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Building smaller hospitals

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Earlier articles in this series investigated the capacity margin dictated by the 18 week referral to treatment guarantee (Jones 2009a,b), i.e. all targets have implicit capacity implications. This article will examine the application of a capacity margin into understanding bed occupancy and bed numbers.

In recent times the very high cost of capital arising from the private finance initiative (PFI) has led to the construction of hospitals which are considerably smaller than those which were there before (Hellowell & Pollock 2007). A review of the methods for forecasting hospital bed requirements has suggested that the trend in occupied bed days is the preferred method for determining future bed needs (Jones 2001,2009c). Figure 1 looks at the trend in occupied beds for England over the ten years to 2007/08. Contrary to expectation there has been very little change in the annual average of occupied beds for most specialty groups and a completely unexpected peak in medical occupied beds around 2004/05.

Figure 1 gives no indication whatsoever that the average hospital should be any smaller today than it was 10 years ago, however, over this period available beds declined by 11% for the general & acute specialties and 19% for maternity. There appears to be a huge gulf between the accepted 'wisdom' that efficiency is reducing bed demand and reality. Clearly (available) overnight beds are declining but the baseline (occupied) demand has not. We need to break this problem down to its component parts to understand the truth of the matter.

Admissions

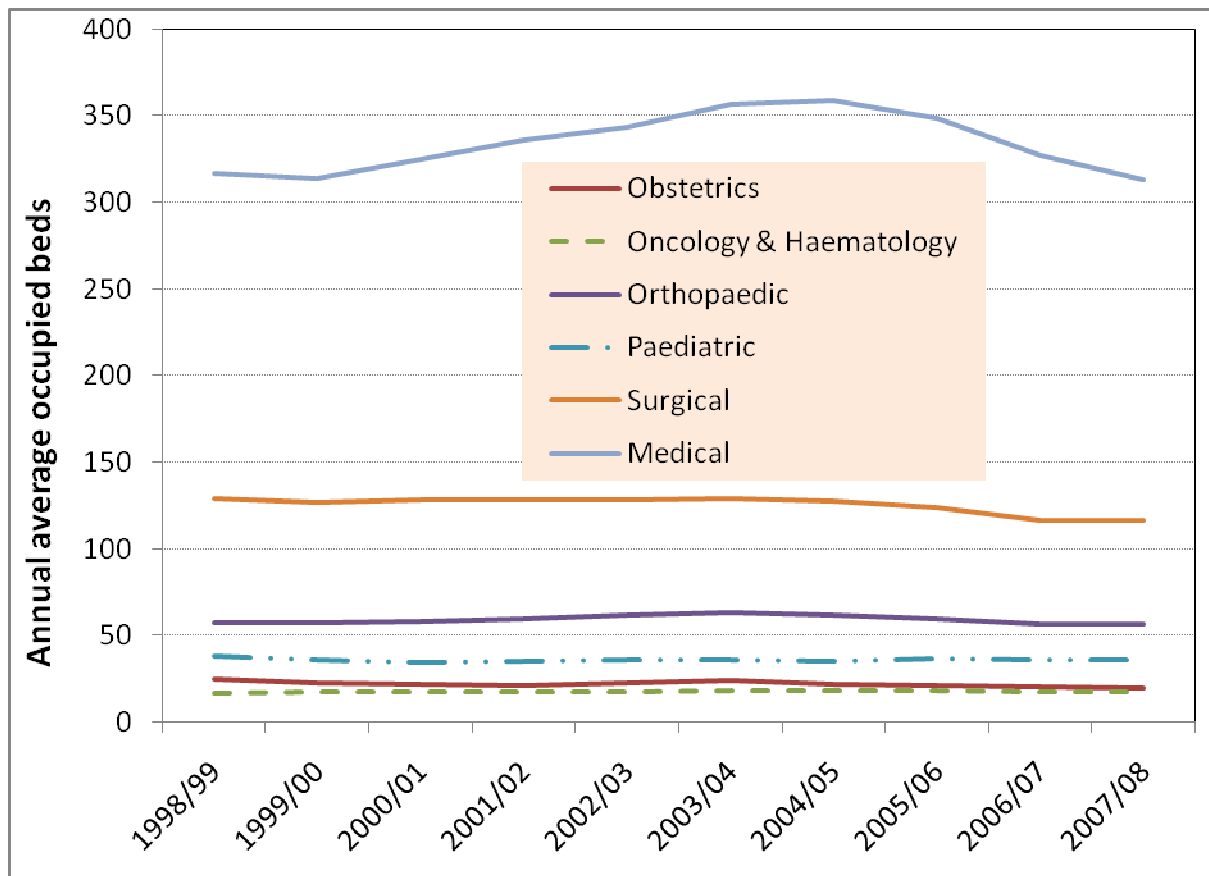
Increasing admissions will be part of the underlying demand for additional beds. The trend in overnight stay admissions is given in Figure 2. To reveal the underlying demand for overnight stay, day case admissions have been excluded and admissions via A&E have also been excluded in an attempt to remove zero day stay emergency admissions. As expected the general trend is upward.

The movement to day surgery for the surgical group accounts for the decline between 1998/99 and 2001/02, however, since then the net increase is upward. The medical group shows the step-like behaviour which characteristically roughly occurs every six years (Jones 2009d,e). The most recent step change in the medical group occurred in late 2007 and will therefore be reflected in 2008/09 and 2009/10 national data when it becomes available. Paediatric and maternity are roughly parallel for obvious reasons. The general conclusion is that demand via admissions will continue to grow

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with demographic change representing a minimum case scenario, especially in medicine where different forces are at work.

Figure 1: Trend in occupied beds at the average English hospital

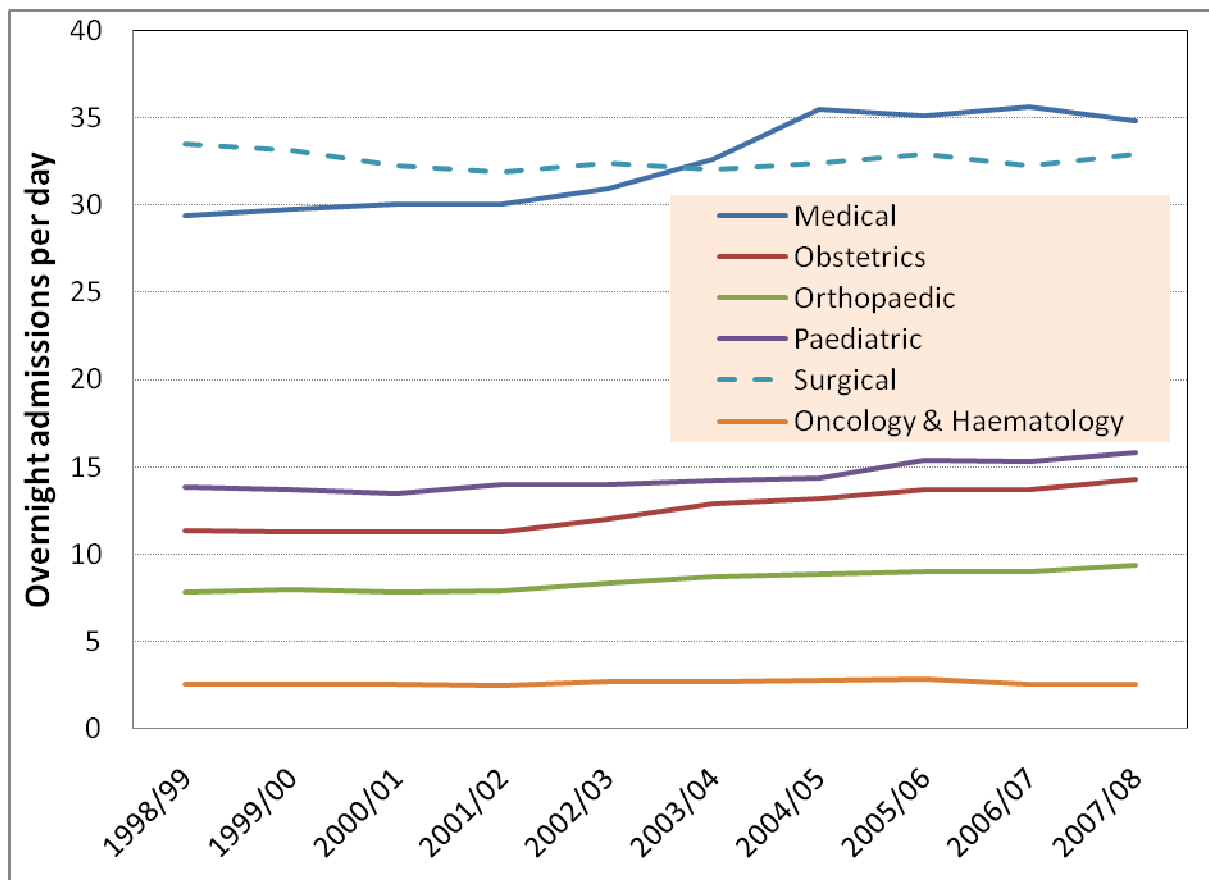


Footnote: Total bed days for England were obtained from Hospital Episode Statistics (<http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=207>) and scaled down to the size of an average hospital by dividing by 73,000. It is important to note that occupied beds are not the same as available beds and the difference between the two is the capacity margin which is more commonly called the average occupancy.

Length of Stay

The next component of total bed days is the length of stay. A key observation to understand this dilemma is that average length of stay in the USA has declined very little in the past ten years (Nataraja et al 2009), i.e. we are in a period where it is becoming increasingly difficult to achieve large reductions in length of stay. The situation in medicine is more complex as the six year cycle appears to lead to a corresponding cycle in length of stay (Jones 2009f), hence, bed days will increase once again in 2007/08 and 2008/09 and possibly also in 2009/10 to be followed by a decline to the point of onset for the next cycle.

Figure 2: Trend in daily admissions at the average English hospital



Footnote: Comments and data as per Fig 1. Admissions with an overnight stay, i.e. excludes day case admissions.

Bed Days

The combination of admissions and length of stay is therefore likely to produce a repeat of Figure 1 over the next ten years, i.e. the average hospital retains the fundamental bed demand it roughly had back in 1998/99 except for Medicine which will show the cyclic increase in bed demand leading to peaks in bed demand.

Available Beds

So how do we match the above observations with declining available beds? The answer is that the declining capacity margin is leading to an inevitable increase in adverse outcomes such as cancelled operations, delays to find a bed, increasing operational chaos, etc. We are achieving financial efficiency at the expense of operational efficiency. To illustrate, we achieve financial efficiency by cutting the amount of instruments available to the surgeon, however, we do so at the expense of operational efficiency. The capacity margin or the average occupancy is therefore not a measure of efficiency per se but rather an outcome of the volatility in demand which is intrinsically high (Jones 2009g)

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Beds are simply the instrument of achieving operational efficiency. When a hospital has too few beds it becomes increasingly difficult to achieve operational efficiency because the opportunity to stream patients via dedicated bed pools and clinical pathways becomes rapidly lost. The point at which a hospital has too few beds to achieve operational efficiency can be recognised as the point at which medical outliers begin to occur.

Conclusions

There is no alternative to PFI funding for new hospitals and need dictates that these hospitals will be considerably smaller than the hospitals which they replace. One can only sincerely hope that the schemes for large scale reduction in bed days are real and not just paper exercises to justify the smaller size. Should they fail to deliver, both staff and patients can expect a difficult experience during the next ten years.

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