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Is the demographic shift the real problem?

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Everyone will be well aware of the ageing population or the demographic shift and that the increase in admissions, A&E attendances and costs are often blamed on 'the ageing population'.

A recent study from Sweden has demonstrated that age-at-first-admission for those aged 60+ has increased in parallel with increasing life expectancy (Karampampa et al 2013) – implying there should not be a problem.

In this respect, the proportion of the population aged 75+ between 1998 and 2011 roughly increased at 0.04% per annum from around 7.4% in 1998 to 7.75 % in 2011; this is hardly explosive growth. Given this trend how do we account for the results shown in Table 1 where only a few specialties at the bottom of the table are showing the sort of expansion in the proportion of admissions aged 75+ which may be expected from demographic change? This rapid and unexpected expansion is also reflected in A&E and outpatient contexts (Jones 2012c,d). Recall that this is a ratio and therefore growth in admissions *per se* or shifting admissions out of 'general medicine' into another medical sub-specialty cannot be the cause of these changes.

What are the factors responsible for this disparity? Firstly, it has been pointed out that the admission rate is increasing over time and that the rate of increase escalates with age, i.e. this age group is accumulating first and subsequent admissions faster than younger age groups (Kendrick & Conway 2006). Secondly, this data uses Finished Consultant Episodes (FCE) and therefore we can also infer that this age group is accumulating multiple specialty stays per admission faster than younger age groups, i.e. the care is becoming more complex.

Traditional explanations for these discrepancies have focussed on the elderly living alone and other societal shifts (Kendrick & Conway 2006). These ignore that you have to be ill enough to get admitted to acute care. Consequently societal factors are probably contributory to the problem rather its fundamental cause (Jones 2013a). Putting these points together leads to the

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conclusion that the elderly are accumulating multiple pathologies/conditions/morbidities faster than the younger age groups and at a rate faster than they are ageing.

Table 1: Annual percentage point growth in proportion of admissions aged 75+

Specialty	Growth p.a.	2011/12 FCE
302 Endocrinology	2.7%	119,006
320 Cardiology	1.2%	581,573
350 Infectious Diseases	1.0%	44,275
170 Cardiothoracic Surgery	0.9%	76,765
330 Dermatology	0.8%	119,440
950 Nursing	0.8%	15,220
180 Accident & Emergency	0.7%	594,728
600 General Medical Practice	0.7%	44,510
361 Nephrology	0.7%	152,938
810 Radiology	0.6%	42,199
340 Thoracic Medicine	0.5%	351,281
300/430 General & Elderly Medicine	0.5%	3,568,258
370 Medical Oncology	0.5%	250,050
400 Neurology	0.4%	125,190
410 Rheumatology	0.4%	158,090
140/145 Oral & Maxillo-Facial Surgery	0.3%	300,360
160 Plastic Surgery	0.3%	253,490
301 Gastroenterology	0.3%	817,260
303 Haematology	0.3%	487,680
130 Ophthalmology	0.3%	620,280
190 Anaesthetics	0.3%	194,880
800 Radiotherapy	0.2%	347,030
150 Neurosurgery	0.2%	91,340
101 Urology	0.2%	825,510
120 Ear, Nose & Throat	0.2%	346,460
100 General Surgery	0.1%	1,790,040
502 Gynaecology	0.0%	1,031,080
110 Trauma & Orthopaedics	0.0%	1,200,760
Demographic shift (ageing population)	**0.04%**	n/a

Footnote: Data is from Hospital Episode Statistics (HES) between 1998/99 and 2011/12 and covers Finished Consultant Episodes (FCE) of all types (emergency and elective). Growth in the proportion of admissions aged 75+ was estimated via linear regression using Microsoft Excel.

In Figure 1 another dimension to the problem is that some specialties are showing cycle-like or undulating movement around the general trend line. Given that we are dealing with very large national numbers, random variation cannot explain these undulations. That such long-term cycles exist, even in trauma, has been recently highlighted (Jones 2009, 2012a,e, 2013c); although cycles in infectious disease have been recognized for many years (Fleming et al 1991). Hence we can infer complex interactions of the pathologies/diseases with the environment which will include infectious outbreaks. How do we therefore explain the repeating cycle in

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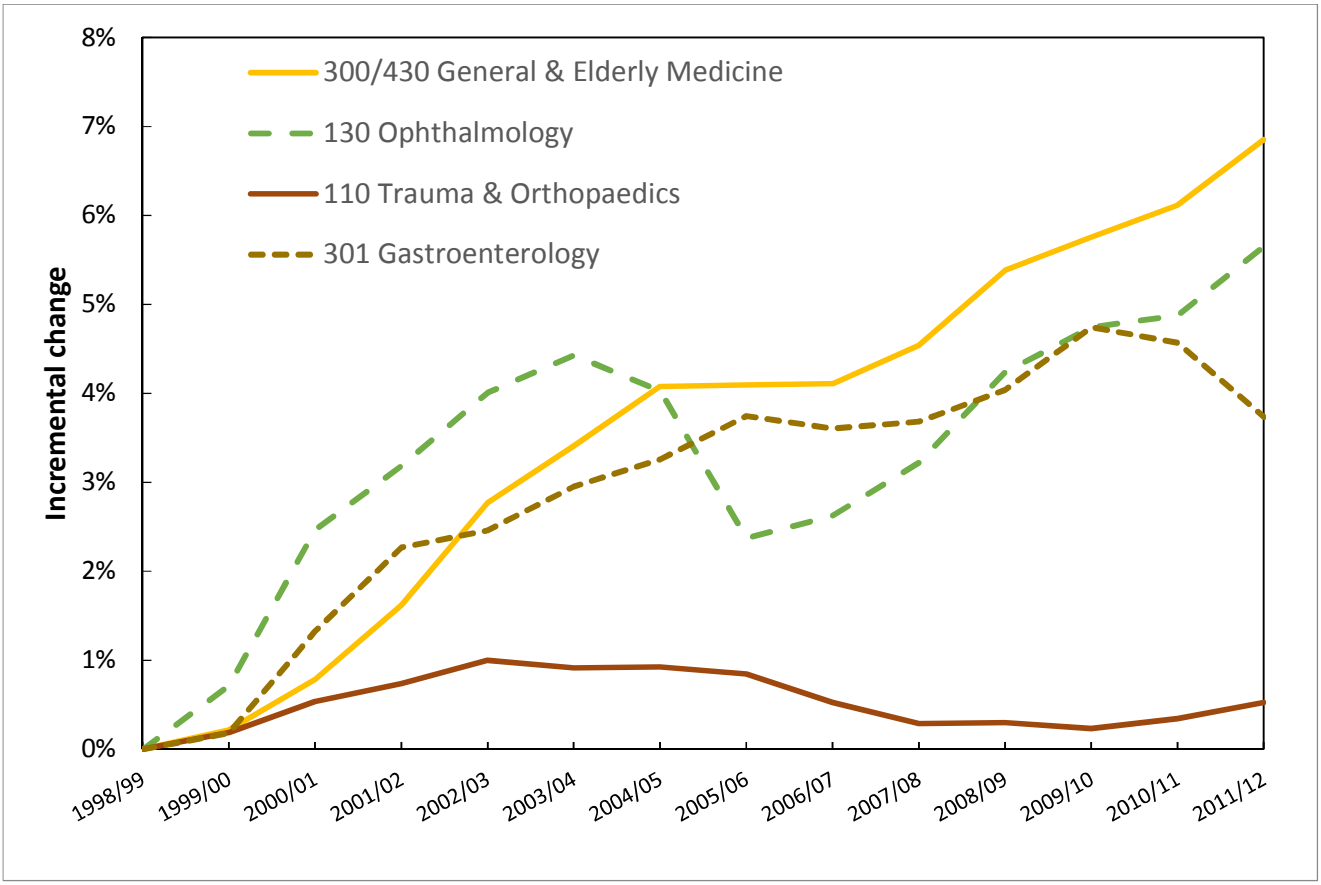
deaths, gender ratio at birth, emergency medical admissions and A&E attendances that characterizes health care costs in the UK (Jones 2013a-e)?

Figure 1: Non-linear trends are common



In this respect the infectious origins of disease have been an expanding area as increasing numbers of pathogens are discovered as the basis for particular diseases (Lorber 1996) - for example, Helicobacter pylori (stomach ulcers), human papiloma virus (cancer of the cervix), viral hepatitis, HIV/AIDS, viral/bacterial meningitis, Lyme disease, etc. One study in Utah (USA) using clinical samples discovered 673 novel species and 111 novel genera of bacteria infecting humans (Schlaberg et al 2012). There are more than 1,400 species of human pathogens with 220 viruses alone known to infect humans and this number is expanding at a rate of one to two extra every year (Woolhouse & Gowtage-Sequeria 2005, Woolhouse et al 2008). Many are scantily studied in terms of their long-term disease potential. Even influenza is suspected of maintaining a long-term presence after infection (Wheatland 2010). Indeed, only in the last five years has the common herpes virus cytomegalovirus (an agent capable of causing auto-immune disease and cancer) been shown to be involved in hospital admission and death (Jones 2012b, 2013a,e).

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Infection with one virus can predispose to infection with another, such that herpes simplex virus 2 increases the risk of infection with HIV around 3-fold (Freeman et al 2006). A recent study on Mexican Americans looking for the prevalence of 13 common infections showed 0.1% had all 13 and 24% had 8 (the most common level of multiple infection), while 50% had 8 or more pathogens (Rubicz et al 2011). This study was conducted for the simple reason that Mexican Americans are known to have a high level of multiple morbidities.

When will we stop and ask the question, is it really the ageing population or is it more to do with older people acquiring higher numbers of infectious agents - and therefore acquiring an increasing burden of multiple morbidities? The trends alone offer a clear message. Are the policy makers listening – if not why not?

References

Fleming D, Norbury C, Crombie D (1991) Annual and seasonal variation in the incidence of common diseases. Royal College of General Practitioners, London. Occasional Paper 53.
Freeman E, Weiss H, Glynn J et al (2006) Herpes simplex virus 2 infection increases HIV acquisition in men and women: systematic review and meta-analysis of longitudinal studies. AIDS 20(1): 73-78.
Lorber B (1996) Are all diseases infectious? Annals Internal Medicine 125(10): 844-851.
Rubicz R, Leach C, Kraig E, et al (2011) Seroprevalence of 13 common pathogens in a rapidly growing U.S. minority population: Mexican Americans from San Antonio, TX. BMC Research Notes 4: 433.
Schlaberg R, Simmon K, Fisher M (2012) A systematic approach for discovering novel, clinically relevant bacteria. Emerg Infect Dis 18(3): 422-430.
Jones R (2009) Cycles in emergency admissions. British Journal of Healthcare Management 15(5): 239-246.
Jones R (2012a) Time to re-evaluate financial risk in GP commissioning. British Journal of Healthcare Management 18(1): 39-48.
Jones R (2012b) Cancer care and volatility in commissioning. British Journal of Healthcare Management 18(6): 315-324.
Jones R (2012c) Increasing GP referrals: collective jump or infectious push? British Journal of Healthcare Management 18(9): 487-495.
Jones R (2012d) Age-related changes in A&E attendance. British Journal of Healthcare Management 18(9): 502-503.
Jones R (2012e) Time to re-evaluate financial risk in GP commissioning. British Journal of Healthcare Management 18(1): 39-48.
Jones R (2013a) Could cytomegalovirus be causing widespread outbreaks of chronic poor health. Hypotheses in Clinical Medicine, pp 37-79, Eds M. Shoja et al. New York: Nova Science Publishers Inc
Jones R (2013b) An unexplained increase in deaths during 2012. British Journal of Healthcare Management 19(5): 248-253.
Jones R (2013c) Do recurring outbreaks of a type of infectious immune impairment trigger cyclic changes in the gender ratio at birth? Biomedicine International 4(1): in press

An edited version of this article has been published as: Jones R (2013) Is the demographic shift the real problem? ***British Journal of Healthcare Management*** 19(10): 509-511. Please use this to cite.

Jones R (2013d) A recurring series of infectious-like events leading to excess deaths, emergency department attendances and medical admissions in Scotland. Biomedicine International (in press)
Jones (2013e) Recurring outbreaks of a subtle condition leading to hospitalization and death. Epidemiology: Open access (in press)
Karampampa K, Drefahl S, Andersson T et al (2013) Trends in age at first hospital admission in relation to trends in life expectancy in Swedish men and women above the age of 60. BMJ Open 3: e003447
Kendrick S, Conway M (2006) Demographic and social change: implications for the use of acute care services for older people. Eur J Population 22(2): 281-307.
Wheatland R (2010) Viral carrier status is instilled by viral regulatory particles. Medical Hypotheses 74(4): 688-691.
Woolhouse M, Gowtage-Sequeria S (2005) Host range and emerging and re-emerging pathogens. Emerg Infect Dis 11(12): 1842-1847.
WoolhouseM, Havey R, Gaunt E et al (2008) Temporal trends in the discovery of human viruses. Proc Biol Sci 275(1647): 2111-2115.