An edited version of this article has been published as: Jones R (2015) Estimating acute costs? ***British Journal of Healthcare Management*** 21(3): 152-153. Please use this to cite.

Why it is so hard to accurately estimate acute medical costs?

Rodney P Jones
Healthcare Analysis & Forecasting
Camberley
hcaf_rod@yahoo.co.uk
www.hcaf.biz

Further articles in this series are available at http://www.hcaf.biz/emergencyadmissions.html

The published version is available at http://www.bjhcm.co.uk

A series of papers in BJHCM and other journals over the past six years has been exploring the possibility that acute medical activity and costs are driven by a series of infectious outbreaks by a persistent agent. Deaths, medical admissions, emergency department attendances all show a step-like increase at the onset of each outbreak and the increase endures for 12 or more months before reverting back to usual levels (see reviews Jones 2013b,c, 2015b). The unique characteristic is highly granular and slow transmission at small-area level. Since the 1950's there have been mostly two outbreaks per decade except for a four-in-a-row series in 1993, 1996, 1999 and 2002 at three year intervals (jones 2015a). More recently there appears to have been a four-in-a-row series in 2008, 2010, 2012 and 2014, this time at two year intervals (Jones 2015c).

To simplify the complexity behind these outbreaks Table 1 shows just the point of maximum admissions (for the 12 months ending at) and the point of minimum admissions (for the 12 months ending at). Over the time period studied there are three outbreaks, namely, the tail end of the 2008 outbreak, the 2010 outbreak and the 2012 outbreak. Each local authority (Bracknell BNL, Reading RDG, Slough SLH, West Berkshire WBS, Windsor, Ascot & Maidenhead WAM, Wokingham WOK) all lie in the larger county of Berkshire, and each is subdivided into 14 to 22 smaller areas called mid super output areas (MSOA) with around an average of 900 medical emergency admissions per annum (see Fig. 1). All data is from the study of Jones & Beauchant (2015).

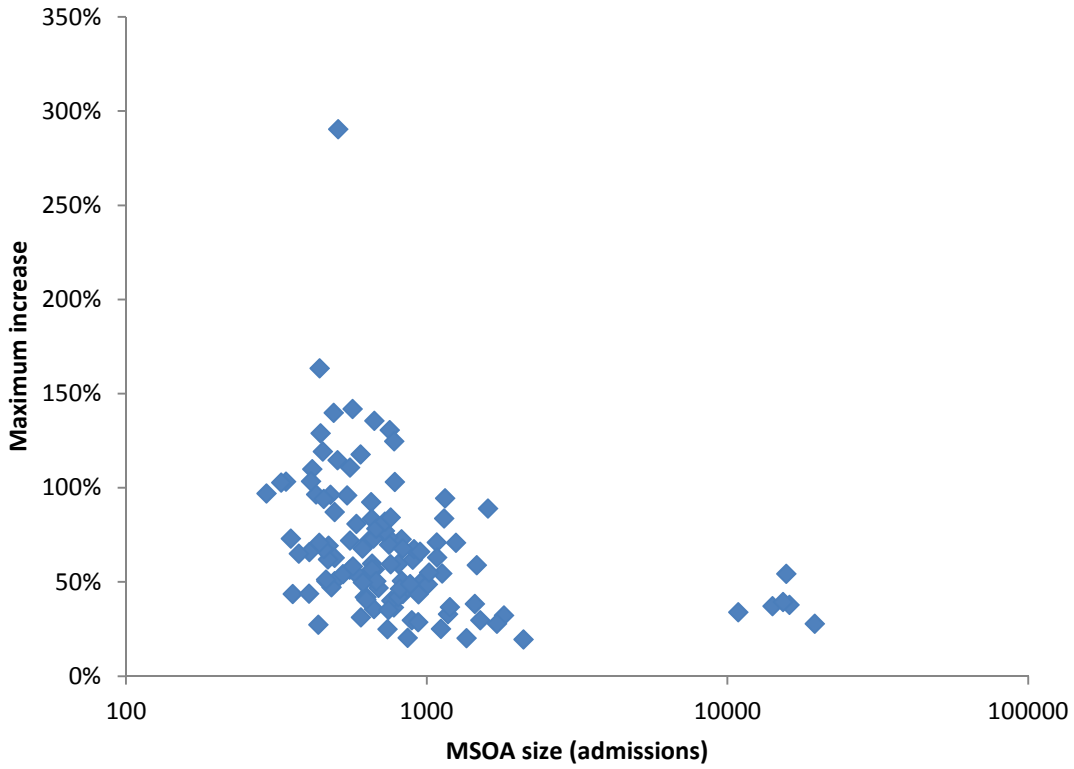
The key point is that while there are three potential maxima and three minima only the biggest maxima and smallest minima are counted in Table 1. If demography were the dominant factor regulating medical admissions then all the maxima would be toward the bottom of Table 1 and all the minima would be toward the top. Clearly this is not so and a force far more powerful than demography is at work. Statistical variation cannot explain the results (Jones & Beauchant 2015).

An edited version of this article has been published as: Jones R (2015) Estimating acute costs? ***British Journal of Healthcare Management*** 21(3): 152-153. Please use this to cite.

Table 1: Point for maximum and minimum 12 month total admissions, Jan-08 to Feb-13

12 month ending	Point of maximum admissions						Point of minimum admissions					
	BNL	RDG	SLH	WBS	WAM	WOK	BNL	RDG	SLH	WBS	WAM	WOK
Dec/Jan-09	2	1	1	2			1	4	4	5	4	2
Feb/Mar-09									1	1	2	1
Apr/May-09						2	3	1		1	2	
Jun/Jul-09						1					1	1
Aug/Sep-09				1	1					1	2	
Oct/Nov-09		1							1			2
DecJan-10				1			1			2		
Feb/Mar-10							1				1	2
Apr/May-10	1				1		1		1	1	2	1
Jun/Jul-10									1	1		
Aug/Sep-10	1	1					1	3				
Oct/Nov-10								1	1			2
Dec/Jan-11				1					1		1	1
Feb/Mar-11		1	1									1
Apr/May-11				1			2				1	
Jun/Jul-11	1			2			1	2	1	2	1	1
Aug/Sep-11								2		1		1
Oct/Nov-11		1			1				1			
Dec/Jan-12							1	2	1	1		2
Feb/Mar-12										3		1
Apr/May-12							1	2	1		1	2
Jun/Jul-12			3							3		
Aug/Sep-12			1	1	1		1	1				
Oct/Nov-12	3		1	1			1					
Dec/Jan-13	3	5	3	2	5	4						
Feb-13+	4	8	4	10	9	14						

Figure 1: Effect of size on the maximum increase relative to the minimum in each MSOA



An edited version of this article has been published as: Jones R (2015) Estimating acute costs? ***British Journal of Healthcare Management*** 21(3): 152-153. Please use this to cite.

Hence infectious spread at small area is creating complex spatio-temporal patterns. However, as Fig. 1 shows over the five year period of this study only a few MSOA experience the maximum possible increase in admissions, i.e. the upper edge of the data points in Fig. 1. The cluster of six points near 10,000 admissions is the maximum observed at whole local authority level. The power-law relationship with size arises out of a phenomena called the modifiable areal unit problem (MAUP) and underestimates the real effect of the outbreaks (Jones & Beauchant 2015).

I have had to use a 23 year time series in Scotland and Northern Ireland to estimate the maximum possible potential for outbreaks at local authority level in these countries (Jones 2015d,e), i.e. in some locations maximum possible only happens 1 in 20 years.

Having presented the basic concepts behind medical activity and costs we can now explore the likelihood of being able to estimate future activity and costs.

1. We have a series of outbreaks usually two per decade but with three- and four-in-a-row outbreaks possible.
2. In each outbreak the response in terms of timing and percentage increase is highly variable.
3. Relatively slow spread totally ignores financial year planning time frames.
4. Costs will always be and can never be anything other than highly volatile.
5. Cost and volume assumptions within the HRG tariff will be invalidated during the outbreaks.

In other words the likelihood of any person or organisation on this planet forecasting future medical costs is zero. Costs will be intrinsically so volatile (Jones 2012a, 2013a) that attempts at 'equitable' funding via the NHS funding formula will miserably fail (Jones 2013a). Financial risk sharing is an absolute necessity (Jones 2012b). Despite this fundamental reality NHS organisations have been blamed and pilloried for not 'managing' medical costs. This has been made worse by the reluctance of politicians and government agencies to acknowledge that there is a serious problem which is far beyond the trivial 'reasons' offered for this apparent failure (Jones 2015b).

All concerned need to sit down and have a serious discussion about how we manage reality rather than playing Alice in Wonderland with the NHS.

References

Jones R (2012a) Why is the 'real world' financial risk in commissioning so high? BJHCM 18(4): 216-217.
Jones R (2012b) High risk categories and risk pooling in healthcare costs. BJHCM 18(8): 430-435.
Jones R (2013a) What every GP needs to know about financial risk in commissioning. General Practice Online http://www.priory.com/family_medicine/GP_commissioning_risk.htm
Jones R (2013b) Could cytomegalovirus be causing widespread outbreaks of chronic poor health. In Hypotheses in Clinical Medicine, pp 37-79, Eds M. Shoja, et al. New York: Nova Science Publishers Inc. Available from: http://www.hcaf.biz/2013/CMV_Read.pdf
Jones R (2013c) Recurring outbreaks of a subtle condition leading to hospitalization and death. Epidemiology: Open access 4(3): 137.

An edited version of this article has been published as: Jones R (2015) Estimating acute costs? ***British Journal of Healthcare Management*** 21(3): 152-153. Please use this to cite.

Jones R (2015a) A previously uncharacterized infectious-like event leading to spatial spread of deaths across England and Wales: Characteristics of the most recent event and a time series for past events. Brit J Med Medical Res 5(11): 1361-1380.

Jones R (2015b) Recurring Outbreaks of an Infection Apparently Targeting Immune Function, and Consequent Unprecedented Growth in Medical Admission and Costs in the United Kingdom: A Review. British Journal of |Medicine and Medical Research 6(8): 735-770.

Jones R (2015c) Has the UK experienced a four-in-a-row epidemic? BJHCM (submitted)

Jones R (2015d) The rise in medical admissions, a "wicked problem" with additional complexity arising from periods of unexplained higher deaths. Ulster Medical Journal (submitted)

Jones R (2015e) A regular series of unexpected increases in total deaths for residents of Scottish Local Authority areas: Is an infectious source implicated? Biomedicine International (submitted).

Jones R, Beauchant S (2015) Spread of a new type of infectious condition across Berkshire in England between June 2011 and March 2013: Effect on medical emergency admissions. Brit J Med Medical Res 6(1): 126-148.