



# The guide to hospital data for non-executive directors

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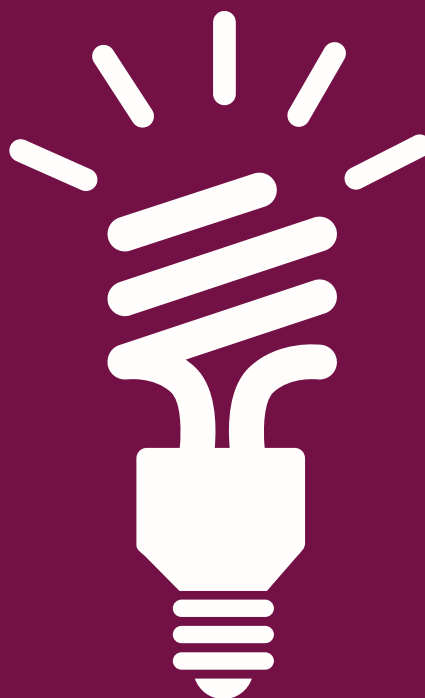


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# Understanding your organisation's data

Understanding your organisation's data is an essential part of providing effective oversight. But data may not always give you the complete picture and it is important to first understand what data is available, how it is recorded and what these records are used for.

This guide will help non-executive directors (NEDs) better understand NHS data and how it can be used to determine what is going on in their hospital. For the purposes of this Briefing we examine data in the acute care setting only. Data is of course collected in primary care by GPs, pharmacists, dentists and opticians, but the various datasets are not linked by the NHS.





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# Part one: Activity, pathways and datasets

Part one introduces the scale of NHS activity, the range of activity, the patient pathway and the major datasets.

## Key points

- 1.** Detailed data is collected on service deliveries that take place in NHS hospitals in England. This data may be analysed by patient pathway stage, by speciality, by treatment provided, or by disease and treatment given.
- 2.** There are a variety of data sources available to NEDs – including the hospital's patient administration system and the NHS Choose and Book system.
- 3.** Analysis of data can provide valuable insights into forecasting service demand, and identifying how to better match capacity to demand by tackling issues like patient non-attendance or appointment rescheduling.

# The scale of hospital activity

In England there are more than 70 million outpatient attendances and 15 million hospital admissions a year. An analysis of the total volume of hospital admissions reveals that two million of these relate to maternity services and babies, eight million are elective and five million are emergency admissions.

Examination of the admissions data reveals that the proportion of the population admitted to hospital increases with age; nearly two-thirds of patients admitted to hospital are over the age of 65 and the likelihood of admission is greater for older people – 83 per cent of people over 85 years of age will be admitted to hospital (see Figures 1 to 3).

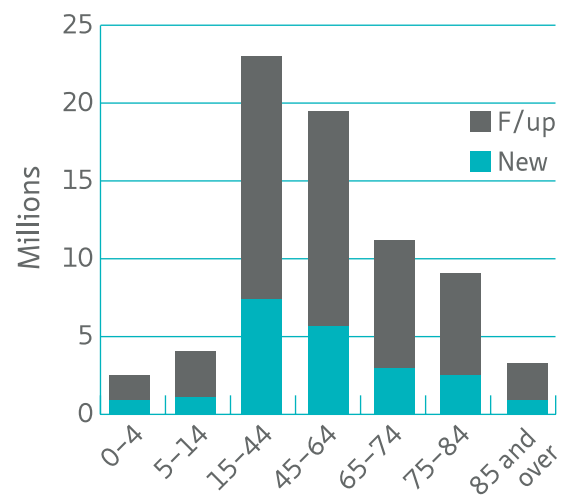


Figure 2. Number of outpatient attendances by age

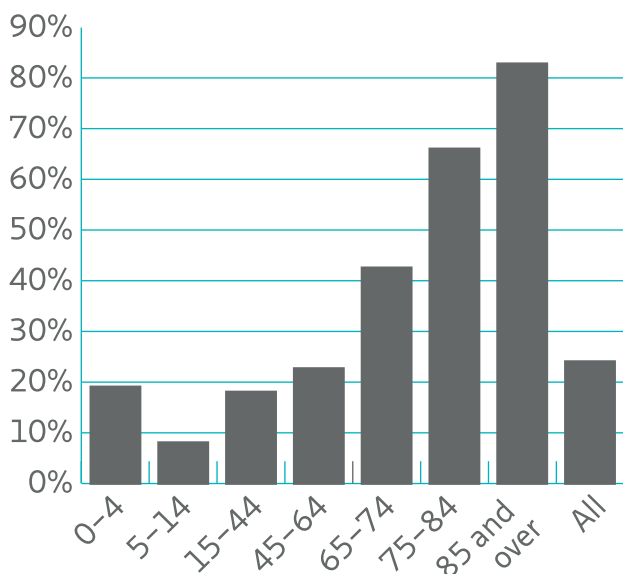


Figure 1. Proportion of age band admitted to hospital

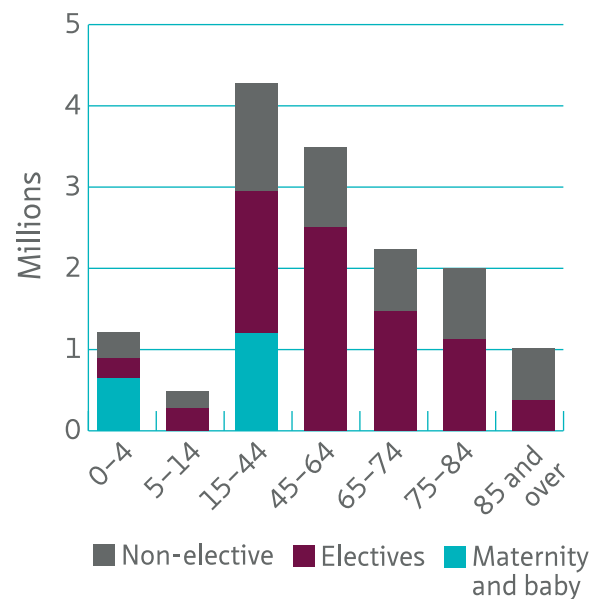


Figure 3. Admissions to hospital by age



# The range of hospital activity

An extensive range of services are delivered in secondary care. These hospital services can be differentiated in five ways:

- **by the stage on the patient's pathway** – outpatient, diagnostics, daycase or inpatient
- **by speciality**, based on the **age of the patient** – for example, birth (obstetrics), childhood (paediatrics) and care of the elderly (geriatrics)
- **by specialty**, based on the **part of the body** that has the problem – which is then further categorised as a surgical or medical (non-surgical) case
- **by treatment provided** by other health professionals – for example, physiotherapy, speech therapy, dietetics
- **by disease**, and the treatment given.

**Other services which support this clinical work include:**

- **'hotel services'** providing food, cleaning and portering
- **technical support** – for example, medical physics, maintaining diagnostic and treatment equipment and ensuring that it delivers the correct dosages; and IT departments
- **estates (or building) services**, looking after the provision of power and water, building maintenance and heating
- **administration** – the management of patient appointments which includes recording data about a patient's hospital contact, coding their treatment into agreed classifications, and the distribution of letters to GPs informing them of what is happening to their patients.

## Key questions for NEDs to ask

- How often does your trust cancel and re-arrange outpatient appointments?
- What is the rate of hospital cancellation by specialty?
- What is your policy for did not attend (DNAs) – does this feel appropriate for your population?
- How many coders does your trust have and are they qualified?
- Is your trust able to consistently recruit qualified coders?
- What internal auditing is done on the accuracy of coding?
- How aware are doctors within your trust of the importance of the source documents to accurate coding?



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# The standard patient pathways for adults admitted to a hospital

This report reviews the standard patient pathways for adults admitted to a hospital.

## Elective admissions

A patient makes an appointment at a GP practice. The doctor carries out an initial examination and possibly some tests before referring the patient to a named consultant. The patient then attends the hospital as an outpatient for an appointment with that consultant. One of the outcomes of this consultation could be a procedure (operation). When the patient is admitted to hospital for the procedure, it is classed as an elective admission – because the patient has chosen (or elected) to have the procedure.

Elective admissions currently make up around 50 per cent of all hospital admissions and include orthopaedic procedures, such as hip replacement. However, as the majority of elective procedures are now carried out as day cases (no overnight stay required) these constitute a smaller proportion of bed occupants.

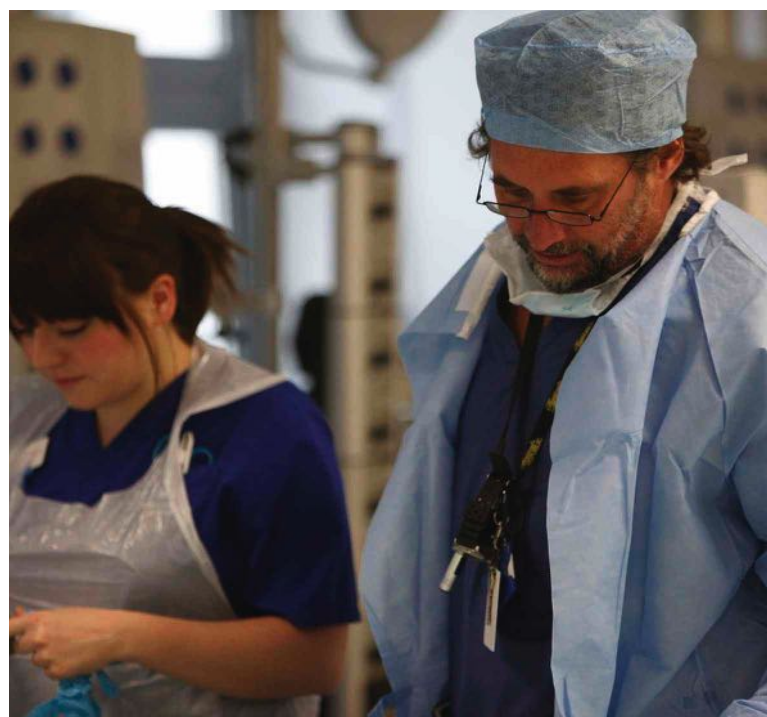
## Emergency admissions

The largest proportion of hospital occupants are emergency admissions. The manner in which patients are admitted through the 'front door' of a hospital as an emergency case will vary from hospital to hospital. Some hospitals only have an A&E department, and patients are admitted straight onto wards from there. Many hospitals, however, now have special admitting units which can cover all emergency patients and are often split between medicine and surgery. These are known variously as clinical decisions units (CDUs), acute medical units (AMUs) and medical and/or surgical admissions units.

A common example of a surgical admission is a patient with severe abdominal pain who has been sent in as an emergency by their GP.

An example of an emergency medical admission is an elderly patient with a urinary tract infection. In the elderly these infections can be debilitating and such patients are often described as being 'off legs'. With an elderly individual, the admission may have resulted following a phone call from a carer or GP.

From a data perspective, there is no seamless linkage between the primary care data sets and that generated by hospitals. Within the secondary care setting itself, the use of three separate data sets within hospitals can make tracking the patient pathway from beginning to end a challenge.



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# The major datasets

The data recording system in use in hospitals today was set up prior to the introduction of Payment by Results (PbR). Despite the fact that the data that underpins hospital income (as defined by PbR) has become a business-critical issue, the way that clinical information is recorded has not changed.

At the present time three major datasets are recorded in a hospital:

- data for outpatients
- data specific to A&E
- data for admitted patients.

These three datasets have a certain amount in common – all record personal information, basic administrative details and some clinical information. The administrative details will include the patient’s personal information and the date of contact with the hospital.

This data is captured in a patient administration system (PAS) which contains the three unlinked data sets.

The information in the PAS is published centrally (in a patient-anonymised form) by the Health and Social Care Information Centre as the Hospital Episode Statistics (HES) database.

## Who records the data?

All three datasets, personal details and some of the administrative data - such as date of attendance and admission - are normally recorded by an administrative assistant such as an outpatient or ward clerk. Nursing staff should ensure the recorded data is correct.

## How is clinical activity recorded?

For outpatients and A&E cases, limited clinical data is recorded at the time of the event. For admitted patient care, clinical information is usually recorded by a team of individuals known as clinical coders.

Clinical coders interpret the information recorded by clinicians and convert this into a set of codes. There are two sets of information that are recorded by coders; diagnoses and procedures.

The majority of hospital activity is recorded using the PAS, and nationally and internationally accepted classification systems are used when recording activity. Patient diagnoses are recorded using International Classification of Diseases (ICD) codes – also known as ICD-10 – and procedures are recorded using operating procedure code supplement (OPCS) codes.

While ICD and OPCS codes are the universally mandated classification systems used in the UK, these codes are not always universally applied in the same way; hospitals adopt slightly different approaches to the way an admission type is recorded, including whether or not to include information details such as whether an admission is via GP.

Similarly, a patient who is a regular attender for renal dialysis, chemotherapy or radiotherapy may have their treatment recorded differently depending on the hospital they attend. Indeed, some trusts do not even record regular attenders (patients attending a hospital without using a bed and not having a treatment that would classify them as a day-case).

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# How is data used for contracting?

## Payment by Results

Payment by Results (PbR) is the current classification for determining how much a hospital should be paid. PbR uses around 1,400 classifications – or healthcare resource groups (HRGs) – which are further subdivided by whether a case was a planned or emergency admission, the specialty of the responsible consultant and the age of the patient.

The NHS contracting rules set down the principles by which payments to acute trusts are made. Under the standard contract, hospital income is determined by PbR – a payment per patient which is linked to the complexity of the service that has been provided. This complexity is defined by a set of healthcare resource groups (HRGs); groupings that represent patient events judged to consume a similar level of resource. At present there are 1,400 HRGs which are used as units of 'currency' and support standardised healthcare commissioning in England.

Payments are based on details taken from the PAS and submitted to the NHS commissioner. The commissioner has a short period of time to challenge the data. However, in practice it is not unusual for commissioners and acute trusts to come to an arrangement that is different – such as a block contract (a fixed price for all activity, irrespective of volumes).

For both outpatients and A&E attendance, a simple 'fee per attendance' model is used. Within outpatients, the fee will vary by specialty and according to whether it is a first or subsequent ('follow up') attendance.

## Choose and Book

Having introduced the different data sets, next we'll examine the first part of an elective pathway – how a patient is referred and is given an appointment. One way of booking an appointment is through Choose and Book, a national electronic referral system that allows patients to choose which hospital or clinic they go to and the time of their first outpatient appointment.

The overall objective is to make Choose and Book the 'everyday method of referral' in the NHS.

When a referring clinician and their patient agree that a referral to a specialist in acute care is required, the clinician is able to enter specific search criteria into Choose and Book and generate a list of appropriate services for the patient to choose from. These services are known as directly bookable services (DBSs).

The system can search for a suitable appointment to be booked at a given time, or the patient can be given an appointment request letter that includes their unique booking reference number (UBRN) and a password. This gives the patient clear instructions on how they can book their appointment later either by phone or via the internet.

When an appointment is booked for a service with no appointment slots available, the referral is placed on an appointment slot issues (ASI) worklist, which is managed by the trust. The most common reason for the unavailability of appointment slots is that the trust is unable to match demand for a particular service.

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# Outpatients

Reports obtained from the Choose and Book system can provide a wide range of useful information; for example, how many referrals have been made at provider and speciality level or how many appointments have been booked and whether there has been an increase in referrals to a specialty in a particular area. Other information, including the age/gender of patients treated, pre-requisite investigations required and alternative services is also recorded.

## Outpatients

Outpatient activity is the most routine patient pathway. An outpatient appointment can be categorised as a 'new' visit – the first time that a patient has been seen by a particular specialty for a given episode of illness – or a follow-up appointment. Outpatient activity is recorded through the PAS. For hospitals trusts, the number of attendances is important because this is the basis on which activity is paid for by the commissioner. In any given trust there can be up to 100 different specialities that offer outpatient clinics.

The routine data items recorded for outpatients include patient details such as name, date of birth and the GP with whom the patient is registered with. The patient's NHS number will also be recorded as this is the key index for all systems. The speciality to which the referral was sent is recorded, but presenting problems are not. The number of patients that do not attend appointments (DNAs) is also recorded by specialty, as well as any cancellations or appointments that have to be re-booked.

Once a patient has been seen, the outcome is recorded from a number of options which include whether the patient was discharged, given a further appointment

or added to the waiting list for a procedure. If a patient is asked to come back again, the next appointment is counted as a follow-up. There are often restrictions on the ratio of new to follow-up patients because commissioners want to discourage hospitals 'holding onto' patients. Outpatient procedures have their own tariff; payments associated with outpatient tariffs are generally lower as procedures are generally less complex.

## Other things to consider about outpatients

Outpatient appointments are generally led by a consultant. However, the patient may be seen by a more junior member of the team and, in some cases, by another clinical professional acting in an independent capacity; for example, a specialist nurse, or consultant nurse. Unlike junior doctors, nurse specialists have their own tariff.

Consultants may want diagnostic tests carried out and will ask a patient to re-attend as a follow-up for a discussion of the test results. This 'loop' into diagnostics used to be a common cause of delay. However, more clinics are being set up as 'one-stop' services where diagnostics are provided when the patient first attends.





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# Part two: Elective hospital admissions, waiting times and patient experience

Part two of this guide looks at elective hospital admissions, waiting times and patient experience.

## Key points

- 1.** Elective hospital admissions is an area where data can be used as an indicator of hospital performance.
- 2.** Length of stay, pre-operative admissions and variation in procedure by day of the week should be monitored.
- 3.** Assessing compliance with waiting times targets is not straightforward. The 18-week pathway requires joining primary care and hospital data sets. Local factors also need to be considered.
- 4.** Patient experience is increasingly used as a quality indicator. The friends and family test is now being implemented and trust scores will be monitored.

# Elective hospital admissions

An elective hospital admission is usually a planned procedure that has been booked either by the GP and the patient, or the patient has been on a waiting list. An elective admission occurs when the decision to admit can be separated in time from the actual admission. Elective admissions do not include transfers from another hospital.

Elective admissions account for around 50 per cent of admitted hospital activity in the UK, with emergencies accounting for 35 per cent and maternity and babies the other 15 per cent. The vast majority (just over 80 per cent) of elective admissions are day cases, where a patient is admitted to hospital, has surgery and is discharged on the same day, without having to stay overnight.

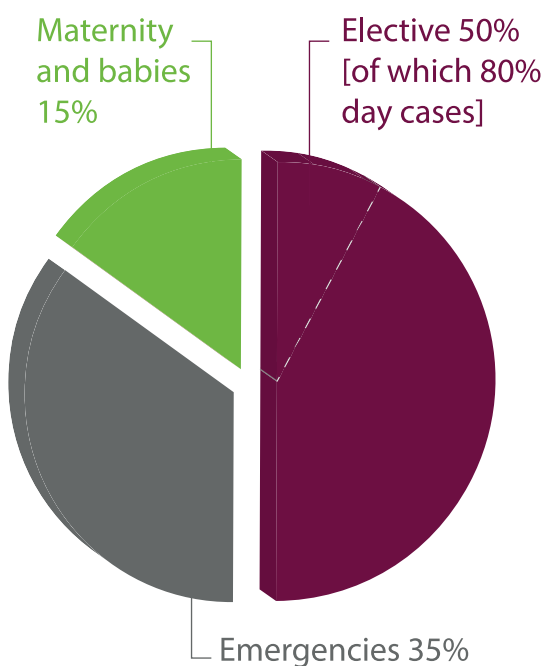


Figure 4. Admitted hospital activity in the UK

## Elective admissions and efficiency

### 1. Length of stay

One of the key metrics that can be used by hospitals as an indicator of performance is length of stay. A hospital that is able to reduce length of stay for a given procedure can either use fewer beds or make better use of existing bed capacity. There are many factors that contribute to variation in length of stay, such as age, sex and co-morbidities. The annual CHKS '40 Top Hospital' awards regularly finds that those in the top 40 use on average 1.5 fewer wards than those outside the top 40 (for a matched casemix). This is why benchmarking against other hospitals is helpful, because it is possible to adjust for each of these.

Anyone monitoring and benchmarking length of stay should also look at the percentage of patients who are admitted on the day of procedure. There may be good clinical reasons for admitting prior to procedure but, for the majority of patients, pre-operative length of stay should be zero (days).

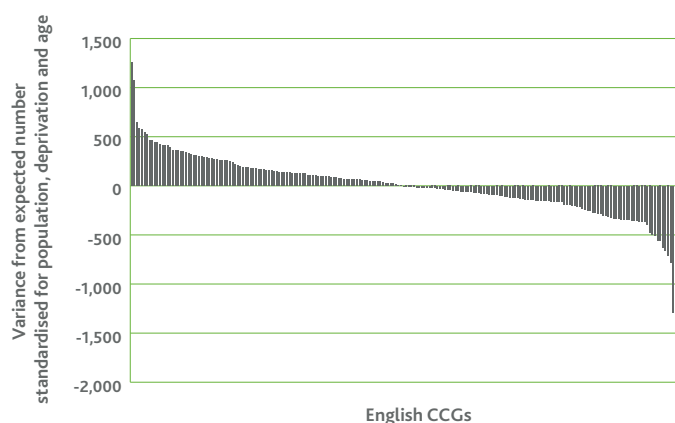
Reviewing the standardised rate for procedures (adjusted for age, sex and deprivation) per head of the population can also be used as a benchmark to see whether the hospital is carrying out more procedures than peers. An example of this kind of analysis is shown in Figure 5. It demonstrates the wide variation in the number of cataract procedures that were carried out when compared to the expected number for the population, analysed by clinical commissioning group (CCG).

Major advances in surgical and anaesthetic techniques have enabled the vast majority of surgery, perhaps 80 per



# Elective admissions and efficiency continued...

cent or more, to be carried out on a day surgery basis.<sup>1</sup> Day surgery has a better safety record (for example, patients are less exposed to the risk of infection on wards).



**Figure 5. Standardised variation in NHS cataract operations performed over 12 months**

For non-day cases there are few reasons why a patient needs to be admitted the day before – a practice that has become less common as hospitals strive for greater efficiency. As well as day cases and non-day cases there are a number of admissions that are recorded for diagnostic tests. These are carried out on the same day of admission although the scale of this activity is difficult to determine because some trusts record it in the outpatient data set and others in the inpatient data set.

NEDs faced with data on elective admissions should consider the percentage of elective admissions that are day cases. They should be looking at the recommended percentage of elective admissions for a given procedure produced by the British Association of Day Surgery (BADs).<sup>2</sup> However, caution is needed when looking at the figures because the counting varies from hospital to hospital.

## Key questions for NEDs to ask

- How does our day case rate compare nationally?
- How does our day case rate compare with our peers?
- What is the proportion of patients with a pre-operative length of stay greater than zero?
- How many patients who were intended day cases stayed overnight and what was the reason?
- How do we ask the friends and family test question?
- What do we do with responses to the friends and family test?
- How do we manage the cost associated with administering the friends and family test?

The variation is a result of the way the trusts intend to manage a particular patient. For example, in some hospitals zero length of stay is not counted as a day case.

One additional day case rate analysis that can be conducted is a review of day case overstays – these are planned day case patients who end up being admitted to hospital. It is worth taking into account that this can be as much about how the system records the intended management of elective admissions (i.e. whether they are planned day cases or admissions requiring one or more overnight stays).

As outlined in the first section, there are three separate major datasets recorded in a hospital: the dataset for outpatients; data that is specific to A&E; and data for admitted patients. Data on elective admissions can be

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# Variation in hospital activity

found in the dataset for admitted patient care. One of the fields that is completed by hospital staff is the date on list – this is when the decision is made for a patient to undergo a given procedure. The date of procedure and date of discharge is also recorded. Surgeons also rate patients on the list according to urgency.

## 2. Variation in hospital activity

Previous research has found considerable variation in hospital activity throughout the week.<sup>3</sup> It has revealed that Mondays tend to have the highest volume of inpatient elective admissions – the same day as the highest number of emergency admissions, with consequent problems of bed availability. Variation in discharge rates has also been found, with the highest proportion of patients being discharged on Fridays and the lowest at the weekend, so although there are few admissions bed availability can be reduced.

Smoothing the flow of weekly activity can help to improve operational efficiency, and many trusts are addressing daily variation by moving some procedures to the weekend – a time when hospital activity has traditionally slowed.

One of the key challenges facing hospitals is how to ensure patients are discharged on time. Hospitals that send patients home late in the day are missing the opportunity to make use of a bed for another patient. The target many hospitals have therefore adopted is to discharge before 11am, but in most cases, especially with the elderly, other factors are at play, such as the responsiveness of social services and the existence of dedicated day case units.

Another set of figures that provides an insight into efficiency is how many operations are cancelled by the hospital. High cancellation rates are a sign of bottlenecks or an indication that straightforward procedures are not working. For example, a patient with a complex procedure is likely to need a bed in an intensive care unit (ICU) following the operation. However, if there is no ICU bed available on the day of admission, the operation will be cancelled.

Understanding the reasons for cancellations gives a good insight into what is happening at ward level. NEDs might ask what sort of pressure is put on elective admissions when there is a bed crisis and whether these happen routinely.

Comparison with peers is a useful way to monitor performance. However, information on theatre usage is rarely shared outside a hospital's four walls because data is not collected centrally.



# Waiting times

Since the introduction of targets in the 1990s, the issue of waiting times has moved up the political agenda. One target was that by 2008 no one should wait more than 18 weeks from GP referral to hospital treatment. In 2009, data showed that 93 per cent of admitted patients and 98 per cent of non-admitted patients began treatment within 18 weeks.

The emphasis was then changed to delivering an 18-week pathway from GP referral to start of treatment. This was included in the NHS Constitution, which gives patients the right to start consultant-led treatment within a maximum of 18 weeks from referral, unless they choose to wait longer or it is clinically appropriate to wait longer. The 18-week pathway presents challenges for hospitals, for example, joining up primary care data and hospital data. As a result, different parts of the healthcare system now have to work together more closely than they have before.

The complexity of the pathway is clearly a factor in whether the 18-week target is met. For example, a patient may require multiple diagnostic tests before a decision can be made about treatment. From the hospital's point of view, there has to be adequate visibility around the number of referrals and theatre capacity because decisions will have to be made about the types of procedures that are carried out. For example, dermatology procedures do not take as long as those in orthopaedics.

In addition, some hospitals have their own way of interpreting the time at which waiting starts and stops. The impact of this is mitigated by the various rules around when the clock stops and starts and when it can be stopped altogether, or suspended. For instance, a patient may not be available for a procedure because they are on

holiday.<sup>4</sup> In this case the clock would stop for the period of time they were away.

Elective treatment is the area where patients are most likely to exercise choice and, as a result of waiting times, the two are linked. However, this is less evident now most hospitals are meeting the waiting time objective.

Hospitals have to find their own way of combining the three data sets to monitor compliance against the 18-week target. It is therefore not always possible to be precise about how waiting times should be measured.

However, as is common with most targets, the key is to ensure there is a good process around the management of patients who are most at risk of breaching the 18-week wait. There is a complex set of rules about meeting this target, with a number of financial penalties for failure(s).

For most urgent procedures, NHS data tells us that the average waiting time will be around two weeks. Figure 6 shows that an increasingly small proportion of patients end up waiting longer and it is on the 'tail' in this distribution chart where effort needs to be focused.

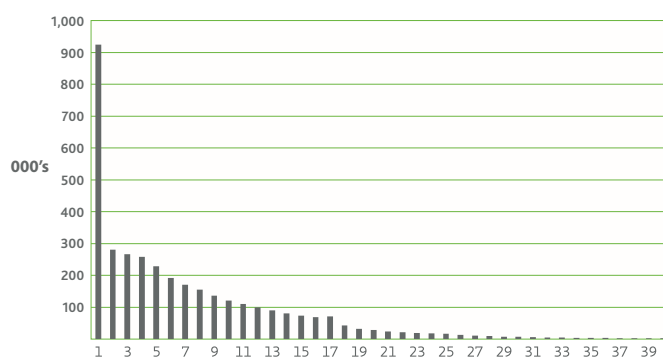


Figure 6. Weeks between 'put on list' and 'procedure carried out'

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# Patient experience

The three most commonly used questionnaires to measure patient experience are:

- **the EQ-5D** (European Quality Of Life – 5Dimensions) – used to provide a simple, generic measure of health for clinical and financial appraisal
- **the SF-6D** (Short Form six dimension) – used to judge the effectiveness of healthcare interventions
- **the HUI** (Health Utilities Index) – used to measure health status and health-related quality of life.

The NHS has adopted the EQ-5D questionnaire model to produce patient reported outcome measures (PROMs) for four clinical procedures: hip replacement; knee replacement; cataract surgery; and hernia operations. PROMs assess the quality of care from the patient's perspective and calculate the health gains after surgical treatment using pre- and post-operative surveys.

## PROMs

PROMs data is collected, processed, analysed and reported by a number of organisations, including hospital trusts, the Health and Social Care Information Centre and contractors. The Health and Social Care Information Centre is responsible for scoring and publishing PROMs data as well as linking it to other data sets such as hospital episodes statistics (HES). Hospitals can request data, which can be presented at individual consultant level.

The collection and reporting of PROMs was a key priority previously set out in the NHS Operating Framework. This committed to "extending the use, collection and validity of PROMs across the NHS, wherever practicable".

The framework identified PROMs as a key source of information about the outcomes of planned procedures and they will form a core part of Quality Accounts. As a result, PROMs are becoming a key tool for hospitals.



## The NHS inpatient survey

*The NHS inpatient survey* is carried out by the Care Quality Commission and looks at the experiences of people who are admitted to hospital with at least one overnight stay. Each hospital is provided with a report on its scores in the survey, which enables them to compare their performance against all other trusts and identify areas for improvement. The results can be used by hospitals to gain a better understanding of their patients' experiences, and are used by the Care Quality Commission for regulatory, compliance and monitoring activities.

The friends and family test is currently being introduced across the NHS. Every patient will be given the opportunity to share their views on their experiences. It will initially ask



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# The friends and family test

patients one question: whether they would recommend hospital wards and A&E units to a friend or relative based on their treatment. The test aims to allow the public to compare healthcare services in a completely new way, and it is hoped that publishing the responses to the test will “drive other hospitals to raise their games.”

This approach is reflected in the NHS annual staff survey which asks whether staff would be happy with the standard of care provided by their organisation if a friend or relative was being treated there. The initial focus of the friends and family test will be on providers of acute inpatient services and A&E departments. It will in time be rolled out to all NHS settings. It is hoped that trusts will ask a broader range of questions about patients’ experiences in order that improvement opportunities can be identified and explored.

Data collected from friends and family tests will be published on a locally determined basis, with providers and commissioners able to upload their friends and family score via their local profiles on NHS Choices.

“

**...whether staff would be happy with the standard of care provided by their organisation if a friend or relative was being treated there**

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# Part three: A&E, non-elective admissions, readmissions and diagnostics

Part three looks at accident and emergency, non-elective admissions, readmissions and diagnostics.

## Key points

- 1.** Rising trends in emergency admissions indicate strained hospital capacity and adverse impact on quality of performance.
- 2.** Patterns emerging when analysing emergency data reflect systemic pressures, which affect patient flow, and indicate the need to ensure adequate staffing and clinical skills mix.
- 3.** Analysis of readmission data can be used to understand quality of performance, but does not allow for clinical correlation between separate admissions, and can lead to misinterpretations.
- 4.** Quality and patient safety can be assessed by looking at weekly variation in diagnostic activity.

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# Accident and emergency

Accident and emergency (A&E) data reaches the Health and Social Care Information Centre (HSCIC) in one of two ways: either it is submitted by hospital trusts via the secondary uses service (SUS) or via the weekly A&E collection. SUS is a repository for healthcare data which secondary users can access for a range of reporting and analyses to support the NHS in the delivery of healthcare services.

The weekly A&E collection adds up the total number of attendances in the week for all A&E types, including minor injury units and walk-in centres and, of these, the number discharged, admitted or transferred within four hours of arrival.

In 2011/12 there were 17.6 million A&E attendances recorded at major A&E departments, single specialty A&E departments, walk-in centres and minor injury units in England. Of these attendances, 25 per cent arrived at A&E by ambulance or helicopter.<sup>6</sup> Around 60 per cent of all attendances are discharged either for GP follow-up or no follow-up and 20 per cent are admitted to hospital for further treatment.

As we have explained in previous CHKS briefings, A&E data is recorded in one of the three separate and unlinked hospital data sets. The only clinically relevant information recorded in the data set about patients are diagnosis code and treatment code. There are five A&E indicators that are currently published by the NHS in England:

- left department before being seen for treatment rate
- re-attendance rate
- time to initial assessment
- time to treatment
- total time in A&E.

## Key questions for NEDs to ask

- Do we include mothers and babies in non-elective admissions?
- How many emergency surgical procedures are there during the week?
- How many emergency surgical procedures are there at the weekend?
- When do most patients arrive and how well does staffing match this?
- How many patients were operated on before diagnostic tests were received?

## Non-elective (emergency) admissions

The 20 per cent of patients who are admitted to hospital for further treatment are counted as non-elective admissions, often called emergency admissions. According to the HSCIC, an emergency admission is “when the admission is unpredictable and at short notice because of clinical need”. If the decision to admit is at short notice because of clinical need, and the decision to admit and admission could not be separated in time (in other words, the admission could not be delayed to some later date), then the admission should be classed as an emergency admission.

Patients can arrive as emergency admissions via routes other than A&E. This proportion shows considerable variation which can largely be attributed to different recording rules used by different providers.



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Many trusts have an initial assessment area for medical emergency admissions, but there is a lack of consistency in the labelling of these units. They can be known as clinical decision units (CDUs), observation units (OUs), acute assessment units (AAUs) or acute medical units (AMUs). AMU tends to be the most used term. Some trusts have a similar unit within the surgical side of the hospital, but this is less common.

As we explained in part one of this guide, data is recorded in spells and episodes. A spell is the entire hospital stay from beginning to end and can consist of several consultant episodes. A new episode will be initiated when the responsibility for the patient is transferred from one consultant to another.

This is why it is possible to record care delivered by one or more consultants during a spell. If the patient is transferred to another hospital, dies or is discharged, the episode and the spell end. Many spells, however, contain only one episode.

With an emergency admission it is likely the first episode will be in an AMU. From there a patient might be transferred to a specialist ward where a new episode begins under a different consultant.

The majority of adult emergency admissions are medical and most consultants working in an AMU are physicians who are trained in a specialty or sub-specialty within general medicine. Some will be acute physicians whose role is the initial assessment of medical emergency admissions but there appear to be fewer of these generalist physicians working in AMUs. This means that in emergency medicine it is more difficult to carry out an analysis of consultant workload and outcomes as a consultant may have a

predominant commitment to a specialty, but who also provide some non-specialty commitment on the AMU. This results in specific challenges to ensure adequate staffing, and clinical skills mix, in AMUs and similar emergency care structures.



## Weekend working

In addition, weekend working also presents a challenge not just in terms of assessing performance and outcomes, but also in terms of ensuring an adequate skill mix. A survey conducted in 2010 by the Royal College of Physicians and the Society for Acute Medicine found that the provision of consultant-led care at weekends remained limited<sup>6</sup>. In many hospitals, acute physicians predominantly provided a weekday AMU service, with weekend cover often delivered by specialty/general physicians. The RCP says this situation is evolving as more acute physicians are appointed. However, achieving a 12-hour, 7-day (12/7) consultant presence on the AMU presents a number of challenges. One of these is that extending the hours of acute physician presence on the AMU into weekends could compromise weekday service provision, particularly for

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# Emerging patterns

smaller hospitals with a smaller number of senior staff from whom they can make a rota.

Some hospital trusts include data on maternity and babies in emergency admissions. This means that anyone presented with an analysis of emergency admissions has to be sure what is included and excluded. Like all data, maternity can easily be misunderstood if there is insufficient understanding of the detail. Journalists have reported that the quality of hospital data is poor because maternity statistics included males. However, this shows a lack of awareness because the data includes boy babies. When you start to look at emergency admission figures, some patterns emerge. For instance, elderly patients account for the highest proportion of emergency admissions, whereas patients needing emergency surgery account for a small proportion. For smaller hospital trusts these numbers can be low and the expected level is around three patients requiring emergency surgery at the weekend. The majority of surgical patients have one or two days of pre-surgical assessment and a third of emergency surgical admissions do not have a procedure carried out.

In terms of the data, diagnosis allows for several conditions to be recorded. This is called the depth of coding and analysis shows it has been increasing in recent years. Patients now have on average four diagnoses or symptoms recorded on admission.

One other useful piece of information that is recorded on admission is the source of admission. This could either be GP, or from A&E. However, as we have come to expect not all hospital trusts record this in the same way and some organisations do not use a GP-referred code. This makes national-level analysis harder but the figures show about

25 per cent of emergency admissions are referred by GPs, but given some trusts do not use this method at all, this will be an under representation.

## What does the data tell us?

One of the major weaknesses of the admitted patient care dataset is that it does not have any time data recorded. Analysis is therefore only really possible by days or multiples thereof (weeks/months). Frequently, board level reporting is done at a monthly level. This risks misinterpretation because of a variance of at least 10 per cent between months (February with only 28 days against months with 31 days). The effects of weekends and bank holidays are similarly masked and can lead to errors in the interpretation.

The other major consequence is that little analysis is done around the flow within the day, which is critical for emergencies. Figure 7 shows the number of admissions into hospital from A&E. This was work done by CHKS linking the A&E data set, which has a time of discharge and discharge destination (allowing the time discharged from A&E for an admission into the same hospital) with the admitted patient care data set, and thus gives a time of arrival.

Figure 7 shows the number of admissions by the hour for every day of the week. A very consistent pattern can be seen, with the peak occurring around 3pm to 4pm every day (including weekends). It can also be seen that the level remains high throughout the evening and into the early hours of the following day.

# What does the data tell us?

## continued...

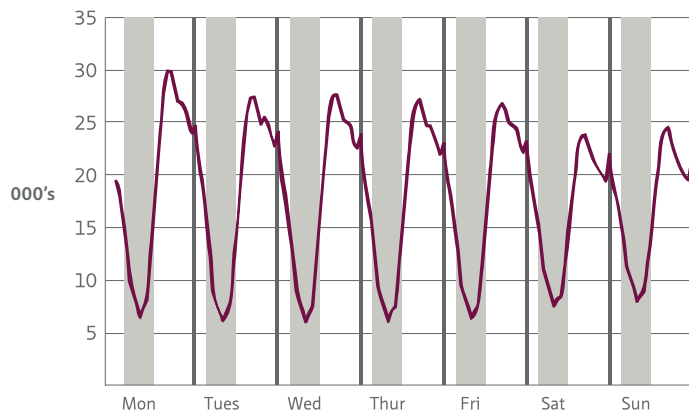


Figure 7. Emergency admission from A&E by hour

The quietest time (highlighted) is the period from 3am to 12 noon, with the lowest level of all at 7am. For most hospitals this does not match the rostering of staff – especially the senior decision-makers who can minimise the time in hospital. The one caveat is that this excludes the approximately 25 per cent of emergency admissions that do not come through A&E (although these are likely to further increase the effect described). Many hospital systems do have the time of admission recorded (with varying degrees of accuracy) but this is not part of the central return, so a local analysis may well be possible.

A further analysis of arrival times based upon admissions from A&E shows that when a patient is admitted after 3pm they are more likely to stay overnight and be discharged the following day. If a patient arrives before 3pm they have a high chance of being discharged the same day. Unfortunately, the process of admission (where a patient rings a GP surgery for a home visit, home visit occurs, an ambulance is called and then transfers to hospital) tends to increase the likelihood of arrival after 3pm. We know that the vast majority of the growth in emergency admissions is accounted for by zero length of stay and one-day length of stay patients.

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Over 50 per cent of all emergency admissions to acute hospitals in England now stay no longer than one day.

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# Readmissions continued...

In one trust,<sup>7</sup> an in-depth analysis of data revealed that the peak influx of patients from A&E to the AMU occurred in the evening, and there was no change over the weekend. The overall demand for emergency care was not the problem; the problem was the availability of staff at the right times to meet the demand.

Further analysis revealed that although two-thirds of patients arrived during working hours (when senior decision-making staff were available), patients were not in the 'right' place by the time the senior staff left the hospital at 6pm.

Over 50 per cent of all emergency admissions to acute hospitals in England now stay no longer than one day. NEDs might find it useful to get a better understanding of the outliers in any length of stay analysis (those with an unusually long length of stay) because this can highlight problems with the discharge process. This can be an important area to focus management attention to ensure there is good linkage with services outside the hospital to achieve timely discharges.

Outliers have cost implications as one hospital trust discovered. It came across 23 patients who had spent four times longer in hospital than expected. At around £270 per night, the total cost that could have been avoided was £470,000.

Improving the care of patients with dementia has become a major national focus and there are certainly lots of potential areas for improvement. The evidence is that patients with dementia stay, on average, at least 25 per cent longer than patients of a similar age and condition, but there is considerable variation between trusts with some having a much higher figure.



Looking at short-stay emergency admissions, 71 per cent of patients with dementia stay in longer than one day. The equivalent figure for patients without dementia is 60 per cent. Readmissions average 50 per cent higher and the number of falls in hospital is three times higher than expected – with a consequential doubling of length of stay. A good examination of length of stay, best carried out at specialty or condition level, and preferably adjusted for case mix, is a rich source of information about how efficiently a hospital is running.

## Readmissions

A readmission occurs when a patient is admitted as an inpatient to any specialty, in any hospital, within a specified time period following discharge. Readmission rates can be used to help to monitor success in preventing, or reducing, unplanned readmissions to hospital. However, there was no nationally agreed definition of a readmission. As such, readmission rates were calculated differently between providers.

In 2011/12, Payment by Results guidance stated that commissioners would not reimburse for emergency

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# Diagnositics

readmissions within 30 days of discharge from an elective admission. In April 2012, this policy was extended so that trusts would potentially incur charges for any unplanned readmission within 30 days following elective and emergency admission.

Analysis of readmissions can be used to highlight when an intervention wasn't carried out successfully the first time. The major focus has inevitably been on elective admissions where the patient was readmitted as an emergency within 30 days.

The weakness is that most analysis of readmissions does not look at whether there is a medical linkage between the two admissions. In other words, a patient might be readmitted for something not connected with the original condition. Data shows that a second admission is often unrelated to an original admission.

There are also some conditions where it is appropriate for a patient to return in an 'unplanned' manner for follow-up treatment, such as cancer, because it is not possible to predict accurately when the next admission should occur. The policy is currently being reviewed. There remains a series of national exclusions from non-payment, and new guidance has been drawn up based on providers and commissioners setting a threshold using a joint clinical review.

## Diagnositics

Some diagnostic information is recorded in the admitted patient care data set, but only when it is carried out on admitted patients.

So, for example, the radiology department within a hospital trust will know how many CT scans and MRI

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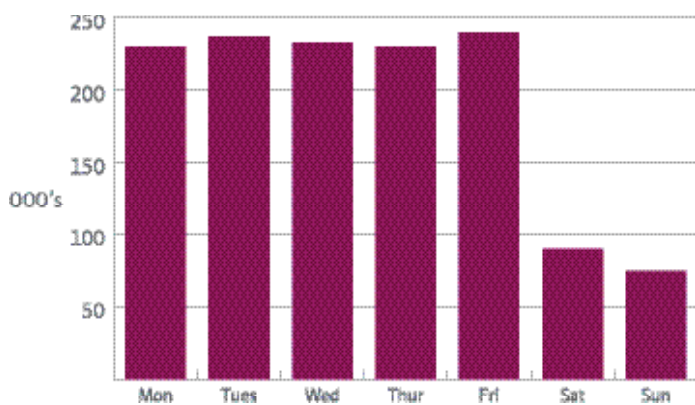
**CHKS research has found that patients admitted at the weekend are not getting diagnostic tests as quickly as those admitted during the week.**

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scans have been carried out, but only those carried out on admitted patients are visible in the national data.

Diagnostics activity is recorded on separate systems which generally do not integrate with the other data sets. At present, there is no requirement for hospital trusts to record diagnostic activity in the commissioning data sets. However, the HSCIC says this does not necessarily mean that the activity shouldn't be reported, especially if there is a suitable treatment function code to describe this activity. If the diagnostic test is carried out by the consultant responsible for the outpatient attendance, this should be recorded as one attendance under the consultant.



**Figure 8. Number of diagnostics by day of week (for emergency patients only)**

The HSCIC has recently developed a new data set for diagnostic imaging, called the Diagnostic Imaging Dataset (DID). The new data set gives commissioners a better understanding of demographic and geographic variation in access to different tests and different providers. For example, linking cancer registry data to diagnostic imaging test data for cancer patients gives an insight into the

care pathway for patients. It also sheds light on when diagnostic imaging is used and whether any improvements can be made to support earlier diagnosis.

This diagnostic imaging is an extract taken from a hospital's radiology information system (RIS). Extracts of data have been required for imaging activity since April 2012. Other areas of diagnostics, such as pathology tests, are currently not included in any national data sets.

CHKS research has found that patients admitted at the weekend are not getting diagnostic tests as quickly as those admitted during the week. Non-executive directors should try to find out whether there is any similar variation. In many cases, a clinical director will be responsible for monitoring diagnostic activity and it will be possible to determine which consultants are ordering diagnostic tests and, for instance, whether junior doctors are ordering more than would be expected.





# Diagnostic procedures

Figure 9 shows further analysis at the level of diagnostic procedure with the 12 most common procedures carried out on a Sunday and their relative proportion to a normal weekday.

**Figure 9. Diagnostic procedures carried out on a Sunday, showing their relative proportion to a normal weekday**

	Sunday	Average weekday		Sunday as a % of average weekday
Code	No. of diagnostic procedures	No. of diagnostic procedures	Description	
U05	41,986	83,467	Diagnostic imaging of central nervous system	50%
U21	23,446	70,857	Diagnostic imaging procedures	33%
U20	5,324	36,934	Diagnostic echocardiography	14%
U35	2,153	7,217	Other diagnostic imaging of vascular system	30%
U07	950	5,365	Diagnostic imaging of chest	18%
U54	1,461	5,146	Rehabilitation for other disorders	28%
U08	1,398	4,035	Diagnostic imaging of abdomen	35%
U13	893	3,171	Diagnostic imaging of musculoskeletal system	28%
U16	209	2,894	Diagnostic imaging of hepatobiliary system	7%
U11	528	2,626	Diagnostic imaging of vascular system	20%
U50	417	1,877	Rehabilitation for musculoskeletal disorders	22%
U09	324	1,621	Diagnostic imaging of pelvis	20%

Source: CHKS analysis of HES (taken from [www.chks.co.uk/userfiles/files/The\\_weekly\\_pulse\\_June\\_12.pdf](http://www.chks.co.uk/userfiles/files/The_weekly_pulse_June_12.pdf))



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# Part four: How to make good use of data - quality and safety, including mortality; activity, contracting and finance

Part four looks at how to make good use of data across: quality and safety, including mortality; activity; contracting; and finance. It also includes a short technical guide on ICD-10, OPCS-4 and healthcare resource groups (HRGs).

## Key points

- 1.** Many indicators can be used to monitor quality and safety. They should not be considered in isolation.
- 2.** The quality of indicators is inextricably linked to the quality of data.
- 3.** The accurate coding of clinical activity is fundamental, particularly when constructing mortality rates
- 4.** Good clinical coding is also crucial in determining the right level of payments for healthcare services, and thus defining NHS tariffs.

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# How to make good use of data

Data, by its nature, is something that should be handled carefully. NHS data is no exception and non-executive directors need to be aware that they have to ask the right questions in order to establish what the data is telling them. The questions are simple and straightforward. For instance, do our emergency admissions figures include mothers and babies? Without answers to these questions the data cannot be interpreted correctly.

We have already highlighted the sort of questions that can be asked of NHS data in parts one, two and three of this series. We now turn to how the data can be used to help trusts improve the quality and safety of the services they provide.

## Quality and safety

There are many indicators that can be used to monitor the quality and safety of care provided by a hospital trust. However, there is no single 'dashboard' that should be used; the recommendation is that trusts monitor a wide spread of indicators and consistently track these over time. Although this intelligence is useful, it is one dimensional. The board can only see how the trust is performing in isolation. Benchmarking is required to assess performance within, and across, the healthcare system. There is, understandably, a growing market for benchmarking services. Providers work with trusts to make sure they are comparing like with like, and peer group comparison shines a light on the areas where improvements can be made.

However, non-executive directors need to be aware that in order to benchmark data a number of things have to happen. First is adjustment of the raw numbers. At its simplest level, this is for the size of the hospital trust and the number of patients that it delivers care to in

comparison to other trusts (turning "raw" scores into rates, for example, the number of events per 1,000 patients).

The next stage of refinement is the construction of risk-adjusted indicators. Risk adjustment is the process of adjusting for risk factors (which might explain variation in outcome) so that comparison can be made. In essence, the adjustment is not only for the volume of patients seen but also key characteristics which would affect the indicators (such as age, diagnosis, co-morbidities and procedure). Adjustment can be made for a number of indicators, including length of stay, readmissions and mortality. Although it sounds straightforward, performing clinically credible risk adjustment is difficult and there are different ways of adjusting for risk. The following example explains the basics.

## Risk adjusted readmissions within 30 days

This indicator is the relative risk of readmission within 30 days. It is the ratio of the observed number of readmissions to the expected number of readmissions (taking into account the various risk factors). This ratio is then multiplied by 100. The factors that will influence the ratio are:

### 1. The accuracy of the observed number of readmissions

This sounds like it should be a simple count: how many people have come back as an emergency admission within 30 days of discharge? However, the rules for this indicator, used for the current financial penalty, include people who end up being admitted to a different hospital within the 30 day period, which your staff will not be able to 'see' until the central data lets them know.

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# Risk adjusted readmissions within 30 days

## 2. The way the expected number of readmissions is calculated

There is no one single 'correct' way to predict the expected number. It relies on having a good understanding of the way services are provided. For instance, are there any sub-groups who should be excluded for specific reasons? Looking at readmissions, many cancer treatments are not carried out to a fixed timetable so patients might appear as readmissions when they are on a known treatment pathway and potentially should be excluded from this indicator. The calculation then requires the use of good statistical methods to make the 'best' prediction – but it is possible for two different answers to be produced, depending on the methodology.

When looking at quality of care, indicators like readmissions within 30 days and length of stay might be considered useful. It is possible that a higher than expected level of readmissions within 30 days in a given specialty (such as orthopaedics) indicates that operations are not being carried out as successfully as they are elsewhere. Likewise, a longer than expected length of stay on a specific ward might indicate problems with the quality of care provided – perhaps a few patients developed pressure ulcers.

However, non-executives should be aware that a longer than expected length of stay can also be a result of poor coding of co-morbidities. This means hospital data will not record how sick the patient is. Alternatively, it could signal a pathway issue where a consultant might be making a judgement based on years of practice such as: "I always keep my patients in overnight". Since indicators can be skewed in this way, it is always in the board's interest to seek assurance from divisional teams where there is an outlier and, if appropriate, instigate consultant-level investigation.

Mortality indicators have taken on a particular importance in the last few years. The three main measures currently used in England are:

- SHMI – Summary Hospital-level Mortality Indicator (Heath & Social Care Information Centre)
- RAMI – Risk Adjusted Mortality Index (CHKS)
- HSMR – Hospital Standardised Mortality Ratio (Dr Foster Intelligence).

**SHMI is the only measure now published on NHS Choices.** All three measures are usually expressed as a value of 100. An index above 100 indicates more deaths than expected, whilst a lower index indicates fewer deaths than expected. The Health & Social Care Information Centre publishes SHMI slightly differently. It uses 1.00 as the average, which is often multiplied by 100 to allow comparison.

The NHS Medical Director has made it clear that mortality ratios are one of a number of indicators that should be monitored, and hospital trusts should not rely on a single indicator. In addition, six factors need to be taken into account which can have a direct impact on mortality ratios.

These are:

- percentage of the population who die in hospital as opposed to outside
- population demography
- different pathways of care
- zero length of stay emergencies
- palliative care
- data quality.

(See our in-depth report, or visit [www.chks.co.uk/Knowledge-Base](http://www.chks.co.uk/Knowledge-Base)).

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# Mortality ratios

A high mortality ratio is not necessarily a sign of a poor performing trust from a safety perspective. We have seen a number of factors which can affect an individual figure, including the quality of information in the case notes to support accurate clinical coding and the service provision, which is reflective of the local population.

Non-executives therefore need to understand what can impact their own mortality ratio so they can identify areas of sub-optimal care, improvements to their clinical coding processes, or management of patients. Although there is continued discussion about their usefulness as a predictor of the safety of care, it is clear that they are a useful 'smoke alarm' to trigger further investigation. Boards must ensure they have an understanding of what the indicators say about their own organisation and have the necessary processes in place to address any issues highlighted.

One of the most effective ways to use mortality ratios is to develop a process of review around one measure. This will ensure consistency and will allow comparison over time to demonstrate improvement. This review should include triangulation with other indicators such as infection rates and scores from patient surveys.

We have already explained that the NHS contracting rules set down the principles for which payments should be made. Under the standard contract, hospital income is determined by payment by results (PbR), which effectively is a payment by patients; linked to the complexity of the service that has been provided.

This complexity (there are around 26,000 codes to describe specific diagnoses and interventions) is defined by a set of healthcare resource groups (HRGs). These reflect patients who use similar amounts of resource. An

HRG code consists of five characters (two letters followed by two numbers and a final letter) and covers a spell of care, from admission to discharge. At present, there are 1,400 HRGs, which are used as 'units of currency' and support standardised healthcare commissioning across the NHS. One patient spell may involve several different HRGs, so an automated set of rules is applied by centrally provided software (known as a 'grouper' software) to decide the most appropriate one for payment. In essence, this identifies the most costly element of the care provided and assigns the patient spell to that HRG.



NHS tariffs are the set prices paid for each unit of currency (HRG). For example, £118 is the national tariff for an outpatient attendance in obstetrics or £5,080 for a hip operation.

There are currently over 1,100 tariffs. So the key to getting the right level of payment lies in the coding. Many of the tariffs have two levels: a lower one for the average/normal patient and a higher one for those with complications. The identification of complications is reliant on coding (and thus on the correct information being recorded in the source document for coding).



# Mortality ratios continued...

An example of the importance of good coding is given in Figure 10, which shows that the inadvertent omission of the site being the knee meant the original coding would have resulted in almost £1,400 less income for the trust.

**Figure 10. The importance of good coding**

	Original coding and price	Revised coding and price
Diagnosis	M65.8 – Synovitis and tenosynovitis	M65.8 – Synovitis and tenosynovitis
Diagnosis	F17.1 – Harmful use of tobacco	F17.1 – Harmful use of tobacco
Procedure	W84.6 – Endoscopic excision of synovial plica	W84.6 – Endoscopic excision of synovial plica
Procedure	Z94.3 – Left sided procedure	Z84.6 – Knee site
Procedure		Z94.3 – Left sided procedure
HRG (tariff year 13–14)	HB99Z – Other procedures for non-trauma – £292	HB23C – Intermediate Knee Procedures for non-trauma without CC £1,673

The tariff is multiplied by a nationally determined market forces factor (MFF). This is unique to each provider and reflects the fact that it is more expensive to provide services in some parts of the country than in others. Non-executive directors should be aware that the PbR tariffs do change and are used as a lever to control spending in the acute sector. For example, best practice tariffs have now been introduced. This reduces the amount paid for a procedure where there is significant unexplained variation between what is considered good practice and practice within the hospital trust.

The current list includes cholecystectomy, cataract, fragility hip fracture care and acute stroke care, interventional radiology, primary total hip and knee replacements, adult renal dialysis, transient ischaemic attacks (TIAs), paediatric medicine and day cases in breast surgery, general surgery, gynaecology, orthopaedics and urology.

When a patient is discharged, clinical coders translate the care the patient received into codes using two classification systems. These are ICD-10 for diagnoses and OPCS-4 for interventions (see below). This information, together with other information about the patient, such as age and length of stay, is sent from the hospital's computer system to a national database called the Secondary Uses Service (SUS). Reports from SUS allow commissioners and providers to make adjustments to monthly contract values agreed in the NHS standard contract to reflect what has actually happened to patients.

In practice it is not unusual for commissioners and acute trusts to come to an arrangement that is different. Under certain conditions, commissioners are allowed to revert to block contracts (a fixed price for all activity irrespective of volumes).

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# Complications and misadventures

In the NHS Operating Framework 2010/11 a marginal tariff was introduced which meant that acute trusts would be paid only 30 per cent of the NHS tariff price for emergency activity above their 2008/09 levels. This, together with the non-payment for readmissions within 30 days of discharge, has continued to the current day.

The money withheld from providers in payments for non-elective admissions above the threshold is administered by NHS England's local area teams, who use it for "local investment in relevant demand management schemes".

One further change is that the calculation of the tariff is changing and will no longer be based on officially calculated costs (reference costs) but on a less rigid set of information, which will be collected by Monitor (from trusts who calculate costs at a patient level). The Department of Health published its last Code of Conduct for Payment by Results for 2013/14 in February this year. It is now up to NHS England to decide whether further additions to the code are needed.

## ICD-10 and OPCS-4

ICD-10 refers to the tenth revision of the International Statistical Classification of Diseases and Related Health Problems (ICD). This is a medical classification list by the World Health Organization (WHO). It codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases.

The code set allows more than 14,400 different codes and permits the tracking of many new diagnoses. This can be expanded to over 16,000 codes by using further optional sub-classifications.

The Office of Population Censuses and Surveys Classification of Interventions and Procedures (OPCS-4) is a procedural classification for the coding of operations, procedures and interventions performed during inpatient stays, day case surgery and some outpatient attendances. Although the code structure is different, as a code set OPCS-4 is comparable to the American Medical Association's Current Procedural Terminology.

## Complications and misadventures

Complications and misadventures are recorded by the clinical coding team using the relevant ICD-10 code for the type of complication. This is taken from the information documented in the casenotes by the clinical team. Benchmarking between trusts can be useful, but too much emphasis should not be placed where rates are higher or lower than the peer group trust.

A high rate could simply be down to a trust having more robust information capture and is not necessarily an indication of poor clinical care. In the same way a trust with a lower rate may not be capturing and recording information very well and the lower rate may disguise a poor performing trust. Trusts should ensure there is a procedure in place for monitoring complications and misadventure cases as part of their clinical governance process.

## Find out more

Please call us on 01789 761600 or email [info@chks.co.uk](mailto:info@chks.co.uk) to find out more about any of the information that we have discussed in this report. Or visit [www.chks.co.uk](http://www.chks.co.uk) to read some of our Insight reports.



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