After 18 Weeks?

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The 18 week referral to treatment was largely achieved by December 2008 and it comes as no surprise that the government has only recently proposed that this will now become a patient right. With achievement of 18 weeks many may be thinking that they can reduce capacity and make cost savings while still delivering this new 'right'. Is this a reasonable expectation or is it bizarrely possible that it was easier to get to 18 weeks than it will be to maintain it? The explanation of this apparent conundrum lies in the variability associated with demand. Most people would be comfortable with the fact that the variation associated with high volume demand should be lower than for infrequent or low volume demand situations.

The mathematical description of this relationship is given by Poisson statistics. A key relationship defined by Poisson statistics is that the standard deviation (a measure of the variation around the average) is always equal to the square root of the average.

Hence if we are expecting 9 arrivals in a period of time the standard deviation describing the variation around this average will be the square root of 9 = 3. If we take 2 times the standard deviation as the 95% confidence interval (95% of all outcomes fall within the limits) then on 95% of occasions the actual number of arrivals will be somewhere between 3 and 15 even though the average is 9.

By reducing the maximum waiting time that a patient has to wait our demand in the period gets smaller and smaller because we are sub-dividing the bigger annual demand.

The available capacity to cope with the peaks in demand due to statistical variation therefore increases in an exponential manner. In such situations the effective available capacity needs to become increasingly greater than the annual average demand in order to cope with the peaks in demand.

Figure 1 gives an example applicable to a medium size Orthopaedic department. This figure illustrates an exceedingly pertinent point.

The increment in capacity needed to guarantee the maximum waiting time does not change by a large amount between a 2 year maximum wait and a 6 month maximum wait, i.e. the equivalent annual capacity only increases by 69.

However for maximum waiting times less than 6 months the exponential relationship becomes exceedingly important such that at a 1 month maximum waiting time the equivalent annual capacity has had to increase from 2,419 (2 year maximum) up to 2,686 (1 month maximum), an increase of 267.

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Of even greater relevance is that at a 1 month maximum inpatient wait the equivalent annual capacity is 336 higher than the average! This represents a 14% premium on capacity. Orthopaedics is a high volume specialty and the implications to smaller specialties should be apparent.

Figure 1: Excess capacity required to deliver a guarantee wait as the maximum waiting time reduces.
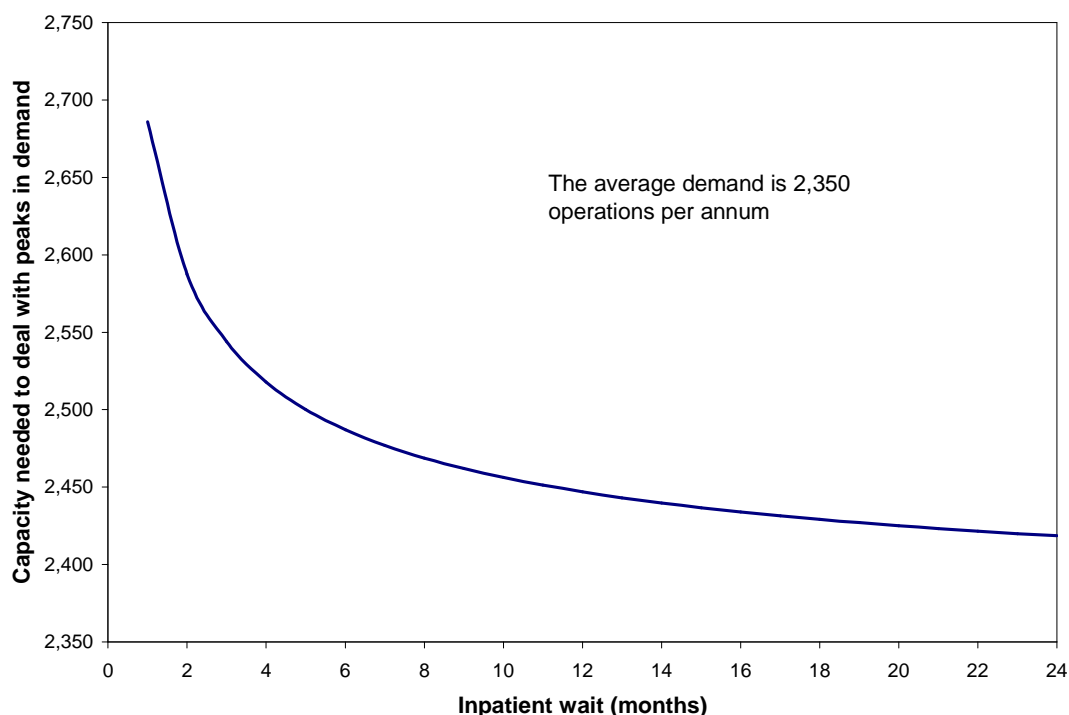
So how does this relate to the difficulty or otherwise of maintaining 18 weeks. Basically, the temporary capacity margin required by most Trusts to achieve 18 weeks has only been of the order of 3% to 5% above baseline demand. This is considerably lower than the 14% margin shown in the example. So we conclude that indeed it is far easier to get to 18 weeks than it will be to maintain the target and that considerable re-design will be needed right across the NHS all the way from the flawed assumptions behind choose and book, namely, we know demand before it happens hence have all those necessary appointments just waiting to be filled through to how do we deliver the huge flexibility implied by the required capacity margin.

In the real world the variation around the average demand is considerably higher than that predicted by Poisson variation and so following articles will discuss the implications of 18 weeks to capacity planning, bed occupancy, etc.

Suggested Reading

http://www.docstoc.com/docs/3237700/How-statistical-variation-in-demand-affects-all-healthcare-processes
http://www.docstoc.com/docs/5049782/A-Capacity-Management-Tool-to-Enable-Acute-Hospitals-to-Deliver-a-Guaranteed-Maximum-Waiting-Time