Tariffs in emergency care

The crisis in emergency medicine in the UK was no surprise to staff in the specialty, but was not expected by the Department of Health. This article explains how chronic, systematic under-resourcing of emergency care has caused emergency departments to decompensate, and discusses actions that are necessary to prevent recurrence.

All NHS emergency care, including ambulance services, is free at the point of use to the whole UK population. Over the past 20 years societal, technical and professional changes have altered the care that could and should be given in the emergency department, and the pressure these changes are exerting is increasing.

In England the Payment by Results system is used to match hospital income to activity. Activity is recorded using a standardized coding framework that is then translated into sums of money to be paid to the provider (the hospital). The amount of money payable – the tariff – is estimated by analysing how much those activities cost in different hospitals (the reference cost).

Unfortunately in emergency medicine in England, the Payment by Results system has failed to adequately match resources with need, which has been exacerbated by increased demand (*Figure 1*). The result has been chronically under-resourced emergency departments running on large numbers of expensive temporary staff (Press Association, 2014), and requiring repeated financial 'bail-outs'. This article explores:

- Why this has happened.
- Why this has happened now
- What we need to do to prevent recurrence.

(Although this article focuses on Payment by Results and specific examples are from the English system, the principles discussed are relevant in other systems of payment.)

Evolution of emergency medicine

Twenty years ago

Emergency medicine has changed markedly over the last 20 years. Previously the clinical model of emergency medicine was based on filtering and referral to inpatient specialties to investigate – 'admit to decide'.

Now

Technological advances, pressure to reduce inpatient beds, increased recognition of the dangers of hospitalization and increased breadth of medical training have enabled emergency medicine to develop rapidly. Decision-making has rightly been pushed towards the front of the hospital with the key diagnostic and therapeutic interventions at the point of first contact – 'decide to admit'.

Instead of seeing mainly minor trauma and the occasional major trauma as was the case 20 years ago, emergency departments now see many medical patients who are acutely unwell, a large proportion of whom are frail and elderly.

Children form a quarter of the workload and major trauma, cardiac and stroke care is being concentrated in fewer centres. Contrary to the widely propagated myth, recent data from emergency departments suggest that only 15% of patients attending could have been dealt with in primary care. This is in line with the findings in other comparable countries (Australia, New Zealand).

Drivers of change

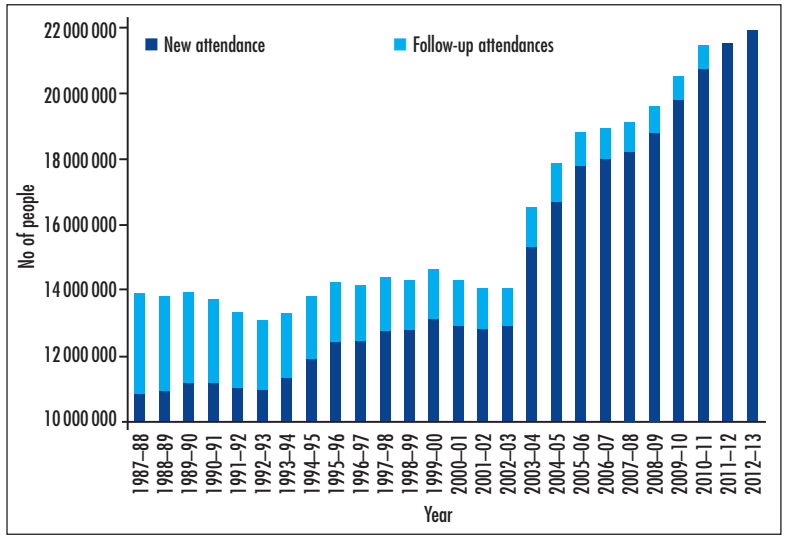
Factors that have driven these changes include:

General practice availability is reduced

This is particularly true out of hours. This means patients arrive at hospital without the assessment and detailed contextual history that a knowledgeable GP can provide, putting a premium on experienced senior doctors who can make safe decisions with limited or missing information.

There has been a narrative that 40% of patients 'inappropriately' come to the emergency department, but the true figure is closer to 15%, in line with previous UK

Figure 1. Emergency department attendances – England 1987–2013. From Health and Social Care Information Centre (2014a).



Dr Thomas Hughes *is Consultant in Emergency Medicine, Emergency Department John Radcliffe Hospital, Oxford, OX3 9DU, and Honorary Senior Lecturer in Emergency Medicine, University of Oxford, Oxford,* **Dr Ian Higginson** *is Consultant in Emergency Medicine, Derriford Hospital, Plymouth and* **Dr Clifford Mann** *is Consultant in Emergency Medicine, Musgrove Park Hospital, Taunton*

Correspondence to Dr T Hughes (tom.hughes@ndorms.ox.ac.uk)

research by the Primary Care Foundation (Carson et al, 2010) funded by the Department of Health, and international studies (Nagree et al, 2013).

From a patient's point of view, there are no 'inappropriate' patients, only 'inappropriate' health-care provision. Attending an emergency department where 'the lights are always on' is rational if there is no coherent alternative.

Shorter postgraduate training

Postgraduate medical training has shortened, meaning that doctors in training are less experienced and more risk-averse. This has made consultant time more valuable because by the time a patient arrives at hospital, senior doctors are increasingly the only clinical group that has the experience and confidence to send patients home without performing exhaustive and expensive tests.

Increased specialization

Inpatient specialties have moved away from acute 'generalist' work to specialist and sub-specialist work, reducing their exposure to acute patients. The increasing burden of acute work and tariff structures under Payment by Results have re-enforced this behaviour, as these specialist activities are net income-generators, whereas acute care rarely makes money.

Newly developed acute specialties, in particular emergency medicine and acute medicine, have ended up filling the void. In other countries some of these roles have evolved into the 'hospitalist' (Wachter and Goldman, 1996; Leman, 2007; Wachter, 2011, 2014).

Figure 2. Diagnostic coding.

There are several different systems of coding in use within the NHS:

1. The Commissioning Data Set, which was developed in the 1970s to describe emergency department activity. It is incompatible with any international standard
2. The International Classification of Diseases (currently ICD10 in the UK) based on public health classification of diseases, maintained by the World Health Organization
3. The Systematized Nomenclature of Medicine Clinical Terms (SNOMED-CT) system, originally developed by pathologists and blended with the 'READ' codes that are still used in NHS general practice
4. The Unified Diagnostic Dataset developed by the College of Emergency Medicine (2014), that provides a limited list (approx. 600) of diagnoses specific to emergency medicine (coded either as ICD10 or SNOMED) together with a measure of certainty – possible/probable/proven

Figure 3. Healthcare resource groups and Payment by Results.

The NHS English system uses Payment by Results to match resources to expenditure. It would be too complicated to set a tariff for every single condition or operation, so patients with conditions that require similar resources are put into a healthcare resource group.

The concept of healthcare resource groups was developed in the USA in the 1980s, when they were called diagnosis resource groups. The concept has been successfully adopted in many countries as a fair means of distributing reimbursement, although it is not currently used in Wales, Scotland or Northern Ireland.

The central tenet of Payment by Results is that money should follow activity – as activity increases or decreases, so should the payment. The amount paid can be increased (Best Practice Tariffs) to create incentives, or reduced to deprecate activity that is judged to be too prevalent, e.g. tonsillectomy.

Pressure on inpatient beds

Pressure on inpatient beds and rising demand has meant that emergency departments are often unable to discharge patients to inpatient specialties. This 'exit block' is a common issue facing hospitals around the world and results in emergency department 'crowding' that has a direct adverse effect on patient outcomes.

Health-care systems have reacted by developing initiatives to reduce admissions and front-load clinical care so that patients may be treated outside hospital wherever possible – 'ambulatory care' or 'hospital in the home'. However, this creates more work as the emergency department is the natural interface between primary and secondary care because it is staffed 24/7.

Patient expectations

Patient expectations of emergency department care have increased, re-enforced by the 4-hour standard of discharge from emergency department care in the UK. Well-publicized failures of care have resulted in more scrutiny of quality of care, which is welcomed.

These factors mean that a large proportion of the diagnostic workload of the hospital has moved from inpatient units into the emergency department. This would not be a problem if the resources had followed the shift in activity, but for reasons explained below, this has not occurred.

Measuring emergency care

Inpatient specialties measure their work according to diagnosis on discharge (acute) or procedure (elective). These data are used by a piece of software called the Grouper to derive the appropriate health resource group, which determines the tariff. The tariff is the amount of money that the hospital is paid for an individual patient episode of care (Department of Health, 2013a).

When the current dataset for emergency department diagnostic coding (the Commissioning Data Set) was developed nearly 40 years ago, the work of the emergency department was largely minor injuries and occasional major trauma. The Commissioning Data Set was appropriate for the workload at that time but is now not fit for purpose (*Figure 2*). It is not sufficiently granular to capture the increase in medical acuity and complexity.

Audits have shown that a valid diagnosis only exists for approximately half of emergency department attendances. Even the number of emergency department attendances is not consistent between different NHS measures (Hospital Episode Statistics and the Secondary User Statistics) – there is a difference of about 4 million patients (Health and Social Care Information Centre, 2014a).

When Payment by Results was implemented for emergency departments (*Figure 3*), a pragmatic solution was required. The lack of an effective diagnostic coding system, and the requirement for a tariff system that could not be

gamed (manipulated for advantage), meant that an alternative approach to that used for inpatient care was required.

Healthcare resource groups for emergency department care are therefore based on the investigations and treatment the patient received. The singular focus on investigation and treatment for remuneration has caused all other data relating to an emergency department attendance (e.g. patient diagnosis) to be neglected – 'what gets paid gets measured', making it difficult to understand emergency department caseload. Activity has increased but acuity and complexity has disproportionately increased. The lack of coherent information about this is why the Department of Health did not foresee the current decompensation.

How much should emergency care cost?

'What gets paid gets measured.' It is difficult to gauge the true disparity between activity and remuneration because coding of emergency department data – diagnosis, investigation and treatment – is unacceptably poor (*Figure 4*). However, it is easy to show that current emergency medicine healthcare resource groups do not accurately reflect the work done by the emergency department. For example:

Emergency department *vs* inpatient costs

Technical advances, e.g. use of troponin tests, have enabled diagnostic work that was previously performed as an inpatient to move into the emergency department. However, in doing so, major disparities in remuneration have evolved. For example, a patient admitted with chest pain and discharged after a normal troponin blood test, chest X-ray and ECG (electrocardiogram) will attract a tariff of £109 (NHS England and Monitor, 2014) (*Figure 5*). If the same patient was admitted to a medical ward for exactly the same tests and discharged the same day, this would attract a tariff of £673 (NHS England and Monitor, 2014).

How is the tariff set?

The tariff is the amount of money payable for each healthcare resource group, and is derived from the 'reference cost' (*Figure 6*).

Reference costs: how it should work

For each patient healthcare resource group for which the hospital claims income from the NHS, the hospital estimates the cost of treating that healthcare resource group, and submits these estimates to the Department of Health.

The reference cost is worked out as:

$$\frac{\text{Cost of providing care to patients with healthcare resource group}}{\text{Number of patients with healthcare resource group}}$$

Costing elective patients is relatively easy – a patient comes in with a condition, e.g. osteoarthritis, has an operation, e.g. hip replacement – and has a predictable and linear progress through the hospital. Each element of the patient journey is costed using a standardized methodology, and the reference cost is the sum of these average costs.

All hospitals submit their reference costs to the NHS, which uses the reference costs to determine the tariff. This is usually around the median of the submitted reference costs. This ensures that the tariff paid is a fair reflection of the true cost of providing the care.

Reference costs: elective specialties

To illustrate the difference between elective and acute specialties, we start with elective specialties – *Figures 7* and *8*. As can be seen by the distribution graphs, there is

Figure 4. Flying blind.

Emergency departments are under-resourced because the method of measuring and thereby rewarding clinical activity has not kept pace with the increase in acuity and complexity in patient care.

The current level and quality of data is indefensibly poor. In 2013 the House of Commons Health Committee commented:

'The system cannot accurately analyse the cause of the problem, still less resolve it, if it continues to "fly blind". More accurate information about the causes of rising service pressures is not simply a management convenience; it is fundamental to the delivery of high quality care.' (House of Commons Health Committee, 2013)

Figure 5. Sample emergency department tariffs. All costs from NHS England and Monitor (2014).

Minors

A young adult comes in following a fall, with an undisplaced broken wrist. The patient has a radiograph taken, is seen by a nurse practitioner, and a plaster cast is applied.
Tariff = £118

Majors

A confused elderly patient comes in following a fall: 'Collapse ?cause'. She is seen in the Rapid Assessment Area and an intravenous cannula is sited, bloods are taken, an ECG (electrocardiogram) is performed. A chest radiograph is taken and there is a wait for nearly 3 hours for a urine specimen, which is positive for a urine tract infection. During this time the patient is in a high acuity area because she needs intensive nursing supervision as she has a tendency to wander off. A total of 1 hour of emergency department registrar time is taken up – very little on medically assessing or treating the patient – mostly on assessing home circumstances and safety and suitability for discharge.
Tariff = £109

Resuscitation

An unconscious patient arrives in the resuscitation room following alcohol ingestion and a fall. He is received by a large team including three consultants, three middle grade doctors, two junior doctors and four nursing staff. The patient is intubated and ventilated, undergoes CT (computed tomography) scans, and is then nursed in the emergency department for a total of 6 hours while he wakes up. He too has a fractured wrist that is put into plaster. He wakes up abusive and difficult, requiring extensive ongoing nursing input.
Tariff = £235

Figure 6. Reference costs.

Every hospital is funded to calculate the cost of providing any particular service – the 'reference cost'. The hospital submits this data to the NHS, which aggregates the data to set the tariff payable for each healthcare resource group.

The cost of staff is at least 70% of the cost of providing the emergency department service. The cost of staff, equipment and facilities is much the same all over the NHS, therefore one would expect a high level of agreement about the cost of providing an emergency department service.

quite tight agreement about the costs and a normal (Gaussian) distribution of the tariffs.

Reference costs in emergency medicine

For emergency departments a similar exercise is supposed to be carried out. The complexity of calculating the true costs makes it difficult to do, and the results suggest that most hospitals do not perform this activity accurately if at all.

Staff costs (70% of all costs) and overhead costs (heating, lighting, parking, security) are likely to be fairly similar in all hospitals and therefore there is inexplicable variation in the reference costs of emergency care – the resuscitation patient (VB01) (*Figure 9*) and the minors patient who does not need any investigations or treatment (VB11) (*Figure 10*).

The range of reference costs for treating a resuscitation patient was from £29 to £6566. Twenty two hospitals' reference costs claim that they can treat a resuscitation patient for less than £100. One hospital's reference costs were £29 for treating a resuscitation patient and £61 for a patient who required no investigations or treatment.

A patient requiring resuscitation may tie up more than ten clinical staff for at least an hour and is likely to involve expensive and time-consuming activities including blood transfusions, CT (computed tomography) scans and ultrasound. Therefore these low figures seem highly improbable. The true reference costs for these patients with the highest level of acuity are therefore much higher than the submitted reference costs.

Having examined at the highest acuity patients, we should now look at the lowest acuity patients (*Figure 10*). We see that the reference costs generally over-estimate the cost of providing the least acute care. This makes emergency departments look unrealistically expensive compared to other forms of care. This is not the case but just a function of the reference cost system.

Why has this occurred?

If a very simplistic method of calculating emergency department reference costs is used:

$$\frac{\text{Cost of treating all emergency department patients}}{\text{Number of emergency department patients}}$$

it will tend to overestimate the costs of treating low acuity patients, and underestimate the costs of treating high acuity patients, and this is exactly what is seen.

Figure 7. Reference cost submissions for cataract surgery. Mean reference cost = £906, standard deviation = £348, actual tariff = £874 (Best Practice). From Department of Health (2013b).

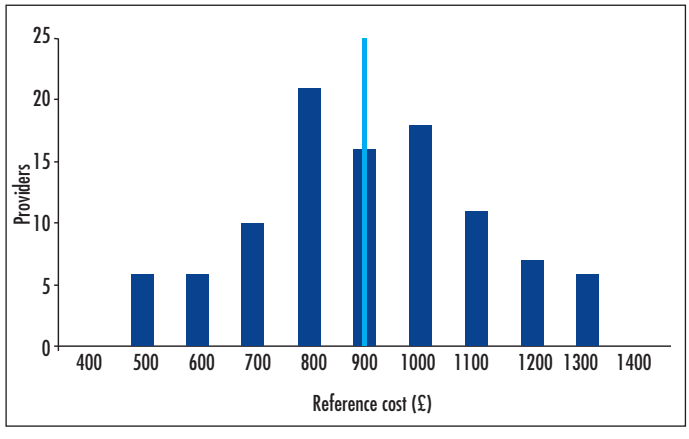


Figure 8. Reference costs for hip and knee replacements. Hips mean = £5681, standard deviation = £1278, actual tariff = £5280; knees mean = £5833, standard deviation = £1272, actual tariff = £5707. From Department of Health (2013b).

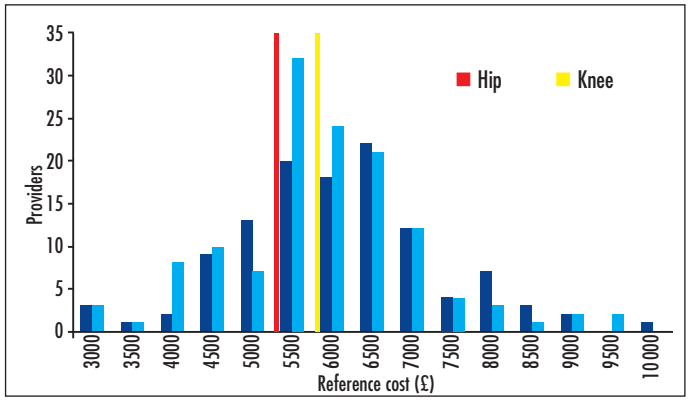


Figure 9. Reference costs of a resuscitation patient (HRG code VB01). Mean = £301, standard deviation = £409. From Department of Health (2013b).

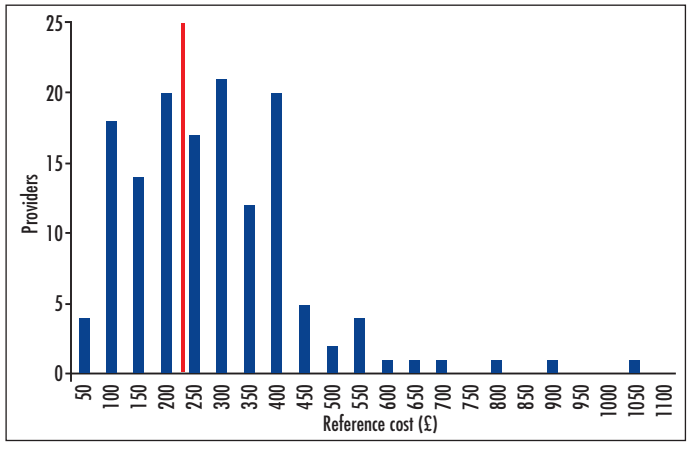
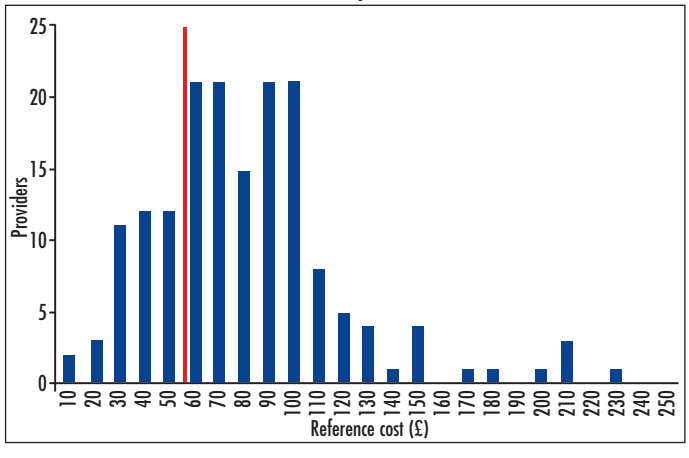


Figure 10. Minors patient with no investigation or treatment (VB11). Mean = £82, standard deviation = £46. From Department of Health (2013b).



It should also be noted that the reference costs give only the historic cost of care, not of what the cost of providing high quality care should be. In inpatient specialties these are termed best practice tariffs.

Why hasn't this happened in other countries?

The same situation has occurred in other countries, to a lesser or greater extent. Health care is moving out of hospitals wherever possible, for reasons described above. Within hospitals, health-care decision making is moving to the front of the hospital. The UK has been sheltered from some of these effects because it has historically had such a strong system of 24/7 primary care.

In the UK an average of 25% of the population attend an emergency department every year (Health and Social Care Information Centre, 2014b) – in the USA where primary care coverage is poorer, the average is 42%, and interestingly has increased where they have implemented 'whole population' health care (Smulowitz et al, 2014).

How should the tariff be set?

It is important to recognize that Payment by Results is not the problem per se. Rather the issue is that the system is only as good as the data we input into the Payment by Results mechanism: rubbish in = rubbish out.

A fairer way of calculating the reference costs is to fund a stratified sample of hospitals to perform detailed costing, as occurs in other countries. The College of Emergency Medicine strongly advocates this approach.

Other ways of paying emergency care end up with what is essentially a fixed price contract. This is counterproductive as it removes a major incentive for GPs to manage patients in the community instead of sending them into hospital whenever they are sick. It is like building a power station and saying 'you can have as much electricity as you like for a fixed price'.

The future: value-based commissioning

Nationalized health care cannot fund all treatments that may be beneficial. While this may seem a political debate, those charged with spending public money are looking to health care to show that they are spending money wisely.

Health-care providers and professional organizations need to show that they work to maximize the overall population benefit. Although not well appreciated, too much health care results in harm. As health-care provision increases, the benefits tail off, the harms increase on a straight line, and therefore there is an optimum point of health-care provision (Donabedian, 1988, 2003) (*Figure 11*).

At the moment it is impossible to establish the position of emergency care on this curve, which makes it difficult to defend spending resources when the benefit is not apparent.

How can we measure value in emergency care?

Those charged with buying health care of a population need to understand and measure the value of health care they commission.

$$\text{Value} = \frac{\text{Health benefit}}{\text{Cost}}$$

To demonstrate the value of any intervention, one should measure the starting point, the finishing point, and the cost of going from one to the other.

$$\text{Value} = \frac{\text{Output} - \text{input}}{\text{Cost}}$$

Output captures the whole patient outcome and includes quality, safety and patient experience. This is relatively easy in the elective specialties. For example doing a hernia operation accurately predicts:

- The starting point (a patient with a hernia)
- The finishing point (a patient without a hernia)
- The cost of the operation
- The health benefit to the individual and society of the operation.

Moreover, the operation itself is a reasonable proxy for the starting and finishing points, assuming a consistent threshold for operation.

Acute health care has a far greater challenge. Measuring investigations and treatments alone is a poor proxy for value-added. To be able to understand value in acute healthcare we need to measure:

- Inputs – patient acuity, patient complexity
- Outputs – patient diagnosis using the Unified Diagnostic Dataset system, patient experience and patient outcomes wherever possible.

With these data, the NHS can create a framework that rewards emergency department activity fairly and can build new incentives (best practice tariffs) to discharge rather than admit patients.

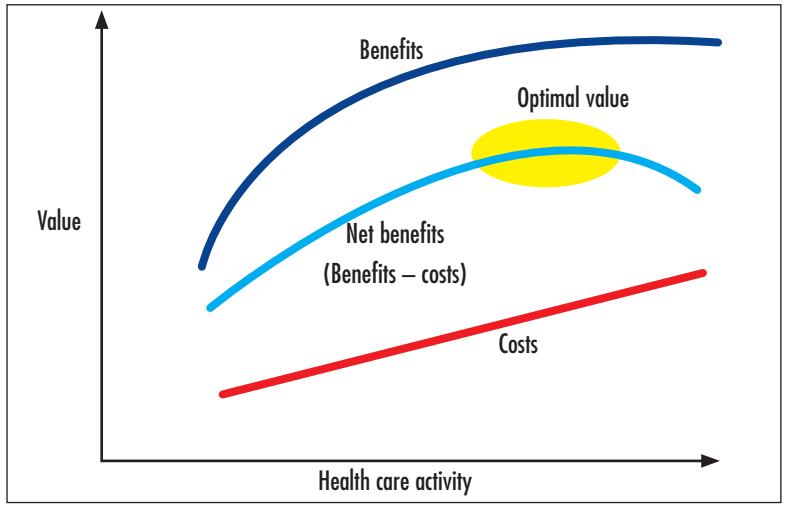
What determines value in acute health care?

When assessing value in health care, it appears that:

- In high acuity health care, outcomes are the most important determinant of value
- In low acuity health care, cost is the most important determinant of value (Sharp et al, 2014).

Therefore tariffs should reflect this.

Figure 11. Donabedian's graph of value vs health-care activity.



Why does this matter?

Under-resourcing emergency medicine nationally directly translates into under-resourcing locally. To a hospital management team, it makes no sense to allocate more staff and equipment to an area that consistently loses money. This does not recognize potential savings within hospitals from properly functioning emergency departments.

Under-resourcing emergency medicine has made senior clinical posts less attractive as competing specialties offer much less intensive workload in less stressful environments, with the work concentrated within office hours.

Figure 12 shows that a large proportion of emergency department patients are processed outside normal office hours, so staffing ought to match this, meaning that senior staff work far more unsocial shifts than comparable specialties. The graph shows arrival times (the start of the patient journey), not when the important decision-making occurs, which is 2–3 hours after arrival.

There is currently no contractual mechanism by which the intensity and anti-social working patterns of emergency medicine can be recognized. This, together with much better pay prospects in many other specialties, has resulted in a recruitment crisis within emergency medicine.

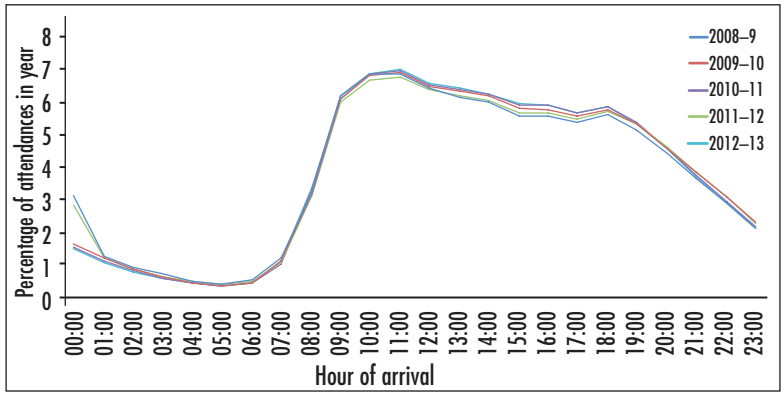
Conclusions

The current crisis in emergency care could have been anticipated and avoided if emergency departments had been collecting the right information. Emergency departments have been under-resourced because the method of measuring and rewarding clinical activity based on investigations and treatments alone has not kept pace with the increase in acuity and complexity.

The Payment by Results system is not intrinsically broken. Submission of poor quality reference costs data has skewed the payment mechanism: rubbish in = rubbish out. The continued failure to collect good quality data in emergency departments harms patients by not allocating appropriate resources to provide adequate care for these patients.

The authors are pleased to confirm that the Secretary of State for Health has initiated a complete review of the current dataset, with a view to ensuring much better data to inform emergency care in the future. This would lay the foundation for fairer funding models, and better measures of clinical activity. **BJHM**

Figure 12. Emergency department attendance by hour of day. From Health and Social Care Information Centre (2013).



KEY POINTS

- Acute care generally and emergency care in particular is underfunded.
- The data that we collect about emergency care are limited and of poor quality, and this undermines the value of emergency care.
- Payment by Results works, but needs to have the right reference cost data.
- The current reference cost data are poor, but this can be easily fixed with a system of sentinel hospitals.
- Emergency care needs to be able to demonstrate the value that it gives to the wider health economy.

Conflict of interest: none.

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