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Benchmarking length of stay

Dr Rod Jones (ACMA)
Statistical Advisor
Healthcare Analysis & Forecasting, www.hcaf.biz
hcaf_rod@yahoo.co.uk

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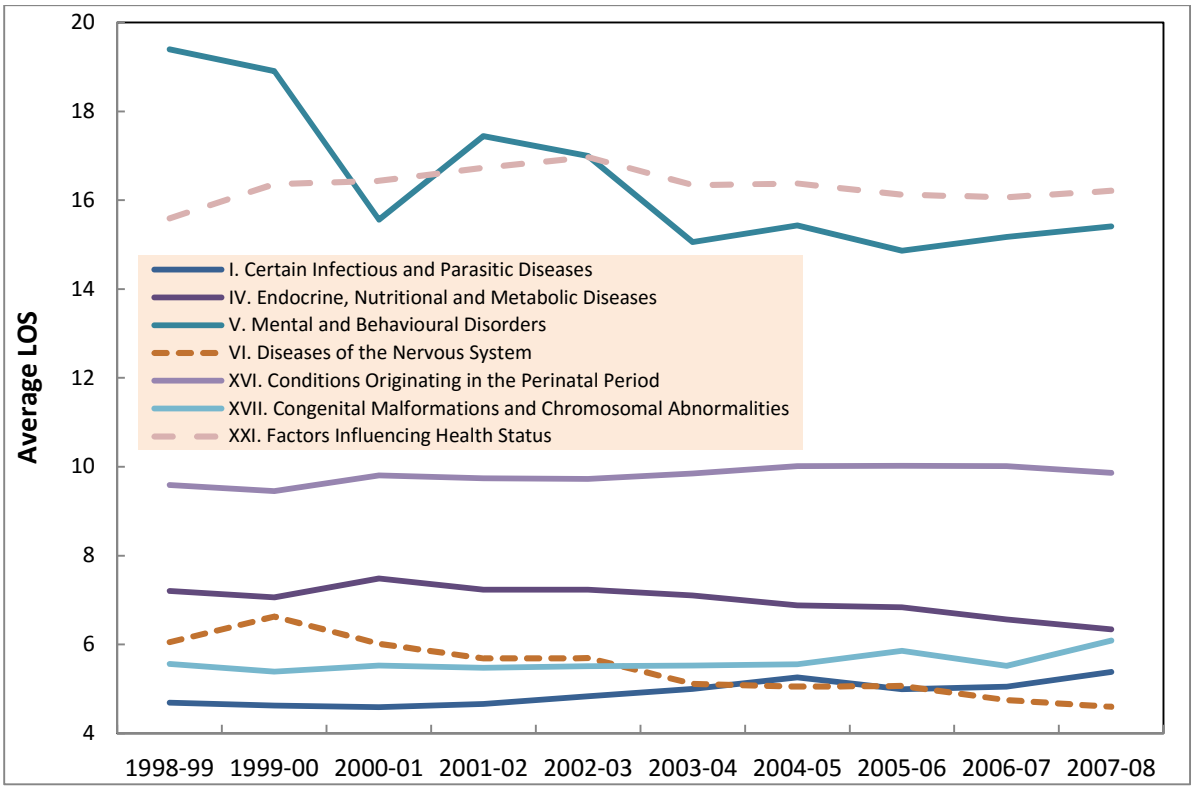
Key Words: Hospital efficiency, length of stay (LOS), trends, benchmarking, England, Australia, Canada, volatility, environment

Our perception of how health care behaves is reflected in the policies which are formulated to contain health care costs. Hence most would view length of stay (LOS) as a continuously decreasing measure, reflecting increasing efficiency. Deviations from this assumed behaviour are therefore regarded as evidence for poor efficiency.

Fig.1: Trends in length of stay for Australia



Footnote: Data is from http://www.aihw.gov.au/hospitals/index.cfm and includes both elective and emergency admission but excludes all forms of same day or zero day stay admissions, hence, what at first may appear to be a high average LOS.

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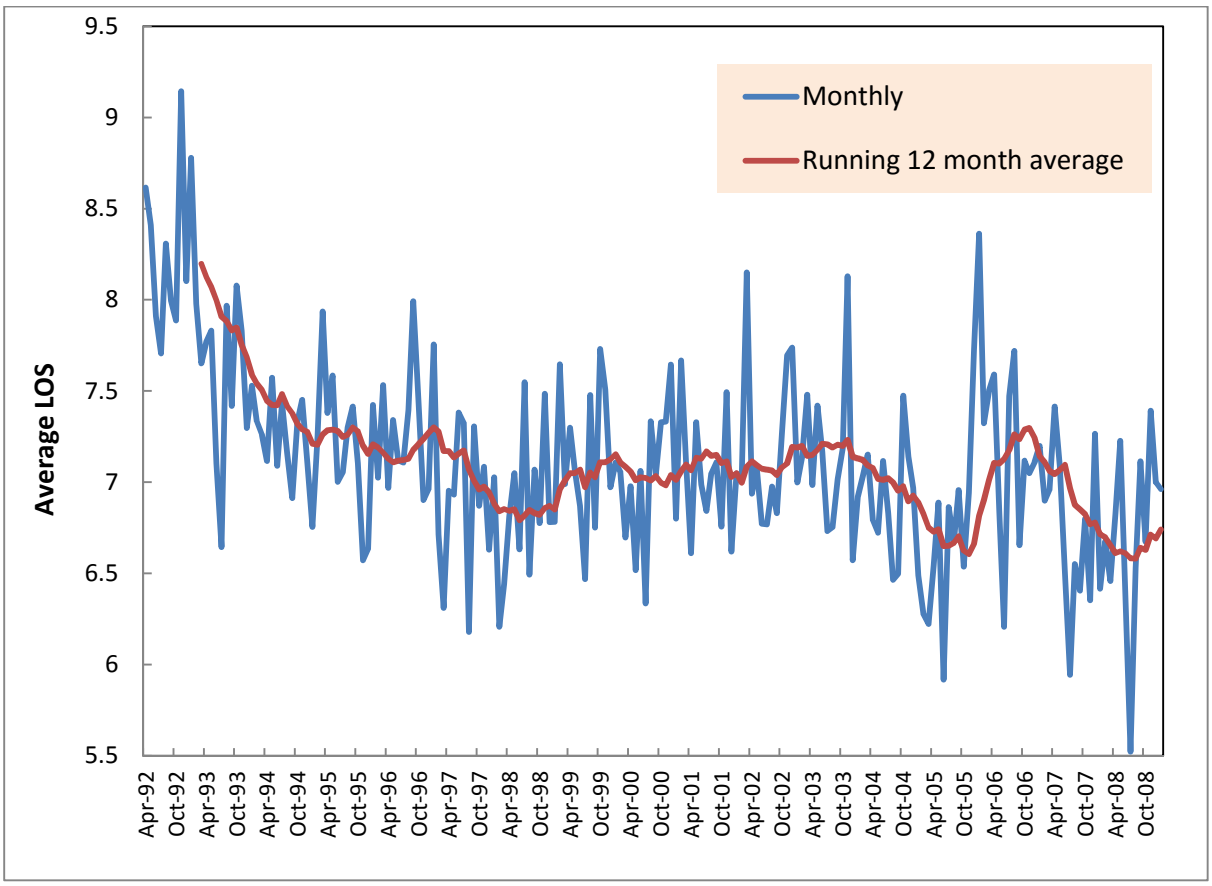
The most common view for LOS uses annual averages. Figure 1 gives such a view using the international classification of diseases (ICD-10 CM) chapter level grouping of diagnoses. On this occasion the data comes from Australia, and excludes the confounding effect of same day, or zero day stay admissions. As can be seen the trends include unexpected peaks and troughs and do not always show the expected progression to lower length of stay over time. Such erratic behaviour cannot be attributed to small numbers since at chapter level we are dealing with an average derived from a minimum of 35,000 admissions per annum in Chapter XVII. High volatility in bed demand for Mental Health (a by-product of LOS volatility) is also seen in the UK (Jones 2009c)

In common with all healthcare systems there is very little evidence for large scale length of stay reduction (Jones 2001, Nataraja et al 2009). The contribution of zero day stay admissions to apparent length of stay reduction in the UK has been previously discussed (Jones 2009b,d,e,f).

Fig.2: A monthly time series for Cardiology (Alberta, Canada).



Footnote: Data kindly provided by Alberta Health Services. Monthly admissions to Cardiology range from 400 to 600 over the time period and hence the calculated average LOS is only subject to small statistical uncertainty. Length of stay is calculated for discharges made in each month.

A less common, but equally valid view of LOS is at the monthly level. Figure 2 gives a very long-term data series from Alberta, Canada for emergency admission to the specialty Cardiology.

Figure 2 captures the tail end of an international period of reducing LOS, extending from the 70s through to the mid-90s. However, more importantly, it demonstrates the very high volatility in

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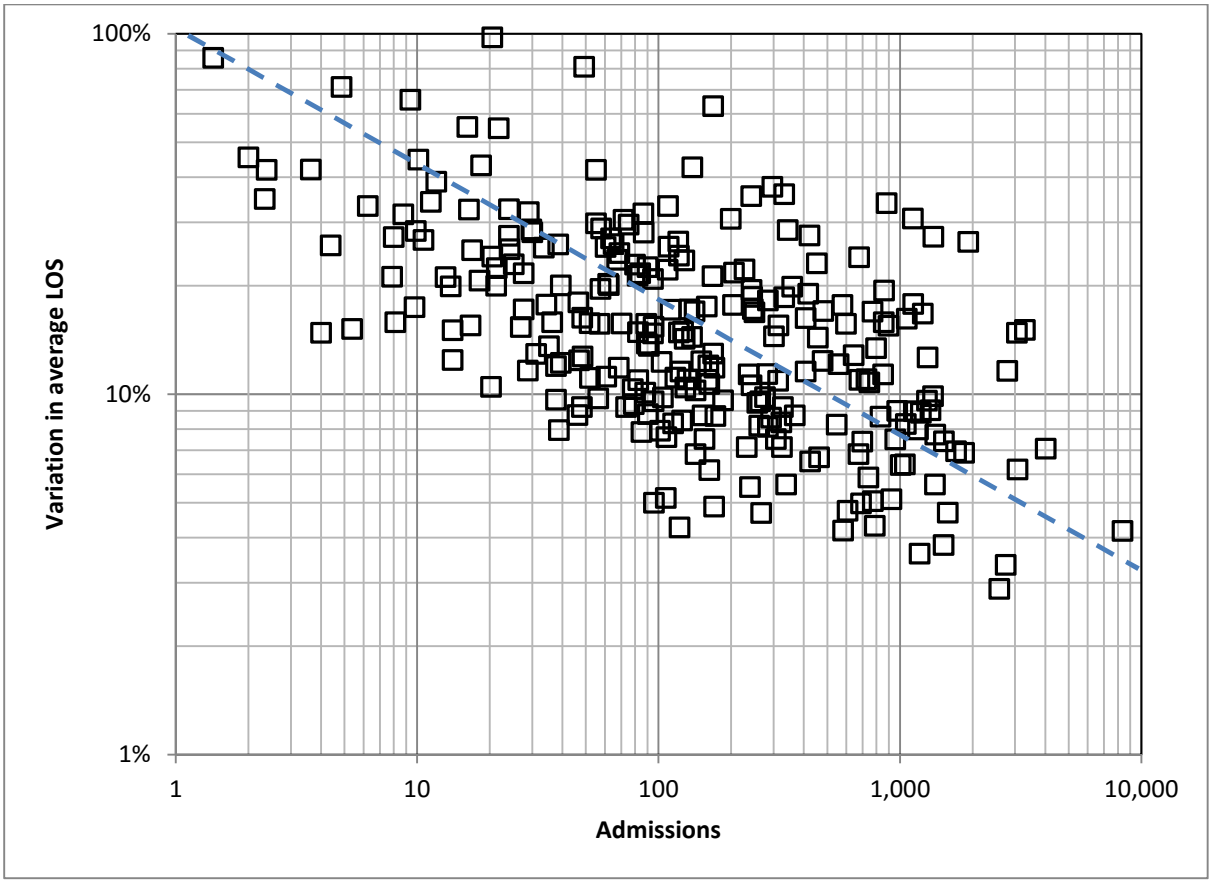
average LOS seen at monthly level and equally significant volatility in a 12 month average of LOS. Extended periods of higher than average LOS can also be seen.

The endpoint of the efficiency agenda is usually to reduce the number of hospital beds. At this point, it must clearly be stated that the number of available hospital beds, depends entirely on the volatility in LOS (and admissions) and not the annual average. There appears to be a serious disconnect between our chosen perception of how LOS is supposed to behave and the real world. Could it be that a desperate need to save money has led to an 'Alice in Wonderland' view of 'reality'.

The profound effect of the environment (changes in temperature, pressure, humidity, pollution, pollen, viruses, etc) on human physiology and hospital admissions is simply too strong for our vague perception of continuously reducing LOS to have ever been true (Hughes et al 2004). Delivering sustainable health care efficiency will not be facilitated by denying the way the real world behaves.

Fig.3: Variation associated with average length of stay.



Footnote: Data is for a large English SHA over the period 2001 to 2008. Quarterly average LOS at the level of diagnosis was extracted using the Dr Foster performance software. A time series using Q1 data was constructed to avoid seasonal fluctuations in LOS. The time series was corrected for the underlying trend and the resulting standard deviation around the average calculated. The measure of variation is one standard deviation divided by the average LOS, hence, one standard deviation of variation is equivalent to x% of the average LOS, etc.

Indeed the use of LOS benchmarking as a means of identifying efficiency opportunities does have serious limitations. LOS is determined by age, sex, deprivation and the ability of acute Trusts to

discharge into a supportive primary and social care environment. Even HRG-based comparison has serious limitations in that LOS within a HRG is highly dependant on the specialty (Jones 2009a). Figure 3 presents a somewhat uncomfortable view of the ability to benchmark a local (small number of admissions) LOS against an assumed very large benchmark group.

As can be seen the standard deviation associated with a measured average length of stay is highly dependent on the sample size. Hence the trend line shows an expected reduction in standard deviation arising from the square root of the number of data points. While there is a 'trendline' the actual standard deviation reflects the unique sensitivity of each diagnosis to the wider environment. Length of stay is itself a factor in the observed variation (as LOS to the power 0.14) and hence diagnoses with a high average LOS tend to have higher variation although by far the major determinant is sensitivity to the environment. The point of interest here is that benchmarking is a blunt axe, rather than a precise scalpel.

In conclusion, the desperate need to save money may be acting to blinker our view of how the real world behaves. Length of stay benchmarking gives answers which may or may not be valid. At the end of the day the aim is to reduce the total number of bed days, not the length of stay per se. Hence, acute trusts should focus on schemes to remove blockages to early discharge which are applicable across all specialties (Rae et al 2007) while PCTs should focus on discharge avoidance and on allowing patients who have been admitted to be rapidly discharged into a receptive primary and social care environment.

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