



The non-executive directors' guide to hospital data

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

Key points

- Rising trends in emergency admissions indicate strained hospital capacity and adverse impact on quality of performance.
- 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.
- 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.
- Quality and patient safety can be assessed by looking at weekly variation in diagnostic activity.

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 *Briefing* 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.

This *Briefing* looks at accident and emergency, non-elective admissions, readmissions and diagnostics.

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.² 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 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.

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 the [first briefing](#) in this series, 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 limited². 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 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.

Emerging patterns

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.

'Weekend working presents a challenge in terms of assessing performance and outcomes and in ensuring an adequate skill mix'

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?

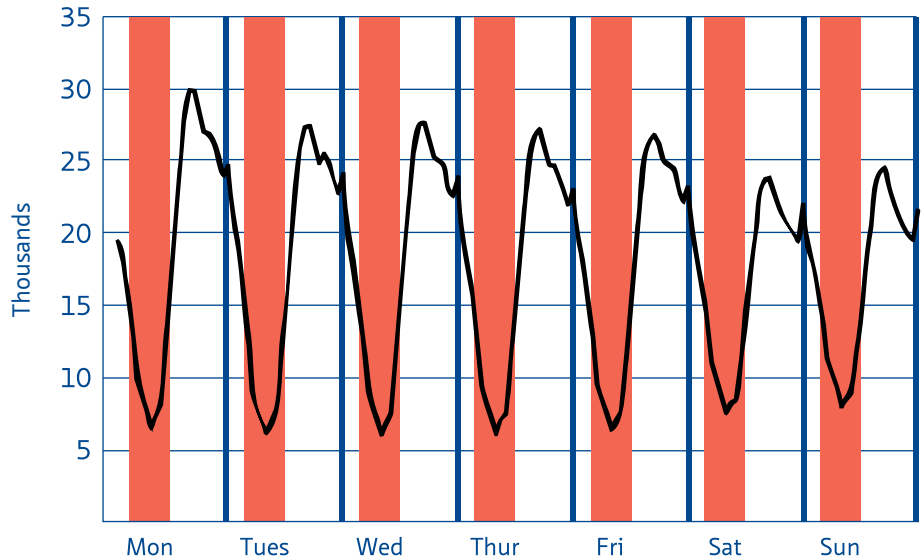
One of the major weaknesses of the admitted patient care dataset is that it does not have any time data recorded. Analysis is therefore only really possible by days or multiples thereof (weeks/months). Frequently, board level

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 1 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 1 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. 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

Figure 1. Emergency admission from A&E by hour



Source: CHKS analysis of A&E and HES data sets combined

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.

In one trust,³ 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 is no nationally agreed definition of a readmission. As such, readmission rates are calculated differently between providers.

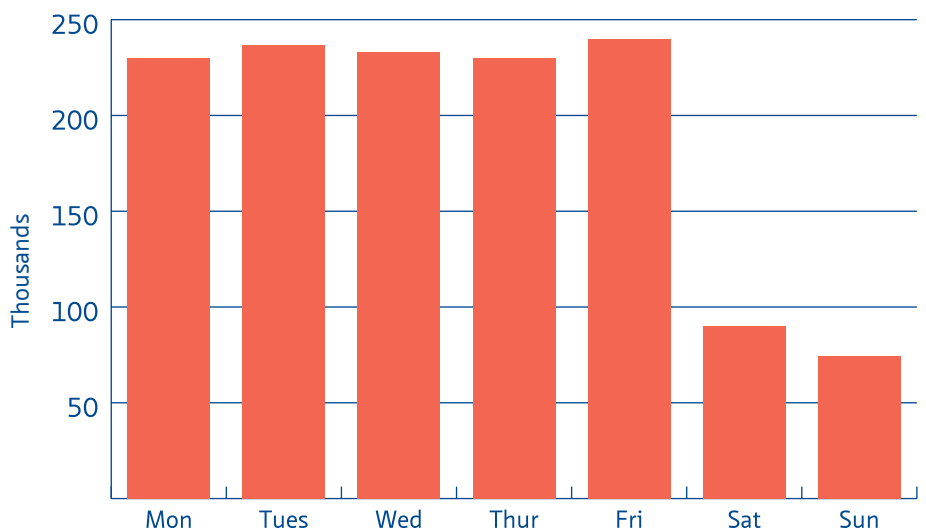
In 2011/12, Payment by Results guidance stated that commissioners would not reimburse for emergency readmissions within 30 days of discharge from an elective admission. In April 2012, this policy was extended so that trusts would potentially incur charges for any unplanned readmission within 30 days following elective and emergency admission.

'There is no nationally agreed definition of a readmission... rates are calculated differently between providers'

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

Figure 2. Number of diagnostics by day of work (for emergency patients only)



Source: CHKS analysis of HES (taken from www.chks.co.uk/userfiles/files/The_weekly_pulse_June_12.pdf)

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.

Diagnostics

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

	Sunday	Average weekday		Sunday as a percentage 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)

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.

Figure 3 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.

References

1. [Health and Social Care Information Centre, Jan 23 2013. Accident and Emergency Attendances in England 2011–12.](#)
2. Royal College of Physicians (2010). *An evaluation of consultant input into acute medical admissions management in England, Wales and Northern Ireland. Report of a descriptive survey and audit results against national guidelines.* www.rcplondon.ac.uk/resources/acute-medicine-evaluation
3. The Health Foundation (2013) *Improving patient flow.* www.health.org.uk/publications/improving-patient-flow

The non-executive directors' guide to hospital data

This *Briefing* is the third in a series of four – the 'Non-executive directors' guide to hospital data' – which have been developed to increase the non-executive director's understanding of NHS data and give them the confidence to ask the right questions about it. All the *Briefings* will be available from the NHS Confederation and CHKS websites.

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