

Understanding growth in emergency admissions

Dr Rodney P Jones (ACMA, CGMA)
 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>

Abstract

Growth in emergency admissions to hospitals in England over the period 1998/99 to 2013/14 is reviewed using specialty groupings. Lowest growth is in Orthopaedics which shows long-term cycles. Growth in admissions to the specialty 'Accident & Emergency' shows nearly 600% growth due to the unintended consequences of the four hour target for treatment in A&E. The majority of these admissions would be classified as an ED attendance in most other countries. Some other specialties show evidence for changes in counting around the time that the A&E target was introduced. Highest growth is for the medical specialties which show evidence for long-term cycles.

While it may be widely understood that emergency admissions are 'growing' and that the ageing population is most commonly 'blamed' for the rise, it is often beneficial to take a long term view before leaping to preconceived notions.

Table 1: Annual emergency admissions relative to 1998/99

	A&E	Oncology	Anaesthetics	Medicine	Plastic Surgery	Obstetrics	Paediatrics	Surgical	Head & Neck	Haematology	Orthopaedic	Mental Illness
2013/14 FCE	574,600	57,000	6,000	2,608,000	58,000	34,000	652,000	920,000	110,000	35,000	288,000	72,000
1999/00	-5%	7%	-2%	2%	15%	3%	-1%	1%	1%	-4%	3%	-5%
2000/01	-4%	9%	2%	4%	15%	4%	-1%	2%	0%	-12%	0%	-8%
2001/02	3%	12%	2%	5%	19%	6%	4%	1%	-1%	-6%	1%	-12%
2002/03	4%	15%	6%	8%	18%	-1%	2%	2%	0%	-6%	2%	-14%
2003/04	80%	20%	13%	14%	18%	-2%	4%	5%	4%	-9%	3%	-20%
2004/05	199%	18%	9%	20%	19%	22%	9%	9%	7%	-5%	5%	-24%
2005/06	370%	24%	12%	22%	23%	29%	16%	12%	9%	-12%	5%	-32%
2006/07	458%	32%	16%	23%	26%	27%	13%	10%	3%	-9%	2%	-36%
2007/08	500%	37%	17%	23%	26%	47%	17%	9%	4%	-9%	1%	-41%
2008/09	593%	40%	26%	30%	31%	59%	24%	11%	7%	-5%	-1%	-40%
2009/10	649%	49%	15%	33%	37%	68%	27%	17%	7%	2%	2%	-42%
2010/11	663%	56%	23%	37%	39%	39%	31%	18%	8%	9%	0%	-45%
2011/12	592%	64%	46%	38%	46%	46%	28%	20%	6%	12%	-1%	-46%
2012/13	592%	63%	47%	42%	32%	30%	37%	19%	7%	15%	-7%	-46%
2013/14	579%	68%	49%	46%	38%	36%	35%	23%	8%	7%	-5%	-47%

All data is from the Health & Social Care Information Centre

<http://www.hscic.gov.uk/searchcatalogue?q=title%3A%22Hospital+Episode+Statistics%2C+Admitted+patient+care+-+England%22&area=&size=10&sort=Relevance>

An edited version has been published as: Jones R (2015) Understanding growth in emergency admissions. *British Journal of Healthcare Management* 21(4): 195-197. Please use this to cite.

The following analysis takes Hospital Episode Statistics (HES) between 1998/99 and 2013/14 to help elucidate the basis for any increase. Table 1 displays the long-term trends relative to 1998/99 as the base year. The first row gives the number of admissions in 2013/14 as an indication of relative size. As can be seen the medical group of specialties dominates the number of emergency admissions. The yellow block marks the point of any abrupt changes in counting. Several specialties show an abrupt change in 2002/03 or 2003/04 and this marks the point at which the 4 hour target was introduced for A&E (Jones 2006).

The step change in Obstetrics in 2004/05 is probably to do with the increased scope of the HRG tariff and mainly involved re-badging outpatient observation of events during pregnancy. At the time the tariff had a flaw which made it financially lucrative to count these patients as an 'emergency' admission; however, there were huge disparities between hospitals over this practice. The reduction in Mental Illness is due to the shift to care in the community. Oncology (average age 62) shows a slightly increasing trend over time but with an overall average of +4.7% p.a., which in some locations that lack hospice facilities; will include an element of palliative care.

Anaesthetics show 2.2% p.a. growth up to 2010/11, with an 18% step-increase (+900 FCE) in 2011/12, which is probably due to changes in the process of care in several of the largest hospitals. Haematology shows a general trend downward to 2007/08 followed by an increase. The reasons for this behaviour are unknown but could involve the somewhat fluid boundary between elective and emergency care.

Trauma & Orthopaedics (average age 55) defies all commonly-held notions regarding the ageing population and shows a long-term cycle within $\pm 5\%$ of the 1998/99 level of activity. My own 22 year consultancy experience confirms the fact that trauma admissions and bed demand follows such long-term cycles. A study in the Netherlands confirms that the weather is a primary factor in these cycles (Stomp et al 2009).

The impact of the 4 hour target for A&E is seen most clearly in the explosive growth in 'admissions' to the specialty 'Accident & Emergency'. Both the 4 hour target and the shift to assessment units led to massive growth in the three years 2003/04 to 2005/06. By 2007/08 every hospital in England has a variety of adult and paediatric assessment units (Jones 2010) and admissions eventually peak in 2010/11. Not every assessment unit is coded to specialty A&E and this may explain the slight reduction since 2010/11.

The bulk of these additional 'admissions' were zero day stay (Jones 2006) and Fig. 1 gives the proportion of emergency admissions in 2013/14 which were zero day stay (admitted and discharged before midnight). Fig. 2 investigates the potential role for age in the proportion of zero day stays. As can be seen around age 55 the potential for zero day stay drops significantly and this is probably due to the rise in comorbidities in the elderly (St Sauver et al 2015).

An edited version has been published as: Jones R (2015) Understanding growth in emergency admissions. *British Journal of Healthcare Management* 21(4): 195-197. Please use this to cite.

Figure 1: Proportion of emergency admissions in 2013/14 which were zero day stay.

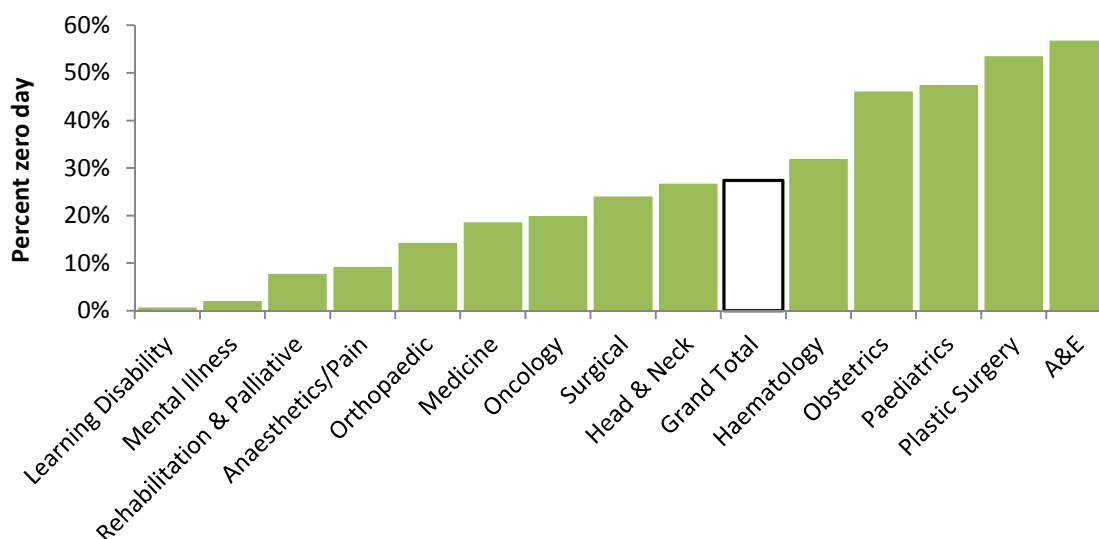
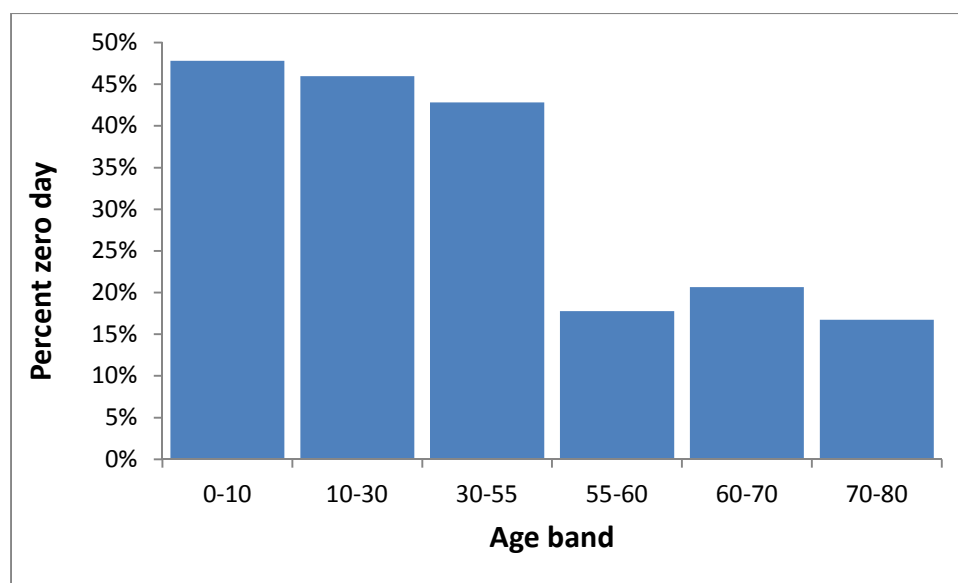


Figure 2: Role of average specialty age in the proportion of zero day admissions



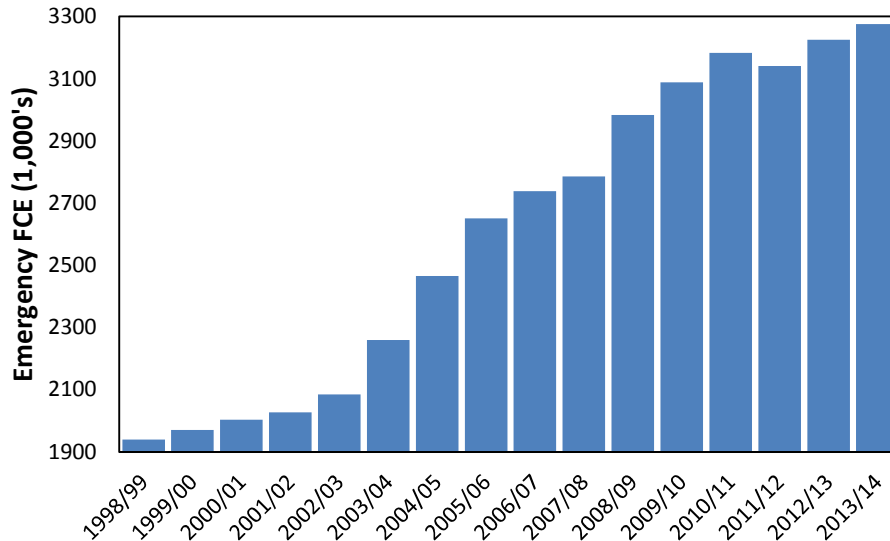
The remaining specialty groups display modest growth (Head & Neck +0.3% p.a., Surgical +1.6% p.a., Plastic Surgery +1.9% p.a.) suggesting that simple demographic growth (the ageing population) is sufficient to explain the trends, however, the medical group displays growth which requires further explanation and this is explored in Fig. 3.

Due to the potential substitution between admissions into an A&E assessment unit, which may be coded to medicine in some hospitals, Fig. 3 includes A&E admissions. The issue of explosive growth in the years 2003/04 to 2005/06 has been discussed above and explains a large part of the surge seen in these years in Fig. 3. For example, specialty A&E accounts for around 2.2% of all emergency admissions between 1998/99 and 2002/03 and rises

An edited version has been published as: Jones R (2015) Understanding growth in emergency admissions. *British Journal of Healthcare Management* 21(4): 195-197. Please use this to cite.

thereafter to 12.3% in 2009/10. However, imposed upon these counting issues are a series of other events which require explanation.

Figure 3: Trends in medical admissions



Outbreaks of a presumed infectious agent have been shown to increase both deaths and medical admissions in the years 2003/04, 2008/09, 2010/11 and 2012/13 and all of these years show a step-like increase over the previous year (Jones 2015a,b). The 2003/04 event is partly obscured by the impact of the 4 hour target and the opening of assessment units, however, the other step-changes are easier to observe, and endure for a few years before beginning to abate – hence the cycle like movement in the Fig. 3. The 2010/11 event appears to be far more granular than the other events and only had a strong effect on around one-third of local authority areas (Jones 2015a). This cycle like behaviour is not exclusive to medicine and can also be seen in Head & Neck with a distinct minimum in emergency admissions in the year before each outbreak. Such undulating behaviour is also seen in the Surgical group and in Oncology where the minimum appears to show a one year lag. Such lags have been observed for a variety of conditions in both an inpatient and outpatient context.

In conclusion, after adjusting for the unintended effects of the 4 hour A&E target and the opening of assessment units from 2002/03 onwards, many specialties show growth which simply arises from demographic factors. There is no observable growth in T&O but long-term cycles are evident, presumably due to the weather. Growth in the medical group has been greatly exaggerated by a series of step-like increases which affect both deaths and admissions and appear to have an infectious aetiology. Other specialties also show evidence for cyclic behaviour emanating out of these infectious events.

An edited version has been published as: Jones R (2015) Understanding growth in emergency admissions. *British Journal of Healthcare Management* 21(4): 195-197. Please use this to cite.

References

Jones R (2006) Benchmarking zero day stay emergency admissions in Thames Valley. http://www.hcaf.biz/Forecasting%20Demand/benchmark_zero-daystay_emergency_admissions.pdf

Jones R (2010) Emergency assessment tariff: lessons learned. *British Journal of Healthcare Management* 16(12): 574-583.

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. *British Journal of Medicine and Medical Research* 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.

Stomp W, Fidler V, ten Duis H-J, Nijsten M (2009) Relation of the weather and the lunar cycle with the incidence of trauma in the Groningen region over a 36-year period. *J Trauma* 67(5): 1103-1108.

St Sauver J, Boyd C, Grossardt B, et al (2015) Risk of developing multimorbidity across all ages in an historical cohort study: differences by sex and ethnicity. *BMJ Open* 5: e006413.