on surgical wards should be a last resort and trusts should only have outliers when medical bed occupancy is high.

Exhibit 15

Medical outliers on surgical wards and percentage of occupancy of medical and rehabilitation wards

Mostly, medical patients are placed in surgical beds because the medical beds are already full – but some trusts could do better.



Source: Audit Commission Survey, 2002 – England and Wales

46 Although trusts differ in their performance on the efficiency indicators set out above, most could improve in at least one area – releasing beds, reducing trolley waits, outliers or cancellations. However, some trusts are under such pressure that even with better management they are unlikely to solve these problems without more beds.

Some trusts have more than twice the level of medical and rehabilitation beds of others.

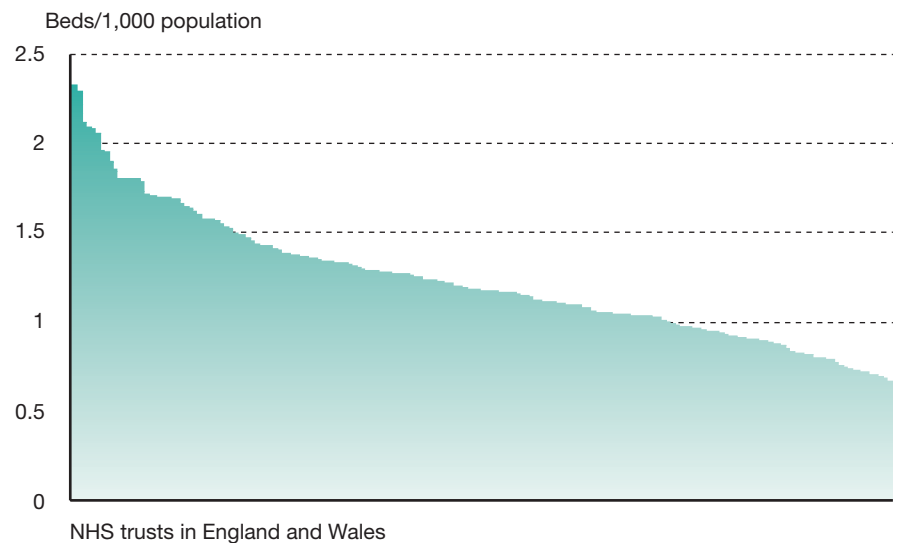
Planning bed numbers

- 47 The numbers of beds that trusts have relative to their local populations varies¹. Some trusts have more than twice the level of medical and rehabilitation beds of others (**Exhibit 16**). And there are regional differences, with trusts in the north of England and Wales having more beds relative to their catchment populations, while the South East and South West regions have the least (**Exhibit 17, overleaf**).

Exhibit 16

Medical and rehabilitation beds per 1,000 catchment population

There are large variations in the numbers of bed that different trusts have relative to their catchment populations.



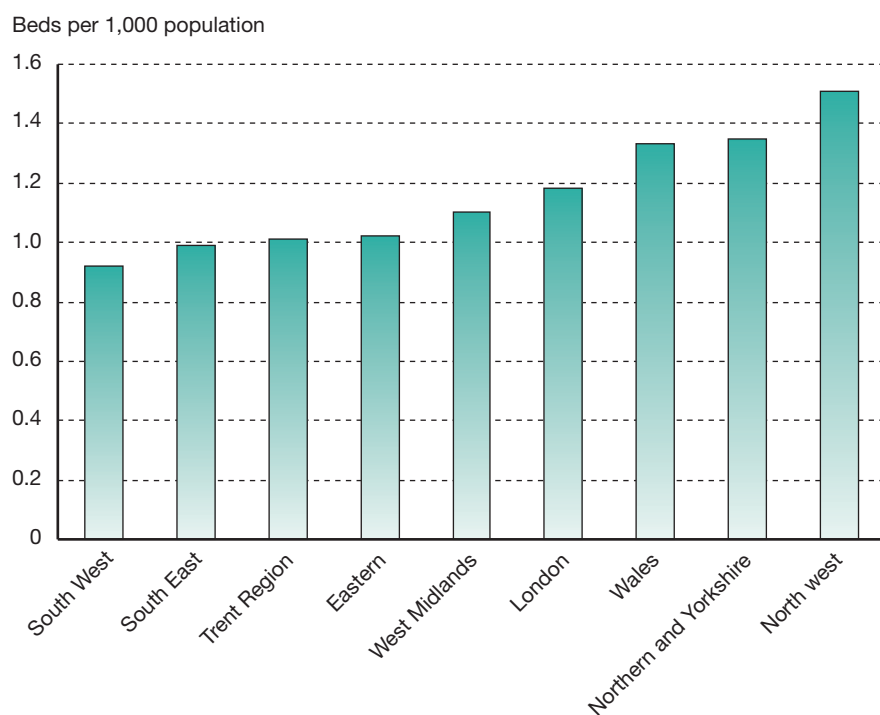
Source: Audit Commission Survey, 2002 – England and Wales – for catchment population see footnote

¹ Catchment populations have been calculated by allocating areas to trusts in proportion to the relevant patients actually admitted from that area in a sample year.

Exhibit 17

Medical and rehabilitation beds per 1,000 catchment population within regions

There are quite marked regional variations.

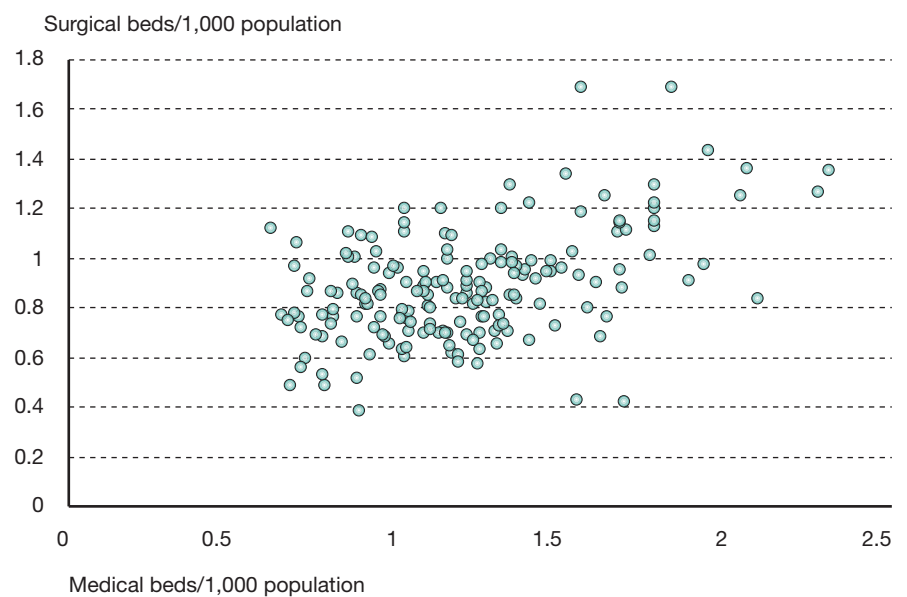


Source: Audit Commission Survey, 2002 – England and Wales

- 48 The numbers of medical, rehabilitation and surgical beds that trusts have relative to their catchment populations are quite closely correlated (**Exhibit 18**). This means that there is also considerable variation in numbers of surgical beds relative to catchment populations.

Exhibit 18**Relationship between provision of medical and surgical beds per 1,000 catchment population**

Trusts that have more medical and rehabilitation beds also tend to have more surgical beds.



Source: Audit Commission Survey, 2002 – England and Wales

- 49 Of course, some trusts need more beds relative to their catchment populations than others. There may be fewer non-acute beds available in the local health economy or the population that they serve may be older or more deprived and so have greater health-care needs.
- 50 There is a tendency for trusts that have beds on several sites, particularly those with small sites that may be used for less acute or rehabilitative patients, to have more beds relative to their populations. This relationship holds for both medical and rehabilitation beds, and for surgical beds. Managing beds across several sites is complicated. When it is done well, the ability to move less acutely ill patients to non-acute beds can help to release acute beds for patients who need them. These non-acute beds, however, often have low occupancy levels, making them relatively expensive. Decisions about providing beds have to take local factors, such as geographical location, into account. They can rarely be taken on the basis of cost or efficiency alone.

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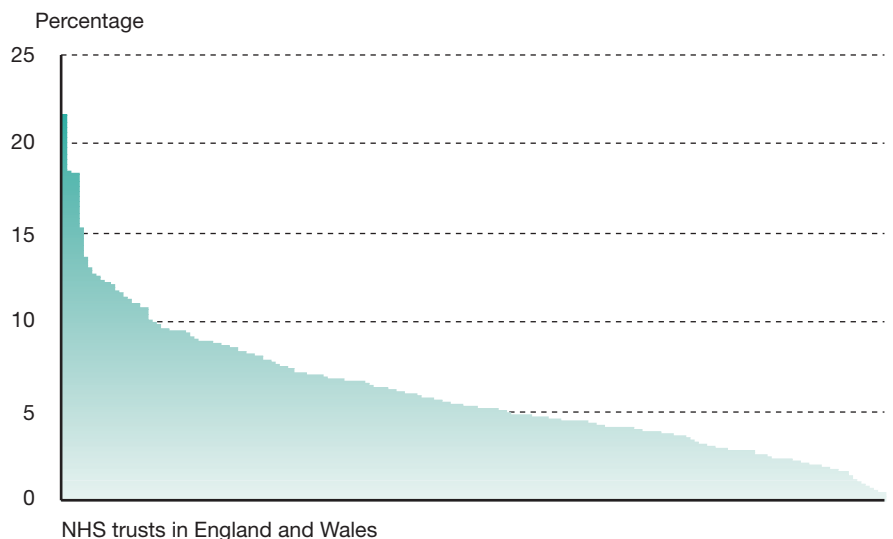
Delays to discharge and transfer

- 51 One way to assess the impact on acute trusts of the (lack of) provision of non-acute beds or other intermediate care in the community, is to measure delays to discharge or transfer from acute beds. Trusts frequently complain that their acute beds are occupied by patients who are medically stable and who no longer need the levels of care provided for patients in these beds, but who cannot safely be discharged for reasons beyond the trust’s control.
- 52 In the survey carried out on the four Thursdays in May 2002, trusts were asked to record how many of their beds were occupied by such patients. On average (median) trusts reported that 5 per cent of their available beds were used in this way (Exhibit 19).

Exhibit 19

Percentage of available beds occupied by patients whose transfer is delayed

An average trust has 5 per cent of its beds occupied by patients whose transfer is delayed.



Source: Audit Commission Survey, 2002 – England and Wales

- 53 Another way of assessing this so called ‘bed blocking’ problem is to calculate the proportion of beds that are occupied by patients who stay for a long time. Few patients who are still in hospital after 56 days are there for diagnosis or treatment. Trusts caring for more patients staying beyond 56 days are, therefore, likely to be experiencing delays to discharge or transfer. The average proportion of bed days used by emergency medical admissions occupied by these patients – 25.7 per cent – is considerable.

- 54 In an apparent paradox, trusts that serve younger catchment populations tend to have more delayed discharges and a higher proportion of beds used by long-stay patients (**Table 2**). One plausible explanation for this is that there may be a confounding London effect. Of the 35 trusts classified as serving younger populations, 22 are in London. The 35 London trusts as a group also have a higher number of beds occupied by long-stay patients and patients whose discharge is delayed.

Table 2

Proportion of beds and bed days used by patients whose transfer is delayed or who stay more than 56 days

Trusts serving younger populations have more delayed transfers.

Age group	Percentage of catchment population over 65 years	Percentage of beds occupied by delayed transfer patients	Percentage of bed days used by patients staying more than 56 days
Older	More than 21	4.65	23.3
Medium	16 – 21	5.21	26
Younger	Under 16	5.57	31.8

- 55 When trusts have beds that are occupied by patients whose transfer is delayed due to factors genuinely beyond their control, they need more beds relative to the population they serve. There is, however, no correlation between either the delayed transfer indicator or the percentage of bed days occupied by patients staying more than 56 days and the number of available beds relative to trusts' catchment populations (**Exhibit 20, overleaf**). Trusts with a higher proportion of long-stay patients and fewer beds will, therefore, be under greater pressure.

Exhibit 20

Proportion of bed days used by long-stay patients and provision of medical and rehabilitation beds per 1,000 catchment populations

There is no relationship between the proportion of long-stay patients that a trust has and the number of beds it has relative to its catchment population.



Source: Audit Commission Survey, 2002 – England and Wales

- 56 There are regional differences in the numbers of delayed discharges. Regions with the biggest reported problems are the south east and the West Midlands. Trent, Northern and Yorkshire and Wales reported the lowest numbers of beds being used by patients whose discharge is delayed.

Numbers of beds and admissions

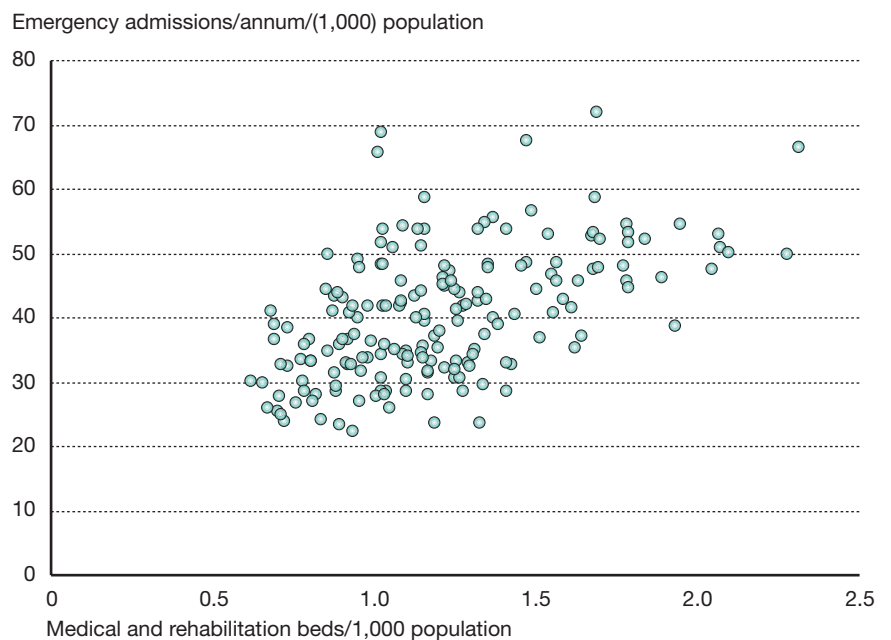
- 57 There is a strong correlation between the number of medical and rehabilitation beds a trust has relative to its population and the number of emergency medical patients it admits relative to its population (**Exhibit 21**). This means that trusts tend to use any beds they have regardless of the size of population they serve. This could be explained by differences in the health and economic states of the populations served.

There is a strong correlation between the number of medical and rehabilitation beds a trust has relative to its population and the number of emergency medical patients it admits relative to its population.

Exhibit 21

Relationship between medical and rehabilitation beds and emergency admissions relative to the population served

Trusts with more beds relative to their populations admit more patients relative to their population.



Source: Audit Commission Survey, 2002 – England and Wales

It seems likely, therefore, that the decisions to admit taken by doctors in A&E departments, or other emergency access points, are influenced by bed availability as well as clinical judgement...

- 58 The relationship holds true both nationally and within regions where differences in admission rates due to health and economic status should be less marked. It also holds true when trusts are classified by the age group of the population they serve. Thus, among the group of trusts that serve an older population, those with more beds relative to their population admit more patients. It seems likely, therefore, that the decisions to admit taken by doctors in A&E departments, or other emergency access points, are influenced by bed availability as well as clinical judgement, and that admissions thresholds vary both over time and from trust to trust. This is important because it means that if trusts open more beds in order to increase bed availability and reduce the risks of delays and cancellations, some of this may be offset by increased admissions, unless checks are put in place. It also means, however, that there are some trusts with too few beds that may not be able to admit patients who would benefit from an acute admission, leading to problems with access and pressures in primary care.
- 59 This relationship between numbers of medical and rehabilitation beds and medical emergency admissions also occurs between surgical beds and elective admissions.

Bed occupancy levels

60 A major part of the Audit Commission survey was gathering reliable bed occupancy figures. These differ from other existing sources of information on bed occupancy because:

- they were collected at midday (rather than midnight) on Thursdays, since this is when trusts are busiest; and
- they were collected by bed type: medicine, surgery, paediatrics, critical care and specialist.

The data were also collected ward by ward and checks were included to ensure consistency over four weeks.

61 The results show that occupancy is very high – particularly in medicine and rehabilitation (**Table 3**). The exception is paediatric occupancy, with a median level of 66 per cent. This is lower than might be expected and warrants further investigation. It is also important that paediatric beds are not included in a general count of available beds, since most patients waiting for admission in A&E are adults.

Table 3

Bed group	Median occupancy all trusts (per cent)
Medicine and rehabilitation	97
Surgery	93.6
Paediatrics	65.8
Critical care	82.6
Specialist beds	94.7

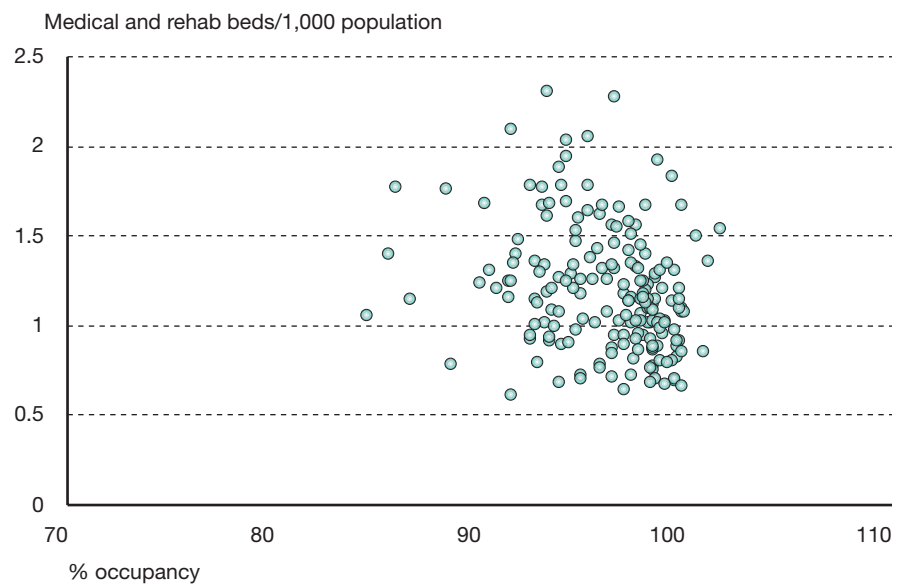
Bed numbers and occupancy levels

62 Trusts with more medical and rehabilitation beds relative to the populations they serve tend to have lower occupancy levels (**Exhibit 22**). Since trusts that have more beds relative to their populations admit more patients, there is also a correlation between admission rates and occupancy levels. The more patients admitted relative to the population served, the lower the occupancy level. The likeliest explanation of this finding is that if there are relatively more beds, doctors will lower the admission threshold and admit more patients than they otherwise would have done, but they will stop short of the high occupancy levels that inevitably occur in hospitals with relatively few beds. Lower occupancy levels are also associated with shorter waits for emergency admission and fewer medical and rehabilitation outliers on surgical wards. This may explain the unexpected finding that the more patients admitted relative to the population, the shorter the wait for a bed.

Exhibit 22

Medical and rehabilitation beds available and percentage occupancy levels

Trusts with more beds relative to the populations they serve tend to have lower occupancy levels.



Source: Audit Commission Survey, 2002 – England and Wales

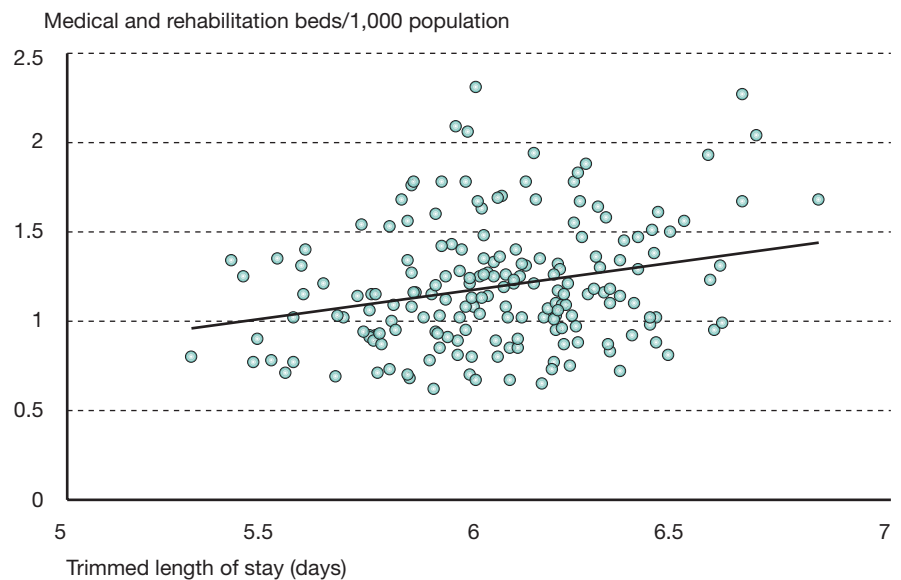
- 63 Trusts that have beds on several sites tend, as a group, to have lower occupancy levels in their medical and rehabilitation beds. This may be because of the greater difficulty in managing beds on multiple sites efficiently, as discussed earlier. The relationship still holds that, of trusts with multiple sites, those with more beds relative to the population served have lower occupancy levels. They also admit more patients more quickly.

Bed numbers and length of stay

- 64 Having more beds increases the tendency to admit patients to hospital: it might also be expected to reduce pressure to discharge patients. Trusts with fewer beds, conversely, are under greater pressure to discharge more quickly. There is, in fact, a slight positive correlation between bed numbers relative to the population served and length of stay (**Exhibit 23, overleaf**). Again, this correlation holds within regions and within the group of trusts serving populations with more older people, suggesting that decisions to discharge are affected by bed availability. This finding means that commissioning more beds, even where trusts are genuinely hard-pressed, may result in less improvement than expected in delayed admissions and cancellations, unless length of stay is controlled at the same time.

Exhibit 23**The relationship between trimmed (2-14 days) emergency medical length of stay and the number of medical and rehabilitation beds per 1,000 catchment population**

Trusts with more beds have longer lengths of stay.



Source: Audit Commission Survey 2002, HES and PEDW 2001/02

- 65 Given these complex relationships, planning the correct number of beds is always going to be difficult. Demand expressed both as admission numbers and length of stay cannot be determined precisely. The need for a bed is not just a simple matter of clinical need, but is influenced by many factors, including how many beds there are. However, higher bed numbers relative to the population do have a positive effect through lower occupancy levels. So there is likely to be some benefit to patients from increases in capacity.
- 66 Most trusts though, as described in the previous section, should aim first to improve patient experience by increased efficiency in the use of their existing beds. This will sometimes require investment in more support and diagnostic services, but it may also involve changes in working practices or a review of current arrangements.

Most trusts ... should aim first to improve patient experience by increased efficiency in the use of their existing beds.

Conclusions

- 67 The provision and management of inpatient beds, together with the staff and services that support them, are both complex and expensive. Beds must be available so that patients do not have to wait when they need admission in an emergency, but they must be also used efficiently so that resources are not wasted. Good bed management is, therefore, vital in acute trusts. This review has looked at some of the outcome measures of good bed management, together with some measures of efficiency and of trusts' capacity to meet their demand. It shows that:
- A substantial proportion of patients who require emergency admission are admitted via departments other than A&E. The Audit Commission survey in May 2002 showed that of all patients admitted in an emergency by whatever route, 81 per cent were admitted within four hours. In one in five trusts though, some patients are admitted to areas without proper facilities.
 - Average adult occupancy is 95 per cent, with medical and rehabilitation beds being, on average, 97 per cent occupied. The ability of trusts to admit patients quickly is affected by bed occupancy levels. By common agreement, bed occupancy levels are too high.
 - Trusts could make more efficient use of their existing beds by reducing the length of stay for some routine surgical patients and through faster diagnosis, treatment and discharge for emergency medical patients. This would reduce bed occupancy and make more beds available. In some trusts, though, the root of the problem is insufficient beds.
 - The number of beds available relative to trusts' catchment populations varies. There is a strong correlation between this number and the number of admissions, suggesting that demand is partly determined by the number of beds. This makes it very difficult for trusts to plan bed numbers and control their use.
 - The current allocation of beds between medicine and surgery does not reflect actual bed usage and needs urgent review in order to avoid patients being placed in inappropriate beds.
- 68 In most trusts there is considerable pressure on the available beds, making it difficult to ensure that patients are admitted quickly to the most appropriate bed. Nevertheless, it is very important that, before trusts make changes, they have a clear understanding of the very complex interactions and feedback mechanisms that influence their bed usage. Without this, resources may be invested inappropriately and the changes may not bring about the expected improvement in patient outcomes. The individual tailored reports provided to trusts by their auditors as part of the Acute Hospital Portfolio are useful starting points in helping trusts to develop this understanding.

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- 1 Audit Commission, *Lying in Wait: the Use of Medical Beds in Acute Hospitals*, Audit Commission/HMSO, 1992.
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- 6 Audit Commission, *Data Remember: Improving the Quality of Patient-based Information in the NHS*, Audit Commission, 2002.



The Acute Hospital Portfolio is a performance improvement tool for acute and multi-service NHS trusts. It comprises 16 topics ranging from A&E Departments and Bed Management, to Procurement and Supply and Catering.

The topics have been added to the Portfolio in phases of four per year. A 'balanced score card' performance framework is developed for each topic. Data are then collected from all relevant trusts in England and Wales (or taken from existing national sources, where possible). The Audit Commission's appointed auditors then provide each trust involved with a tailored performance assessment based on the national comparative data produced and taking account of the local circumstances of the trust. In-depth audit work may also be undertaken at some poorly performing trusts that demonstrably need it. The national results of the surveys are published in short reviews such as this one and the data, together with computer software to facilitate their use, are released to NHS bodies.

This review reports the national results of the recent assessment of Bed Management. It is one of four reviews being published at the same time – the other three are: Outpatients, Waiting for Elective Admission and Operating Theatres. Most NHS acute and multi-service trusts will already have received their performance assessments from their auditors and agreed action plans for improvement where these are needed for these four topics. The data on which they are based and comparative analysis computer software will be released to NHS bodies on CDs by the end of June 2003.

Trusts have already received similar material for each of the eight topics covered previously and they are currently collecting data for four more topics: Facilities Management, Information and Records, Pathology and Therapy and Dietetics. Feedback to trusts on these topics will take place in the autumn and the national reviews will be published next year.

Full details of the Portfolio can be found on the Audit Commission website: <http://www.audit-commission.gov.uk/itc/acuteportfolio.shtml>

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