ORIGINAL ARTICLE

Can good bed management solve the overcrowding in accident and emergency departments?

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The NHS Plan[1] makes the commitments that a patient's total time in accident and emergency (A&E) will be no more than four hours. Many trusts are currently struggling to reduce four hour trolley waits (the time from the decision to admit (DTA) to leaving A&E). A recent survey conducted by the BMA and the British Association for Accident and Emergency Medicine[2] suggests that official figures give an over-optimistic picture of the current pressures in A&E departments, and long patient waits are still common.

The ability to move patients with a DTA out of A&E depends on the ability of the hospital to accommodate them (or to accommodate patients from the MAU, etc, to make room available). This movement is normally the responsibility of the bed management (BM) function, according to the National Audit Office (NAO),[3] and this is the case in all trusts with which we are familiar.

BM forms an important part of operational capacity planning and control, a wider activity concerned with the efficient use of resources. Outside the health context, the production/operations function of an organisation is concerned with activities such as scheduling and work flow to enable throughput to meet demand, and minimise work in progress and maximise resource utilisation. Despite the obvious analogies, very few acute hospitals have an operations management function.

The objective of this paper is to demonstrate the part that operational capacity planning and control, in particular BM, plays, and could play, in improving service delivery. It starts by describing the typical function and structure of BM in acute hospitals, patterns of hospital activity, and their effects, particularly on A&E. Developments in operational capacity planning are then considered. These aim to improve planning and management of supply and demand, and moving towards and maintaining lower bed occupancy in medicine. BM has a key part to play in these changes, which have the potential to transform acute hospitals into systems that can deliver the government's emergency care commitments, including reducing the post-DTA wait component of A&E time. Recognising this, the Modernisation Agency is in the early stages of developing recommendations for good practice in BM, which will be evaluated at two trusts.

The paper draws on data from a variety of studies and a range of projects, both complete and ongoing. Academics at the Manchester School of Management have undertaken two detailed surveys of BM practice for NW Region[3] and the Greater Manchester Chief Executives Group, which included detailed interviews with BM staff and qualitative comparative analysis of the 12 acute hospitals in Greater Manchester, and study of the available literature on BM. We continue to have a close involvement through helping run a pilot training programme, involvement in the Greater Manchester Bed Managers' Network, contributing to the Modernisation Agency's BM good practice initiative, and pursuing ongoing academic research ideas. The quantitative analysis is derived from forecasting projects conducted for NW Region,[4] a current project to support bed management with planning tools that are being developed and evaluated at a number of hospitals using action research methodologies, and a joint project with a Greater Manchester hospital to use operations management and operational research analysis techniques to improve capacity management.

This paper starts by outlining the part BM plays in the flow of patients through acute inpatient beds, the context in which bed managers operate, and the impact this has on BM and the patient experience. Data from South Manchester University Hospitals NHS Trust (SMUHT), whose acute site is Wythenshawe Hospital, are used to illustrate the context and impact. The potential of BM to improved capacity planning in acute hospitals is then discussed, and several initiatives then described, drawing on experience in Greater Manchester and nationally.

BED MANAGEMENT

Figure 1 shows a simplified representation of the patient journey, and the role of BM in it, elaborating the Audit Commission's[5] Admission-Placement-Stay-Discharge BM framework. BM is closely involved with all phases of a patient's spell in an inpatient bed, sometimes managing or working with designated discharge or care (stay) management staff.

Bed managers place emergency admissions (via A&E, MAU, transfers from other hospitals and, in some trusts, handle urgent referral telephone calls from GPs) and elective admissions (although not in all trusts[3]), attempting to accommodate to come in (TCI) lists. In some trusts, patients outlying on inappropriate wards (particularly medical patients on surgical wards) may be transferred to another ward, in others this is not the case as it is considered disruptive (a widely quoted figure is that a move will add a day to a patient's length of stay[6]). Discharge involves coordinating many services the patient may require, from the pharmacy and transport to care packages provided by agencies outside the trust. Despite great potential to contribute to capacity planning and crisis avoidance, in practice BM is often characterised by bed finding, and firefighting once a crisis is occurring.[3 7]

In considering BM, and operational capacity planning in general, it is necessary to recognise that the components of the patient journey form a system, the effective management of which requires integration. For example, problems such as trolley wait and cancelled operations (for lack of a bed) are frequently the result of general problems at the discharge end of the process or arising from the activity patterns in emergency demand, elective demand, and discharge. Thinking of the process as a system, and bringing in manufacturing analogies, leads to ideas around patients being "pushed" through the system from pressure at the admission end or "pulled" towards planned or anticipated discharge.

Abbreviations: BM, bed management; DTA, decision to admit; TCI, to come in

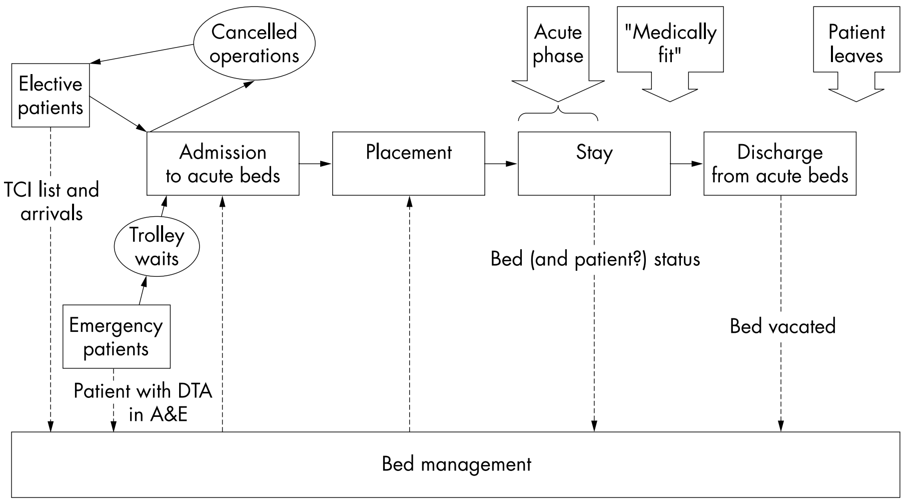

Figure 1 Conceptual overview of the patient journey and the role of bed managment.

The dashed lines in figure 1 indicate the flows of information required for effective BM. In most hospitals bed managers spend a considerable amount of time collecting this information, for example through ward walking, and there are particular problems in its timeliness and accuracy that limit the effectiveness of BM.

The BM function at SMUHT is similar to that at most of the acute trusts we have encountered.[7] The bed managers have access to a bed pool made up of the hospital's medical beds and a large proportion of the surgical beds. Consequently there is competition for beds between emergencies and electives, and prominently between medicine and surgery, and the need to balance demand from these two sources. Beds (and the necessary staffing and support for them) are the main capacity constraint. Occupancy is very high, as is the level of medical outliers. Bed managers cover seven days a week, 8 am to 8 pm then hand over to night staff. Information about bed status is collected by ward walking and telephone.

THE CONTEXT: AN EXAMPLE OF ACTIVITY PATTERNS

To understand the pressures on the BM function, some of which is passed on to A&E, it is necessary to understand the pattern of supply of and demand for beds. Typical of most trusts, both emergency and elective admissions at SMUHT peak early in the week, while discharge activity peaks towards the end of the working week. A particular problem, at this and several other Greater Manchester acute hospital trusts, is the activity patterns on Sundays. Although there is very little discharge activity, many elective patients are brought in for planned work later in the week, despite few "five day" beds being opened until Monday. The direct result is difficulty in moving patients out of A&E because of a lack of beds, and a backlog in A&E on Monday morning. Coinciding with the high volume of Monday admissions, the impact of the weekend frequently persists until Wednesday or Thursday. This section contains a description and some analysis of relevant

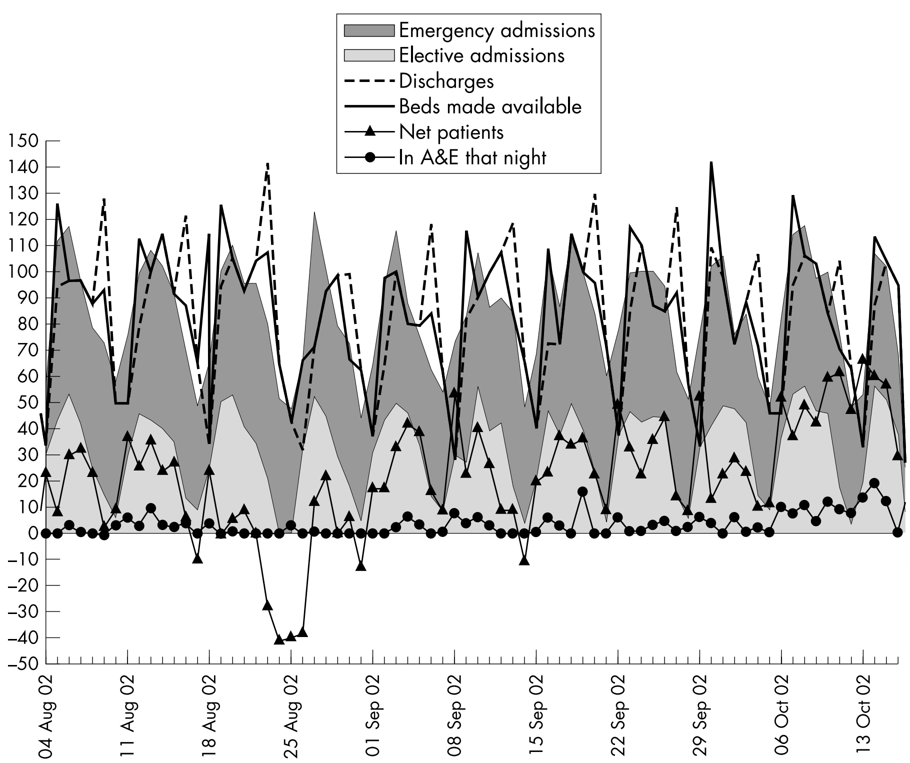

Figure 2 Historical daily inpatient levels, SMUHT.

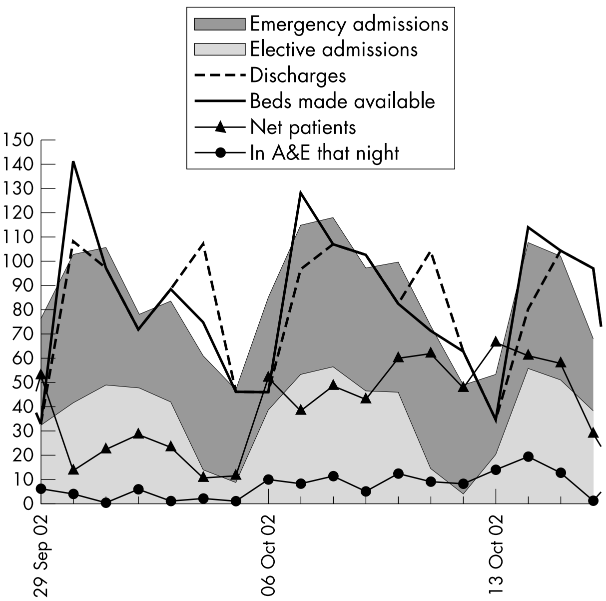

Figure 3 Historical daily inpatient levels around week commencing 6 October 2002, SMUHT.

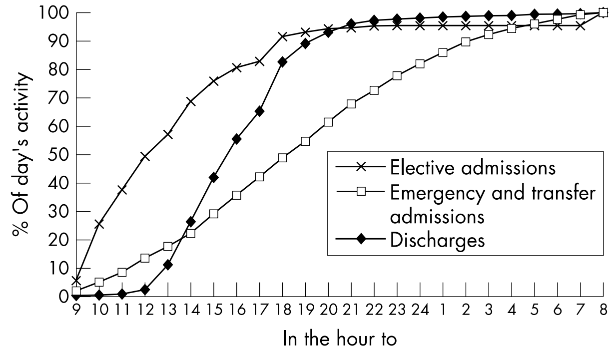

Figure 4 Proportions of inpatient admissions and discharge activitiy by time of day.

activity patterns at SMUHT. These are very similar to patterns in other hospitals from which we have data.

Figure 2 shows the activity levels in the acute bed pool at SMUHT over two and a half months, based on history data from the PAS. Emergency admissions each day are stacked on electives to show total (admitted) demand. The "beds made available" line is the daily discharges, modified by the five day beds within the bed pool opening or closing. Data on the actual numbers closed are not available, so a representative figure of 33 beds actually opened or closed is used on the graph. "Net patients" is a running total of the net change in the number of patients in the bed pool from an arbitrary start point, and "In A&E that night" is the number of patients with a DTA in A&E at 8 am the next morning. Where the solid areas protrude above the "beds made available" line, insufficient beds become available that day to accommodate the day's admissions. Gaps between the "beds made available" line and the solid demand areas indicate more beds made available than required that day (alone). The "net patients" shows the cumulative effect. The dates displayed are Sundays.

The activity patterns are clearly cyclical. For example, beds made available are often insufficient on Sundays, when discharges are few, and Tuesdays, when elective admissions are very high, but the five day beds have already been used. Each week Sundays generally have the highest numbers of patients in the bed pool and the highest numbers of patients waiting in A&E the next morning. The irregular pattern of elective work is also apparent.

Figure 3 shows the period around the week from Sunday 6 October in more detail. In this week levels of elective admissions were unusually high (in fact the highest of the year to that point) and it was a moderately busy week for emergencies. Triggered by a busy Sunday (6 October), there were a large number of patients with a DTA in A&E that night, so a large A&E "queue" the next morning, and each successive morning, with an unusually large one on Thursday (note unusually high level of electives that day), and a jump in the level on the Sunday and Monday nights. The morning queue only returned to a low level on the (night of the) 16 October after an unusually quiet Wednesday for both electives and emergencies.

Another mismatch is in the timing during the day of admissions and discharges, as illustrated in figure 4, which has been compiled from the Wythenshawe Hospital history for 2001. Elective admissions occur almost exclusively just before or during the "BM day" (8 am–8 pm), emergencies (and transfers from other trusts) occur throughout the 24 hours, with a slight peak in the afternoons. However, the bulk of discharges occur between midday and 1800. Thus, as shown in the graph, most admission activity happens before the corresponding amount of discharge activity. So the mornings are a particularly difficult time for BM, coinciding with the period when any A&E backlog should be cleared. Furthermore, emergency admissions continue through the evening and night, when little discharge activity does or can take place to provide space for them.

The context: the relation between emergency and elective admissions

Looking at 36 weeks of history (February to mid-October) from 2002 at SMUHT split by day of the week, there are no statistically significant correlations between emergency and elective admissions. This confirms the lack of coordination between scheduling elective load with emergency demand. The only correlation between emergency admissions and A&E DTA queue the *following* morning is on Sundays. This is the day on which low discharges and early call in of electives displaces emergencies, as noted earlier. There is, of course, a very significant relation between queue size on successive mornings, indicating regular periods of sustained pressure from A&E.

The context: on planning and performance

A key requirement for effective BM identified earlier is information about pending admissions to the acute bed pool and the status of beds in the pool. Very few BM functions have access to TCI lists that they consider complete enough to contribute to planning earlier than the end of the day before planned admission. Information about DTAs in A&E is usually gathered in person (at the start of the day) and by telephone, though some trusts (including SMUHT) have developed real time data links from A&E to BM. Accurate and timely bed status information is vital. This is a particular problem for most BM functions. Various pressures, including workload and outlying of patients, have produce a culture in many hospitals of bed status being difficult to obtain. Of particular importance is the declaration of a discharge to BM. Coupled with limited potential of some PAS and limited administrative support on wards, BM functions therefore generally rely on ward walking several times a day to update bed states and locate vacated beds.[7] This information is supplemented by some updates by telephone. It is recognised that ward visits have other benefits too, providing "soft" information (such as ward staffing levels and experience) and establishing relationships and "policing".

Few trusts in Greater Manchester and surrounding areas seem to be explicitly considering capacity issues in detail yet.

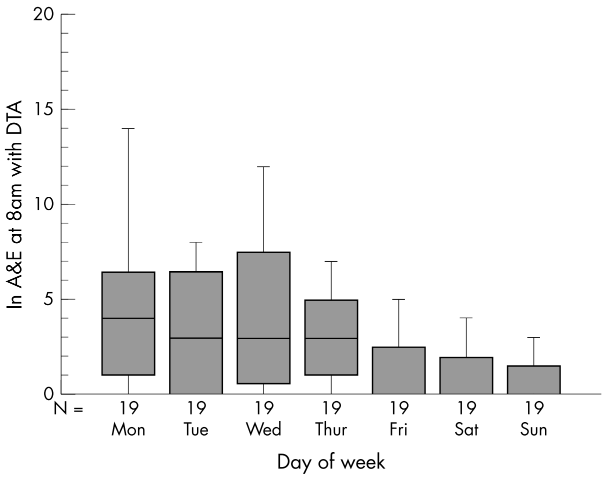

Figure 5 Box plots of numbers of patients waiting in A&E at 8 am with DTA, SMUHT 6 June to 16 October 2002.

One acute hospital in the area has only this year established a forum to consider capacity across both medicine and surgery, and this only in broad (rather than operational day to day) terms. A particularly severe emergency-elective clash (aggravated by a small rise in emergency admissions and some delayed discharges because of social services problems) at one NW hospital (not SMUHT) earlier this year resulted in a blocked A&E, a large build up of ambulances, and a considerable number of very long trolley waits. That these were not included in official performance figures accord with reports of practice at some trusts, both in print[8] and informal. Such obfuscation makes problems harder to diagnose and so harder to tackle in order to improve the actual patient experience. The difference between official figures and the reported experience of A&E staff is also marked.[2]

There are complications at other trusts with trolley wait history. DTA times may not be recorded or recorded late (sometimes deliberately[8]), conversely some BMs report missing DTA time data resulting in referral time being used instead (and so long waits may suddenly appear!) or that DTA can be declared too early: patients may be unready for a bed (for example, off having tests) or be subsequently seen by a physician in A&E and the DTA revoked. Problems with these type of data have recently been highlighted.

THE IMPACT: ON BED MANAGEMENT

Many trusts have a characteristic and cyclical pattern of large backlogs (or queues) of patients waiting in A&E with a DTA at the start of the day, with the situation being worst early in the week. This results from their being insufficient empty beds available overnight, sometimes exacerbated by less active BM by night staff. As well as its adverse impact on the operations of A&E (including taking up space and nursing staff time) and the patient experience, this is stressful and very time consuming for BMs.

Figure 2 illustrated this pattern with SMUHT data. Figure 5 shows the size of this backlog by the day of the week. The difference in levels of backlog across the days of the week is very statistically significant ($p<0.001$ on analysis of variance and Kruskal-Wallis), and the distinction between Monday to Thursdays, and Fridays to Sundays is clear visually and statistically significant ($p>0.1$ from Kruskal-Wallis for within groups and $p<0.001$ from Mann-Whitney for between groups).

THE IMPACT: ON PATIENTS

It is well known and documented that waiting may not only decrease patient satisfaction but also potentially have adverse clinical outcomes.[9] It is not the purpose of this paper to detail these, as it is focusing on the internal management issues surrounding waiting in A&E, but they are recognised and are additional factors that strengthen the case for more effective capacity management.

THE POTENTIAL OF BM TO CONTRIBUTE TO CAPACITY PLANNING

Approaches to better managing capacity can be divided into three related categories:

- adjusting working practices to better match the general patterns
- increasing "slack" in the system through lower bed occupancy
- operational planning to anticipate day to day supply and demand, together with the capability to take steps to attempt to match them

The potential impact of matching activity patterns

Acknowledgement of activity characteristics such as those described above suggests scope for matching the patterns,[10] at a tactical level by changing patterns of working. For example, consideration of the timing of elective work and when the patients should be admitted, and discharge activity cycles over the course of the day and the week. Such changes are not quick or simple to implement and require extensive consultation with a wide range of stakeholders, which may explain why they seem to be rarely implemented.

The potential impact of considering occupancy issues

Reducing occupancy is analogous in operations management terms, to "storing" the service by building up a stock or buffer of product (beds) during production (that is, core hospital activity) time to cope with periods when production cannot match demand. Queuing theory and simulation techniques from operational research readily demonstrate that any production type system subject to fluctuations from its environment will cease to perform efficiently if utilisation approaches 100%, results including long throughput times, large volumes of work in progress, and poor responsiveness to customer demand. Application of these ideas and techniques to the acute hospital system[11] has produced oft quoted target occupancy levels of 85%–90%.

The key driver of trolley waits is recognised to be lack of beds[2] resulting from very high occupancy. High occupancy also drives other system inefficiencies such as medical outliers, which increases length of stay and can lead to cancelled elective operations, which in turn inspire perverse behaviour such as bringing surgical patients in early to block a bed. (While some patients require early admission on clinical grounds, others are brought in for purely to fit with administrative working practices, or to secure a bed. However, this blocks the bed to further elective patients as well as potential emergencies!).

To avoid four hour trolley waits (and ultimately the 1.25 hour waits estimated to satisfy four hour total A&E time), the current phenomena of a backlog of patients with a DTA in A&E building up over night to be cleared by bed managers over the course of the morning (if possible) must cease to be common. Unless discharge can be changed from the daytime only activity shown in figure 4, the only way to accommodate emergency admissions overnight is to have a stock of empty beds available the evening before. This buffer stock must be large enough to cope with the inherent volatility of emergency demand. Figure 5 shows the levels of extra bed buffer required at SMUHT to cope with the nights. As figure 2 shows, the same principle applies to weekends, as discharge activity is at very low levels. Probabilistic models can be used to model risk against safety margin required, as in the example cited earlier.[11]

The drive to lower occupancy goes further than operational responsiveness to A&E, it is central to an efficient acute hospital. A medical division operating at levels of occupancy sufficiently low to absorb volatility of emergency demand (on almost all occasions) would not have to outlie patients, reducing length of stay (so further reducing occupancy) and reducing knock ons to surgery such as cancelled operations (for lack of a bed) and the incentive to bring in early to block beds. The NAO[3] found 50% of electives were admitted before the scheduled day of their procedure, noting that the small number of trusts bringing only 20% in early suggested considerable scope for increasing throughput by a general reduction in early admission. As the proportion of surgical emergency patients is much lower than for medicine, occupancy levels could be much higher; the main planning operation would be scheduling. Reducing bed requirements from medicine might permit resources to be redeployed to boost the availability and responsiveness of support services, further reducing waiting times and length of stay.

The "efficient hospital" model described above would be threatened if occupancy increased to the levels at which the components of inefficiency, such as medical outliers, began to reappear. BM, and associated areas such as admission and discharge teams, would be central to maintaining the bed buffer at appropriate levels at appropriate times of the activity cycles.

THE POTENTIAL IMPACT OF CONSIDERING OPERATIONAL PLANNING ISSUES

The remaining category of contribution of BM to capacity planning (and service to A&E) suggested earlier was operational planning to anticipate day to day supply and demand together with the ability to react. Though the potential for this anticipatory and proactive mode of BM has been acknowledged[3 7] few trusts have attained this. The aim is to better juggle the limited resources, though as mentioned above, it would be a vital contribution to maintaining occupancy (particularly of medical beds) around target levels.

Anticipatory planning requires prediction of admissions and discharges, and the ability to react. Operational research offers a range of forecasting techniques to project historical patterns into the future. With large amounts of history from a comparatively stable system they can produce useful degrees of accuracy, for example, the bed requirements work done for NW Region.[4] Simpler techniques are also available, and may be more appropriate for the less aggregate and more variable environments in which many BMs work. In the future, there is the potential to use much better sources to base predictions on. From November 2002 the Met Office is piloting numerical forecasts of emergency admissions under the *Forecasting the Nation's Health* project.[12] Though the NAO[3] reported BM involvement in supporting consultants' decisions on elective admissions TCI lists in 49% of trusts, and calls for BM involvement in type and size of lists, this is very rare in our experience. Few BMs have access to TCI lists of elective patients complete enough for planning purposes more than a day in advance, making this the least predictable element! Discussion with the Modernisation Agency suggests they have been unable to find successful examples of discharge prediction based on the patients actually in a hospital, though several hospitals are investigating this approach. There is thus considerable potential to improve short-term forecasting of supply and demand.

Prediction of supply and demand is of little use without the capability to react. Effective capacity planning of the sort of hospital wide bed pool described above requires control of both the emergency and elective streams, and influence over discharge. The main lever is escalation, hospital wide or targeted on trolley waits (as noted in reference 10). Measures step up from informal expediting of discharges, through to formal cancellation of electives, treat and transfer of emergencies, and ultimately diverting patients to another A&E.

There is clearly huge potential to improve the information available to BM about the demand for and supply of beds. It was noted earlier that few BM functions have access to reliable TCI lists, to contribute to planning, or timely information about bed status, particularly the time and location of discharges. The main barriers are cultural issues about the way TCI lists are assembled and disclosure of bed status by wards.

BM INITIATIVES

Hospital activity patterns and the volatility of emergency demand mean the only way to meet the very ambitious trolley wait time targets is to have more slack in the system, particularly to have a stock of empty beds available by the end of daytime activity (as it is very difficult to find and accomplish discharges overnight). BM would be important to ensure occupancy does not creep up again. Responsiveness to emergency demand in higher occupancy environments requires effective levers to adjust elective and discharge activity. The much shorter time targets also obviously require that the BMs become aware of a DTA and the patient's requirements as soon as possible. This section outlines some initiatives in these areas, include demand management, many developments around discharge, and anticipatory planning. Demand management initiatives aim to smooth or reduce emergency admissions, so can reduce peaks of overcrowding in A&E. The way these initiatives have been developed means that few have been published and evaluated in the public literature (a problem which the emergency care research community acknowledges[13]). Those in which we are involved are generally at an early stage, and we intend to publish more details and evaluations when more data have been collected.

Management of emergency demand

At many trusts in Greater Manchester, the BMs take GP urgent referral telephone calls. As recommended by the Modernisation Agency,[10] referrals seen by GPs can be admitted without routing them through A&E. Being experienced nurses, they are also able to advise on appropriate sources of care and, following policy in the area, check the GP against the trust's designated catchment area. Several "stack" patients under GP care at times of pressure, postponing admission for an agreed period and so "smoothing" extreme peaks in demand. These practices can reduce demand at the A&E, and in some cases, the hospital, though their success depends on availability of alternatives and positive relationships with GPs, otherwise a patient may present at A&E directly.

At SMUHT the BMs have a link through their PCs to the A&E information system, allowing them to display a list of patients waiting in A&E, showing waiting times and information about requirements. This is being integrated with the PAS, potentially making it more accessible across the site.

In Greater Manchester hospital teams (utilisation review teams) are being established to target inappropriate admissions, and promote good practice in admissions and post-take ward round procedures. This initiative is at an early stage and has not yet been formally evaluated in the publicly available literature, but a pilot at SMUHT reduced emergency admissions by 5%. Interestingly, analysis suggests that inappropriate DTA in A&E occurs more often during periods of pressure perhaps as a result of staff having less decision making time with a patient, rather than inappropriateness reducing due to rising thresholds. As with the role of BMs in reducing (inappropriate) admissions via GPs, this scheme will rely on services being available outside the hospital, and also not stimulating additional attendances.

Clinical decision units are also reported to be effective in reducing inappropriate admissions.[2] Evidence based protocols and access to more rapid diagnostics increase the speed and quality of decision making.

Management of elective demand

The particular issue of admission of elective patients on Sundays and to seven day beds, is under discussion at SMUHT. Greater Manchester has an area wide emergency admissions policy, supported by a system of thresholds and traffic lights used by the bed managers. It is designed to encourage the many trusts to "consume their own smoke", and to be seen to be doing so, particularly to discourage protection of elective work by while seeking to shifting responsibility for pressure from emergencies to other trusts. Under this, "ring fencing" surgical beds was discouraged, the philosophy being to maximise the size of the bed pool. Ironically, discussion with a similar trust outside the area suggests this might be counterproductive. They operate under greater pressure with a smaller pool, and suggest that severely restricting the number of surgical beds accessible to medical outliers concentrates medicine on "consuming their own smoke" rather than relying on extensive outlying during particular pressure. They have observed that, as discussed in the last section, this reduces the tendency of length of stay to increase and surgery to start blocking beds.

On the elective side, there are considerable political and cultural pressures not to adjust elective admissions to take account of emergency pressure, even in cases of extreme A&E overcrowding, such as that mentioned earlier. At only one hospital in Greater Manchester does BM have access to TCI useful in planning, coupled with the power to directly cancel electives to match capacity. Several trusts outside the area do this in a more sophisticated manner: during periods of pressure electives can be cancelled before the scheduled day of admission, and if pressure is lower than anticipated, patients who have agreed to be placed on a short notice TCI list can be invited attend.

Management of supply through discharge management

At the other end of the patient journey, comparatively little attention has been paid to discharge processes until the past few years. The NAO report[3] was the first to consider it in depth. The medical side of the great majority of acute trusts might be characterised as "push" rather than "pull" systems, patients being pushed to the next stage by pressure of patients behind them rather than pulled to the next stage according to provisionally determined programmes and timetables of treatment.

Many studies show a considerable proportion of a patient's spell is inappropriate or non-acute. A particular problem occurs at the end of a patient's "acute" phase in hospital (see fig 1). Some ward rounds may occur as rarely as once or twice a week, potentially resulting in an average interval of 1.5 to 3.5 days between a patient becoming non-acute and being declared medically fit for discharge. This is compounded by access to diagnostic services. Once medical fitness has been declared there is often another delay while information about the patient's fitness is conveyed to support services and a discharge package assembled. There is great scope to reduce spells by increasing the frequency of ward rounds and considering the probable content and timing of a patient's discharge package earlier, potentially at the time of admission. Some trusts, for example Aintree and Bath, have or are developing systems to assign a patient an expected discharge date on admission.

The general thrust of many initiatives is to foster a "discharge focus" in medicine. The Modernisation Agency[10] had recommended care pathways for medical patients, though few trusts have developed more than a handful so far. In the past few years many trusts have appointed discharge facilitators/coordinators, often attached to the BM function and involved in targeting delayed discharges and bed blocking, and finding and expediting discharges during periods of pressure at the admissions end.

Many have also set up discharge lounges (sometimes combined with an admission lounge to form a "transit" lounge) to attempt to lessen the effects of discharges happening later in the day than admissions (as the example in figure 4 showed). The success of a discharge lounge seems to depend heavily on its location and facilities, and the enthusiasm of discharge staff "pulling" patients through the process to the lounge. Other initiatives include nurse led discharge and a system whereby each patient is assigned a discharge status (one such successful system is at Bath).

Given that the acute phase of a patient's spell might be expected to be similar for similar types of patients in different hospitals, variations in the way they handle discharge (and the ability to discharge) are likely to form a considerable component of the very considerable disparities in length of spell we have observed in different hospitals. The definition of a "delayed discharge" only beginning 28 days after being declared fit for discharge reduces the visibility of the problem, though the threshold implies its scale. Under the "push" system, these fit for discharge patients can act as a "buffer", occupying beds up to the near 100% level. A systems view of bed use, for example as illustrated in figure 1, emphasises the crucial role of discharge in managing bed utilisation, whatever improvements are made elsewhere.

An interesting model of how medicine could be organised in a low-occupancy discharge-focused environment is in operation at Wolverhampton and East Kent.[6] A large general medicine bed pool operates at about 85%–90% occupancy, with a maximum length of stay of two or three days, and is supported by a set of specialist medical units that "pull" appropriate patients from the general pool (and, in some cases, direct from A&E or outside the hospital). It requires extensive use of care pathways, and is reported to have reduced length of stay and greatly reduced the need for outliers. We know of another trust about to try this, but also have contacts with another who have just abandoned it, anecdotally this was because of circumvention of BMs and pathways by physicians. A general medical pool of 100 beds at these levels of occupancy could be adequate to absorb overnight emergency admissions (for example, fig 5), and the concentration of the "bed buffer" would make it easier to access (especially at nights) and maintain.

The utilisation review teams idea could be a way for trusts to use BM to reduce occupancy, and so reach the "virtuous circle" of increasing efficiency. Otherwise trusts operating at very high occupancy find it hard to envisage how they could be in a position to try such a model without a large (if short-term) increase in medical beds.

Bed status information

Several hospitals are developing real time (or almost real time) bed status information systems through the PAS. Examples include Oldham, Leeds, and Shrewsbury. Compliance is an issue, cultural issues about information disclosure were mentioned earlier, and ward walking is often still practiced to some extent. Unsurprisingly, higher compliance seems to be being achieved in systems that require other patient administration such as patient transfer or discharge to be done through the ward PAS terminal, collecting BM information in the background.

Future initiatives for operational planning

The Emergency Care Strategy Team of the Modernisation Agency, are sponsoring development of a toolkit of basic tools to help bed managers and operational capacity managers understand and start to anticipate demand and supply patterns. The operational goal is finishing each day's "active"

BM with a sufficient buffer of empty beds to cope with admissions overnight—that is, to avoid a queue in A&E at the next morning. An early version was described in the Hospital Operational Intelligence Guide.[14] Inspired by ideas from Aintree University Hospitals Trust, it is in use (informally) at several trusts, and formal pilots are being started at two others.

Escalation measures should also be anticipatory rather than reactive. Several trusts have good examples that explicitly include A&E pressure and backlog in assessing pressure on the hospital system, and triggering appropriate BM responses.

CONCLUSIONS

The balance of priorities in many trusts seems to have swung towards the elective side over the past few years. One factor might be the greater visibility of and repercussions from problems with waiting lists and cancelled operations than with trolley waits. The shift to much shorter A&E waiting times is a great challenge to most trusts, and is re-focusing attention on the emergency side.

A&E trolley waits are largely attributable to the lack of a "buffer" of empty inpatient beds, which could absorb the backlog of DTAs, particularly overnight and, at some trusts, at weekends. Such backlogs cannot start to be cleared until general hospital activity (and often BM) starts up again in the morning.

BM, in the broad sense as part of operational capacity management and the narrow sense of bed finding, plays a key part in establishing and maintaining a stock of empty beds. Contributions to demand management include promoting the appropriate use of beds, gatekeeping GP urgent referrals, influencing the volume, timing and placement of electives to match expected capacity (that is, discharges, emergencies, and opening/closing beds). Supply management measures include establishing and maintaining a discharge focus.

Operational capacity management is very poorly developed in most acute hospitals and faces many major cultural and political barriers, particularly in relation to the interaction between the surgical and medical side. Despite this there is great potential though to move to anticipatory and coordinated planning, and current initiatives may hold the key to achieving the reduced levels of occupancy necessary for the efficiency gains required to enable the hospital system to be meet the responsiveness demanded of it in the NHS Plan.

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