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Financial risk in medical admissions

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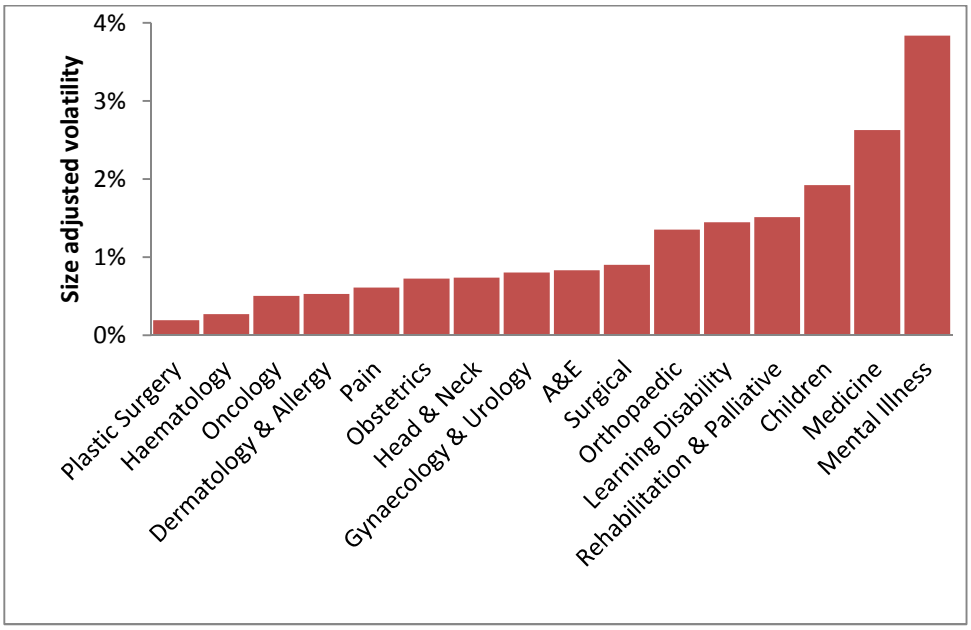
A series of articles in BJHCM over the past four years has accumulated evidence for international outbreaks of a new type of infectious immune impairment. In England, each of these events adds somewhere in excess of £1 billion to emergency inpatient costs, somewhere between £2 to £3 billion to outpatient costs and possibly up to £7 billion into total NHS expenditure. These high incremental costs are due to the profound effects across all aspects of health care activity (ambulance journeys, A&E attendance, GP referral, inpatient, etc) with differential effects across age and gender (Jones 2012a). The effects are specific to a group of medical and mental health diagnoses (see Jones 2012a for a review).

Figure 1: Average relative volatility in occupied beds (1998/99 to 2010/11)



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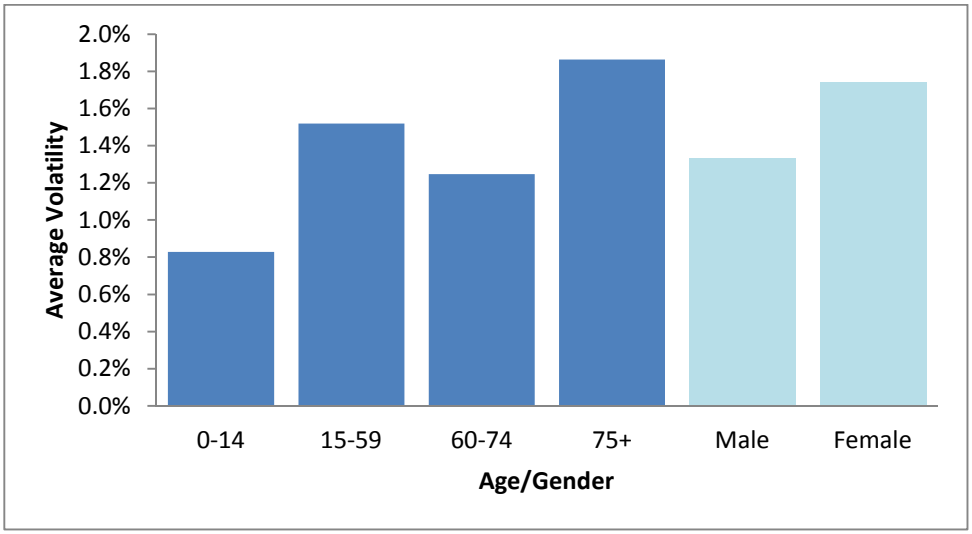
Footnote to Fig 1: Data is for England (as per previous studies) and includes elective and emergency admissions. Day case have been imputed a one day stay. All specialties have been adjusted to the volatility equivalent at 16,000 occupied beds. Volatility has been assessed against second order polynomial curve fits with the percentage difference between actual and predicted averaged over the 13 years. In some instances the data has been modelled as two consecutive polynomial curves. Adjustment has been made for a change in the way bed days were counted from 2008/09 onward.

The mechanisms by which such an immune impairment could cause serious mental health problems are also becoming increasingly recognised (Maes et al 2012). Recent articles have demonstrated potential linkages with cycle-like trends in certain cancers and a pattern of increased deaths following each outbreak (Jones 2012b,c). The author's unpublished studies have also confirmed spatial spread *within* the catchment area of single hospitals in England and overseas and at health board level in Wales and Scotland.

As a summary of previous studies Figure 1 shows the average year-to-year volatility associated with occupied beds in England where the specialties have been aggregated into a number of broad groupings. As can be seen the volatility associated with bed occupancy is highest in the two specialty groups where the proposed infectious agent exerts its spectrum of immune-based effects. In this figure the volatility has been adjusted to that which would be observed if all the specialty groups had the same number of occupied beds as the surgical group. Hence the apparent volatility of the medical group in Figure 1 which accounts for 45% of all occupied beds is higher than the 1.3% actual volatility due to the size adjustment. The key point is that the size adjustment allows the very high relative volatility in Medicine and Mental Health to be revealed. The relative high volatility in learning disability is of interest due to the known role of cytomegalovirus as a causative agent in neurological development problems in the foetus and resulting learning difficulties as the child develops (Hyde et al 2010). For the moment this remains a hypothesis, however, the key point is that health care is behaving in non-characteristic ways which demand an explanation.

Figure 2: Average volatility in medical admissions (1998/99 to 2010/11)



Footnote: Adjusted to volatility equivalent at 2 million admissions per annum (total admissions including day case). Specialty Paediatrics has been included as a medical equivalent for the younger ages but is excluded from the analysis of volatility in gender. Growth each side of 2003/04 was independently calculated to adjust for differential growth in zero day stay emergency admissions.

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Figure 2 investigates the volatility of medical admissions by age band with the very old and middle ages being most affected. The volatility is associated with even greater age specificity when single year age bands are used (unpublished studies). Apparent volatility is lower in Figure 2 than Figure 1 for two reasons. Firstly, since admissions to the broad age bands give roughly similar numbers the volatility retains a high degree of the 'actual' level without the need for adjustment for size. Secondly, volatility for admissions is lower than for occupied beds because occupied beds contains self-adjustment for the dramatic changes in case mix which accompany each outbreak.

Figure 3: Ratio of female to male medical admissions

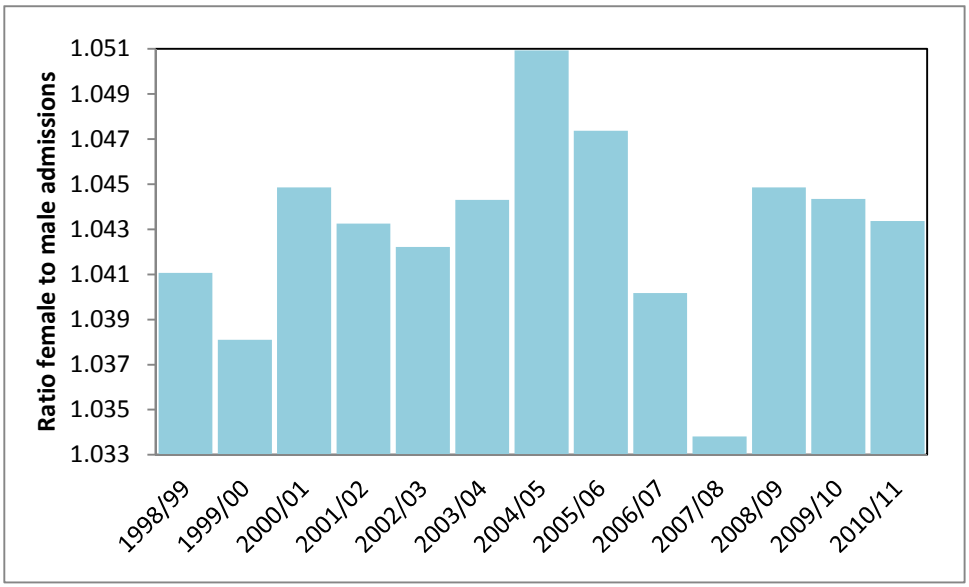

Figure 3 demonstrates that each outbreak triggers a characteristic change in the ratio of female to male medical admissions. The extent of this pattern can be discerned despite using financial year totals where the ratio of female admissions first increases and then decreases following outbreaks in 1999 (mainly in northern parts of England?), 2002 and 2007. The ratio of admissions may also have a slight time lag. The differential patterns following each event could be indicative of different strains of the same agent.

It would appear that agencies such as the Health Protection Agency (HPA) in the UK, the Centre for Disease Control (CDC) in the US and similar agencies elsewhere will need to implement the necessary monitoring and analysis (especially in the elderly population) to establish the exact nature of the infectious agent. Indeed if the pattern of outbreaks observed in the past continues the next outbreak is due any time between 2012 and 2015.

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