



Interim Management and Support

**Planning for predictable flows of patients into unscheduled  
care pathways beyond the Emergency Department:**

***Meeting Demand and Delivering Quality***



## Preface

Overcrowded hospitals are dangerous places for patients and stressful places for staff. Length of stay drives costs.

By taking effective steps to reduce length of stay, overcrowding can be reduced or eliminated. Money will be saved. Harm events will be reduced. Staff will find their work more rewarding.

This short paper, which was commissioned by the Urgent and Emergency Care Intensive Support Team, describes an approach to managing urgent and emergency patient flow in acute hospitals that can significantly reduce length of stay. The principles described in this paper have been successfully implemented across the NHS. You too can do it.

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## 1. Introduction

Unscheduled care pathways in hospital are driven only by the flow of patients who arrive at the door. Whilst there may be opportunities for commissioners to modify the way the general public and the primary and community care services access the hospital, once they arrive, the patients' needs have to be met promptly, safely and efficiently.

In the case of people who present to the Emergency Department, NHS service standards require very rapid completion of assessment and delivery of definitive treatment within four hours of arrival. The hospital must therefore have a good understanding of the anticipated flow of unscheduled patients into its various specialties and ensure that it plans resources to be available so as to reliably help those people. It must also keep a close watch on the actual versus the anticipated demand and on the hour-by-hour flow of patients through the system and be able to escalate resources appropriately if demand rises or bottlenecks appear.

A key point to understand is that the primary driver of resource use at the front door is demand and not other things that may be going on in the hospital. Just how prompt, safe and resilient these unscheduled care services will be for patients may, nevertheless, be profoundly affected by the clinical efficiency and effectiveness of downstream care by the hospital, by length of stay, by discharge planning and by the efficiency of partnerships for onward health and community support, particularly for the 20% or so of frailer patients whose needs on leaving hospital will remain complex.

Analysis of information from standard Trust data sets including the Patient Administration Systems and Hospital Episode Statistics can be used to design and test clinical service plans to improve the effectiveness, safety and efficiency of patient experience.

These data sets usually demonstrate a high degree of predictability of unscheduled care workloads but may also show differences in day to day demand within each working week and substantial opportunities to reduce length of stay (LoS). They can provide enough information about the pattern of patient arrivals during each 24 hours to help ensure that available resources can be organised to respond in a timely, safe and effective way.

Detailed analysis can generally be conducted on the 13 weeks of data from a quarter. In general, activity modelling does not get any more precise with larger aggregations and loses reliability as smaller subsets are used. Mean activity is generally shown and where appropriate, the 85<sup>th</sup> centile of the activity distribution is calculated because this is a prudent workload to use for capacity planning.

One small note of caution is that these analyses may not capture patients who are seen by a specialty team in Emergency Department and immediately discharged from there. The scale of such unmeasured work is generally modest but it often uses senior medical staff time. This specialist work might be obtainable from an ED computer database (It is also specialist activity which may not be attracting payment).



The example in this paper uses real data from an average size DGH. The model is scalable between about 25 and 60 medical assessments per day and ratios of medical, surgical and trauma caseloads is unlikely to vary very much. In larger units, often metropolitan teaching centres, a slightly different model may be required, particularly when there is a substantial stream of tertiary inpatient work.

This paper focuses on three unscheduled care pathways which extend beyond the Emergency Department:

- Acute Medicine and related specialties
- General Surgery and Urology
- Trauma

There is considerable overlap in the evidence and discussion in relation to all specialties and it is recommended that the paper is read as a whole if it is to provide insight into whole system analysis and service development.



## 2. Acute Medicine

### Activity shows no seasonal variation

There is remarkably little seasonal variation in patients admitted by the medical team.

Table 1 shows the mean number of admissions each day in five quarters from of 2007-2009.

<b>Emergency Admissions to Medicine each Day (Mean in each quarter)</b>					
	<b>2007-2008</b>				<b>2008-2009</b>
	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q1</b>
From ED	27	27	28	28	29
From GP	18	19	19	19	19
<b>Total per Day</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>47</b>	<b>48</b>

**Table 1** shows the average daily total of all Emergency Assessments performed by the Acute Medical team each day.

This crude average hides some predictable variations. Whilst there are only small differences in demand during the working week a substantial reduction is observed on Saturday and Sunday because there are so many fewer GP referrals.

This is a pattern commonly seen in medicine but often less marked in other admitting specialties. When planning resources to meet this pattern of demand, using mean data would underestimate the workload for about half of the days. Research suggests that prudent capacity planning should be based on the 85<sup>th</sup> centile of the variation in demand.

**Table 2** shows both mean values and this 85<sup>th</sup> centile activity.

<b>Medical Assessments by day of week in Q1 2008-09 (Mean and 85<sup>th</sup> centile activity)</b>						
	<b>From ED</b>		<b>From GP</b>		<b>Total</b>	
	mean	85 <sup>th</sup> centile	mean	85 <sup>th</sup> centile	mean	85 <sup>th</sup> centile
<b>Monday</b>	26	30	14	20	40	<b>51</b>
<b>Tuesday</b>	26	32	16	20	42	<b>53</b>
<b>Wednesday</b>	24	28	15	19	39	<b>48</b>
<b>Thursday</b>	25	29	16	18	41	<b>48</b>
<b>Friday</b>	26	30	17	21	43	<b>52</b>
<b>Saturday</b>	23	28	4	5	27	<b>33</b>
<b>Sunday</b>	21	28	3	3	24	<b>32</b>

**Table 2:** Referrals to Acute Medicine from the Emergency Department and directly from General practitioners by day of the week.

*The mean and 85<sup>th</sup> centile of the distribution is shown in Table 2. (N.B. less medical patients present at weekends due to many fewer GP referrals.) When planning clinical resource requirements and bed capacity, it is recommended that the total activity at the 85<sup>th</sup> centile (right hand column) is used.*

### **The busy times of day are reasonably predictable**

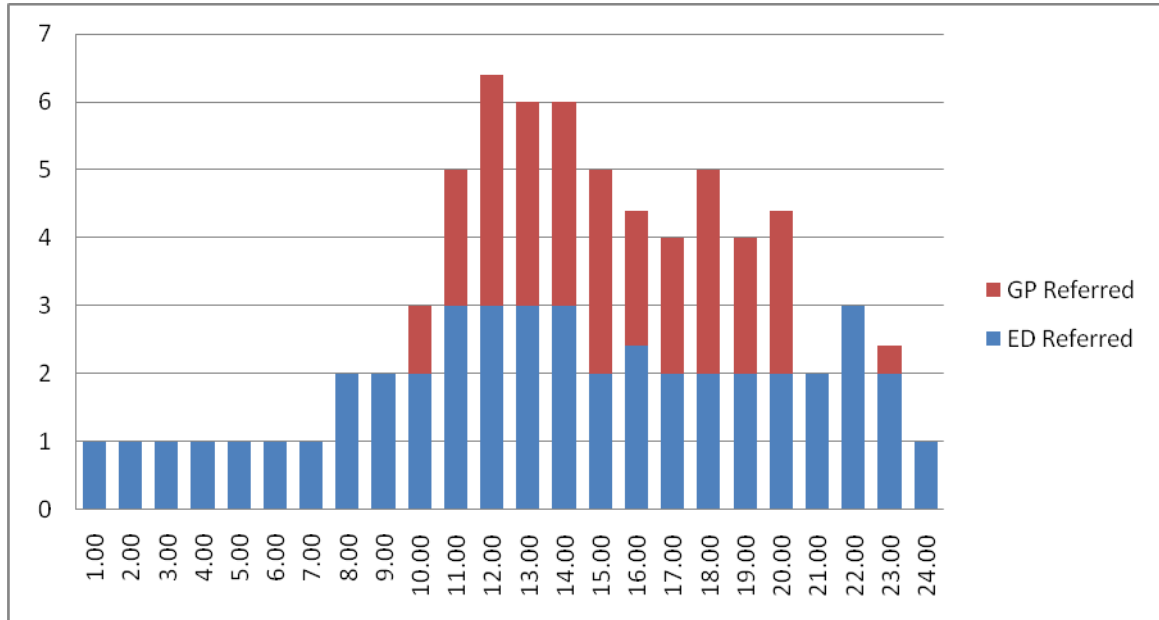
It is possible to create a profile of the time patients are admitted. This probably lags behind the time of their arrival by at least 2-3 hours if they first present unheralded in the Emergency department.

In many more detailed projects, it has also been demonstrated that the lag between GP and patient agreeing the hospital referral and the patient's arrival in the acute medical unit may represent a further 3 or more hours of delay. This delay often reflects the operational priorities of the ambulance service where Category 'A' 999 calls take precedence to the exclusion of these sick and often vulnerable patients waiting at home. The effect may be to cause an avoidable bulge in patient arrivals in the early evening just as the hospital is "winding down" diagnostic and support services.





**Figure 1: Weekday pattern of medical admissions hour by hour (85<sup>th</sup> centile)**



**Figure 2: Weekend pattern of medical admissions hour by hour (85<sup>th</sup> centile)**



In this example the acute medical team needs to create capacity to assess up to six patients an hour through the peak hours during the week but only a maximum of three per hour at the weekend. Observation suggests that approximately one hour of “junior” medical time is required for each patient during the first 24-hours.

Close working relationships between emergency and acute medical teams using integrated records should minimise duplication of effort which can otherwise consume twice this medical resource. Assessment is completed when a senior competent doctor has reviewed the working diagnosis with the patient and agreed a care plan.

The assessment will include an estimate of whether care can be delivered at home, by a short admission of less than three nights or through specialist care over a longer period. The responsibility for this assessment is increasingly seen as the job of a fully trained specialist (i.e. a consultant). Middle grade doctors make a vital contribution in the service for which their time must be protected. Supervision and feedback to them from the supervising consultant must be built into their working routines.

The Royal College of Physicians in its third working party about acute medical care over the last decade recently recommended that the aim should be for a consultant review to take place within four hours and certainly within 12 hours of the patient’s arrival. It also recommends that any individual consultant’s caseload in a single duty should not exceed 20-25 patients.

In future, the organisation of Consultant and middle grade work should move towards more immediate contact with patients as they arrive because the reduction of risk and increase in effectiveness of care and satisfaction of the patients and their carers are very high impact benefits.

*Acute medical care: The right person, in the right setting – first time  
Report of the Acute Medicine Task Force October 2007*

<http://www.rcplondon.ac.uk/pubs/contents/2a8ed5fa-64af-4b2c-af03-85e90b7a6d20.pdf>

At least 15 minutes of consultant time for each patient should be factored into the resource plan. All three RCP working parties about acute care have emphasised the importance of this direct clinical leadership and supervision. Its importance was borne out by the NCEPOD audit of deaths following emergency medical admission which contains clear recommendations about the requirement for direct consultant involvement in care at an early stage.

*Emergency Admissions: A journey in the right direction? A report of the National Confidential Enquiry into Patient Outcome and Death (2007)*

<http://www.ncepod.org.uk/2007ea.htm>

A further NCEPOD report in 2009 demonstrates, in a much larger series of patients that across all specialist emergency work, delays in access to consultant input continues to contribute to adverse outcomes in about a quarter of patients who die. It also highlights the risks of poor communication and ineffective team work contributing to bad outcomes.

*Caring to the End? A review of the care of patients who died in hospital within four days of admission A report of the National Confidential Enquiry into Patient Outcome and Death (2009)*

[http://www.ncepod.org.uk/2009report2/Downloads/DAH\\_report.pdf](http://www.ncepod.org.uk/2009report2/Downloads/DAH_report.pdf)

Early consultant involvement is likely to increase the number of patients who can be managed at home and also increase the number whose care needs only a short stay in hospital, perhaps linked to on-going care from a well integrated long term conditions service in the community. Shortening length of stay for everyone may substantially alter the bed requirement as well as improving patient safety and satisfaction. (See below)

Many hospitals with caseloads of the magnitude in this example are investing in the development of Acute Medicine as a subspecialty. The most widely used and effective model is to have one consultant responsible for patients arriving between 0800 and about 1630hrs, being approximately half of the day's total caseload.

By working in the Assessment Unit in the afternoon and early evening, to the exclusion of other planned clinical commitments, this consultant ensures that each patient completes their diagnostic assessment within 4 hours and certainly within 12 hours of arrival, consistent with the standard for the future recommended by the RCP. A second consultant takes over for the evening and overnight, perhaps seeing some patients in the evening and certainly completing all the remaining assessments the following morning, to the exclusion of other planned commitments and working closely with the registrar on duty through the night.

In this model of care, the daytime, weekday role would be a routine component of the work for a team of at least three Acute Physicians. They would also provide continuity of care for short stay patients, for example by scheduling themselves clinical rounds on the short stay unit the morning after they have performed a day in the assessment unit. They will also provide overall leadership, including clinical governance responsibility to the multi-professional team working in these two clinical areas. The acute physicians can be included in weekend rota arrangements and the sub-specialty offers good opportunities for part time and flexible working.

In hospitals with more than about 50 acute medical referrals each day, a team of six consultants may be more appropriate because they can offer extended presence through the busy evening period and provide two review rounds each day in the short stay wards. Although this is expensive, such a team is likely to manage the whole episode of care for more than 60% of the referred patients.

In many organisations, senior medical supervision at the weekend falls substantially more than the demand and the service becomes critically under-resourced. Patients wait for discharge, which in many hospitals is still a rare event on a Sunday. Being referred for assessment at the weekend can be a substantially less satisfactory experience with delay, risk and uncertainty significantly increased because the acute medical service is not geared up to meet predictable demand. Some adjustments to weekend mode may be necessary, but senior decision making, reasonable access to diagnostic support and pro-active discharge facilitation should be 7-day a week services.

### **Length of stay reveals several opportunities for improvement**

Whilst there is considerable frustration in the delays inherent in organising complex discharges and ultimately, in the number of delayed transfers of care, patient needing only short spells of hospital care may also experience many unnecessary bed days. Each ward transfer adds one or two nights to LoS, boarding out in another specialty often leads to 2 or 3 night extensions.

Continuity of care in a specialist short stay unit can offer appropriate patients an extremely effective and shorter in-patient experience and many such units now discharge upward of 65% of patients before the third night in hospital.

In the upper quartile of NHS hospital performance, overall median LoS for all-age medical emergency admissions is approximately 4 -5 nights. It is often the case that patients admitted on Monday or Tuesday will have a shorter admission by approximately two nights compared to those admitted on Friday or at the weekend.

Daily decision making in these high volume medical pathways, with consultant support every day, is an important component of best practice. It helps to minimise risk by reducing delay in decision making, improves communication with patients and their carers and promotes prompt, pro-active discharge planning.

Some acute medical teams now offer a “virtual” ward where a patient remains under intensive investigation, with all their clinical data available through the PAS clinical information and PAX systems, yet the patient sleeps in their own bed at home.

The example below is data from the same example hospital at the beginning of an improvement programme.

**Table 3:** Medical Emergencies: Length of Stay

LoS days	% admissions
0	22
1	17
2	10
3	7
4	6
5	5
6	4
7	4
8	3
9	2
10	2
>10	18

**Current proportion of patients staying less than three night = 49%**

**Current median Length of Stay = 6 or 7 nights**

### **Very long tail on distribution of Length of Stay (LoS)**

A review of what is achievable through short stays in unscheduled care has been published by the NHS institute. *Focus on Short Stay: NHS Institute: 2007.*

[http://www.institute.nhs.uk/option.com\\_joomcart/Itemid,26/main\\_page,document\\_product\\_info/products\\_id,192.html](http://www.institute.nhs.uk/option.com_joomcart/Itemid,26/main_page,document_product_info/products_id,192.html)

In a review of the winter of 2008-2009 conducted by NHS North West, the proportion of unscheduled care patients with a length of stay less than three nights varied across the region from 51 to 66% and the proportion of patients staying in an acute bed for more than 14 nights from 11 to 18%.

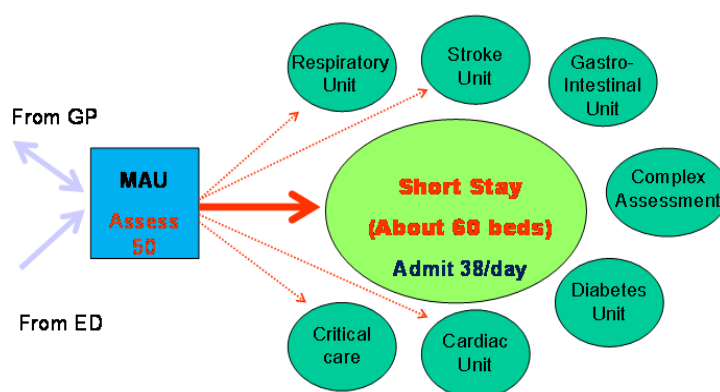
### **The Medical Patient Pathway**

The general framework for a model of care can be drawn and quantified using the sort of demand analysis given above. The model clearly splits the resources and process for the first diagnostic consultation (i.e. assessment) from the short stay care facility. It is recommended that the functional distinction is important but there may be considerable advantage in co-location of the two elements which will generally be managed by a multi-professional acute medical team.

Good functional relationships with the Emergency Department are vital, to avoid duplication of effort, to optimise the partition of work between the ED Observation Unit rather than MAU referral and to optimise use of available skills at night. (Note that the NHS SITREP definitions only allow the 4-hour clock to be stopped by admission or discharge – so an ED Observation Unit does not “avoid an admission” but it will operate on a different tariff structure from a Medical Assessment Unit and

use clinicians with rather different experience and skill sets. The two should not be seen as interchangeable.)

Around the acute medical service will be clustered as many sub-specialist teams as the hospital provides and these are often ward-based. The minimum configuration is usually Cardiology, Chest Medicine, Diabetes, Elderly Care (sometimes with wards known as “complex care wards”), and Gastroenterology. Each specialty team will be led by at least two consultants. There is opportunity for flexibility in sizing of specialty wards to fit local geography because approximately a third of patients needing a longer stay have more general medical needs which makes their placement in any particular specialty less critical. Integration of pathways of care for patients with infection control requirements must be built into the local plan to ensure that appropriate isolation and/or cohort nursing facilities are available.



**Figure 3:** A diagrammatic representation of the relationships between a Medical Assessment Unit, Short Stay Wards and Sub-Specialty Units in a typical General Hospital.

*The “Complex Care” unit is so labelled to stress the acute geriatric function and particularly the importance of efficient comprehensive geriatric assessment arrangements. Missing from the drawing is an infection control unit or cohort ward, created to manage MRSA risk in many hospitals. The numbers are taken from the same exemplar general hospital used throughout and serve to introduce the quantitative methodology discussed below.*

### How many beds does the Medical Unit need? Quantitation of the model

This model can be effectively used not only as a qualitative description of the way things are organised but also to plan the size or number of beds in each component pool. Many hospital clinicians and managers will refer to research which has clearly showed that once occupancy within a bed pool rises above about 85%, the chances of a new patient having to wait for a bed starts to rise exponentially and above about 90% occupancy the risk of delay is very real. These observations were originally made many years ago.

For a technical review of the mathematics and logic see:

*New Approaches to Bed Utilisation – making queuing theory practical*  
Dr Rod Jones; New Techniques for Health & Social Care. Harrogate Management Centre. 2002

[http://www.hcaf.biz/Recent/Microsoft%20Word%20-%20New%20approaches%20to%20bed%20utilisation%20\\_2\\_.pdf](http://www.hcaf.biz/Recent/Microsoft%20Word%20-%20New%20approaches%20to%20bed%20utilisation%20_2_.pdf)

Note however that these observations relate to a pool of beds and not, necessarily, the whole system.

It is vital to ensure that the MAU stays below 85-90% utilisation at all times so that it has capacity to care for the anticipated number of arrivals hour by hour. (Batching or bunching because of delayed transport of GP referred patients by the ambulance service is a particularly unwelcome difficulty.) Similarly, the short stay unit should always have the capacity to take patients. If it is used as a buffer to ensure that patients needing specialist care get to the right ward with 12-24 hours, then the specialist bed pools can run close to 100% occupancy (particularly since the official, oft quoted, calculation is based on the midnight return taken on a Thursday night).

Seeing the problem of capacity and occupancy in this way promotes a much more efficient use of bed stock. In fast changing parts of the system, such as the MAU, trigger points for the escalation processes may be created for several time-points in each 24 hours at different levels to reflect the anticipated demand in the coming hours.

### **Using the Exemplar Data to work an example:**

The example shown below uses the data from the general hospital shown in the figures and tables above.

#### ***If 50 people arrive on Day 0:***

The assessment unit must be big enough and should be planned on the assumption that each patient workspace can be turned over no more than three times in each 24 hours. A mix of beds, trolleys and a serviced lounge together with some consulting and treatment rooms for doctors as well as bedside facilities are needed. At least a quarter of the referred patients will be ambulant and can be efficiently assessed in an out-patient style consulting environment. Many such patients are referred by GPs and are generally more likely to continue their treatment at home than those referred from ED.

The clustering of work around the middle of the day must also be absorbed so a unit with at least 16 and perhaps 20 spaces is the minimum requirement. There is merit in planning the assessment unit for a slightly longer turn-around cycle, perhaps closer to 12 rather than 8 hours. This enables some of the short diagnostic pathways to become even more efficient and facilitates a closer working relationship with the Emergency Medicine team for whom a “Clinical Decision Unit” is often planned on a maximum stay of 12 hours.

In the example, such a decision unit would need to have the capacity to provide care and comfortable facilities for about 25-30 patients. There is likely to be a greater proportion of bed spaces and a more comprehensive 'hotel service' infrastructure because patients are staying longer.

Some hospitals have sought to combine medical and surgical assessment facilities within one unit. Clinical leadership and availability of appropriate equipment and skills are not necessarily easier to ensure in such bigger and less clinically focussed places. In the exemplar hospital, the surgical team would be predicting a need to accommodate approximately 20 patients for assessment each day with peak activity coinciding with that in medicine. The trauma service would add a further 6-8. With nurse led assessment in surgery well-documented as safe and effective, many units combine the assessment space into a surgical short stay facility where diagnostics and minor surgical procedures can be completed and perhaps 75% of the patients returned home within 48 hours.

There is no clear consensus as to optimal long term arrangements but the two services are usually focussed to meet substantially different health care needs within professional boundaries that are well understood. Some innovative teams have created very close links between an ortho-geriatric service and trauma care and in a few places, early collaboration by the elderly care team in surgical emergency work delivers safer, shorter, more effective acute care spells to these patient groups. In general, "combined" assessment units are not obviously safer or more effective.

Note that the assessment unit may well accommodate all the overnight admissions, helping to retain focus in the hospital at night team, minimising disturbance in other wards in the small hours and creating the potential for a very efficient early morning consultant review. Such nocturnal arrangements will only be truly satisfactory if the unit is also ready to accept new admissions in the morning without delay to onward flows of patients.

#### ***From assessment (Day 0):***

- At least 25% (12) will return to community care on same day
- 18-20 will need a short stay bed
- 20 will need a specialist/longer stay bed
  - *If all admissions through short stay: 20+20=40 beds for first night*

#### ***On Day 1:***

- About another 20% (10) will return to community care
- 8-10 will need to stay one more night
- 20 should be moving to specialist beds
  - *10 short stay are discharged and (say) 15/20 move on to specialist wards: so short stay requirement for second night 10 +5= 15 beds*



## **On day 2:**

- The 8 remaining short stay patients return to community care
- All specialty/longer stay patients have now been placed
  - *All short stay discharged and remaining specialist ward patients correctly placed so third night requirement for short stay unit = 0 beds*

The steady state requirement for short stay is therefore 40+15 and with further modest allowance for congestion of 5 this approximates to 60 beds.

It is important that specialist units are planned with capacity to take the reasonably predictable small but daily flow of patients within 24 hours of the requirement being identified. Otherwise the number of buffering beds in short stay must be greater. The essentials of this model have proved to be a robust framework for many successful implementations.

## **Beds in Specialist Wards**

Size of specialty units needs to be based on more detailed examination of each sub-specialty case load. Hospital data sets and HES can help with this work, particularly if consultants and subspecialties are already ward based.

Particular thought needs to be given to the role of acute beds for elderly care because nationally, there is more than a threefold variation in length of stay from hospital to hospital. This observation was explored in the National Beds Inquiry ten years ago and informed the National Service Framework for Older People. *Shaping the Future NHS: Long Term Planning for Hospitals and Related Services Consultation Document on the Findings of The National Beds Inquiry – Supporting Analysis DH 2000*

[http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_4020470.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4020470.pdf)

Allocation of patients to specialist care based solely on chronological age is increasingly seen as anachronistic and perhaps even discriminatory. Many elderly care teams now see themselves as particularly expert in the care of frailer, older people with complex needs, be it at the start of the inpatient spell or shortly after a period of specific care, for example following a GI haemorrhage, a fractured neck of femur or a myocardial infarction.

Acute elderly care seems to work best when there is rapid and effective multi-disciplinary team providing a comprehensive geriatric assessment linked into a well integrated community network of health and social care facilities for intermediate care, re-ablement and ongoing supportive care. Some hospitals are exploring the benefit of early identification of patients with such needs, for example, by using British Geriatric Society markers of frailty to screen all patients during first assessment.

*British Geriatrics Society: Comprehensive Assessment for the Older Frail Patient in Hospital. Best Practice Guide 3.5. 2005*

[http://www.bgs.org.uk/Publications/Compendium/compend\\_3-5.htm](http://www.bgs.org.uk/Publications/Compendium/compend_3-5.htm)

An acute elderly team can often rapidly return patients to a pre-existing package of community care, perhaps with temporary additional support or can initiate a comprehensive assessment without delay where this is more appropriate. Their links to the complex and proliferating network of community health and social care support are vital skills in acute medicine which can do much to reduce the particular risks that an acute hospital environment poses to this group of patients. Their potential to inform and influence the commissioning of appropriate, responsive and compassionate services for frailer older people cannot be over-stated. Such teams have the ability to combine the best practice of acute medicine with a very strong community focus and holistic awareness of the need to optimise the quality of life for this section of society.

If the 20 admissions each day in the current example who are expected to need more than two nights in hospital stay for the national average of about 7 nights, the Medical Unit would need 140 beds (over and above MAU and Sort Stay). This might be a reasonable interim target whilst enhanced arrangements for frailer older people are refined. This crude modelling needs to be more thoroughly worked in the local context. For example Coronary Care stays for MI are generally going to be about 5 nights whilst acute elderly care might perhaps be capped at 21 nights but with a median closer to 11 nights.

It is often the case that the beginning of an improvement project will find overall length of stay in a Medical Unit closer to 10 nights which is in the lowest quartile of national performance rather than in the upper quartile of hospitals which are closer to 4-5 nights. Very long care spells in acute elderly care beds and larger numbers of patients whose transfer of care is clearly delayed may suggest particular areas for focus in improving commissioning arrangements for the care of older people. It is important to remember that acute hospitals cannot be considered as a “place of safety” for such older frail people because their very presence in an acute hospital bed exposes them to particular risk of hospital acquired infections and other avoidable harm.

The table on the following page demonstrates just how much resource may be invested in inefficient length of stay in a medical unit where daily review of every patient by a senior doctor is not available and where pro-active discharge planning based on an estimated length of stay proposed as part of the initial assessment is not taken seriously. The opportunity for cost improvement as well as improved patient satisfaction and reduced risk of harm through hospital acquired infection have been demonstrated many times in hospitals which have committed themselves to this sort of quality model.

In summary and using the example of a medical service providing 50 assessments daily, the overall specialty bed requirement model for all medical specialties might work as follows:

	Length of stay	Estimated bed requirement	
Assessment	Max 8 hrs	20	
	Max 12 hours	30	
Short Stay	Max 2 Nights	60	
Specialty total	10 nights	200	<i>National lowest quartile</i>
	8 nights	160	
	7 nights	140	
	6 nights	120	
	5 Nights	100	<i>National highest quartile</i>

**Table 4:** Summary Medical Bed Model



### 3. Non-Elective (Emergency) Surgery and Urology

#### Pattern of demand for surgical beds

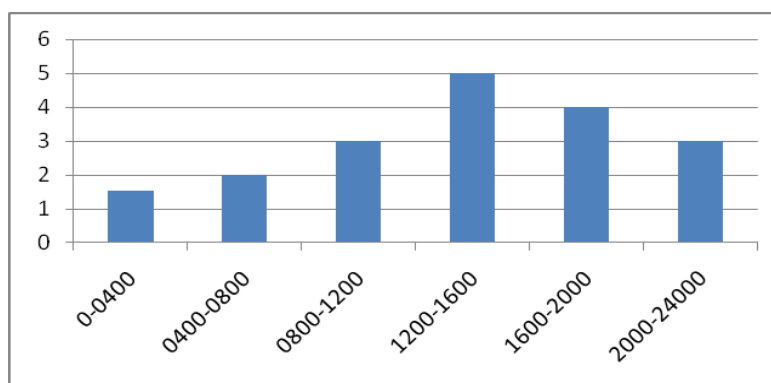
There are generally small differences in demand for non-elective surgical admission during the week and a substantial reduction in the total number of admissions on Saturday and Sunday entirely because there are so many fewer elective admissions. Note that the total elective and non-elective demand for beds is usually highest on Monday and Tuesday.

When planning resources to meet this pattern of demand, using mean data would underestimate the workload for about half of the days. It is generally agreed that prudent capacity planning should be based on the 85<sup>th</sup> centile of the variation in demand. Table 5 shows both mean values and this 85<sup>th</sup> centile activity for non-elective work.

Surgical Admissions; Non-Elective and Elective					
	Emergencies		Elective		Total Beds required
	Mean	85 <sup>th</sup> centile	Mean	85 <sup>th</sup> centile	
Monday	16	<b>21</b>	14	<b>20</b>	<b>41</b>
Tuesday	15	<b>20</b>	14	<b>20</b>	<b>40</b>
Wednesday	15	<b>19</b>	12	<b>16</b>	<b>35</b>
Thursday	14	<b>18</b>	13	<b>18</b>	<b>36</b>
Friday	14	<b>18</b>	12	<b>16</b>	<b>34</b>
Saturday	11	<b>14</b>	3	<b>5</b>	<b>19</b>
Sunday	11	<b>15</b>	4	<b>7</b>	<b>22</b>

**Table 5:** Surgical and Urology Admissions *When planning clinical resource requirements and bed capacity, it is recommended that the total activity at the 85<sup>th</sup> centile is used (Right hand column).*

It is possible to create a profile of the time patients are admitted. This probably lags behind the time of their arrival by at least 2-3 hours. In many more detailed projects, it has also been demonstrated that the lag between GP and patient agreeing the hospital referral and the arrival time may represent a further 3 or more hours of delay. Numbers in Surgery are small so the profile is shown in Figure 4 in 4-hour blocks.



**Figure 4:** Estimated arrival times for non-elective surgical referrals

## Surgical Non-Elective Length of Stay

The profile of length of stay is shown in Table 6. Two thirds of all patients have less than four nights in hospital. There is probably scope to speed the departure of these patients even further so as to see these patients out of hospital before the third night. Good benchmark data in this form for inter-trust comparison is not yet widely available. Median LoS is usually less than 3 nights.

LoS days	% Admissions
0	20
1	20
2	15
3	10
4	7
5	5
6	4
7	3
8	2
9	2
10	1
>10	11

**Table 6:** Surgical Non-Elective Length of Stay

### The surgical patient pathway

Many of the principles discussed in relation to medicine can be applied to surgical emergencies. In particular, the availability of a surgical assessment unit is a crucial resource. Well documented arrangements for nurse led assessment have been published and work extremely well. (*Redefining perioperative advanced practice. Scope of practice: measuring impact and sustainability. Radford M. Abbassi A. Williamson A. Johnston P. British Journal of Perioperative Nursing. 13(12):504-7, 510-1, 2003.*) Advanced nurse practitioners can be a hugely valuable part of the team in which senior doctors are less readily available for decision support when they are operating on emergencies.

It is unacceptable to plan in the expectation that patients will have to wait for many hours, often in a busy and congested Emergency Department. Care pathways for common presentations such as abdominal pain and abscess are well tested and allow Emergency Department teams to arrange for patients to move to SAU whilst surgeons are otherwise engaged. The consultant surgeon responsible for unscheduled care must be free of other commitments and have a team of similarly dedicated staff. Access to appropriate diagnostics, particularly imaging is critically important. Clinical leadership of the service is very important to ensure good governance and the maintenance of consistent pathways of care.

A general consensus about standards of care was recently published by the Academy of Medical Royal Colleges:

*Acute Health Services: Report of a Working Party. Academy of Medical Royal Colleges; 2007:*

<http://www.aomrc.org.uk/aomrc/admin/reports/docs/Acutehealthcareservicesreportofaworkingparty2.pdf>

Bed numbers will be influenced by several local factors including the extent to which minor cases such as simple abscesses are managed as day cases, and the extent to which pre-operative length of stay is influenced by access to diagnostic tests or availability of theatre time. An SAU planning to care for patients for up to 24 hours would need no more than 20 beds in the current example and an integrated unit offering assessment and up to two nights of care might well improve continuity to allow shorter stays and absorb 75% of all the work.

Some hospitals have sought to combine medical and surgical assessment facilities within one unit. Clinical leadership and availability of appropriate equipment and skills are not necessarily easier to ensure in less clinically focussed places. There is no clear consensus as to optimal long term arrangements.

## 4. Trauma

Numbers of admissions to the Trauma service are small and all arrive via the ED. The 2007-2008 annual totals in the example hospital have been used for analysis. The caveat that patients seen by the specialty in the Emergency Department and discharged directly from there are not captured in this analysis applies and so may significantly under-estimate the time commitment of the clinicians involved.

There is little day to day variation in patient flow and the 85<sup>th</sup> centile of variation indicates a prudent planning capacity of 7 or 8 patients per day (Table 7).

	<b>Mean per day</b>	<b>85<sup>th</sup> Centile</b>
Monday	6	8
Tuesday	5	7
Wednesday	5	7
Thursday	5	7
Friday	5	7
Saturday	5	8
Sunday	5	7

**Table 7:** Day to day admissions to Trauma Service 2007-2008

There is no pattern to the time of arrival of these patients during each 24-hour cycle.

Length of stay for these patients in the orthopaedic service is as follows:

<b>LoS Days</b>	<b>% Admissions</b>
0	16
1	22
2	12
3	8
4	5
5	3
6	3
7	2
8	2
9	2
10	2
>10	23

**Table 8:** Trauma Non-elective Length of Stay

Whilst half the patients are discharged before the third night, this data suggests an unexpectedly large group staying more than 10 nights. Many of these patients are frail and need complex assessments prior to onward care. It is questionable whether their interests are best served by such long stays on acute trauma wards and better links with an ortho-geriatric service can make for substantial reductions in length of acute care spells.

*(A comparative study of rehabilitation outcomes of elderly hip fracture patients: the advantage of a comprehensive orthogeriatric approach, Adunsky A. Lusky A. Arad M. Heruti RJ, Journals of Gerontology Series A-Biological Sciences & Medical Sciences. 58(6):542-7, 2003)*

### Model of Trauma Care

From an organisational perspective the hallmarks of good care seem to be prompt access to clinical decision making, aided by agreed care pathways, a specialist trauma ward with prompt access to dedicated trauma theatre facilities and leadership from consultants with an interest in trauma care who will maintain oversight of clinical governance and consistent use of care pathways. Strong links with an ortho-geriatric service should be well established.

An NCEPOD report recently reviewed arrangements for care of people with major trauma:

*National Confidential Enquiry into Patient Outcome and Death. Trauma: Who Cares? (2007).* <http://www.ncepod.org.uk/2007t.htm>





## 5. Conclusion

Patients are very consistent about their expectations of hospital services. They want to see someone who knows what is wrong with them and can explain. They want someone who knows what to do and can make it happen. They want people who communicate effectively and are sensitive to their privacy and personal needs and they want to be cared for in a clean and dignified environment. (See for example: *What do patients and the public want from primary care? Angela Coulter BMJ 2005;331;1199-1201*)

The fact that from a hospital perspective, the needs of the community for unscheduled care are predictable and consistent, should make planning and delivery straightforward. The analysis and planning frameworks outlined in this document are designed to help. They should serve to define the tasks which must be resourced so as to sustain a more consistent, safe and efficient journey for each patient through the unscheduled care services which the Trust provides.

In general, focus on early assessment by senior and experienced staff to plan care is likely to be the most important step to reduce the unnecessarily long acute hospital stays which some patients endure. Experience of hospitals which have worked hard to follow the principles of best practice is that length of stay does fall substantially. More importantly perhaps, patient satisfaction increases and complaints fall. Critical incidents become less frequent and the safety of the patients in hospital is improved.



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