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Trends in outpatient follow-up rates:

England '87/88 to '10/11

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Key Points

- The follow-up rate has been declining for many years
- Greatest reduction occurred prior to 2000/01
- For many specialties the decline has reached the point of only small incremental changes
- There is considerable movement in the follow-up rate due to the impact of the environment on rates of GP referral
- Follow-up rate do show natural variability, contracts and financial forecasts should reflect this reality

Abstract

Trends in the follow-up rate for a variety of outpatient specialties are investigated over a 24 year period. In the majority of specialties the greatest reduction in the follow-up rate occurred prior to 2000/01. Many specialties exhibit a degree of cyclic behaviour in the follow-up rate which seems to arise out of non-linear behaviour over time in the rates of GP referral. Sudden increases in GP referral can arise from a congruence of adverse environmental conditions; i.e. sporadic 'spike' events, or due to longer term cycles in the wider environment (including infectious outbreaks). Such increases result in a higher proportion of false positive GP referrals leading to a dip in the follow-up rate. GP commissioners in England are advised to pay far greater attention to the undulating nature of outpatient activity and costs. Potential environmental factors contributing to such cycles are discussed along with the implications to activity and cost forecasting.

Introduction

Outpatient attendances cost the NHS in England around £8.5 billion and with around 2.3 follow-up attendances for every first attendance the issue of follow-up rates is high on the cost containment agenda (see http://www.improvement.nhs.uk/heart/sustainability/outpatients/follow_up.html). Multiple follow-up for some conditions including post-surgery for particular types of cancer is, of course, fully justified (Cochrane et al 1980, Figueredo et al 2003).

It is well known that junior doctors have a higher follow-up rate than consultants and in ENT at one hospital a Specialist Registrar had around double the follow-up rate of their Consultant (Mirza &

Chetwood 2012). However in another hospital for Urology some 92% of follow-up appointments were judged appropriate (Bromage et al 2006). Perhaps one solution is to define an acceptable range in the follow-up rate which reflects the reality of the need to train junior doctors. The Royal College of Ophthalmologists have detailed a range of acceptable follow-up rates for single cataract, bilateral cataract, chronic open angle glaucoma, ocular hypertension, diabetic retinopathy and age related macular degeneration which is sensitive to the condition, co-morbidities and the rate of false positive referrals (Kelly et al 2011).

With the arrival of GP commissioning it is necessary to educate GPs regarding the behaviour of various activities and rather than seeking to define a set of acceptable follow-up rates this article seeks to place the current trends in a far wider historical context. The existence of cycles in the follow-up rate for particular specialties is highlighted. How such cycles can arise are discussed along with implications to CCG activity and cost planning. The issue as to whether the transfer of 10% of follow-up costs into the price of a first outpatient attendance could lead to increased financial instability, for those specialties where cycles are an important part of the long term trends, are investigated.

This article uses data from two periods, the first covering 1997/98 to 1993/94, is before the introduction of guaranteed maximum outpatient waiting times, and was largely associated with referral demand curtailed by limited outpatient capacity and is before the major reforms designed to increase efficiency in the NHS. The second is from 2000/01 to 2010/11 and covers the period of guaranteed maximum waiting times, i.e. demand is not restricted by capacity, and is during an era of increasing focus on NHS efficiency.

Cycles in Healthcare

The existence of cycles in healthcare receives very little attention in health policy or the forecasting of activity and costs in commissioning (Jones 2009a-c). It has recently been highlighted that cycles are an intrinsic part of the high financial risk in commissioning (Jones 2012b-h). The word 'cycle' is used in its broadest sense for any undulating phenomena which does not arise from simple statistical randomness. The following discussion of the potential basis for cycles in health does not in any way imply that they take precedence over genetic and lifestyle factors in disease but rather that they sit on top of these and probably act via the role of the environment on epigenetics and gene expression (Ralston 2008, Tait et al 2008, Barrero & Belmonte 2011) or via direct effects such as the role of ambient temperature on the viscosity of blood, etc.

Up to the present, population demographics, the ageing population, has been largely assumed to forecast the changes which will arise in any short to medium term forecasts used to commission health services (Jones 2012b). Over relatively short time scales these tend to give straight line projections. However as can be seen in Figure 1 a series of cycles in births underpins the fundamental basis for demographic trends. These cycles originate from the World War I and II baby booms. For example, births after WW II reached a maximum of 83,000 per month in March of 1947. These children then grow and give birth to the next generation at roughly the same time leading to another maximum of around 77,000 between March 1963 to 1965 and yet another around 61,000 between June 1990 and July 1991, etc. The maximum number in each peak has declined due to a general reduction over time in the total number of children born to each mother and the broadening of the peak due to the fact that not everyone has children at the same age (Jones 2012a).

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Each cohort grows older and reaches end of life at roughly the same time. The March 1947 cohort of births had their 65th birthday in 2012 while the March 1963 cohort will be reaching 65 in 2028, etc. These peaks in births create a series of peaks and troughs in the corresponding deaths associated with each cohort. Hence the World War I baby boom which peaked in 1920 lead to higher deaths for 80 year olds in 2000 and 90 year olds in 2010, etc. This knock-on relationship with death is important because it is the approach of death *per se* rather than chronological age which is a major driver of higher health and social care costs (Jones 2011a,b).

Hence while these long term birth cycles which are about 18 or more years apart may, at first, appear to be too long to have any influence on the planning around short term health care activity and costs it should be noted that a series of other health related cycles are superimposed upon the birth cycles. The first of these cycles is the approximate 11 year cycle which relates to the solar flare or solar magnetic activity cycle, i.e. around 5½ years from peak to trough. In this respect, the solar cycle (or year of birth) is known to influence longevity, gender ratio at birth, susceptibility to certain diseases and mental health conditions, incidence of certain types of breast cancers and a cycle in physiological measurements such as temperature, pulse rate, blood pressure, etc (Davis & Lowell 2004a,b, 2006, 2008, 2009, Hrushesky et al 2011). While the solar cycle is not a strong cycle and the magnitude may depend on latitude it illustrates the subtle and complex nature of the expression of health.

In the life insurance industry these birth cohorts, i.e. the year in which a person was born, play a major role in the expression of life expectancy and cyclic behaviour is very commonly observed (Willets 2003). Infectious diseases, various cancers and circulatory, digestive, respiratory system disorders have all been shown to have strong birth cohort effects (Willets 2003). For deaths occurring between 1961 to 2007 strong cohort effects were observed in the data for England and Wales but occur to a lesser extent in Scotland (Forfar 2009) indicating that both environmental and social factors are probably involved.

Imposed on the birth cohorts are additional condition-specific cycles which arise from the interaction between the environment (weather, air quality, infectious outbreaks) and health. Hence trauma admissions follow a set of cycles which are location specific and depend on poorly understood interactions between different weather parameters (Jones 2006b, Rising et al 2011). Temperature has a profound effect on many disease conditions (McMichael et al 2006, Hess et al 2009) and the cycle of global warming is important with a minimum in the longer term cycle occurring around 1880 and a series of local maxima at approximately 20 year intervals occur during the rise in temperature since the 1880's, although the exact pattern depends on hemisphere and latitude (Goddard Institute for Space Studies 2012). Outbreaks of salmonella poisoning have been demonstrated to align with local temperature conditions (Castronovo et al 2009).

Infectious diseases likewise show cyclic behaviour which are unique to each disease and depend on complex interactions between the vector population dynamics (other humans, insects, rodents, etc) and acquired immunity in the host population (Koelle and Pascual 2004). Hence the incidence of syphilis follows an approximate nine year cycle while the incidence of gonorrhoea is not cyclic since there is no acquired immunity (Grassly et al 2005). In this respect a set of particular medical diagnoses appear to follow an approximate five to six year cycle with the commencement of each cycle initiating an approximate 15% increase in medical emergency admissions and GP referrals to particular specialties (Jones 2010a,b, 2012e,h-k).

Finally, the more widely recognised seasonal cycles contribute yet another layer of undulations into the behaviour of a multitude of diseases and conditions (Fleming et al 1991, Allan and Douglas 1994, Kelly-Hayes et al 1995, Manfredini et al 2010). The 12 month average line illustrates this point in Figure 1 where the undulations are due to the fact that seasonal cycles are themselves erratic since the wider seasonal environment is far from static and in turn influences human health, behaviour and hence conception (Jones 2009a,c, 2010d).

In summary, cycles in births create peaks and troughs in cohorts of same aged persons who are subject to differential susceptibility to particular conditions by virtue of year of birth in the solar and other cycles and this susceptibility (along with lifestyle, occupation and other risk factors) is then challenged/exploited via a multitude of environmental, weather patterns, infectious outbreaks and imperfect seasonal cycles. The key point being – never assume that the trends are supposed to be linear, since, for the most part, they are likely to show peaks and troughs which are outside of the range set by underlying statistical scatter (Jones 2006b).

It would appear that human health is far more intricately linked to the environment than is widely appreciated and that such linkages lead to cycle-like increases in patients presenting to their GP with particular symptoms and of their severity. It is also worth noting that the elderly are far more susceptible to changes in the environment. This is part of what is called mosaic ageing, i.e. changes in the environment pose a greater challenge to weakening body systems (Walker & Herndon 2010).

The Trends

Having established a framework within which we can understand the non-linear behaviour of various healthcare trends it is now appropriate to study the long-term trends in the follow-up rate in a number of specialties. In this respect Table 1 and Figure 2 summarise some of these trends. The first observation is that for most specialties the largest part of the reduction in the follow-up rate occurred up to 1993/94. Over half achieved above a 30% reduction in follow-up rate in the first five years compared to the overall 24 year reduction and more than half had achieved greater than a 60% reduction by 2000/01. Following this initial rapid reduction, Table 1 shows that many specialties are only achieving small percentage change in the more recent years and a minority (in decreasing order – Rehabilitation, Nephrology, Respiratory/Thoracic Medicine, Clinical Oncology/Radiotherapy, Orthodontics, Ophthalmology and Cardiology) appear to be showing a trend to higher rather than lower follow-up rates – although this is discussed further later. This may be partly to do with the point at which the measurement, in this case financial year totals, is made within the context of the larger cycles. For the full list of around 80 specialties the most recent three to four year trend (% change per annum) in the ranked series ranges from -4.0% (lower quartile), -0.4% (median) to +2.2% (upper quartile). Around 20% of specialties lie within 0.0 ± 0.5%, i.e. no significant change and for the total of all specialties the slope over the last four years is + 0.2% per annum, i.e. a slight trend upward rather than downward.

Figure 2 also illustrates a common feature of these trends in that, in many instances, they have continued in a broad trend with declining rate of change over time, i.e. reduction ad infinitum is not possible. This trend has continued despite policy shifts, changes in commissioners and multiple health service re-organisations. Whether altered health service priorities would have made any change in the trajectory is therefore open to debate.

The specialties displayed in Figure 2 were chosen because of their relative absence of cycle-like movement since the aim was to illustrate the long term trends rather than to focus on cyclic behaviour. However, the final point to be made from Figure 2 is the existence of cycle like movements in the follow-up rate around the long term trend line which is evident in Ophthalmology with minima in 1987/88, 1992/93, 2000/01 and 2007/08. Such movements are explored further in Figure 3 where a group of specialties with more pronounced cycle-like trends have been selected. As can be seen the trends in some specialties are more difficult to predict and in some instances may include a contribution from changes in the management of long term conditions overlaid onto the environment-induced patterns.

Cycles in Follow-up Rate

To understand the issues behind the cycles in follow-up rate it is essential to understand the inherent ambiguity in GP diagnosis where 50% of initial patient diagnosis remains a description of symptoms (Fink et al 2009). This ambiguity then influences the false positive referral rate such that at times of higher ambiguity (due to any of the cycles discussed above) the rate of discharge back to the GP at first outpatient attendance will increase leading to a corresponding reduction in the follow-up rate (Jones 2006a). Given that sudden increases in GP referral for particular specialties are known to occur (Jones 2012h,k) it is important to look for the points in Figure 3 where there will be a matching decline in the follow-up rate leading to cyclic minima which then climb back up to reach a maxima as GP referral eventually stabilises.

The underlying basis for this behaviour is illustrated in Figure 4 where the trends in first and follow-up attendance in Dermatology are presented. There are several points which arise from this figure. Firstly, 2005/06 represents what is termed a 'spike' year (Jones 2009a,b) where a congruence of environmental factors generates far higher than normal GP referral in a single financial year. The timing of the congruence of environmental factors is important, since if it spans two financial years the 'spike' will appear as a smaller 'hump' in the longer term trend. For this reason commissioners should always follow the trends at monthly level when seeking to understand what may at first appear to be abnormal behaviour.

As has been discussed above, the level of follow-up appointments and hence the follow-up rate is contingent on the trend in GP referral (first attendance) and the rate of false positive referrals. Dermatology has been noted to be one of a number of specialties where GP referral appears to raise and fall in parallel with inpatient admissions to the medical group of specialties with the onset of these changes linked to an event which leads to a localised increase in the number of excess deaths (Jones 2012j). This behaviour appears to spread across the UK in a manner consistent with that of an infectious spread and remains an area which is poorly understood (Jones 2012h,j). Such lack of understanding in no way diminishes its potential for the creation of very large cost pressures (Jones 2012b). Figure 5 illustrates the impact of this spread across England where introduction of the presumed infectious agent occurs around April/May of 2007 and is fully transmitted by around January 2009 (Jones 2012h,j). Note that there will be a lag in the line describing the follow-up rate due to the average time between first and follow-up attendance. The slow spread across England results in a step increase in GP referrals at a local level and the sum of these local step increases can be seen in the totals for England as a progressive increase in the number of first attendances (all specialties) with associated reduction in the follow-up rate. First attendances (GP referral) then reach a new but stable higher level (as also seen in Scotland and Wales) while follow-up attendances then drift back to the original rate seen before the event. The fact that the follow-up rate reverts back is indicative that the fundamental increase in GP referral is to a large degree appropriate, i.e. there is something wrong with the patients and not the GP referral process per se.The use of financial year totals would otherwise disguise the subtle trends occurring within this time period and may lead to incorrect conclusions and hence to inappropriate activity and cost forecasts, hence the uncertainty in the analysis see in Table 1 for the apparent trends in recent years.

Statistical Scatter

The possibility that the cycles and spikes are arising from simple statistical scatter can be excluded since the 95% confidence interval for the follow-up rate is less than ± 0.008 for the upper quartile of specialties ranked by size (84% of all attendances), ± 0.03 for the median (comprising 98% of all attendances) and ± 0.08 for the lower quartile (0.4% of all attendances). The numbers involved are simply too large for statistical scatter to play a significant role. However at the far smaller CCG local level and for contracts with individual providers statistical scatter in the follow-up rate will become of increasing importance and as such the 95% confidence interval for statistical scatter should be clearly defined in contracts. An estimate of the impact of any spike and cyclic factors should also be included as an aid to discussion around any apparent deviation from contract. This is especially relevant where the 'cycles' make it difficult to predict what will happen to the follow-up rate in the future.

NHS Data Definitions

Prompt 'follow-up' after discharge for conditions such as heart failure is known to reduce re-admission rates (Hernandez et al 2010); however, the proportion of patients followed up after admission for cardiovascular or cerebrovascular disease seems to have little effect on re-admission rates (Rayner et al 2002). The cycle of approximate 15% step-increases in medical emergency admissions and A&E attendances (Jones 2010c, 2012h) therefore has a potential knock-on effect to the apparent rate of follow-up attendance. This comes via the NHS definition of a first or follow-up attendance (see http://www.connectingforhealth.nhs.uk/systemsandservices/data/nhsdmds/faqs/cds/outpatact/firstattend) and results in many consultant outpatient 'follow-up' visits subsequent to an unplanned admission or A&E attendance being counted, as per the NHS definition, as a ***first*** outpatient attendance. Depending on the condition this may act to reduce or increase the follow-up rate. Consultant follow-up after a surgical emergency admission is likely to result in one such first attendance and no subsequent follow-up attendances while in a medical context subsequent follow-up attendances may arise. The follow-up rate for outpatient attendances to the specialty A&E subsequent to an A&E attendance is only 0.6 although as expected this shows evidence for cyclic trends. This suggests that GP commissioners should track the follow-up rate for GP and other referral types as separate entities and any contract between commissioner and provider should allow flexibility in the expected follow-up rate.

Policy Implications

Commencing in 2008/09 the Department of Health (England) decided to use the outpatient tariff as a means of increasing ‘efficiency’. Paragraph 45 of the PbR guidance states (DH 2007):

“In order to provide incentives to minimise follow-ups, where these are not necessary, the tariff has been structured to 'front-load’ the reimbursement so that follow-ups have a relatively low reimbursement rate compared with a first attendance. This front-loading has been set at 10% of the follow-up costs. This means that 10% of the costs of follow-up attendances have been added to the first attendance costs making the tariff for first attendance relatively higher”.

Inspection of Figure 1 and Table 1 shows that the bulk of the reduction in national follow-up rates occurred prior to 2000/01 and that by 2008/09 most specialties had levelled out to very low levels of change. It is possible that the DH was aware of this very fact and decided to kick-start further decline via the front loading of the first attendance price. As at 2010/11 this policy seems to have had no discernable effect on follow-up rates. What is more concerning is that such a policy increases the cost sensitivity of the NHS to the existing cycles in first outpatient attendance and knock-on effect to follow-up rates. As stated the cycles appear to increase first attendances more so than follow-up and this policy therefore magnifies the net cost effect of any cycle, as is illustrated in Figure 5. Indeed the fact that prices are based on cost data which is from three years prior also has the ability to magnify the peaks and troughs for any cycle which is around six year duration, i.e. costs from the minimum point in the cycle are translated into costs in the maximum point in the cycle and vice versa (Jones 2012b).

Conclusions

In general, the national trend in follow-up rates appear to have reached a point of small incremental change and in these circumstances fluctuation in the follow-up rate due to spike events and cycles have a greater effect on apparent ‘efficiency’ than is widely appreciated. None of this precludes the need for genuine reduction in follow-up rates where they are excessive (within the context of needing to train junior doctors), although the two are separate issues arising out of different root causes. It would also appear that the forecasting of health services activity and costs is orders of magnitude more complex than has hither to been acknowledged. The Clinical Support Units (CSU) set up to support GP Commissioning in England will need to be able to demonstrate adequate competence in the construction of realistic activity and financial forecasts along with upper and lower confidence intervals. Simplistic forecasts assuming a continuous trend downward are no longer an acceptable or reliable methodology.

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Table 1: Change in the ratio of follow-up to first attendances

Specialty	Follow-up per first		Change over time			
	1987/88	2010/11	to '93/94	to '00/01	to '10/11	Recent (per annum)
Rehabilitation	5.39	4.21	+51%	+18%	-22%	17.2%
Nephrology	14.72	8.76	-11%	-32%	-40%	2.9%
Respiratory/Thoracic Medicine	4.07	2.28	-10%	-16%	-44%	2.7%
Clinical Oncology/Radiotherapy	8.94	7.95	-13%	-28%	-11%	2.6%
Orthodontics	6.87	8.51	-8%	-10%	+24%	2.6%
Ophthalmology	3.87	2.6	-12%	-27%	-33%	0.9%
Cardiology	4.67	1.53	-21%	-45%	-67%	0.8%
Dermatology	2.17	2.2	-10%	-15%	+1%	0.4%
Anaesthetics	4.2	2.43	-22%	-35%	-42%	0.3%
Rheumatology	3.91	3.95	-9%	-4%	+1%	0.0%
Ear, Nose & Throat	2.01	1.36	-9%	-23%	-33%	0.0%
Neurology	2.22	1.45	-16%	-26%	-35%	-0.1%
Gynaecology	2.08	1.4	-13%	-31%	-33%	-0.2%
Urology	2.6	2.17	-17%	-17%	-16%	-0.4%
Clinical Immunology & Allergy	1.45	1.63	0%	+12%	+16%	-0.5%
Accident & Emergency	3.07	0.6	-54%	-63%	-80%	-0.5%
Trauma & Orthopaedics	2.82	1.86	-14%	-30%	-34%	-0.6%
Plastic Surgery	3.29	2.53	-18%	-24%	-23%	-2.0%
General Surgery	2.2	1.4	-14%	-27%	-37%	-2.2%
Gastroenterology	3.83	1.95	-12%	-39%	-49%	-2.2%
Paediatrics	4.46	1.92	-18%	-39%	-57%	-2.4%
Endocrinology	9.59	4.04	-25%	-41%	-58%	-2.9%
Oral Surgery	2.37	1.14	-24%	-35%	-52%	-2.9%
General Medicine	5.5	2.37	-16%	-38%	-57%	-3.4%
Geriatric Medicine	5.31	1.65	-15%	-40%	-69%	-3.5%
Clinical Haematology	17.75	9.87	-5%	-21%	-44%	-3.8%
Genitourinary Medicine	2.1	0.53	-5%	-30%	-75%	-4.8%
Audiological Medicine	1.54	1.03	+40%	0%	-33%	-7.6%
Haematology	13.66	8.5	+26%	+18%	-38%	-8.8%

Footnote: Since the rate of decline in most specialties appears to reach a minimum in either 2007/8 or 2008/09 the most recent change has been calculated as the minimum value of the slope over the last three or four years divided by the average ratio over these years.

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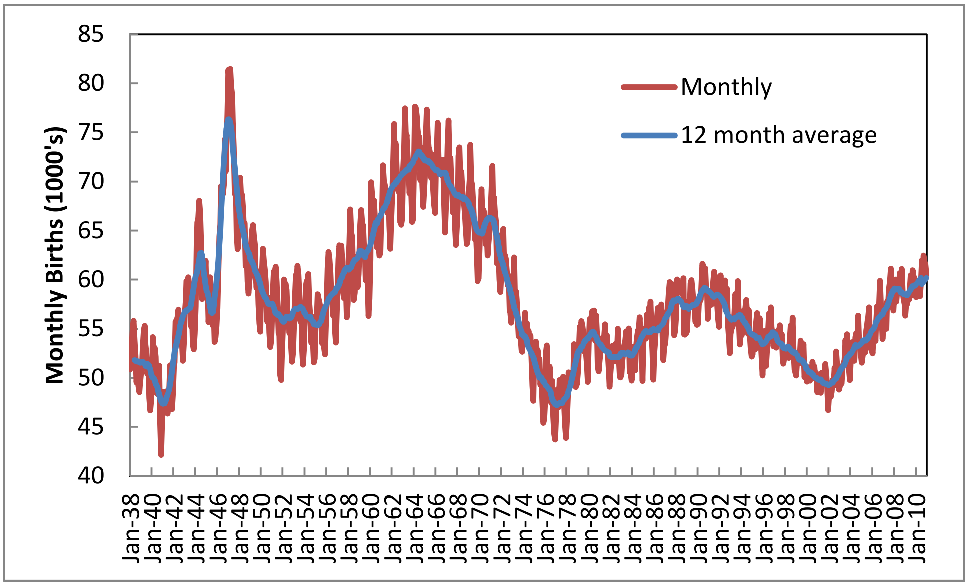
Figure 1: Trend in Births



Footnote: Monthly live births in England & Wales were obtained from the Office of National Statistics and adjusted to equivalent births at 30.42 days per month. This reduces scatter in the chart due to different number of days per month.

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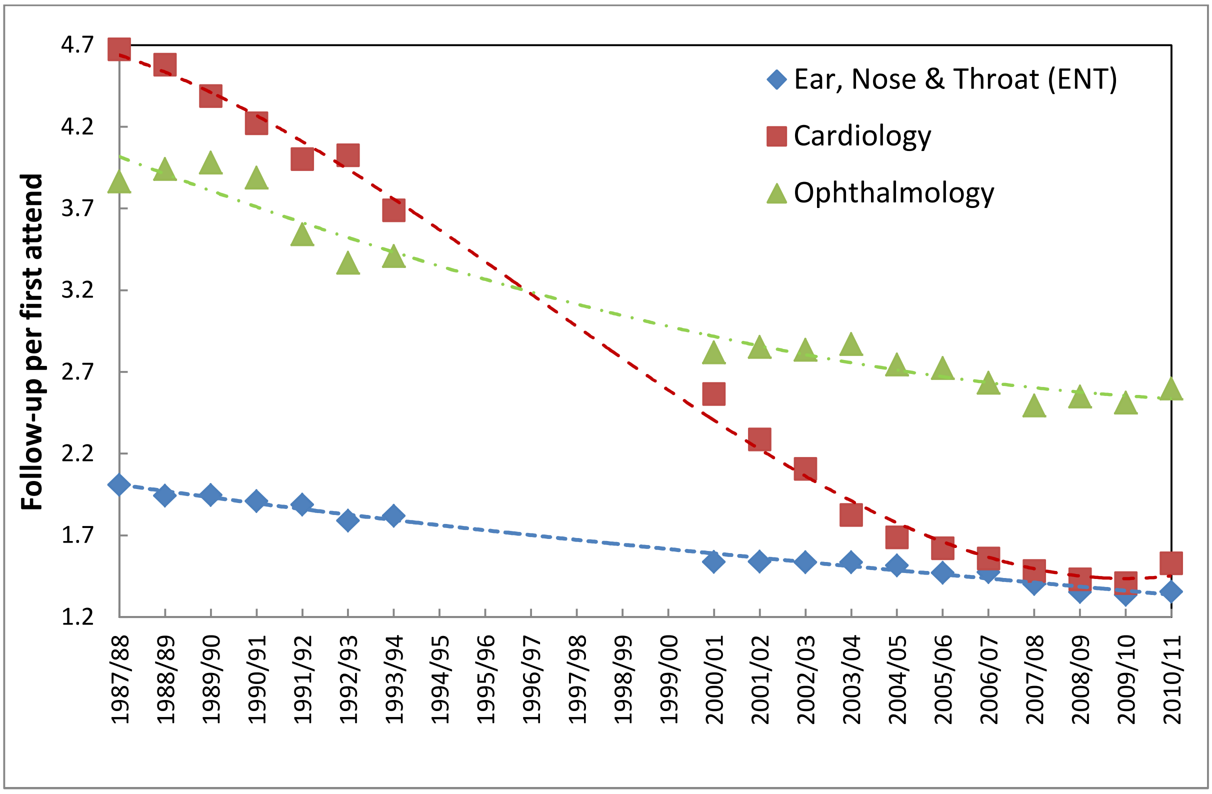
Figure 2: Trend in follow-up to first attendances



Data covering various years is from former paper-based Korner statistics KH09 (1987/88 to 1993/94) while for 2000/01 to 2002/03 (http://www.performance.doh.gov.uk/hospitalactivity/data_requests/outpatient_attendances.htm) and 2003/04 to 2010/11 (http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=890)

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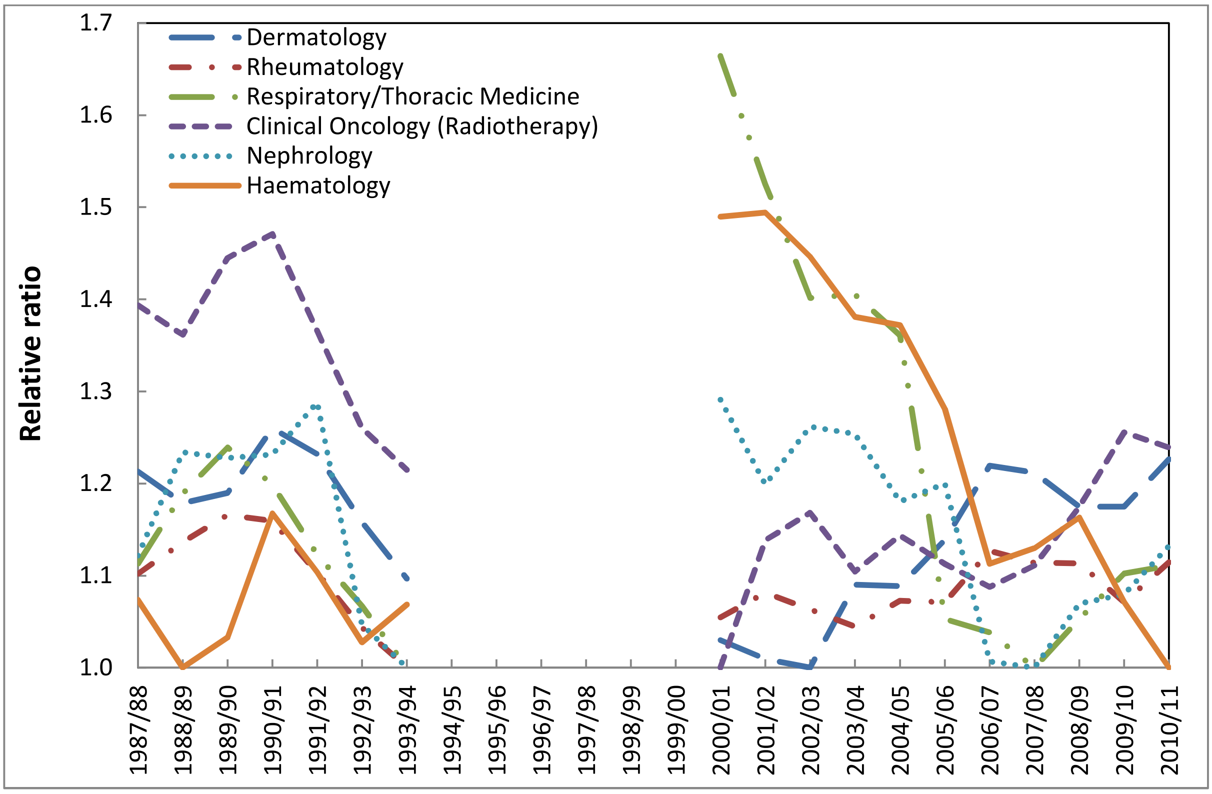
Figure 3: Trend in follow-up rate



Footnote: In order to remove the bulk of the long-term changes the follow-up to first attendance is relative to the minimum value in the 1987/88 to 1993/94 and 2003/04 to 2010/11 time periods for Respiratory Medicine, Nephrology and Haematology while for the other three specialties, it is relative to the minimum over the entire period.

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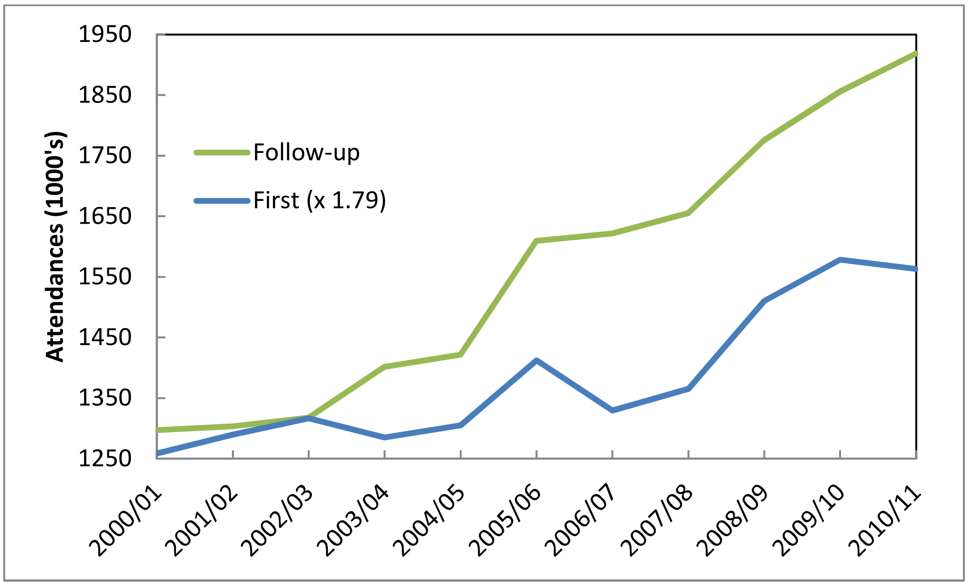
Figure 4: Trends in attendance for Dermatology



Footnote: Data source as per Figure 2.

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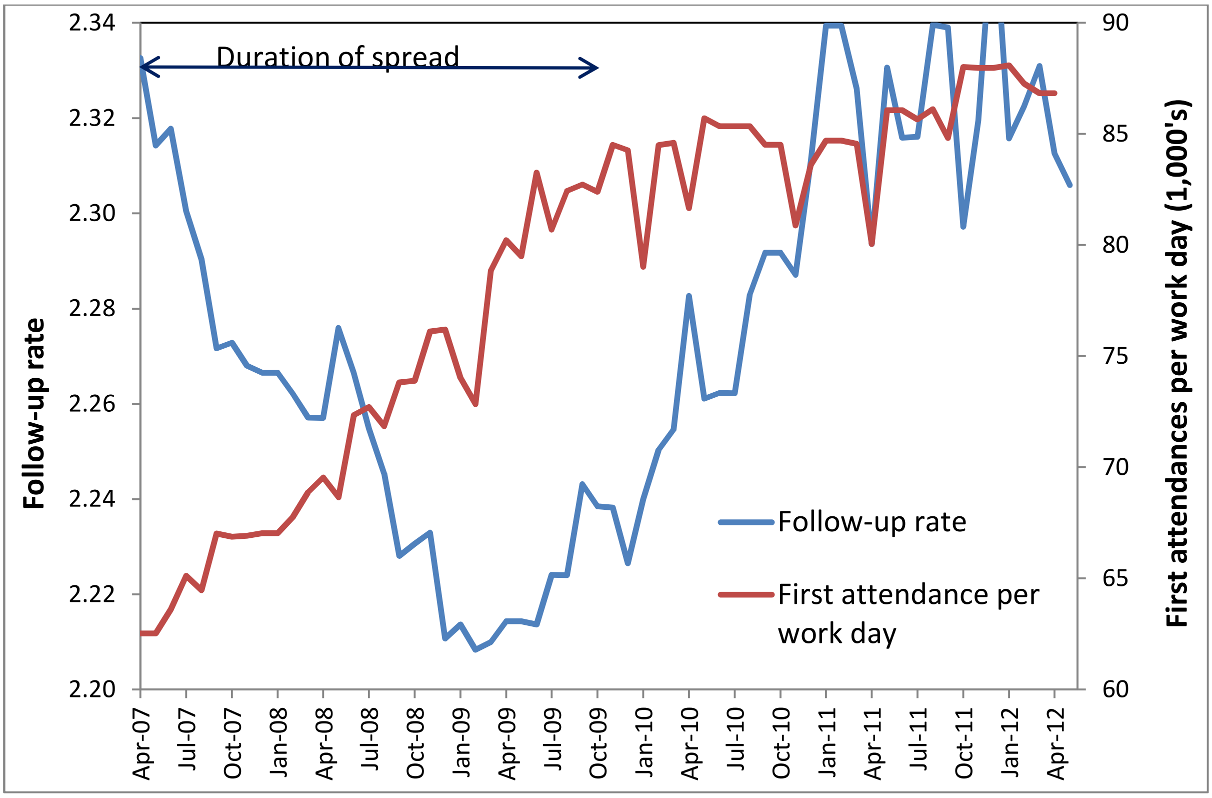
Figure 5: Trend in the all specialty first attendance and follow-up rate



Footnote: Data is from http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1130 and has been adjusted for a month of the year profile in the follow-up rate. The monthly adjustment factors were calculated using the Solver function in Microsoft Excel by minimising the sum of the absolute difference between each successive adjusted rate. First attendance was divided by work days per month and monthly adjustment factors were calculated as above.