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Forecasting emergency department attendances

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Key Words: Accident & Emergency, A&E, Emergency Department, Trends, Attendance, Cycles, Four hour target, trends in emergency admissions

Given the central role which demand plays in the cost of health care Money Matters has recently been exploring the issues around forecasting demand (Jones 2010e-f). Having been involved in health care planning for over 18 years I have serious reservations about the central assumption in NHS planning that demographic change or the ageing population is driving demand (Jones 2010k). In this respect increases in accident & emergency (A&E) attendances which are far above that suggested by demography are a common international feature (Santos-Eggimann 2002, Zaragoza Fernandez et al 2009, Chu et al 2009)). Fig. 1 elegantly demonstrates the complete lack of demographic involvement in that the A&E trends for England over the past 30 years behave in a way which has more to do with wavelet analysis, i.e. recurring peaks and troughs, rather than any other form of recognisable trend.

Of relevance to this wave-like behaviour is the recent observation that health care expenditure in the USA follows a similar pattern (Jones 2010d) as do emergency medical admissions in the USA, Canada and the UK (Jones 2010a-j). A recent review of the behaviour of emergency admissions suggested that wave-like movement may also occur in specialties other than medicine (Jones 2009b,c).

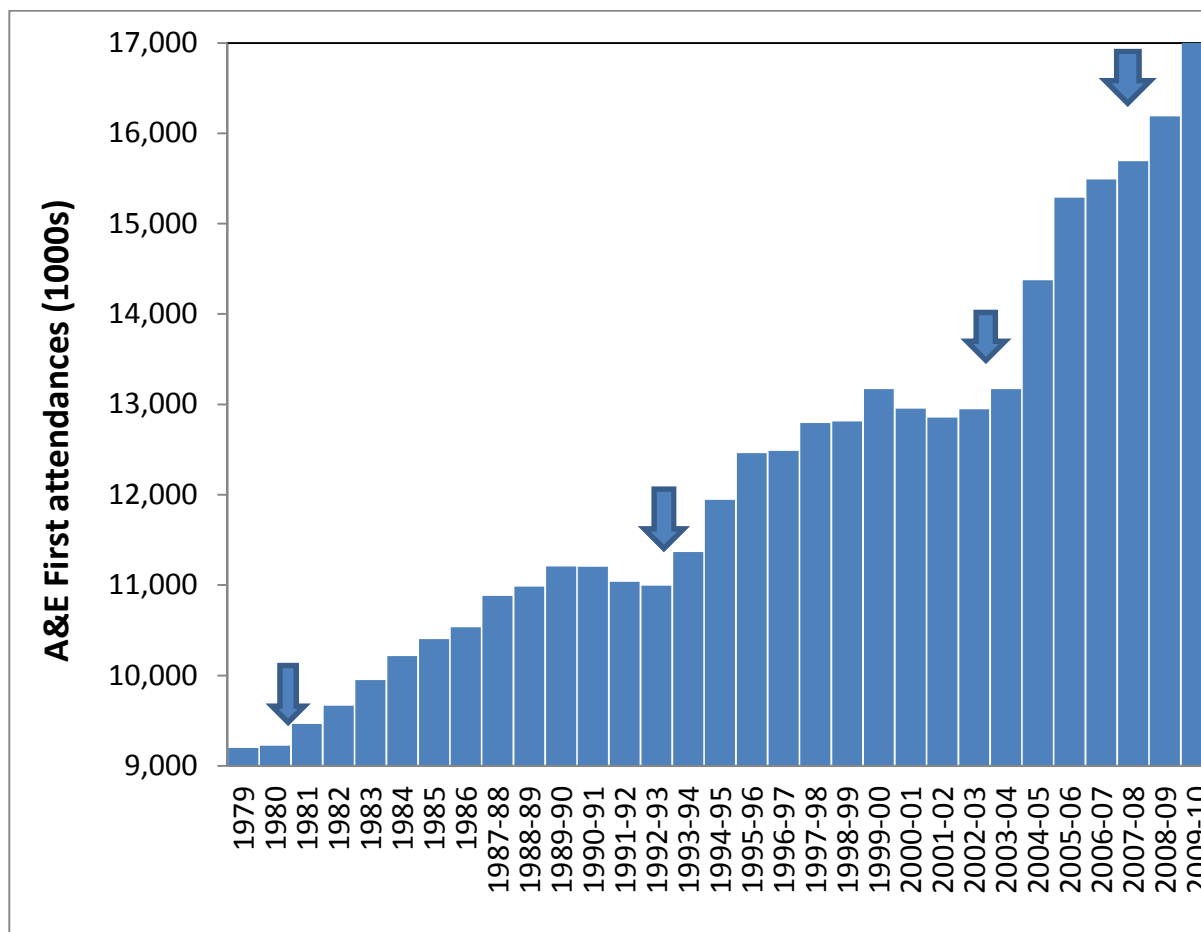
The key question regarding emergency department (A&E) attendances is this, do the arrows marking the onset of each wave correspond to a significant event? The answer appears to be affirmative in that 1993/94, 2003/04 and 2008/09 are all years following the proposed outbreak of a new type of infectious disease in the UK (Jones 2010i-k) and 1981 marks the year following a proposed large step-change in expenditure in the USA (Jones 2010g). While the arrows mark the point of onset for major cycles in A&E attendance in England there are several high points around 1999 and 1990 which appear to coincide with possible outbreaks which appear to have been confined to Scotland and perhaps parts of northern England (Jones 2009c, 2010j) and 1996 in England. An outbreak around 1987 also looks possible (Jones 2009b). Also of interest is that the greatest increase in A&E attendance appears to generally occur in the second year after each 'outbreak'.

Interestingly the data from both Switzerland and Spain show similar wave-like movements in attendances (Santos-Eggimann 2002, Zaragoza Fernandez et al 2009) which are unrelated to demography. Exactly why the years marking certain outbreaks in Fig. 1 appear to exert a more pronounced long-term effect remains unknown although the health care cost data for the USA does

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appear to show some evidence of sub-cycles within the context of longer-term cycles, i.e. 1969 to 1986 and 1986 to 1996 (Jones 2010g).

Figure 1: Trends in emergency department first attendances in England



Footnote: Attendances for England were obtained from the DH, Performance & Statistics website [http://www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Performanceandstatistics/AccidentandEmergency/DH_077485 Data from 2003/04](http://www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Performanceandstatistics/AccidentandEmergency/DH_077485>Data%20from%202003/04%20onwards%20includes%20walk%20in%20centres%20and%20has%20been%20reduced%20by%2015%20to%20make%20some%20adjustment%20for%20the%20change%20in%20case%20mix) onwards includes walk in centres and has been reduced by 15% to make some adjustment for the change in case mix. **Note that the 15% adjustment may have over-corrected the 2003/004 data and hence the step increase in that year may be far higher.**

What conclusions can be reached from the long-term trends in Fig. 1. Firstly, whether the changes are due to the outbreaks of a new type of infectious disease or not we need an explanation for the wave-like behaviour. Secondly, the perception regarding growth in demand is highly influenced by the position relative to the longer trends and hence the perceived success or otherwise of demand management schemes can be very subjective.

Finally, we need to stop deceiving ourselves regarding our ability to plan for future health care demand. For whatever reason, demography simply does not work in the real world and continued reliance on this flawed methodology can only lead to serious problems in future years as we run out of capacity and then have to scabble around for alternative and just as expensive 'solutions' to a problem that we have failed to fully define (Jones 2010k,l). The problem is that, like the emperors new clothes, no one seems willing to admit we have a problem.

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