

Rapid review of Northern Ireland Health and Social Care funding needs and the productivity challenge: 2011/12-2014/15



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Executive summary

The macroeconomic context and impact of the 2010 Spending Review

- The global financial crisis and ensuing recession have left national finances in considerable imbalance. Correcting an unsustainable debt and deficit position has entailed increases in taxation and severe cuts in public spending.
- BY 2014/15, the 2010 spending review plans cuts in departmental spending of around 11% in real terms (in addition to cuts in welfare benefits).
- Spending cuts have not been spread evenly, with health care in all four territories of the UK being 'protected' to varying degrees relative to other spending areas.
- Spending changes for personal social services over the next four years across the UK are less certain, due to local spending decisions by councils in, for example, England.
- The latest Budget for Northern Ireland suggest health and social care will receive a real cut in its budget by 2014/15 of around 2.7%. This compares to a real cut of around 0.25% (more if social care is included) in England, a real cut of around 7.9% in Wales (by 2013/14) and, for next year at least, a real cut of 2.9% in Scotland (not including social care).
- All health and social care services across the UK thus face one of the most severe funding situations since the Second World War.

Funding needs for Northern Ireland 2010/11 - 2014/15

- The judgement of this review is a needs differential for Northern Ireland relative to England of +9%
- The difference in additional funding due to the choice of additional need for Northern Ireland relative to England is relatively small; every 1% additional need translates into £11 million to £15 million additional funding by 2014/15 as the additional needs factor is applied to the marginal growth in funding not the entire Northern Ireland spend.
- Using 2007/8 as a base year, updating three relative needs models used by the 2005 Appleby review and applying Wanless 2002 future funding recommendations to Northern Ireland suggests funding of between £5,327 million and £5,913 million by 2014/15 (at 2010 prices, or £5,886 million and £6,533 in cash terms) depending on the relative additional needs and Wanless scenario across all three models.
- Using 2010/11 as a base year, funding requirements in 2014/15 would be £5,067 million and £5,377 million in real terms (£5,608 million and £5,941 million in cash

terms) depending on the relative additional needs and Wanless scenario across all three models

- On the basis of additional needs of +9%, required funding by 2014/15 is projected to be between £5,360 million and £5,790 million (£5,923 and £6,397 million in cash terms) depending on the Wanless scenario adopted.

The funding gap for Northern Ireland

- Compared with the latest Budget proposals for Northern Ireland, the gap with funding suggested by Wanless and a +9% needs differential will amount to between £1.1 billion and £1.5 billion depending on the Wanless scenario.
- If, however, Northern Ireland had received the same funding increases as the English NHS from 2007/8 to 2010/11 (and the equivalent SR 2010 settlement as the NHS to 2014/15) then the funding gap would be between £0.7 billion and £1.1 billion.

The productivity challenge

- Derek Wanless's funding recommendations for health care across the UK were dependent on the NHS achieving certain levels of productivity improvements. These amounted to between 12% and 20% between 2007/8 and 2014/15 depending on the Wanless scenario.
- Re-analysis of the funding gap calculations incorporating Wanless's productivity assumptions suggests -relative to the Budget for Northern Ireland - a combined funding/productivity gap of between £2 billion and £2.1 billion (on the basis of a needs differential of +9%.)
- Even if health and social care were to receive funding in line with Wanless's recommendations, this would still leave a need to achieve the productivity gains inherent in his recommended funding levels. Depending on the Wanless scenario, these would amount to between £576 million to £892 million by 2014/15 at today's prices for the +9% additional need judgement.
- Overall, the £2 billion productivity challenge facing the Health and Social Care System represents the unmet funding gap **plus** the value of the Wanless productivity assumption. It is essentially an indication in monetary terms of the additional value for money that DHSSPS would have to generate to deliver a modern, sustainable health service in 2014/15 in line with Wanless' 2002 'vision' for the system.
- A broad disaggregation of the value of the productivity gain based on Wanless's 'vision' for future health care services under his Solid Progress scenario suggests that over half the combined funding/productivity gap will need to be closed by: gains in quality, around 9% in responding to demand pressures, around 16% to improving

waiting times, capital infrastructure and clinical governance and the remainder (17%) to real increases in pay and prices.

- Cutting production costs will be part of the task of achieving productivity gains - but largely as a means of freeing resources for higher value activities. However, more importantly, closing the Wanless funding gap requires improving the quality of care received by patients - improving health outcomes, reducing negatively valued attributes of care such as long waiting times etc - but within the constraints of future budgets.

System performance overview

- A system-wide measure of productivity for the Northern Ireland NHS suggests a small increase of productivity between 2005/6 and 2008/9 of just 1% - achieved largely from one year's slow down in input growth rather than growth in outputs over inputs.
- Applying England's unit HRG costs to Northern Ireland activity reveals large 'excess' costs of production: Provisional data for 2009/10 shows: Elective inpatients, 16% excess costs; non-elective inpatients, 29%; day cases, 5%. Overall, costs were around 22% higher.
- There is considerable variation across providers when applying England's unit costs to their activity. Some hospitals appear to incur more than twice the cost that would be expected if they operated at England's unit HRG costs for elective inpatients.
- The total estimated 'excess' cost for elective and non-elective inpatient and day case activity was around £126 million in 2008/9.
- Accurate comparative data on workforce productivity has been difficult to produce. However, indicative data suggests Northern Ireland produces between 17% and 30% less inpatient, outpatient, day case and A&E activity per head of HCHS staff than England.
- Northern Ireland has over 20% more acute beds than England, but these are used less intensively; throughput per bed is around 25% lower than that achieved in England. Patients also stay in hospital around 28% (1.2 days) longer than patients in England.
- Waiting lists for inpatients and outpatients are now rising rapidly since significant falls from 2006 to 2009.
- Around 5,900 patients are waiting over half a year for admission to hospital as an inpatient and over 10,000 are still waiting over half a year for their first outpatient appointment.

- Pharmaceutical costs have risen faster in Northern Ireland than anywhere else in the UK between 2006 and 2009 - net ingredient costs per head of population have risen by over 8% and are now 40% higher than in England.
- Generic dispensing continues to improve - from around 50% in 2007 to 62% in 2009. This compares to 68% in England.

SECTION 1: INTRODUCTION

Background to this review

In 2005 a review of health and social care services in Northern Ireland was carried out at the request of the (then) Finance Minister and Health and Social Services Minister (Appleby, 2005). The aim of that review was primarily to establish future funding paths for health and social care up to 2022/23 based on Sir Derek Wanless's 2002 review of future UK NHS funding applied to Northern Ireland (Wanless, 2002). The review also examined aspects of the productivity of health and social care services and the prevailing performance management system. The 2005 review made 25 recommendations - from levels of funding and the need to measure outcomes to strategies to reduce waiting times and improve the performance management of the system as a whole (see box 1).

Box 1: Recommendations from the 2005 Appleby Review of the Northern Ireland Health and Social Care services.

- 1: In the light of suggested future funding (see Recommendation 3), in-year monitoring additions to health and social care budgets should cease other than in exceptional circumstances and solely on a one-off basis
- 2 : Over and above the need to track spending for reasons of financial probity, the main performance policy monitoring focus should be on tracking outcomes, not spending per se. A programme budgeting approach - as currently being developed in England for 23 disease/service groups- in addition to traditional accounting would be of help with this
- 3: Adopt HMT NAS model-based Wanless 'fully engaged scenario' projections as set out in Table 1 for now as best reasonable guide to future spending in NI
- 4: Further work is needed to investigate the usefulness of employing direct measures of health status (for example, as derived from instruments such as the EQ-5D) in resource allocation models
- 5: Future work on pan-UK resource allocation model would provide a more empirically-based answer to relative shares of resources. Such work should be open, and draw on extensive experience in the area of resource allocation models of research groups across the UK
- 6: If the future spending path suggested by this Review is accepted, then there needs to be some way round the implications of the Barnett Formula for health and social care if the general principle of Barnett are to be maintained and other public services in Northern Ireland are not to suffer
- 7: Routine collection of self-assessed health status data at population level would yield useful comparative data on population health status. In addition, the potential for routine collection of patient related outcome measures in health care services should be explored
- 8: On the basis of current lifestyle data, the funding recommendations based on the Wanless 'fully engaged' scenario imply considerable effort will be needed to engage the Northern Ireland population through expanded public health services and other means.
- 9: Further investigation is required of very high A&E use to explore reasons and find ways for reducing likely inappropriate use

Box 1: Recommendations from the 2005 Appleby Review of the Northern Ireland Health and Social Care services. (continued)

10: Detailed analysis is needed into hospital activity trends as part of a broader analysis of the dynamics of waiting times and lists

11: DHSSPS should develop a more coherent strategy towards partnership with private sector

12: Adopt a multi-pronged long term strategy to reducing waiting times, including long term targets (with milestones) backed by strong incentives

13: Investigate ways to reduce unit cost variations through incentive mechanisms such as tariff-based activity payment/budget setting systems

14: Further investigation is needed to explore possible of reasons for high unit costs at the Royal and Green Park Trusts

15: Investigate scope for further reductions in length of stay and avoidance of admission to hospital

16: Aim in medium term to use outcome-based productivity measures.

17: An assessment should be carried out on the implementation of the GMS contract in Northern Ireland to examine whether the actual improvements in quality outweigh the cost. In light of the finding, the GMS contract should be revised as far as practicable

18: New mechanisms involving greater use of sanctions are needed to tackle high prescribing costs and to encourage greater use of generic drugs.

19: The integration of health & social services should be re-examined with an initial first stage being the implications of ring fencing of funding for social services from the acute sector. There should however be scope for financial sanctions when inefficiency in one part of the system impacts negatively on another e.g. lack of social services provision causing delayed discharge from hospital.

20: Contracting for services from independent/voluntary organisations should be reviewed to consider whether it can be placed on a more strategic basis.

21: Further investigation is required of possible reasons for relatively low labour productivity

22: Health and social care workers in Northern Ireland should formally come under the remit of the relevant GB Pay Review Bodies: this will enable the Government's local pay policy to be implemented on an equal basis in Northern Ireland to the rest of the UK.

23: There is a need to develop an explicit performance management system with rewards and sanctions which provide enough 'bite' to encourage change and innovation in the health and social care system. There are many options for the types of incentives that could be introduced and their design for Northern Ireland. There should however be a commitment to such reform coupled with further investigation of how incentives can be strengthened.

24: Separation of the tasks of service provision and commissioning is an important factor in sharpening incentives. However, the most appropriate structures (e.g. single pan-NI commissioner; devolved GP commissioning etc) needs further investigation.

25: Alongside changes in the performance management system, there is a need to explore the development of a more transparent priority setting process at national level, together with an explicit 'NHS Plan for Northern Ireland' which sets out outcome-based targets linked to new spending paths.

Two key outcomes of the 2005 Review which in particular concern this present review are the estimates made of the relative funding needs for health and social care in Northern Ireland and the need to improve productivity (see Box 2).

Box 2: Future funding and performance: Summary from the findings of the 2005 Appleby Review

Based on an assessment of a 7% greater level of need for health and social care services in Northern Ireland compared with England, the 2005 Review suggested a number of possible funding paths to 2022/23 (see Table 1)

Table 1: Health And Social Care Spending Projections for Northern Ireland

	2002-03	2007-08	2012-13	2017-18	2022-23
Total NI Health & Social Care Spending (£ billion 2004-05 prices)					
Solid Progress	2.7	3.7	4.7	5.5	6.2
Slow Uptake	2.7	3.8	4.9	6.0	7.1
Fully Engaged	2.7	3.7	4.6	5.3	6.0
Average annual real growth in NI Health and Social Care spending (per cent)					
Solid Progress		6.8	4.6	3.1	2.7
Slow Uptake		7.0	5.4	4.0	3.5
Fully Engaged		6.8	4.3	2.8	2.4

However, there was extensive evidence of lower levels of productivity in Northern Ireland:

- Hospital activity per member of staff is 19% **lower** than the UK average.
- Hospital activity per pound of health spend is 9% **lower** than the UK average
- Hospital activity per available bed is 26% **lower** than in England
- The unit cost of procedures is 9% **higher** in NI than England with day case unit costs 9% **lower** and elective inpatient unit costs 12.6% **higher**.
- There are significant **variations** in unit costs between trusts
- Day case rates are **higher** than the UK average and have risen significantly since 1990/91.
- Length of stay has remained broadly unchanged over the past five years.
- Average unit prescribing costs are nearly 30% **higher** in Northern Ireland than in England
- Nearly one in ten of the total Northern Ireland population is currently waiting to attend for a first outpatient appointment.

Since 2005 much has changed however. The macroeconomic environment has been in upheaval with the catastrophe of the global banking crisis and the ensuing recession. The consequent need to manage down national debt and to realign government income and expenditure will have a significant impact on public spending. This became evident in the 2010 Spending Review which laid out a very difficult financial settlement in England (with consequent knock on effects for Northern Ireland). While the NHS in England has been treated relatively favourably with respect to other spending departments, virtually zero real growth over the next four years represents its worst allocation since 1948.

Similarly, the proposed budget settlement for health and social care in Northern Ireland, while comparatively favourable, suggests a real reduction in spending to 2014/15 of around 2.7% (about 0.7% per year on average). Over the last six years there have also been changes in the performance and management arrangements of Northern Ireland's health and social care services.

Given these changes and the unprecedented financial position over the next four years, it has been considered timely by DHSSPS to commission a rapid review of some selected recommendations and issues covered by the 2005 review. The terms of reference for this new review are set out below.

Terms of reference

In broad terms, the scope of the review will be the coverage of the 2005 review which considered both the needs and effectiveness of health and social care in Northern Ireland. For practical reasons and given the dominance of the immediate financial position, this review will focus on the following however:

1. An update of 2005 Review's assessment of relative need for Health and Social Care services in Northern Ireland
2. Estimation of the current and future funding 'gap' (between what is needed to run a fit for purpose health and social care system and what is available)
3. A comparison between the funding gap and the identifiable productivity gap within the system.
4. An outline of the opportunities available to fill the productivity gap through actions in different parts of the system.
5. (If time permits) an outline of the ways information systems can support this process.

Structure of report

The next section (2) briefly, but in a bit more detail, sets out the macroeconomic situation and the current position on public finances following last autumn's Spending Review

including DFP's current budget proposals for 2011/12 to 2014/15. Section 3 reports on updates of three of the models used in the 2005 review to obtain estimates of future funding for health and social care in Northern Ireland based on Northern Ireland's 'fair shares' of the growth in future UK health and social care funding recommended by the 2002 Wanless Review.

The following section (4) provides various estimates of the 'gap' in funding using the estimates of future funding needs from section 3 set against a number of actual future funding paths to 2014/15. Section 5 provides a rapid illustrative review of the system's performance and productivity, suggesting scope for improvement.

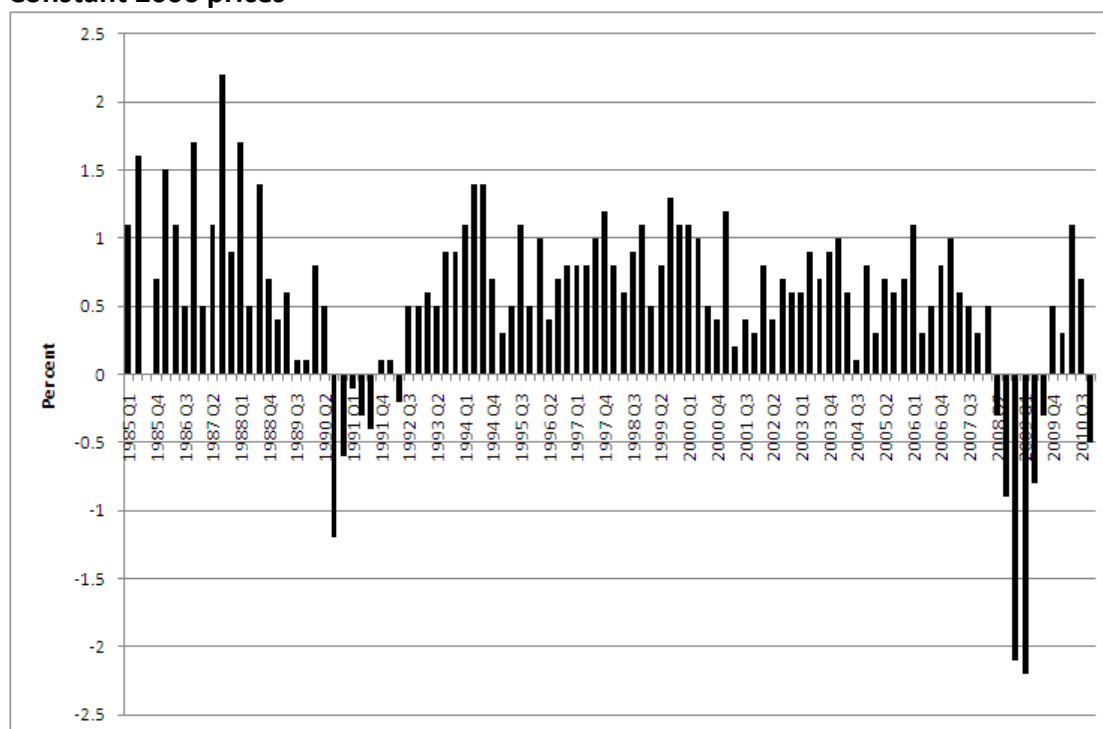
SECTION 2: MACROECONOMIC SITUATION AND PUBLIC FINANCES

The global banking crisis and recession

From the early outward signs of a collapse in the US sub-prime mortgage market in the spring of 2007, the global banking crisis unfolded. Financial institutions thought too big to fail, failed. On September 14th investors in Northern Rock withdrew over £1 billion in the biggest run on a bank in more than a century. In the autumn of 2007 more and more banks start to announce losses. In December the Bank of England cuts a quarter of a percent off interest rates - down to 5.5% - as the scale of the economic impact starts to become clear. This is followed a few months later with a £50 billion plan by the Bank to help banks facing a seizure in credit markets. By 2011, the cost of the financial support to banks and the world economy in general totalled around £7.1 trillion - a fifth of the total annual global economy (Daily Telegraph, 2009). The cost of support by UK government was estimated at around £1.23 trillion - over 80% of its annual GDP. Meanwhile, at just 0.5%, UK central bank interest rates hit their lowest level since 1694.

The economic impact of the crisis was revealed in 2008, when the Office for National Statistics (ONS) publish the second quarter GDP figures. These showed the UK economy had contracted by 0.3%. Five subsequent quarters were also negative and by quarter 3 of 2009 the UK economy had lost around 6% of economic output (see figure 1). This loss is likely to be permanent as, while the UK economy will start to grow, it is unlikely increase at a rate that would take it back to the trend it was on prior to 2007.

**Figure 1: UK Gross Domestic Product: Quarter on Quarter growth seasonally adjusted
Constant 2006 prices**

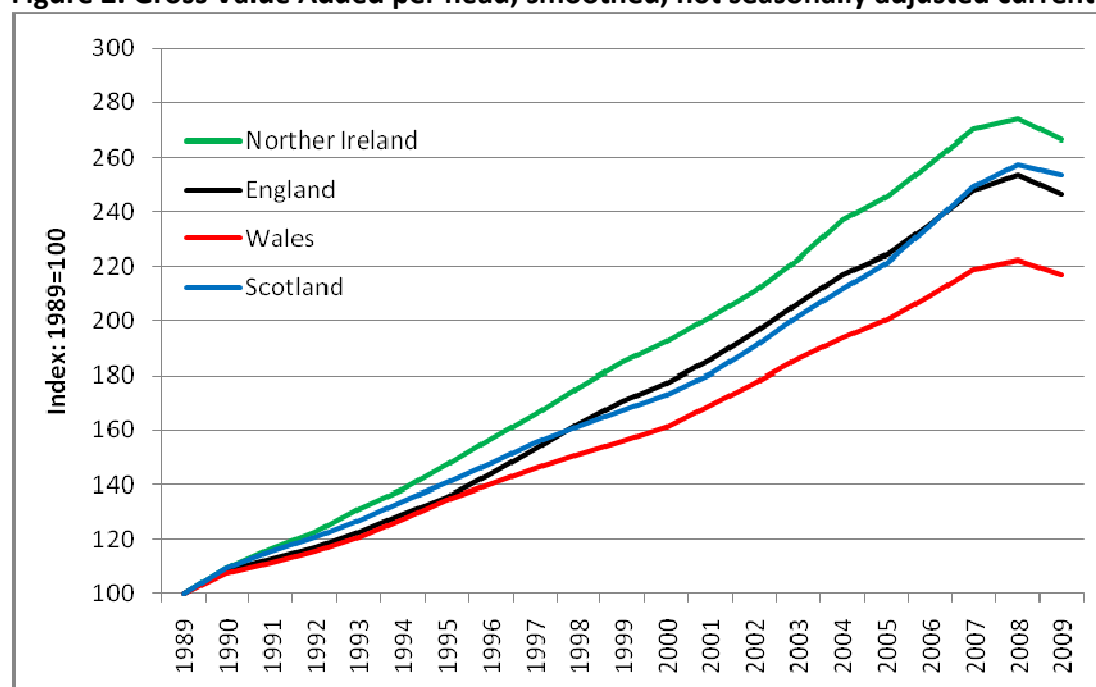


Source: ONS (2011a)

Following modest growth through 2010, the latest provisional GDP figure for the fourth quarter of 2010 suggests the economy once again began to contract - by 0.6%.

The significance of the recession is apparent at regional level too with a reduction in Gross Value Added per capita in 2009 across all four parts of the UK for the first time in two decades (see figure 2).

Figure 2: Gross Value Added per head, smoothed, not seasonally adjusted current prices

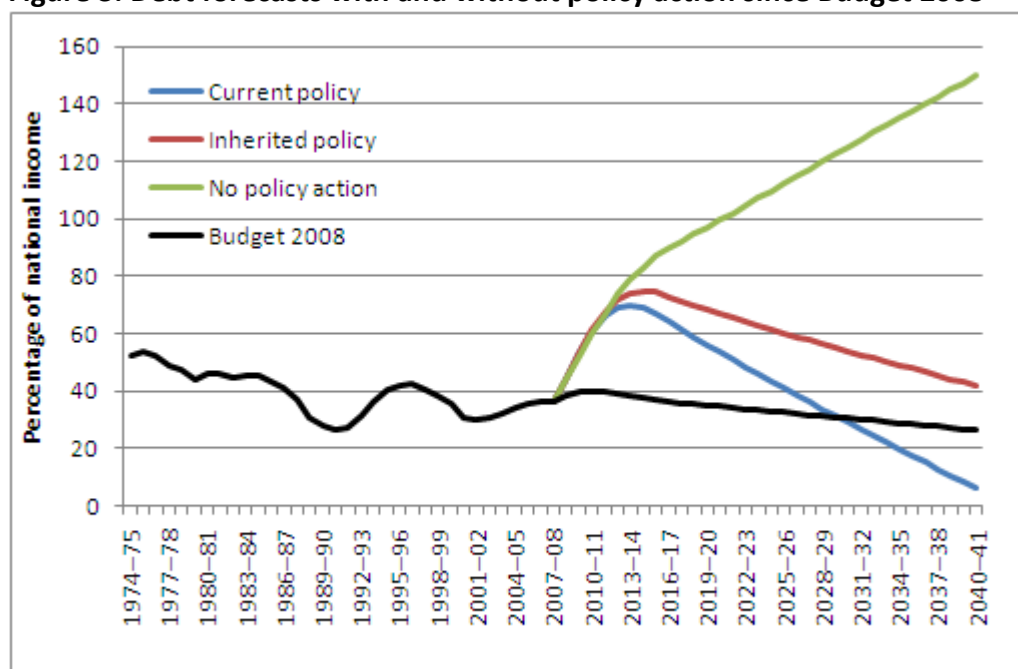


Source: ONS (2011b)

Coalition economic policy

Financing the cost of supporting the banks and the economy as well as the growing gap between revenues and expenditure has meant a growing debt for UK. While economists are not known for their unanimity of opinion, and while there is disagreement over aspects of timing, the balance between tax rises and spending cuts etc, there is near uniform agreement that growing government debt needs to be reduced to sustainable levels. As the Institute for Fiscal Studies (IFS) note in their recent Green Budget (IFS, 2011), the scale of the UK's debt without any policy action is likely to increase to unsustainable levels over the next few years - reaching 100% of GDP by 2019/20 (see figure 3).

Figure 3: Debt forecasts with and without policy action since Budget 2008

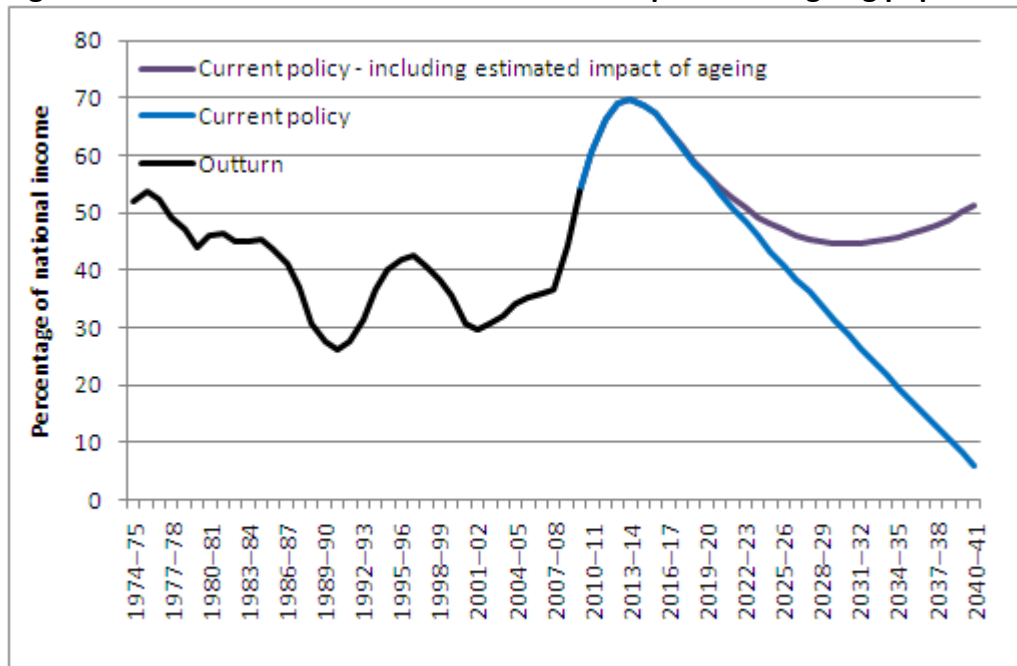


Notes: Forecasts for debt levels assume non-debt interest spending and revenues remain constant as a share of national income from 2017/18 onwards, while inflation is assumed to run at 2.7% a year and real growth in national income at 2.2% a year. Average nominal interest rates are assumed to rise from 4.1% (the level forecast in the 2010 Economic and Fiscal Outlook for the end of the OBR's forecast horizon, 2015/16) to 4.4% between 2017/18 and 2027/28. From 2027/28 onwards, nominal interest rates are assumed to remain at 4.4%. 'No policy action' ignores the direct impact of all fiscal policy measures that have been implemented since Budget 2008. 'Inherited policy' takes policy as of the March 2010 Budget.

Source IFS (2011)

It is also worth noting - as IFS do (see fig 4) - that even with current policies to reduce debt, the impact of demographic change on government spending in the longer term will be a significant issue to tackle.

Figure 4: Debt forecasts with and without the impact of an ageing population



Notes: As for fig 3 above. The forecast including the effects of demographic pressures assumes that the primary balance changes from year to year, beyond 2016/17

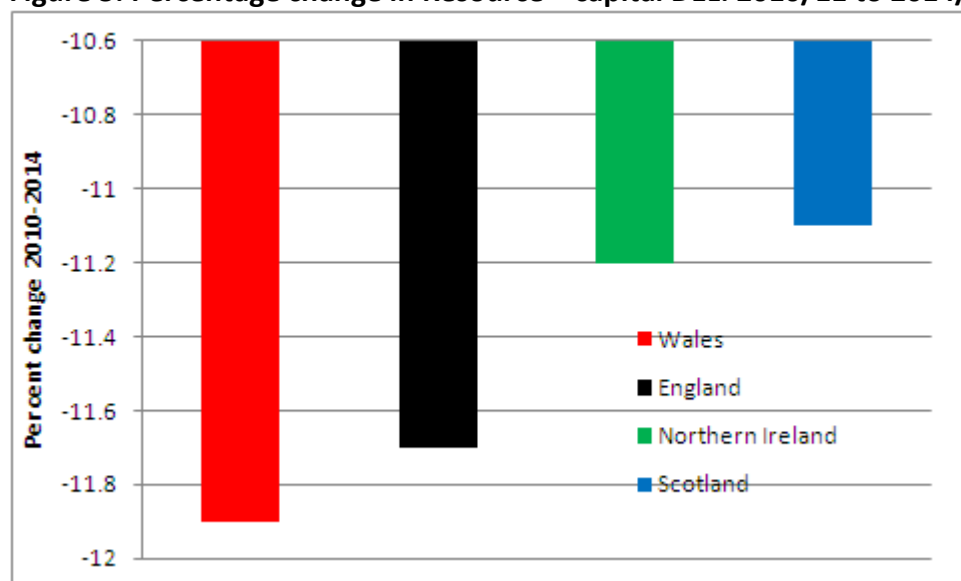
Source: IFS (2011)

Current policy to address the debt issue is essentially a combination of tax increases and cuts in public spending. On the basis of the June Budget and the 2010 spending review, IFS estimate debt will peak at around 70% of GDP in 2013/14 and then fall to the historically sustainable level of around 40% by around 2025/26.

SR 2010 and its impact

The 2010 spending review plans to reduce spending from its peak of 47.4% of GDP in 2009/10 to 39.3% in 2015/16 (HMT, 2010). This will be the most severe five year period for public spending since the Second World War (IFS, 2011). Real terms cuts in departmental expenditure limits (DELs) allocations in all four countries between 2010/11 and 2014/15 range from -11.1% in Scotland to -11.9% in Wales (see fig 5).

Figure 5: Percentage change in Resource + capital DEL: 2010/11 to 2014/15



The pain of these cuts will not be spread evenly however. In particular, in England, for example, health will receive a relative degree of protection (at the expense of other spending areas) with a very small planned real reduction of around 0.2% over the whole of the spending review period (see table 1). If the earmarked transfer of around £1 billion from the NHS budget to social care is excluded, then the English NHS faces a real cut of just over 1.1% by 2014/15. Scotland also plans - for next year at least - to protect its health spending, with a planned real cut of 2.9%. Although less than some other areas, Wales, however, plans a cut of 7.9% by 2013/14. The proposed cut of 2.7% by 2014/15 in the health and social care budget for Northern Ireland also represents a degree of protection relative to other spending areas (see figures 6 and 7).

Table 1: UK regional health budgets (Cash, £ millions)

	2010/11	2011/12	2012/13	2013/14	2014/15	Real change ¹
England						
Health ²	103,800	105,900	108,400	111,400	114,400	-0.25%
Social Care ³	24,600	25,200	25,600	25,700	25,700	-5.45%
Total	128,400	131,100	134,000	137,100	140,100	-1.25%
Northern Ireland						
Health	3,523	3,632	3,758	3,767	3,833	-1.53%
Social Care	900	874	887	906	924	-7.16%
Total ⁴	4,424	4,506	4,645	4,673	4,757	-2.70%
Wales						
Health	6,062	6,050	6,032	6,019		-7.72%
Social Care (Central funding only)	109	100	100	99		-15.53%
Total	6,171	6,151	6,132	6,118		-7.86%
Scotland						
Health	11,120	11,063				-2.94%
Social Care	Na	na				
Total	11,120	11,063				-2.94%

Notes:

1. Percentage real change based on HMT GDP deflators (http://www.hm-treasury.gov.uk/data_gdp_index.htm) and 2010/11 vs latest year for which a budget has been set

2. Spending does not include depreciation.

3. PSS for England are estimated figures

4. Excludes Fire service

Sources:

England: HMT (2010)

Northern Ireland: Northern Ireland Executive (2011)

Wales: Welsh Assembly (2011)

Scotland: The Scottish Government (2010)

Figure 6: 7th March NI Budget: Percentage real changes 2010-2014/15 by spending area

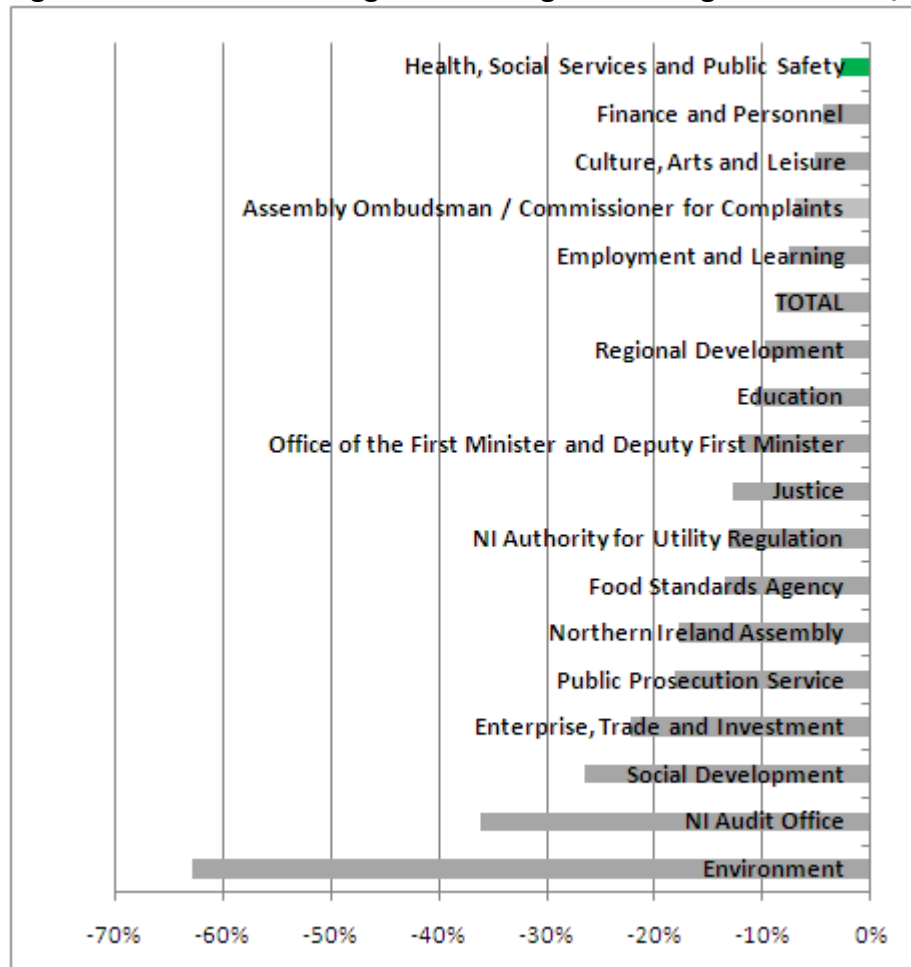
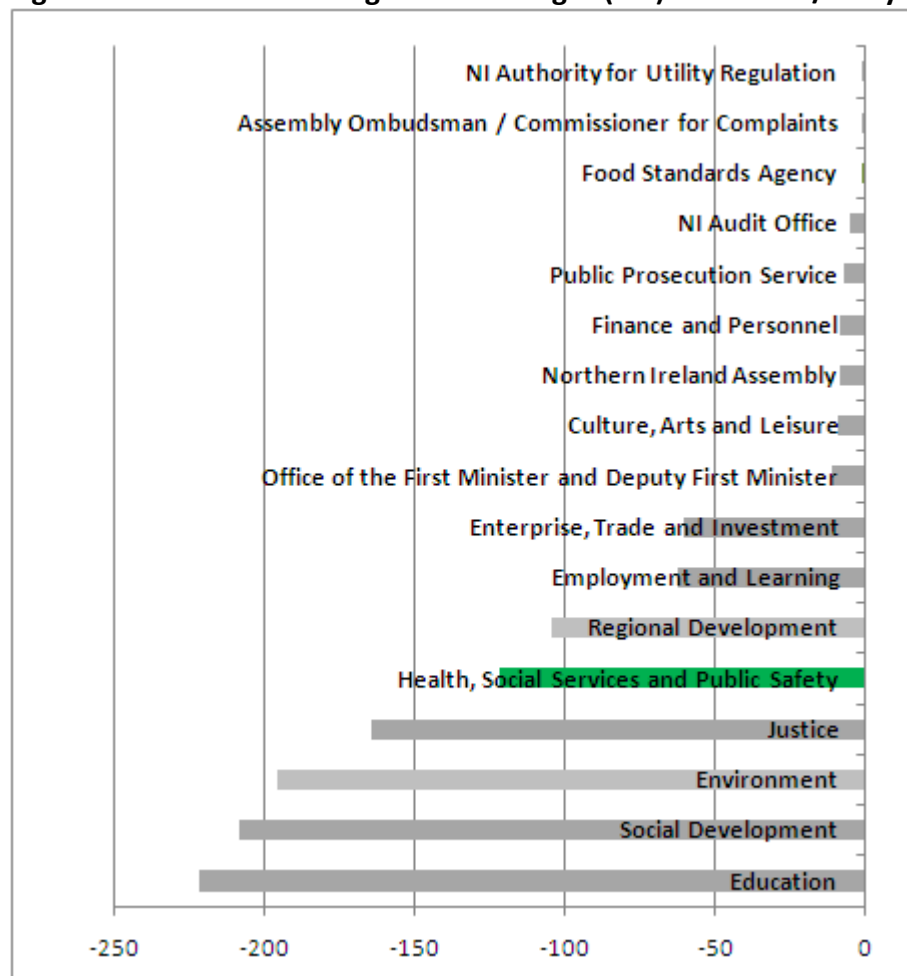


Figure 7: 7th March NI Budget: Real changes (£m) 2010-2014/15 by spending area

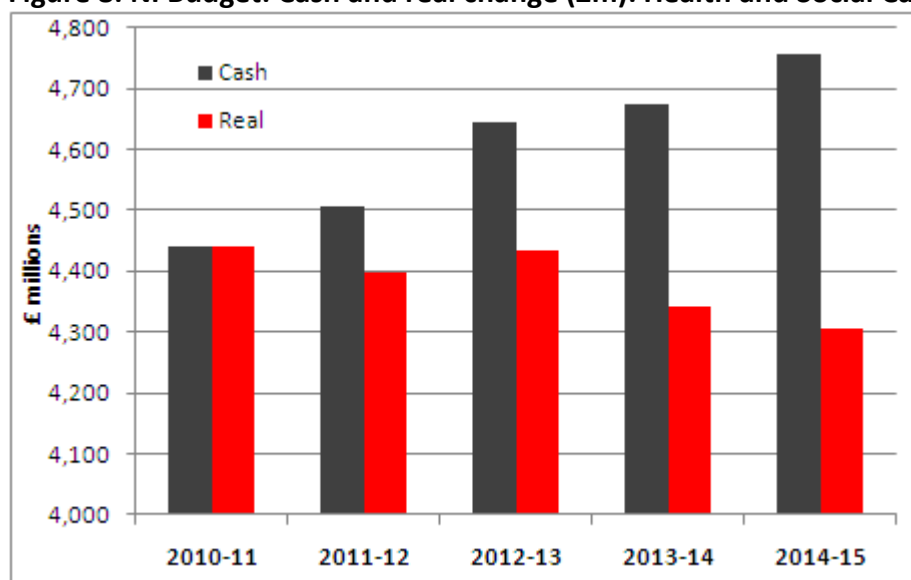


The impact of the spending review and decisions at regional level on social care spending are less clear. In Wales, the expectation is that for 2011/12, social services funds made available from the Health and Social Services Group (which do not cover all spend) will be cut by 8% in cash terms (although much of this apparent cut appears to be a transfer to another budget outside of the group). In England, while overall real cuts to local authority budgets will amount to around 27% by 2014/15, this will not necessarily translate to an equivalent cut in social services budgets as this will depend on priority decisions by individual councils. However, one expectation is a real cut of between 7% and 14% nationally. No decisions are yet known for Scotland.

While the Northern Ireland draft budget proposes a cumulative real cut of 2.7% by 2014/15, as figure 8 shows, changes from year to year vary.

It is important to note that these real changes in proposed budgets (and all real figures in this section) are calculated on the basis of a general measure of economy-wide inflation, the GDP deflator. Predictions for this measure of inflation are made by HMT (and the Office for Budget Responsibility). For various reasons - the public sector pay freeze from 2011 to 2013, the fact that NHS non-pay inflation tends to be lower than the GDP deflator (used as a proxy in forecasting non-pay inflation¹) - the real change in the health and social care budget shown in figure 8 is probably an over estimate; by 2014/15 the real cut - based on inflation specific to the health and social care services - could be nearer 2% than 2.7% - an average of around 0.5% per year rather than 0.7%.

Figure 8: NI Budget: Cash and real change (£m): Health and Social Care



Summary

- The global financial crisis and ensuing recession have left national finances in considerable imbalance. Correcting an unsustainable debt and deficit position has entailed increases in taxation and severe cuts in public spending.
- BY 2014/15, the 2010 spending review plans cuts in departmental spending of around 11% in real terms (in addition to cuts in welfare benefits).
- Spending cuts have not been spread evenly, with health care in all four territories of the UK being 'protected' to varying degrees relative to other spending areas.
- Spending changes for personal social services over the next four years across the UK are less certain, due to local spending decisions by councils in, for example, England.
- The latest Budget for Northern Ireland suggest health and social care will receive a real cut in its budget by 2014/15 of around 2.7%. This compares to a real cut of

¹ Between 1999/2000 and 2009/10, the GDP deflator rose by 44% (2.1% per year) while non-pay inflation in the NHS in England rose by 14% (0.78% per year).

around 0.25% (more if social care is included) in England, a real cut of around 7.9% in Wales (by 2013/14) and, for next year at least, a real cut of 2.9% in Scotland (not including social care).

- All health and social care services across the UK thus face one of the most severe funding situations since the Second World War.

SECTION 3: COMPARATIVE HEALTH AND SOCIAL CARE NEEDS

Re-estimates of Northern Ireland's relative health and social care needs

The approach taken by the 2005 review (Appleby, 2005) to estimate future spending paths for health and social care in Northern Ireland was to try and establish Northern Ireland's 'fair share' of the increase in future spending for the UK as recommended by Derek Wanless's 2002 report (Wanless, 2002). The 2005 review looked at eight models to estimate Northern Ireland's health and social care needs relative to those of England and then applied these relative needs weights to the additional funding recommended by Derek Wanless.

This current review has updated three of these needs models - the Treasury's basic Needs Assessment Study (NAS) model (as further updated in 2001 as part of the Northern Ireland Executive's Needs and Effectiveness Evaluation study), the Northern Ireland health and social care allocation model and the English weighted capitation model - the latter two are used to distribute annual budgets across health and social care areas (in the case of Northern Ireland) and NHS primary care trusts (in the case of England). The results of using more recent data and, in the case of the allocation models, more up to date models following various changes over the last few years are summarised in table 2.

Table 2: Summary of Northern Ireland's health and social care needs relative to England

	2005 Review	2011 update		
		DLA not reduced	DLA reduced ¹	DLA NI=predicted
	%	%	%	%
HMT NAS				
Basic model	4.0	6.0		
NI Executive update	13.2			
NI Executive+ update	16.5			
EQ-5D	4.0			
NI Allocation model				
Acute (elective)	4.1	4.0		
Acute (Non-elective)		7.2		
Maternity	12.1	8.9		
Family	18.5	15.2		
Elderly	-13.3	-3.4		
Mental Health	42.6	43.6		
Learning Disability	58.9	59.1		
Physical Disability	71.1	75.6		
Health promotion	6.4	9.4		
Adult community care	5.2	8.4		
General Medical Services	15.2	16.2		

Prescribing	1.7%	-5.8		
Total	9.5	11.5		
Total (inc. rurality and cost factors)	11.6			
English Allocation model				
HCHS	13.3	10.7	10.3	8.9
Prescribing		11.6	10.3	5.3
Primary medical services		10.8	10.8	10.8
Health Inequalities		47.1	47.1	47.1
NHS total		10.8	10.4	8.7
Personal Social Services ²	13.3	41.7	38.7	30.2
NHS+PSS ³	13.3	17.2	16.3	13.2

Notes

1. The English allocation model was run using actual Disability Living Allowance claimant rates as well as a *reduced* rate based on the English rate plus 5/6ths of the difference between the actual English and Northern Ireland claim rates. The final column shows the impact of assuming DLA rates in Northern Ireland were in line with the relationship between DLA claims as a percentage of working age population and rates of limiting longstanding illness (ie, 36% less than actual DLA rates)²
2. PSS relative need assumed equal to HCHS
3. The updated relative needs figures include adjustments for the Market Forces Factor (MFF) and an emergency ambulance cost adjustment (EACA).

Further details of the work carried out by DHSSPS staff on these updated models is contained in Appendix 1.

Uncertainties and sensitivities

HMT NAS model

The HM Treasury NAS model was developed in the 1970s with updates in 1994. While used to inform funding decisions it was not used to allocate resources across the UK (instead, the Barnett formula was employed to do this). As the 2005 review pointed out, since being updated in 1994, there has been extensive econometric work on health care funding allocation formulae which suggest the HMT NAS remains a relatively crude model for determining relative need. However, it is included here for comparative purposes. Using more up to date data suggests that Northern Ireland's relative needs are around **6%** higher than England - 2% more than the estimate produced by the 2005 review.

Northern Ireland allocation model

Populating the Northern Ireland health and social care model with English data (in essence treating NI and England as two regions in order to allocate a combined budget) suggested that, in the 2005 review, health and social care needs in Northern Ireland were around 9.5%

² There is a strong positive relationship between rates of DLA for working age population and proportions of that population stating they have a limiting long standing illness across regions of the UK (see figure 9). Northern Ireland however has DLA claimant rates which are significantly higher than its LLI rates would suggest.

higher than in England implying **9.5%** higher per capita spend in Northern Ireland. The equivalent up dated figure is now around **11.5%**. The 2005 review also estimated the extra costs associated with a greater level of sparsity plus some additional costs, to produce an increased level of need of 11.6%. The current review has not made these further adjustments.

As with the 2005 review, these results are very sensitive to certain parameters in the model. For example, while learning disabilities and physical and sensory disabilities programmes of care account for just 8.8% of total spend, on the basis of the model, their relative needs are such that they account for around 50% of Northern Ireland's *total* relative need; setting the relative needs indices for these two programmes of care to one (ie no difference with England) reduces overall relative needs from 11.5% to 5.9%.

Moreover, while mental health needs in Northern Ireland are estimated to require nearly 44% higher per capita funding than in England, actual spending (for a programme that consumes just 7% of total spend) is somewhat lower - possibly between 10% and 30%³ lower than per capita spending on mental health in England. If this lower spending is a better reflection of actual need, then reducing the mental health relative need measure to reflect lower per capita spending implies an overall relative need of between 6.2% and 7.6% - for a programme that currently consumes around 7% of the total budget. It is worth noting that spending on mental health between 2007/8 and 2009/10 has increased by around 9% in real terms.

These examples of the sensitivities of the allocation model are not meant to imply that the weightings for mental health or physical and learning disabilities are necessarily wrong, but rather to illustrate that small changes in one or two elements of the model can lead to significant changes in the overall relative needs weighting.

English NHS weighted capitation and social care relative needs formula model

A similar exercise - but populating the then English NHS a weighted capitation model with Northern Ireland data - suggested in the 2005 review that Northern Ireland had higher needs, equivalent to an additional **13.3%** per capita spend. As can be seen from table 2 however, the model used in 2005 only included spending on hospital and community health services (around 77% of total health spend) and did not make any estimates for relative need for other elements of the health budget. The model also assumed that personal social services relative need would be the same as that for HCHS.

Since then, the English capitation formula has been revamped following a review in 2007 (Morris et al, 2007)). The new formula (applied in 2009/10 and 2010/11 to set target allocations for PCTs) includes various structural changes including a new element to cover variations between PCTs in life expectancy: an attempt to build in an element in the allocation for health inequalities.

³ The 10% figure was estimated by Professor David Bamford's 2007 review of mental health and learning disability (Bamford, 2007). The estimate of 30% lower per capita spend has been estimated by DHSSPS for the purposes of this review. It remains a broad estimate.

Using this new formula and, where possible, new data, the closest equivalent needs figure to the 2005 review is that for HCHS. This suggests a reduction in relative needs to **10.7%** for this spending area. For health (the NHS) overall, the relative need is **10.8%**, for social care, **41.7%** and for the NHS and social care combined, **17.2%**.

However, as with the previous model, these estimates are sensitive to a small number of factors. For example, Disability Living Allowance (DLA) claimant rates feature as a variable in the English NHS allocation formula and the personal social service relative need index. However, as was noted in the 2005 review (Appleby, 2005), while the 18-64 NI DLA recipient rate is around 133% higher than in England, rates of longstanding illness are only 14% higher. Research has suggested that around two thirds of the difference can be explained by health factors - a combination of LLI, mortality and hospital admission rates (Rosato and O' Reilly, 2006). DHSSPS analysis suggests that, '*..allowing mental health status and hidden unemployment to explain half the remaining difference[between NI and England], a reasonable compromise might be that 5/6th of the differential [to be] applied to the [English allocation] formula.*' The results of this reduced level of DLA are shown in column 4 of table 2. Overall, the relative need measure is reduced from 17.2% to 16.3%.

An alternative reduced DLA has been used to derive needs estimates in the final column of table 2. Across the regions of the UK (excluding Northern Ireland) there is, as figure 9 shows, a strong positive relationship between the proportion of the working age population in receipt of DLA and the proportion reporting limiting longstanding illness (from the 2001 Census) - except for Northern Ireland, which appears to have a much higher DLA rate than its level of LLI would suggest⁴. Reducing Northern Ireland's DLA claimant rate to the level suggested by its LLI (based on the relationship between DLA and LLI for all regions excluding Northern Ireland) and using this reduced rate in the English allocation formula reduces the overall relative need figure by 5 percentage points from 17.2% to 13.2%.

⁴ Data from The Poverty Site (2011):

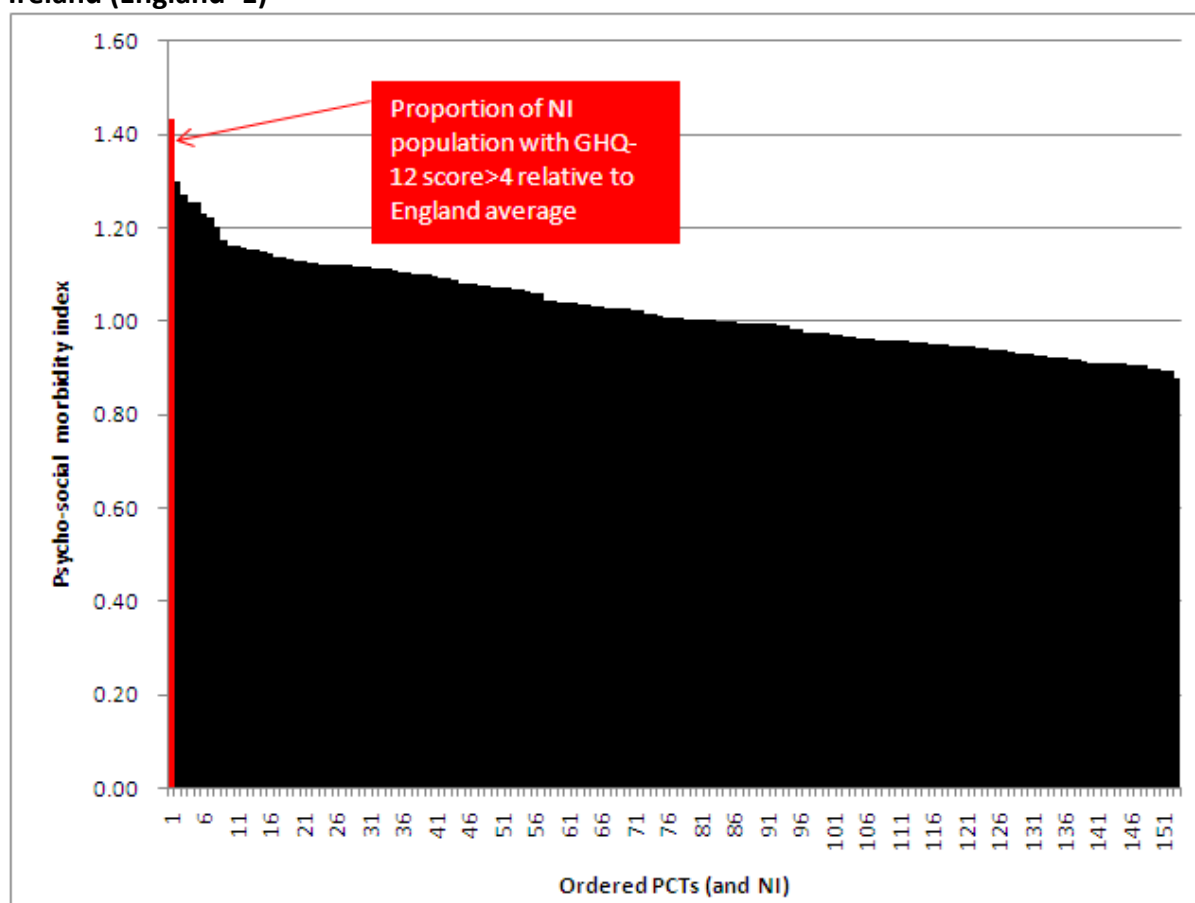
Figure 9: Relationship between DLA claimant rates and rates of Limiting Longstanding Illness (LLI)



Source: Data, The Poverty Site (2011)

Further, as with the Northern Ireland model, the final relative needs measure derived from the English allocation model is sensitive to the relative needs measures of individual spending areas. For example, setting the relative needs measure for mental health equal to England reduces the overall relative need from 17.2% to 12.8% even though mental health spend is just 7% of the NI health and social care budget - significantly less than implied by the high relative need for this spending area. Further, overall estimates of relative need can be sensitive to individual factors within just one spending area. For example, the psycho-social morbidity measure - one of four variables used to construct the mental health needs index - is measured to be around 43% higher than the English average, in fact, significantly higher than any English PCT (see figure 10). If this is set equal to the English average, the overall relative needs for health drops from 10.8% to 7.8% and for the health and social care combined, from 17.2% to 14.9%.

Figure 10: Distribution of the psycho-social morbidity index: English PCTs and Northern Ireland (England=1)



Again, as with the examples of the sensitivities of the Northern Ireland allocation model to changes in just one or two components of the formula, these examples are not meant to imply that elements of the English allocation model (when populated with Northern Ireland data) are necessarily wrong or need changing. However, it is important to be aware of the sensitivities of these allocation models. As the history of their development over the last thirty years or more shows, as evidence has accumulated and more sophisticated statistical techniques have been applied to the difficult issue of assessing relative need, the structure of such models has changed, as have the weights and combinations of needs indicators.

What level of relative need?

As the 2005 review concluded, there are reasons to favour the English capitation model as it has a relatively stronger evidence base for the weights it employs and that in a UK-wide analysis to determine needs weights, English data would dominate. However, again as the 2005 review noted, there are uncertainties and sensitivities in the model which can significantly alter the final overall relative needs figure. Based on updating the new English capitation formula more and with more comprehensive coverage of the elements of the formula, the relative needs for NI fall from 13.3% (in the 2005 review) to 10.8%. It is the inclusion of the relative needs formula for personal social services that brings the combined needs weight to 17.2%. However, the PSS element is very sensitive to just one variable in

the English formula - the level of DLA claimants. Reducing the relatively high Northern Ireland DLA rate to that predicted by NI's level of limiting longstanding illness (as reported in the 2001 Census), reduces the PSS needs weight from 41.7% to 30.2% and the overall weight to 13.2%. If this change and others (for example, those related to sensitivities concerning the psycho-social morbidity index) are combined, the overall needs weight falls even further.

All things considered, therefore, the judgement of this current review is that an additional needs factor of +9% might be considered a reasonable needs differential between England and Northern Ireland. It needs to be stressed that this is a judgement that tries to take account of the variation in results between the models examined and the sensitivities inherent in the results for each model.

As will be seen next, when applying the additional needs factor to 2002 Wanless funding recommendations (as applied to Northern Ireland) the actual choice of level of additional need in fact has a much smaller impact on the final funding figure for 2014/15 than the Wanless spending recommendations; every 1% additional needs only adds between £11 million and £15 million (depending on the Wanless scenario) to the final 2014/15 spending level.

Future Northern Ireland funding needs

Table 3 presents estimates of Northern Ireland health and social care funding needs from 2007/8 (the base year) to 2014/15. These estimates are based on applying the increases in funding for UK health care spending recommended by the 2002 Wanless review to Northern Ireland using the methodology of the 2005 Appleby review.

Northern Ireland's share of the Wanless funding growth for each of the three Wanless scenarios (Solid Progress, Slow Uptake and Fully Engaged) have been based, as in the 2005 review, on the Barnett share for Northern Ireland and not on the total spend in the base year and then the same growth as England thereafter.

Five separate funding paths are shown; three based on updated relative needs models (HMT NAS, Northern Ireland capitation and English capitation) together with the 2005 review's judgement of a 7% additional need relative to England and this current review's judgement of a 9% additional need. As can be seen from the table, the variation in growth in funding (at 2010/11 prices) from 2010/11 to 2014/15 for the different models is relatively small compared to the increase resulting from applying the Wanless recommendations. For example, for the Solid progress scenario, the funding increase by 2014/15 across all five projections ranges from £969 million to £1,101 million.

Using 2007/8 as a base year increases the estimate of the growth in funding needed between 2010/11 and 2014/15 by between £270 million and £430 million (based on 9% additional needs) compared with using 2010/11 as a base year (with the implicit assumption that funding between 2007/8 and 2010/11 matched that recommended by Wanless). Column 10 in table 2 shows what the increase between 2010/11 and 2014/15 based on

2010/11 base year would be. Columns 11-13 reproduce columns 8 to 10 but in nominal or cash terms (ie without any adjustment for inflation).

Table 3: Northern Ireland health and social care funding needs: 2007/8-2014/15

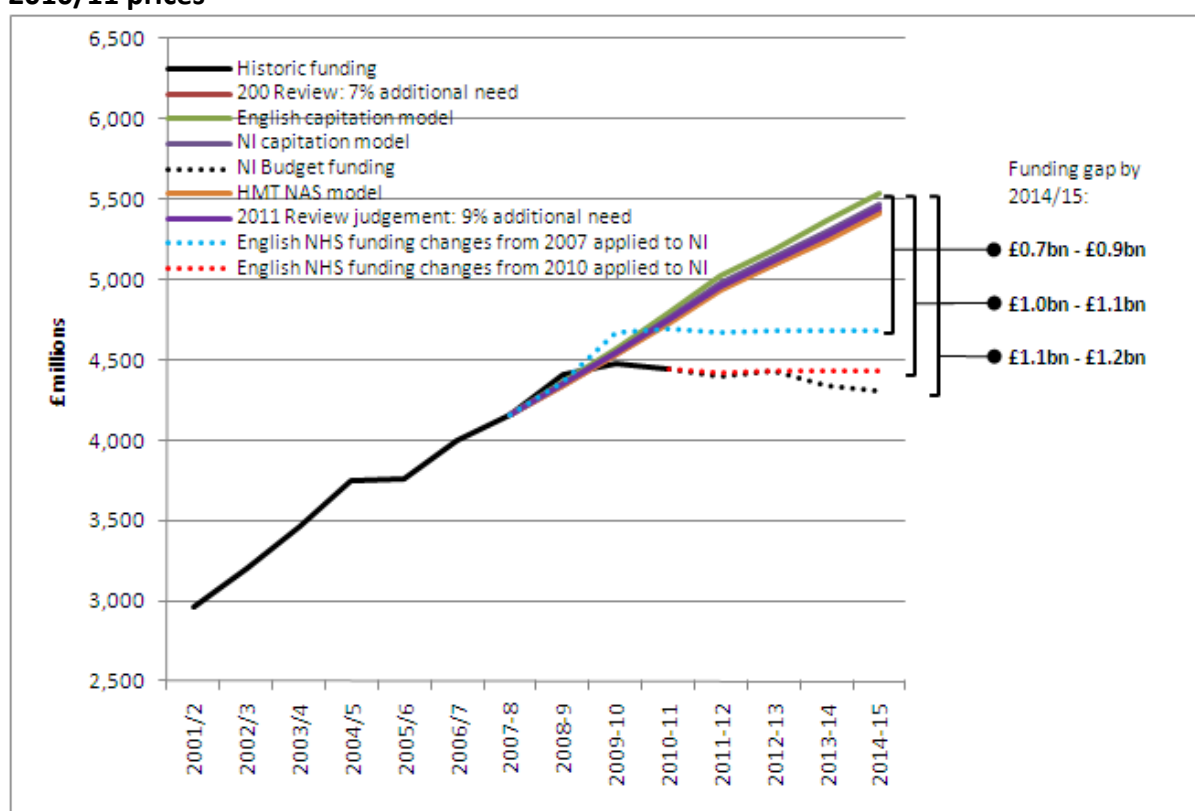
									2010/11-2014/15 Relative to actual 2010/11 spend (£4,441bn)	2010/11-2014/15 Assuming spending matched Wanless recommendations between 2007/8 and 2010/11	2014-15	2010/11-2014/15 Relative to actual 2010/11 spend (£4,441bn)	2010/11-2014/15 Assuming spending matched Wanless recommendations between 2007/8 and 2010/11
	2007- 8 Col1	2008- 9 Col2	2009- 10 Col3	2010- 11 Col4	2011- 12 Col5	2012- 13 Col6	2013- 14 Col7	2014- 15 Col8	2010/11 prices Col9 (col8-4,441)	2010/11 prices Col10 (col8-col4)	Current prices Col11 (col8*1. 1049)	Current prices Col12 (col11-4,441)	Current prices Col13 (col11-col4)
HMT NAS model +6.02%													
Solid Progress	4159	4,341	4,532	4,731	4,939	5,088	5,246	5,410	969	679	5,977	1,536	1,246
Slow Uptake	4159	4,379	4,611	4,855	5,112	5,312	5,525	5,745	1,304	890	6,348	1,907	1,493
Fully Engaged	4159	4,332	4,513	4,701	4,897	5,034	5,179	5,327	886	626	5,886	1,445	1,185
NI Capitation model +11.5%													
Solid Progress	4159	4,351	4,551	4,760	4,979	5,136	5,303	5,474	1,033	714	6,049	1,608	1,288
Slow Uptake	4159	4,391	4,634	4,891	5,162	5,372	5,595	5,827	1,386	936	6,439	1,998	1,547
Fully Engaged	4159	4,341	4,531	4,729	4,935	5,079	5,231	5,388	947	659	5,953	1,512	1,224
England Capitation Model 17.2%													
Solid Progress	4159	4,360	4,571	4,791	5,021	5,186	5,361	5,542	1,101	751	6,123	1,682	1,332
Slow Uptake	4159	4,402	4,659	4,929	5,213	5,434	5,669	5,913	1,472	984	6,533	2,092	1,604
Fully Engaged	4159	4,351	4,550	4,758	4,975	5,126	5,286	5,451	1,010	692	6,022	1,581	1,264
2005 Review judgement +7%													
Solid Progress	4159	4,343	4,535	4,736	4,946	5,096	5,256	5,421	980	685	5,990	1,549	1,254
Slow Uptake	4159	4,381	4,615	4,862	5,121	5,323	5,537	5,760	1,319	898	6,364	1,923	1,503
Fully Engaged	4159	4,334	4,516	4,706	4,904	5,042	5,188	5,338	897	632	5,898	1,457	1,192
2011 Review judgement +9%													
Solid Progress	4159	4,346	4,542	4,747	4,960	5,114	5,277	5,445	1,004	698	6,016	1,575	1,269
Slow Uptake	4159	4,385	4,624	4,875	5,139	5,345	5,563	5,790	1,349	915	6,397	1,956	1,523
Fully Engaged	4159	4,337	4,523	4,716	4,918	5,058	5,207	5,360	919	644	5,923	1,482	1,206

Future funding gaps

Given these estimates of funding needs, how do they compare with actual and planned funding since 2007/8?

Figure 11 takes one Wanless scenario - Solid Progress - and funding estimates based on the five alternative additional funding needs models/judgements and sets these against three different funding scenarios: the Northern Ireland Budget, a notional Northern Ireland spend to 2014/15 assuming the same planned changes as for the English NHS budget from 2010/11 arising from the 2010 spending review, and a similar notional spend/budget but starting from 2007/8.

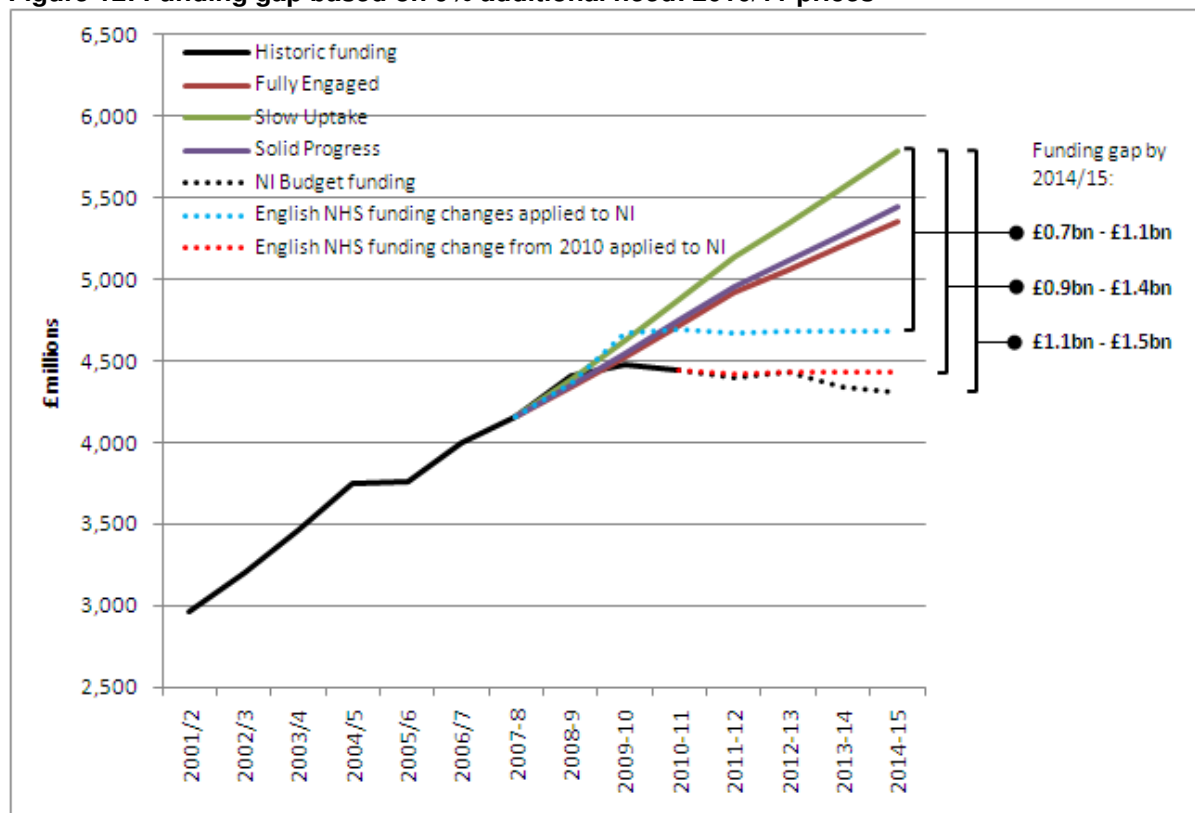
Figure 11: Funding gap based on Solid Progress scenario for four relative needs estimates: 2010/11 prices



While Northern Ireland spending kept pace with needed funding between 2007/8 and 2009/10, a gap opened up in 2010/11 (of between £290 million to £350 million depending on the relative needs model for the Solid progress scenario). From 2011/12 to 2014/15 this gap continues to widen so that by 2014/15 the difference between the NI Budget and funding needs estimates reaches up to £1.2 billion.

Figure 12 presents a similar analysis of the funding gap but based on this review's judgement of a relative need of +9%. Here the funding gap varies between £1.1 billion and £1.5 billion depending on the three Wanless scenarios.

Figure 12: Funding gap based on 9% additional need: 2010/11 prices



Summary

- The judgement of this review is a needs differential for Northern Ireland relative to England of +9%
- The difference in additional funding due to the choice of additional need for Northern Ireland relative to England is relatively small; every 1% additional need translates into £11 million to £15 million additional funding by 2014/15 as the additional needs factor is applied to the marginal growth in funding not the entire Northern Ireland spend.
- Using 2007/8 as a base year, updating three relative needs models used by the 2005 Appleby review and applying Wanless 2002 future funding recommendations to Northern Ireland suggests funding of between £5,327 million and £5,913 million by 2014/15 (at 2010 prices, or £5,886 million and £6,533 in cash terms) depending on the relative additional needs and Wanless scenario across all three models
- Using 2010/11 as a base year, funding requirements in 2014/15 would be £5,067 million and £5,377 million in real terms (£5,608 million and £5,941 million in cash terms) depending on the relative additional needs and Wanless scenario across all three models.

- On the basis of additional needs of +9%, required funding by 2014/15 is projected to be between £5,360 million and £5,790 million (£5,923 and £6,397 million in cash terms) depending on the Wanless scenario adopted.
- Compared with the latest Budget proposals for Northern Ireland, the gap with funding suggested by Wanless and a +9% needs differential will amount to between £1.1 billion and £1.5 billion depending on the Wanless scenario.
- If, however, Northern Ireland had received the same funding increases as the English NHS from 2007/8 to 2010/11 (and the equivalent SR 2010 settlement as the NHS to 2014/15) then the funding gap would be between £0.7 billion and £1.1 billion.

SECTION 4: THE NORTHERN IRELAND PRODUCTIVITY CHALLENGE

Estimates of the productivity challenge

An often overlooked but crucial element of Sir Derek Wanless's 2002 review of the future funding needs of health care in the UK was assumptions he made about future NHS productivity. Over the period 2010/11 to 2014/15, these amounted to productivity increases of around 2% to 3% per annum. Without this growth in productivity, real funding growth between 2007 and 2015 of around 32% as recommended by Wanless would have needed to be over 57%.

In considering the funding gaps (identified in the previous section) from the point of view of the productivity gains needed to close the gap (in the absence of funding) account needs to be taken of the assumptions Wanless made about productivity.

The productivity challenge

Table 4 reworks the funding gap analysis above incorporating Wanless' assumptions about NHS annual productivity gains (from 2007/8) in relation to the proposed DFP Draft Budget for the years 2011/12 and, historically, actual funding from 2007/8 to 2010/11.

As can be seen the productivity gap (as opposed to the Wanless funding gap) increases for all models and scenarios. In terms of the favoured additional needs scenario for this review, by 2014/15 the productivity gap ranges from £2 billion to £2.2 billion (at 2010/11 prices). This represents an increase of around 54% to 57% of the actual spend in 2007/8. It needs to be noted that these figures include recovering from the historic gap in funding that started in 2009/10.

Table 4: Productivity improvement challenge

		2008-9	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2007/2015
HMT NAS +6.02%									
Solid Progress	%	0.0%	5.1%	7.4%	7.6%	4.3%	7.8%	6.6%	54.0%
Slow Uptake	%	0.5%	5.1%	7.4%	7.6%	4.6%	7.6%	6.4%	54.7%
Fully Engaged	%	-0.3%	4.9%	7.1%	7.3%	4.1%	7.5%	6.3%	51.6%
Solid Progress	£m	-2	224	346	380	232	436	392	2,008
Slow Uptake	£m	19	228	350	384	246	429	382	2,039
Fully Engaged	£m	-11	214	334	366	217	418	372	1,909
NI Capitation +11.5%									
Solid Progress	%	0.3%	5.4%	7.7%	7.9%	4.5%	8.0%	6.8%	56.6%
Slow Uptake	%	0.8%	5.5%	7.7%	7.9%	4.8%	7.8%	6.6%	57.3%
Fully Engaged	%	0.0%	5.2%	7.4%	7.6%	4.3%	7.7%	6.5%	54.2%
Solid Progress	£m	11	239	362	397	245	455	411	2,120
Slow Uptake	£m	33	243	367	402	261	447	400	2,152
Fully Engaged	£m	2	228	349	382	230	435	389	2,016
England Capitation +17.2%									
Solid Progress	%	0.6%	5.7%	8.0%	8.1%	4.8%	8.2%	7.0%	59.3%
Slow Uptake	%	1.2%	5.8%	8.0%	8.2%	5.0%	8.0%	6.8%	60.1%
Fully Engaged	%	0.4%	5.5%	7.7%	7.9%	4.5%	7.9%	6.7%	56.8%
Solid Progress	£m	25	254	379	415	260	474	430	2,236
Slow Uptake	£m	48	259	384	420	276	465	419	2,270
Fully Engaged	£m	15	243	365	400	244	453	407	2,127
2005 Review judgement +7%									
Solid Progress	%	0.0%	5.1%	7.4%	7.6%	4.4%	7.8%	6.6%	54.4%
Slow Uptake	%	0.5%	5.2%	7.5%	7.7%	4.6%	7.6%	6.4%	55.2%
Fully Engaged	%	-0.2%	4.9%	7.2%	7.4%	4.1%	7.6%	6.4%	52.1%
Solid Progress	£m	1	227	349	383	234	440	395	2,028
Slow Uptake	£m	22	231	353	387	249	432	386	2,059
Fully Engaged	£m	-9	217	337	369	220	421	375	1,929
2011 Review judgement 9%									
Solid Progress	%	0.1%	5.3%	7.5%	7.7%	4.5%	7.9%	6.7%	55.4%
Slow Uptake	%	0.6%	5.3%	7.6%	7.8%	4.7%	7.7%	6.5%	56.1%
Fully Engaged	%	-0.1%	5.0%	7.3%	7.5%	4.2%	7.6%	6.5%	53.0%
Solid Progress	£m	5	232	355	389	239	446	402	2,069
Slow Uptake	£m	27	236	359	394	254	439	392	2,100
Fully Engaged	£m	-4	222	342	375	224	427	381	1,967

Figures 13 and 14 summarise the productivity gap graphically for the various models under the Solid Progress scenario and specifically for the +9% additional need judgement for all Wanless scenarios.

Figure 13: Productivity challenge: Alternative needs additions, Solid Progress plus Wanless productivity assumptions

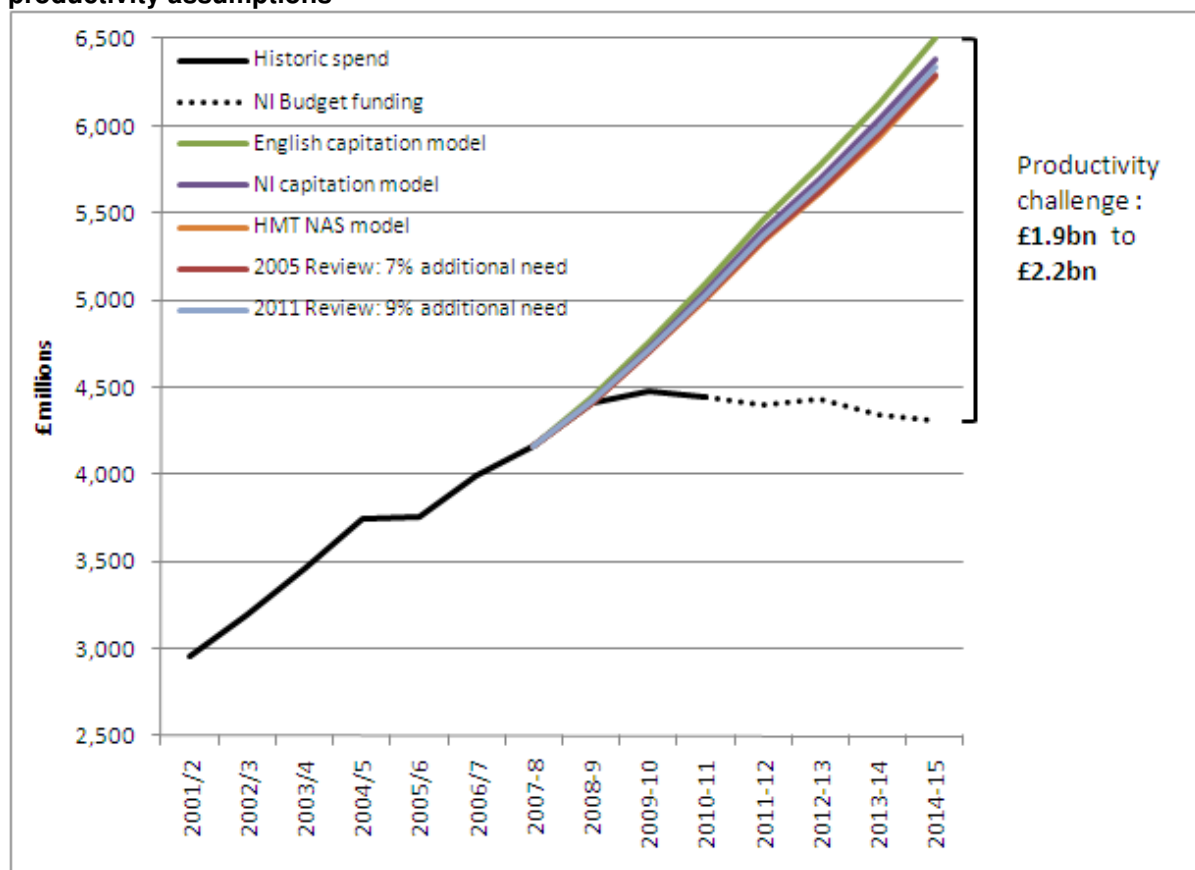
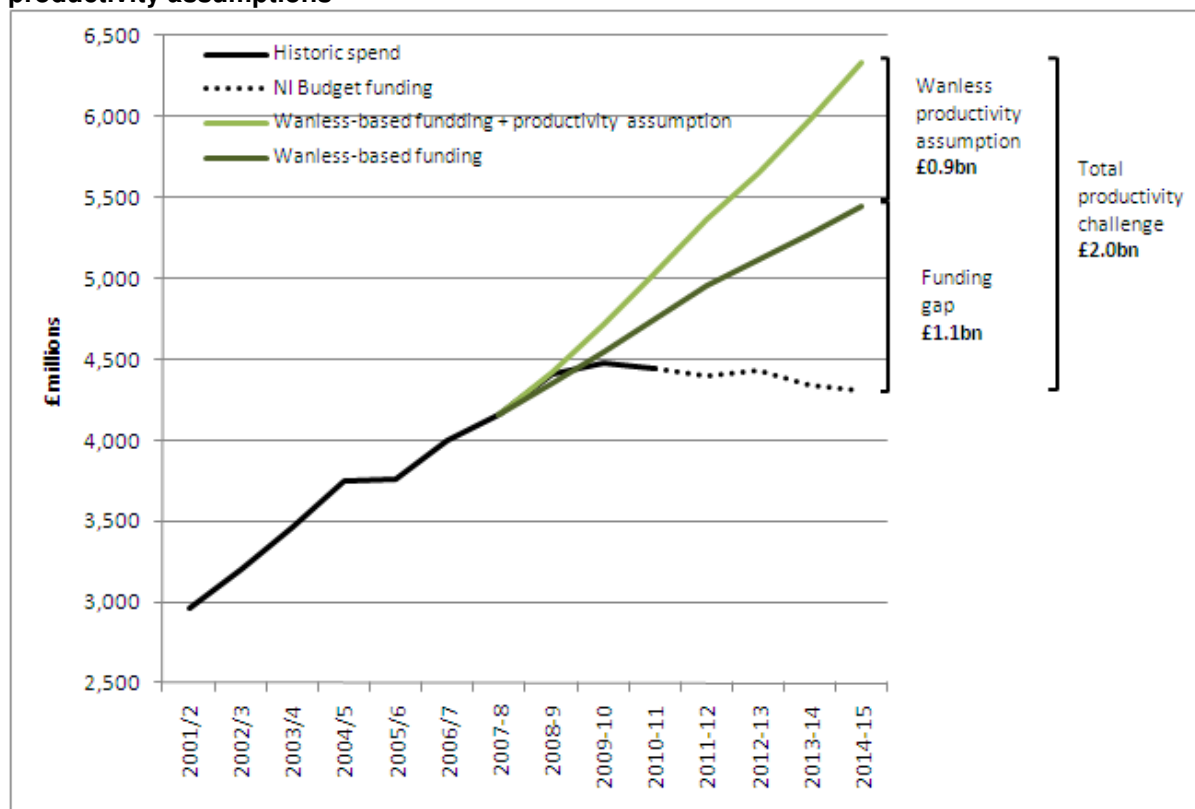


Figure 14: Productivity challenge: 9% additional needs, Solid Progress plus Wanless productivity assumptions



Compared with the Northern Ireland Budget plan for 2014/15 of £4,306 million (at 2010/11 prices), for the +9% relative additional need judgement the Wanless-based funding need plus Wanless productivity assumptions amount to £6,336 million (and hence a gap of around £2 billion). Closing this gap would require a productivity increase of around 30% over the next four years, or around 6.8% each year. This represents a hugely daunting task.

A similar analysis for the English NHS carried out by the King's Fund and the Institute for Fiscal Studies in 2009 (Appleby et al) of the gap between Wanless funding and productivity assumptions and zero real actual funding increases between 2011/12 and 2014/15 under the Solid Progress scenario suggested a total productivity challenge of around 27% to 2014/15 - equivalent to annual gains of around 6.2%.

The difference with the Northern Ireland estimate of 6.8% is due to the assumption of a 9% greater need for Northern Ireland (applied at the margin).

Actual policy to address the productivity gap in England has, however, evolved from an original assessment of the funding gap based on the Department Health's own analysis in 2009 (one not based on Wanless funding recommendations, based on a three, not four year time period and assuming no cash rise - ie a real cut in spending) and has taken account of subsequent policy decisions such as the two-year public sector pay freeze announced in the June Budget, planned spending announced in the spending review and a four-year time frame. As a result, the productivity challenge facing the English NHS has now been broadly assessed at around £20 billion - equivalent to around 20% by 2014/15, or about 5% per annum.

It should be noted that the English productivity challenge outlined here does not include the situation facing social care over the next four years whereas the productivity challenge this review estimates facing Northern Ireland does. The funding/'need' gap that will face social care in England is very hard to estimate as local councils' actual funding and prioritisation decisions are not yet known. However, the combined challenge for health and social care will undoubtedly amount to more than the current challenge for health alone.

Improving productivity: what for?

Expressing the productivity challenge in monetary terms can obscure the original 'vision' for health and social care that underpinned Derek Wanless's original funding recommendations (upon which the funding and productivity gaps reported above are based).

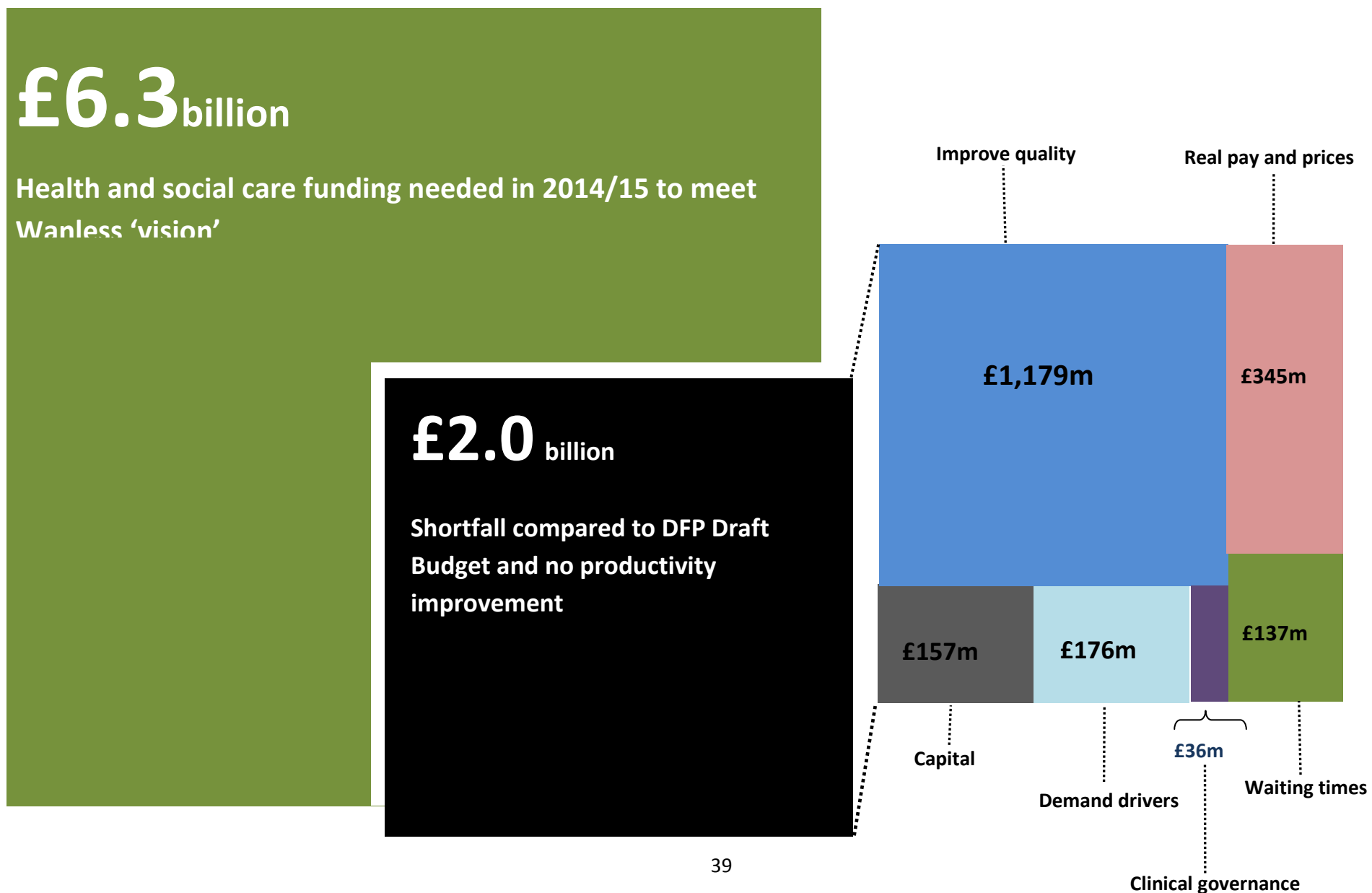
Wanless's starting point was to define or specify what a well-functioning, high quality health system should look like. This included a service with very short waiting times and appropriate and more widescale use of ICT - not just in 'back room' functions, but directly in terms of patients care. It also included better quality infrastructure and equipment (from hospitals to scanners), higher real pay for staff, increased activity to meet demographic and the health effects of lifestyle changes and health seeking behaviour. Importantly, it also included improved quality of care and treatment - a result of applying the best technologies, skills and treatments at the most appropriate time for patients. Wanless envisioned the roll

out of disease/population-specific national service frameworks as the organisational tool for diffusing best practice throughout the NHS in order to improve quality (see Appendix 3 for details).

Given his starting point, it is possible to disaggregate the £2 billion productivity challenge into these broad elements. Figure 15 does this, based on a similar exercise for the English NHS productivity gap under the Solid Progress scenario (Appleby et al, 2009, 2010). This breakdown is not meant to represent a detailed plan for the productivity challenge in terms of Derek Wanless's vision for health and social care. Rather it illustrates in a bit more detail what being more productive is meant to achieve. In doing so it also highlights some high level decisions that could be (indeed in some cases, already have been) taken to reduce the productivity challenge. For example, the decision to freeze public sector staff pay for two years to 2012/13 will mean that the Wanless assumption of around 2.5% real terms pay increases each year through to 2014/15 will be reduced, and hence a reduction in the £345 million (roughly) estimated for increases in pay and prices in figure 15. This will in turn reduce the scale of the productivity challenge

However, the key message from the disaggregation is that the overall productivity challenge of £2 billion represents the **value** of the productivity gain - not the size of real cuts in spending or services - and that in turn, improving the **value** of services to patients (higher quality, shorter waiting etc) and ensuring services adapt and change to meet demographic and other demand pressures is the purpose of being more productive. A key challenge - and one identified by Derek Wanless's 2004 follow up report (Wanless, 2004) - is to get the balance right between actions to place downward pressure on unit costs and improvements in quality, and between necessary measures to improve productivity in the short term and action (and perhaps investment) to tackle population health problems over the longer term.

Figure 15: Disaggregating the productivity challenge: What improving productivity is meant to achieve on the basis of the Wanless 'vision' for health and social care



Summary

- Derek Wanless's funding recommendations for health care across the UK were dependent on the NHS achieving certain levels of productivity improvements. These amounted to between 12% and 20% between 2007/8 and 2014/15 depending on the Wanless scenario.
- Re-analysis of the funding gap calculations incorporating Wanless's productivity assumptions suggests - relative to the Budget for Northern Ireland - a combined funding/productivity gap of between £2 billion and £2.1 billion (on the basis of a needs differential of +9%.)
- Even if health and social care were to receive funding in line with Wanless's recommendations, this would still leave a need to achieve the productivity gains inherent in his recommended funding levels. Depending on the Wanless scenario, these would amount to between £576 million to £892 million by 2014/15 at today's prices for the +9% additional need judgement.
- Overall, the £2 billion productivity challenge facing the Health and Social Care System represents the unmet funding gap **plus** the value of the Wanless productivity assumption. It is essentially an indication in monetary terms of the additional value for money that DHSSPS would have to generate to deliver a modern, sustainable health service in 2014/15 in line with Wanless' 2002 'vision' for the system.
- A broad disaggregation of the value of the productivity gain based on Wanless's 'vision' for future health care services under his Solid Progress scenario suggests that over half the combined funding/productivity gap will need to be closed by: gains in quality, around 9% in responding to demand pressures, around 16% to improving waiting times, capital infrastructure and clinical governance and the remainder (17%) to real increases in pay and prices.
- Cutting production costs will be part of the task of achieving productivity gains - but largely as a means of freeing resources for higher value activities. However, more importantly, closing the Wanless funding gap requires improving the quality of care received by patients - improving health outcomes, reducing negatively valued attributes of care such as long waiting times etc - but within the constraints of future budgets.

SECTION 5: SYSTEM PERFORMANCE OVERVIEW

This section reviews some broad measures and indicators of productivity and performance and suggests that while the productivity gap identified in section 4 represents a huge challenge, there should be scope for improving value for money in health and social care in Northern Ireland.

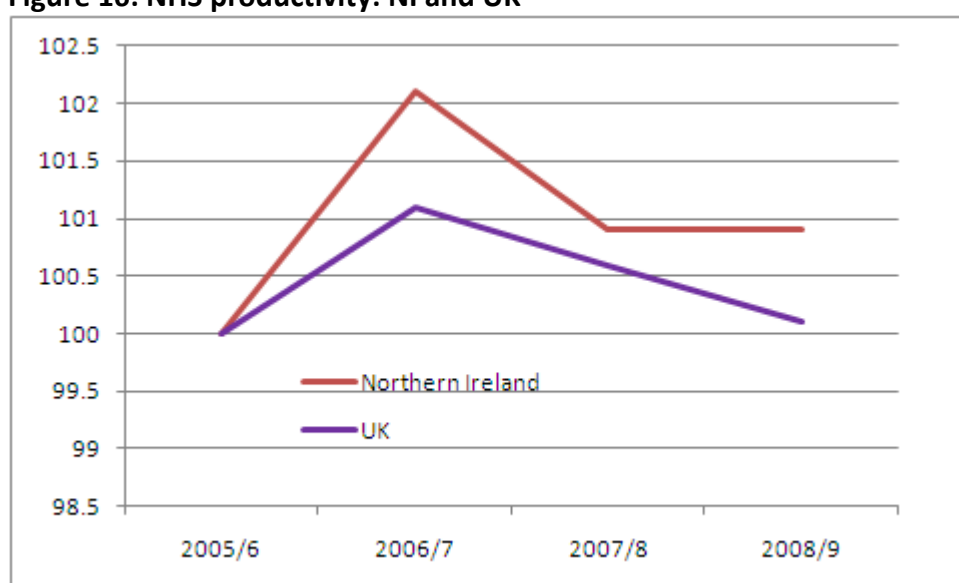
The service areas covered in this section are not, of course, exhaustive. In particular, the nature of data availability inevitably means there is a bias towards secondary care services. This should not be taken as any indication that potential productivity gains are limited to this sector. As the McKinsey analysis for DHSSPS showed (McKinsey, 2010), community services, primary care and social services all have their share of the potential to improve productivity - although opportunities for improving productivity may not be spread equally across sectors.

System-wide productivity measures and indicators

The Office of National Statistics produce measures of UK NHS productivity annually. However, work on disaggregated measures for Northern Ireland are ongoing. Nevertheless, for this review, DHSSPS have produced a broadly equivalent productivity measure for Northern Ireland (see Appendix 4 for details). The comparisons with the ONS UK measure in the figures below should, however, only be taken as indicative.

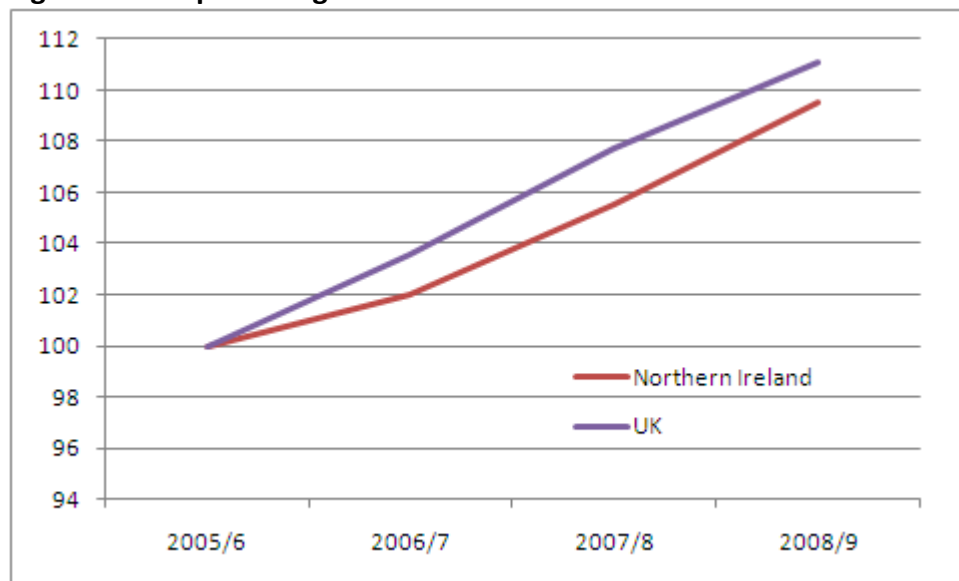
Figure 16 shows that Northern Ireland increased its productivity between 2005/6 and 2008/9 by just under 1%. The UK, on the other hand, increased productivity by a fraction of a percent.

Figure 16: NHS productivity: NI and UK



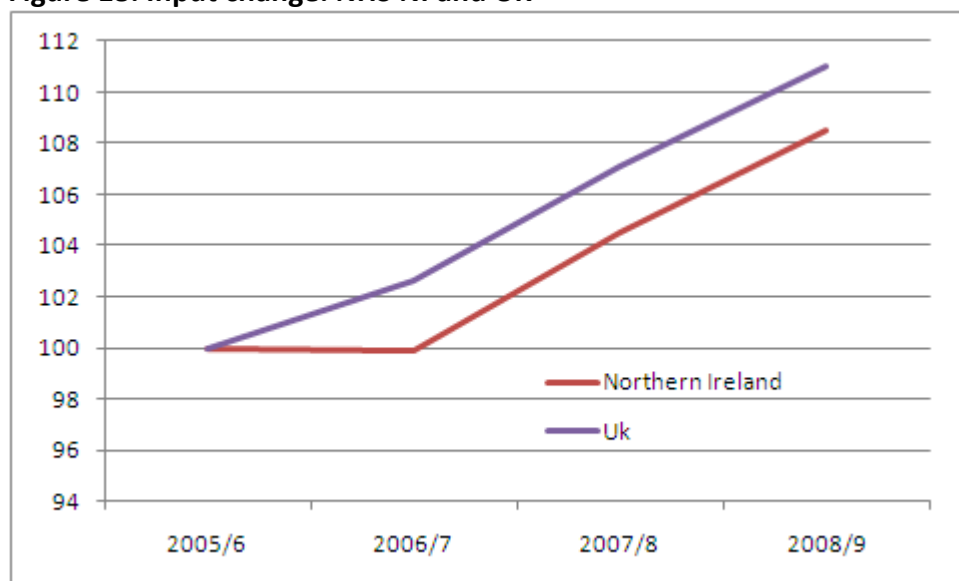
However, the NHS across the UK recorded a faster growth in outputs than Northern Ireland (see figure 17).

Figure 17: Output change: NHS NI and UK



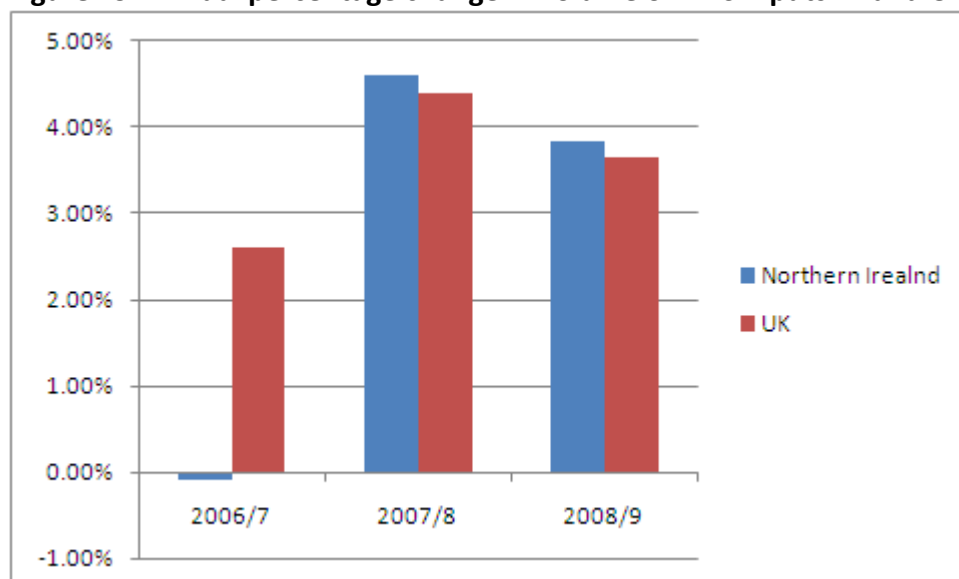
The reason Northern Ireland reported a greater productivity gain was due to its slower growth in inputs (figure 18).

Figure 18: Input change: NHS NI and UK



In fact, the slow growth in inputs relative to the UK was due to just one year - 2006/7 (and in one element of inputs, Goods and services - see figure 19).

Figure 19: Annual percentage change in volume of NHS inputs NI and UK

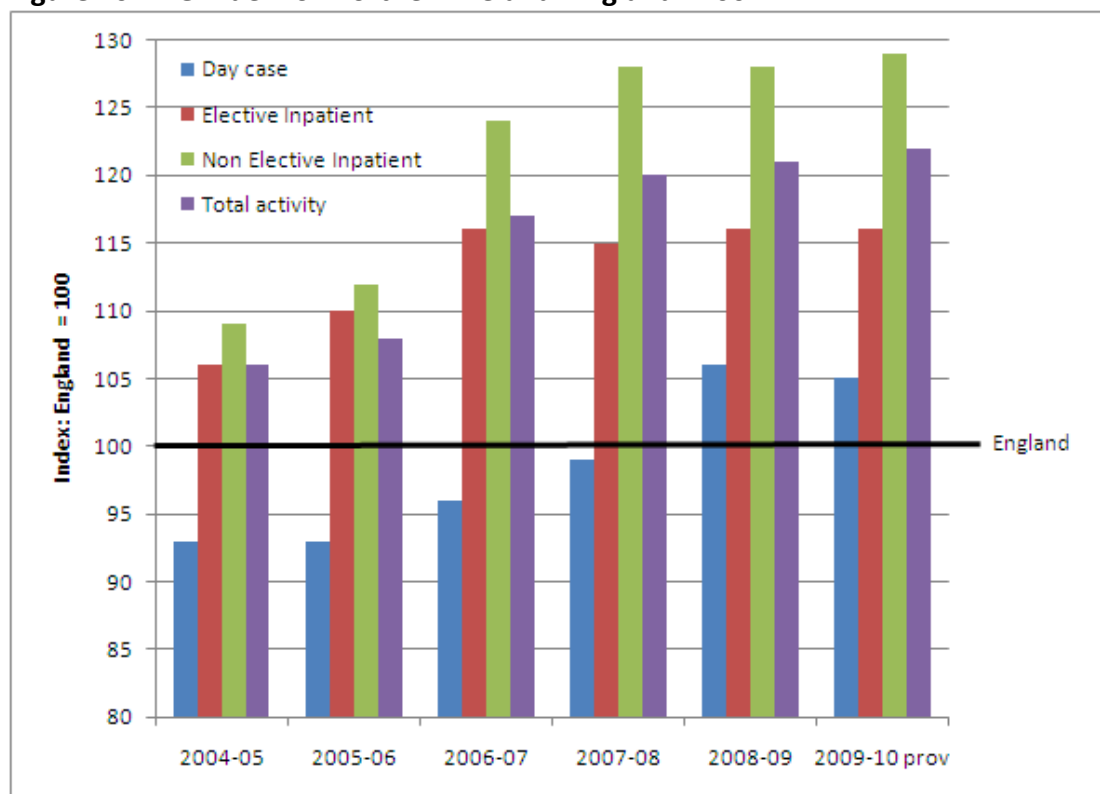


The main conclusion that should perhaps be drawn from these data is the relative lack of improvement in productivity in Northern Ireland and the UK generally. Further, historically changes in productivity across the UK have been most correlated with changes in inputs rather than changes in outputs; as financial inputs grow more slowly, outputs (for a time at least) carry on growing and hence productivity increases. The slowdown in the growth in funding over the next four years might well therefore lead to an increase in productivity in the short term, but is not sustainable without improvements in output growth.

Unit costs

Another aspect of productivity is the costs of production. Figure 20 provides a comparison between Northern Ireland and England for three types of hospital activity - elective and non-elective inpatients and day cases. The comparison is based on using English unit costs by healthcare resource group (HRGs) and Northern Ireland activity. Figure 20 suggests that Northern Ireland has generally become progressively more costly relative to England from 2004/5 to 2009/10 in all three areas of activity (except for day cases in 2009/10 - though this year's data is provisional). By 2008/9, while the costs of producing a day case were around 6% higher than in England, the costs for elective inpatients were 16% higher and for non-elective cases, nearly 28% higher. Across all areas of activity, Northern Ireland costs were just over a fifth more expensive. It should be noted that the move to a new HRG classification system in 2006/7 may account for part of the increase in relative costs between 2005/6 and 2006/7, with subsequent years perhaps more accurately reflecting an existing differential between Northern Ireland and England not properly captured before 2006/7.

Figure 20 HRG index for Northern Ireland. England =100



NB: HRGs cover acute, maternity and elderly medicine specialties only

A similar analysis - multiplying English HRG unit costs by Northern Ireland activity - for providers shows considerable variation, while nearly all hospitals record 'excess' total costs in relation to England (see figures 21 to 26).

Figure 21: Elective inpatients: Provider 2008/9

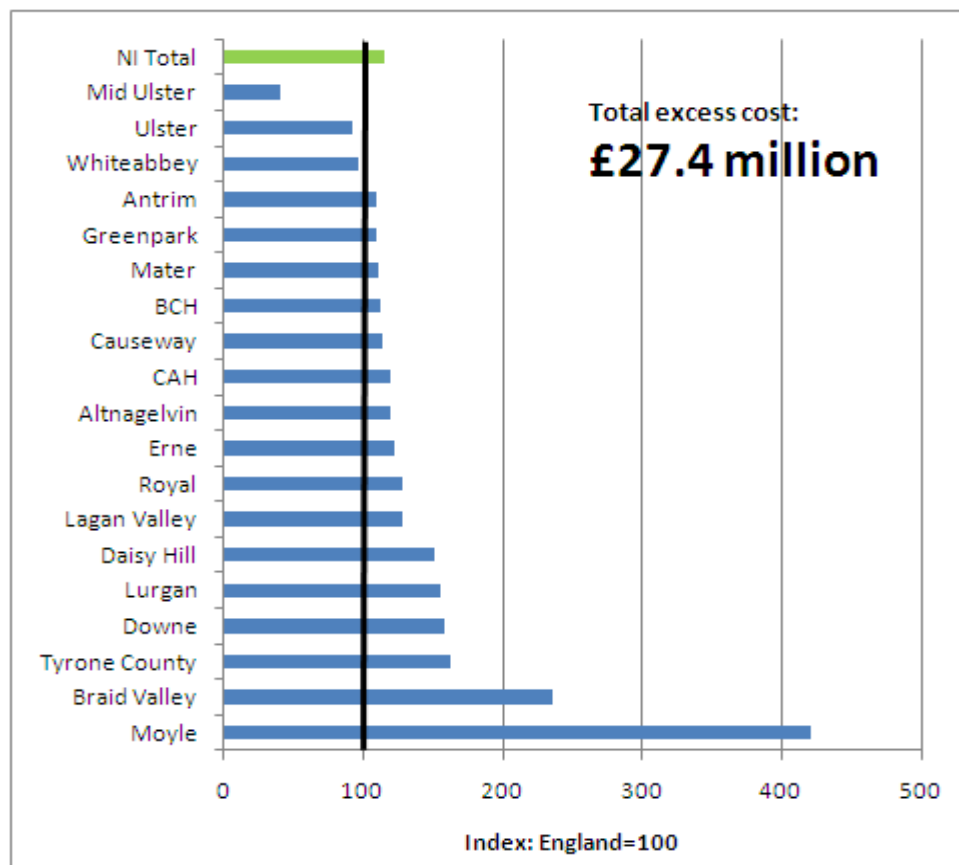


Figure 22: Non-elective inpatients: Provider 2008/9

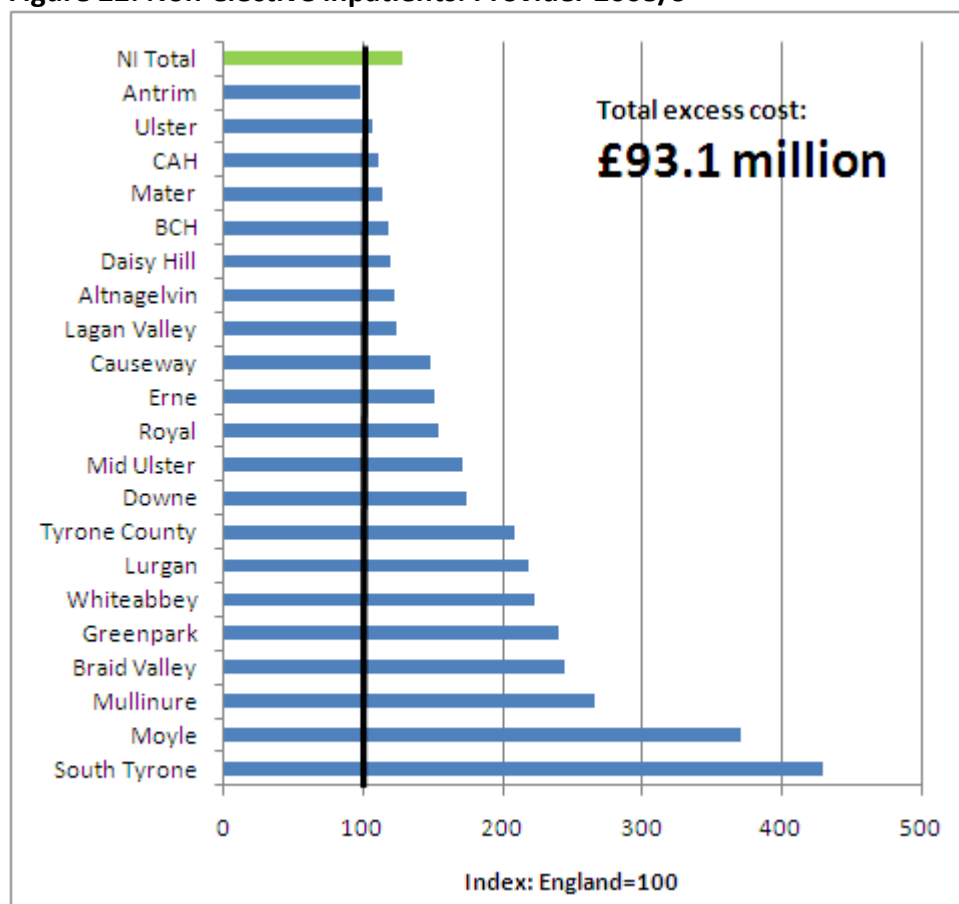


Figure 23: Day cases: Provider 2008/9

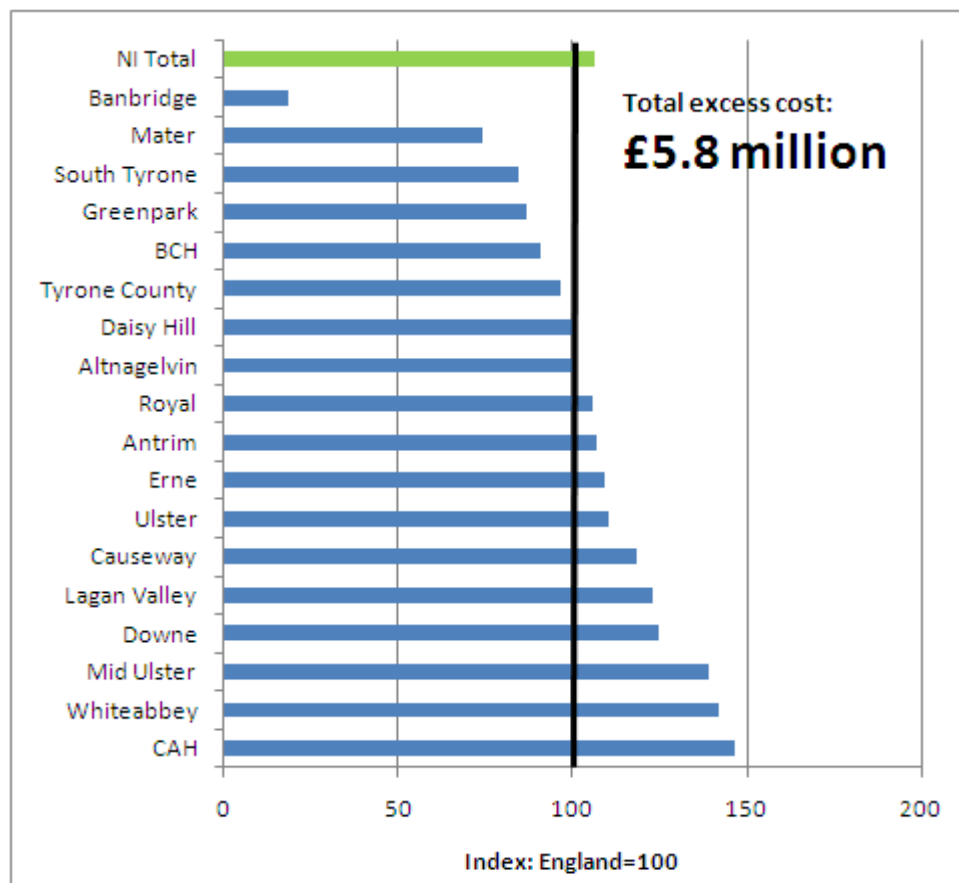


Figure 24: Total: Elective, non-elective, day case, by provider 2008/9

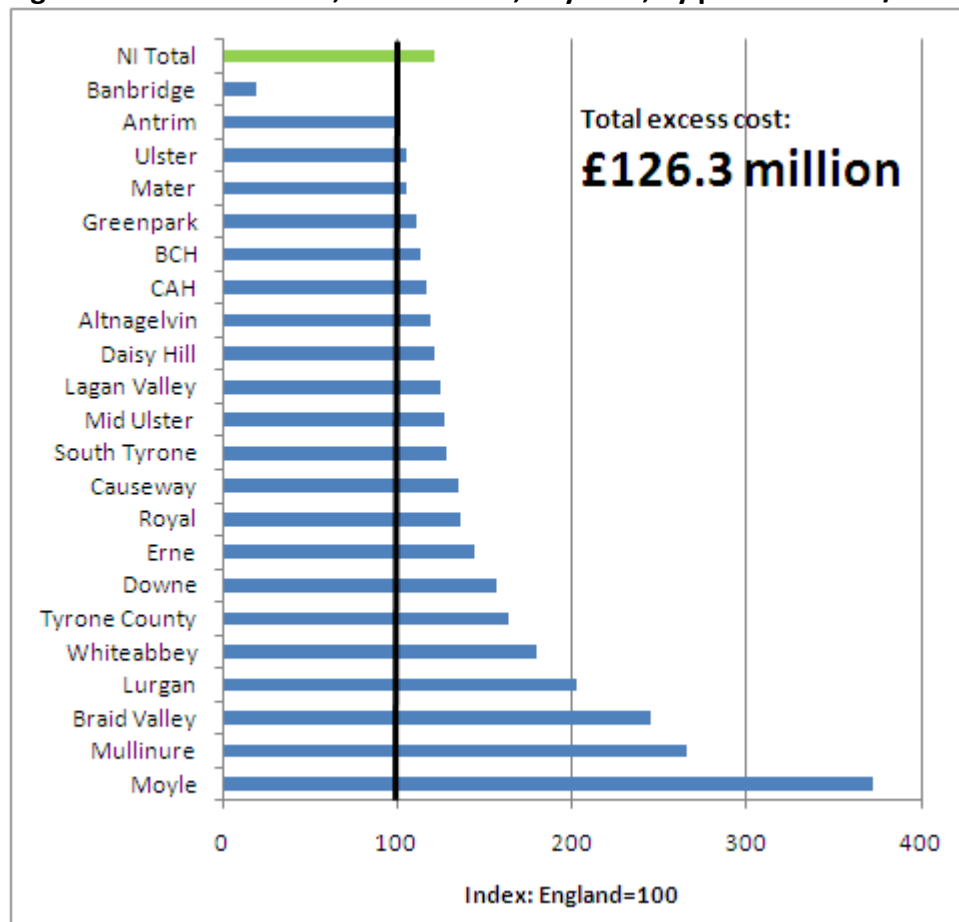


Figure 25: Total: Elective, non-elective, day case, by trust 2008/9

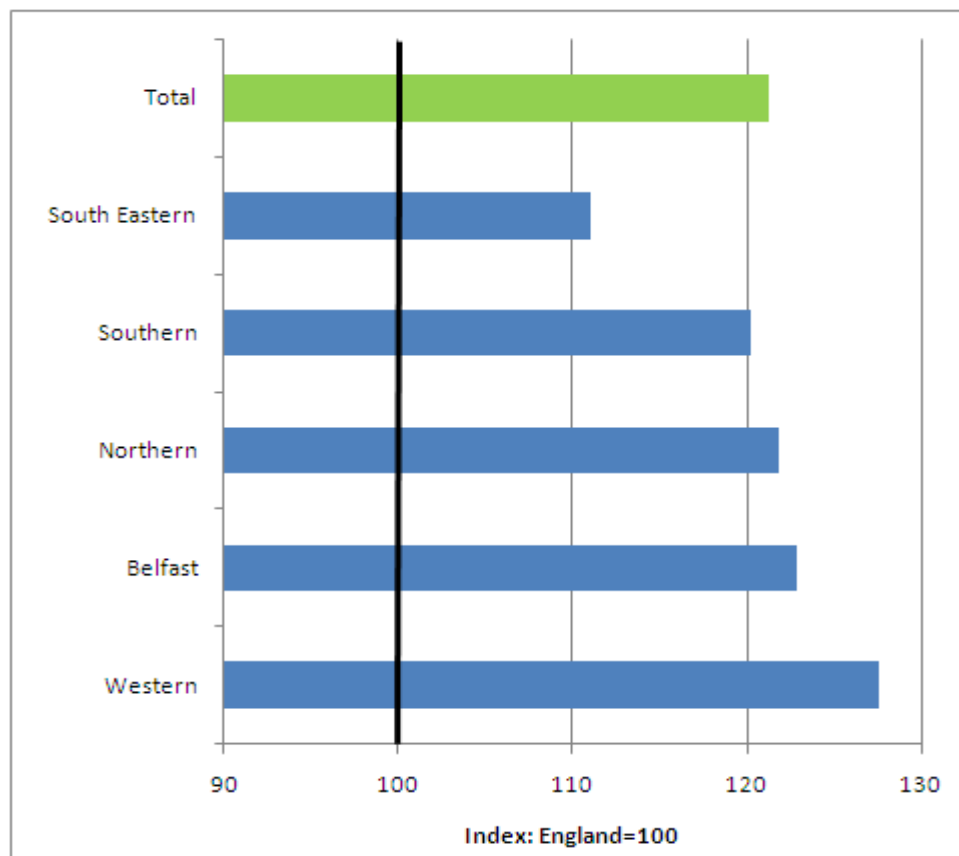
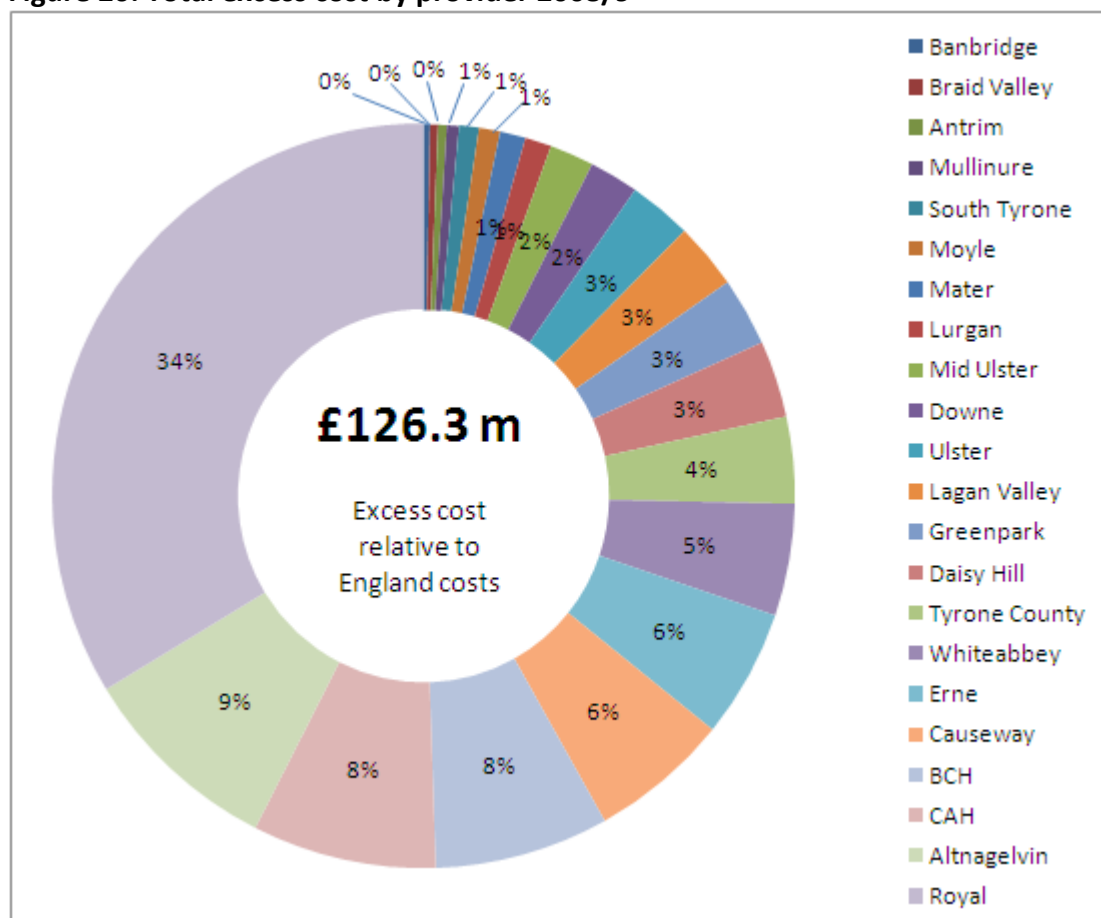


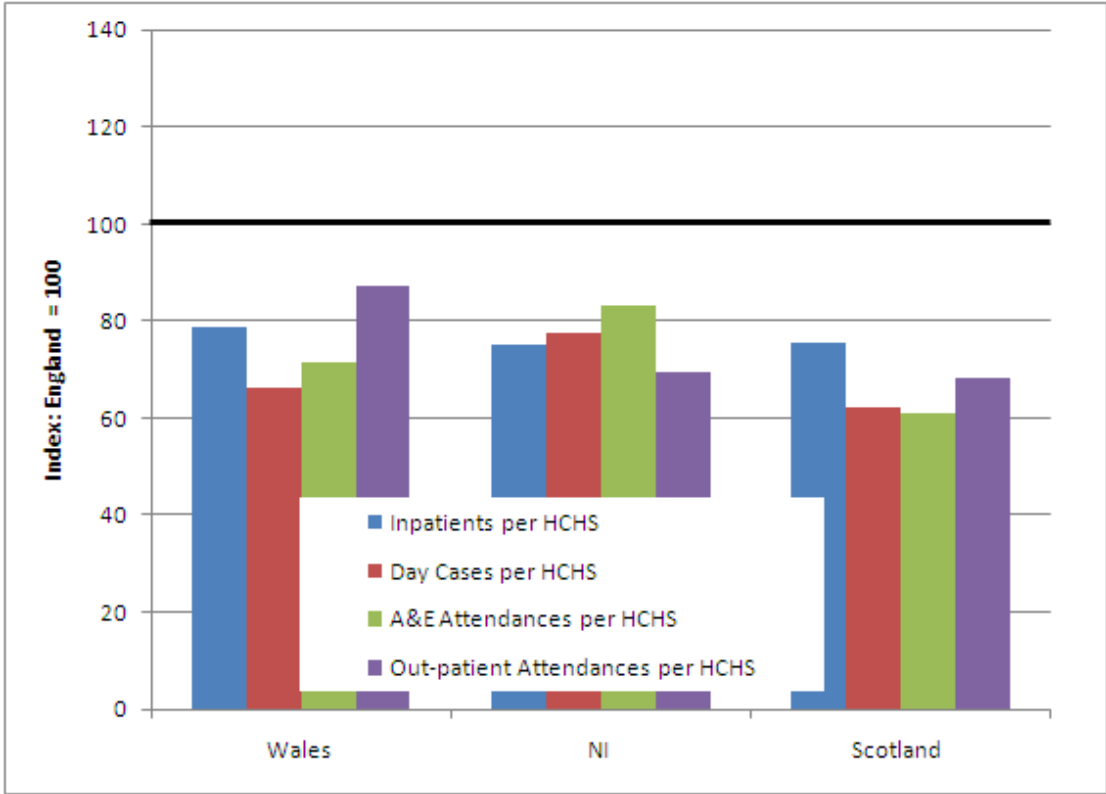
Figure 26: Total excess cost by provider 2008/9



Workforce productivity

Basic measures of workforce productivity also provide an indication of relative productivity across the UK. Figure 27 shows, for example, that Northern Ireland staff productivity for inpatients, day cases, accident and emergency and outpatient activity is between 17% and 30% lower than England.

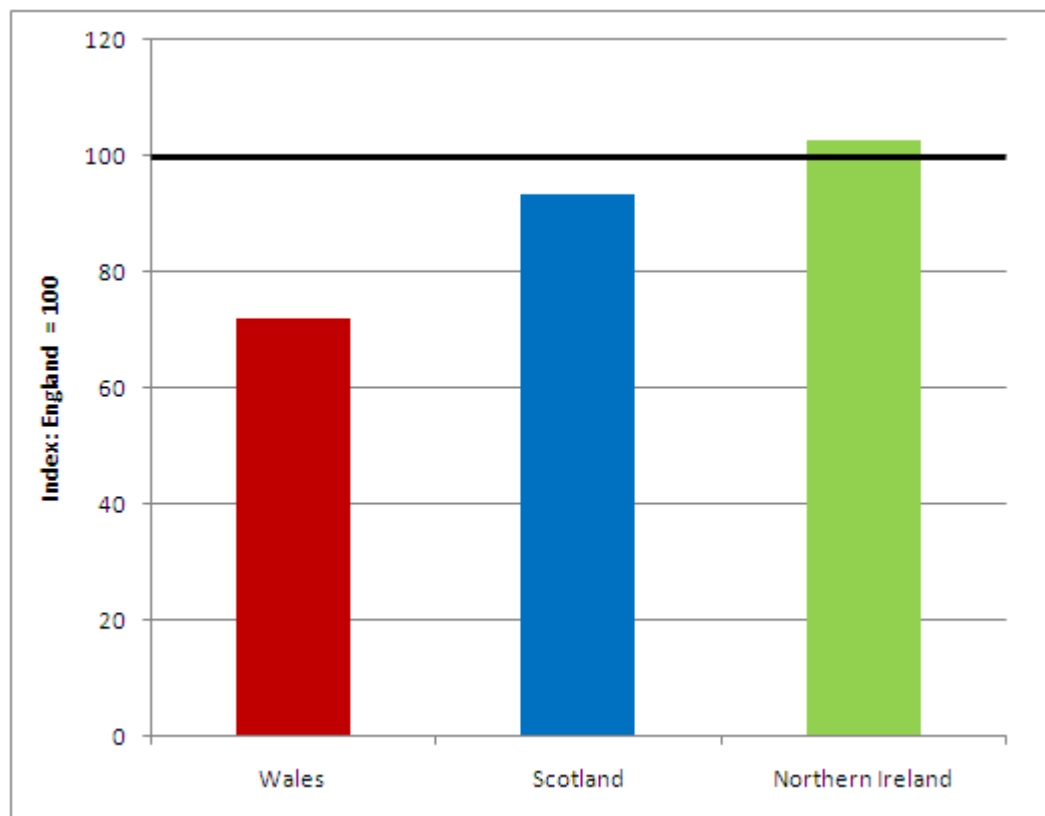
Figure 27: Acute activity per head of hospital and community health service staff: 2008/9



NB: Data for accurate specialties only

However, consultant productivity appears to be around 2% higher in Northern Ireland than in England (see figure 28). However, in all countries trends on this crude productivity measure have been downward for many years.

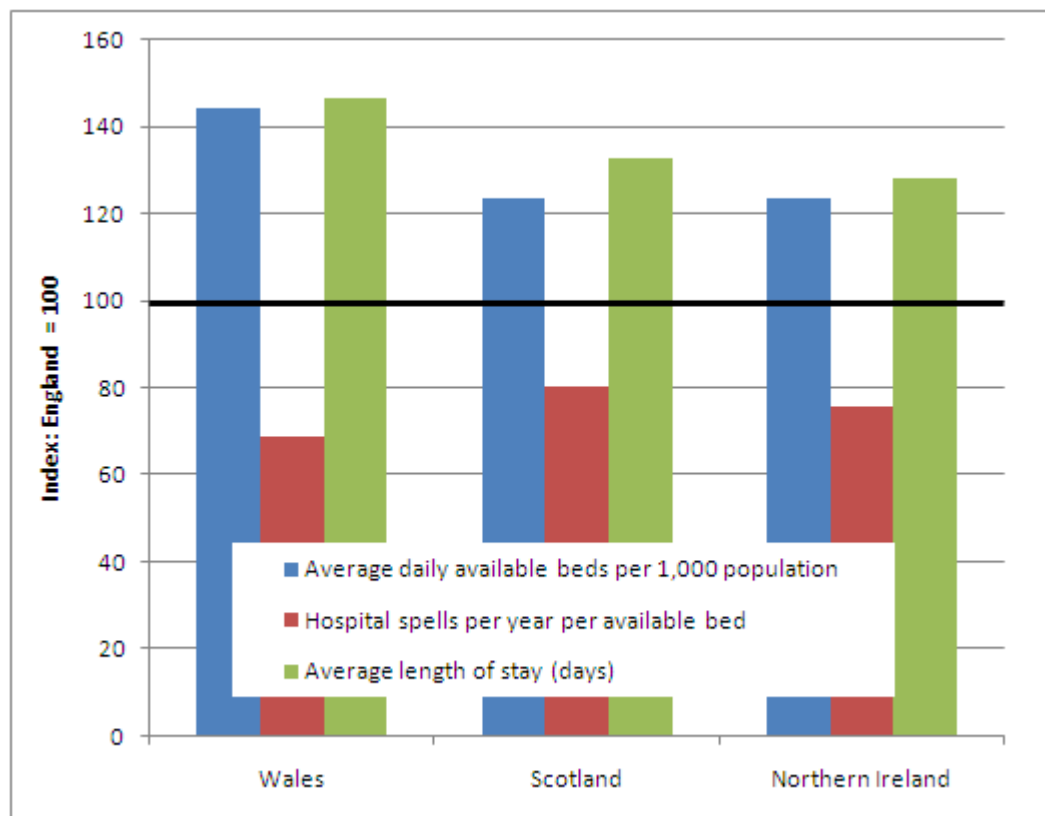
Figure 28: Acute finished consultant episodes per whole time equivalent consultant: Relative to England: 2009/10



Hospital bed use

Northern Ireland has approximately a quarter more acute beds per 100 population than England (see figure 29). However, these beds are less intensively used - 55 inpatient spells per bed per year compared with 72 for England. Further, patients tend to stay in hospital for longer periods - nearly 28% (1.2 days) longer than the average English patient.

Figure 29: Beds, activity per bed and average length of stay relative to England: Acute specialties, 2008/9



NB: Elderly care is not included in any of the data

Waiting times

For patients, having to wait and in particular, having to wait excessively long times to receive treatment in hospital, is a very visible indicator of a health system not working efficiently. Following a steady rise in the numbers on outpatient waiting lists from 1996 to 2006, considerable efforts to reduce list sizes resulted in a huge reduction in numbers waiting - from around 180,000 (then, more one in ten of the entire Northern Ireland population) to around 68,000 in 2009 (see figure 30). However, since then numbers waiting for their first appointment at an outpatients department has risen, and at a faster rate than during the decade from 1996. Numbers waiting have now doubled to around 124,000 by December 2010 (although December shows a slight downturn).

Similar trends can be seen with the inpatient waiting list which has now risen to 51,000 from a low of 35,000 in 2007.

While lists have lengthened, so too have the time patients have had to wait. Figure 31 for outpatients shows that while waiting over three months was virtually eradicated by 2008, numbers waiting between 3 and 6 months now stand at around 27,000, and those waiting over half a year at over 10,000.

Figure 30: Inpatient and outpatient waiting lists: 1994-2010

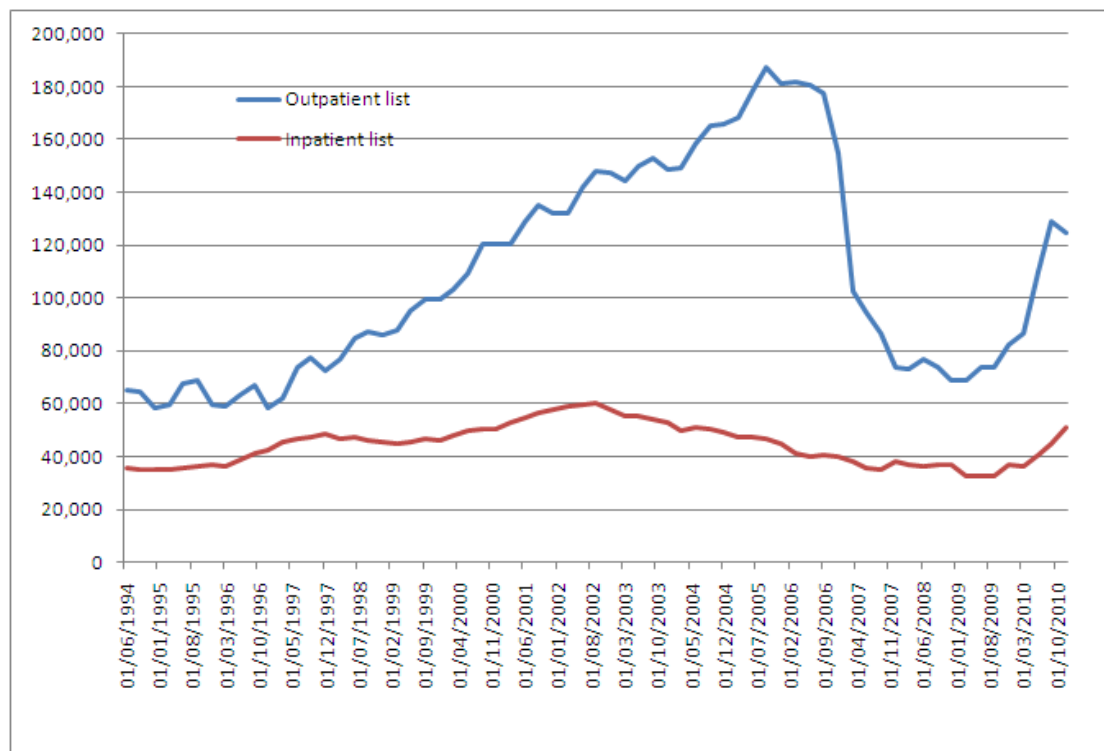
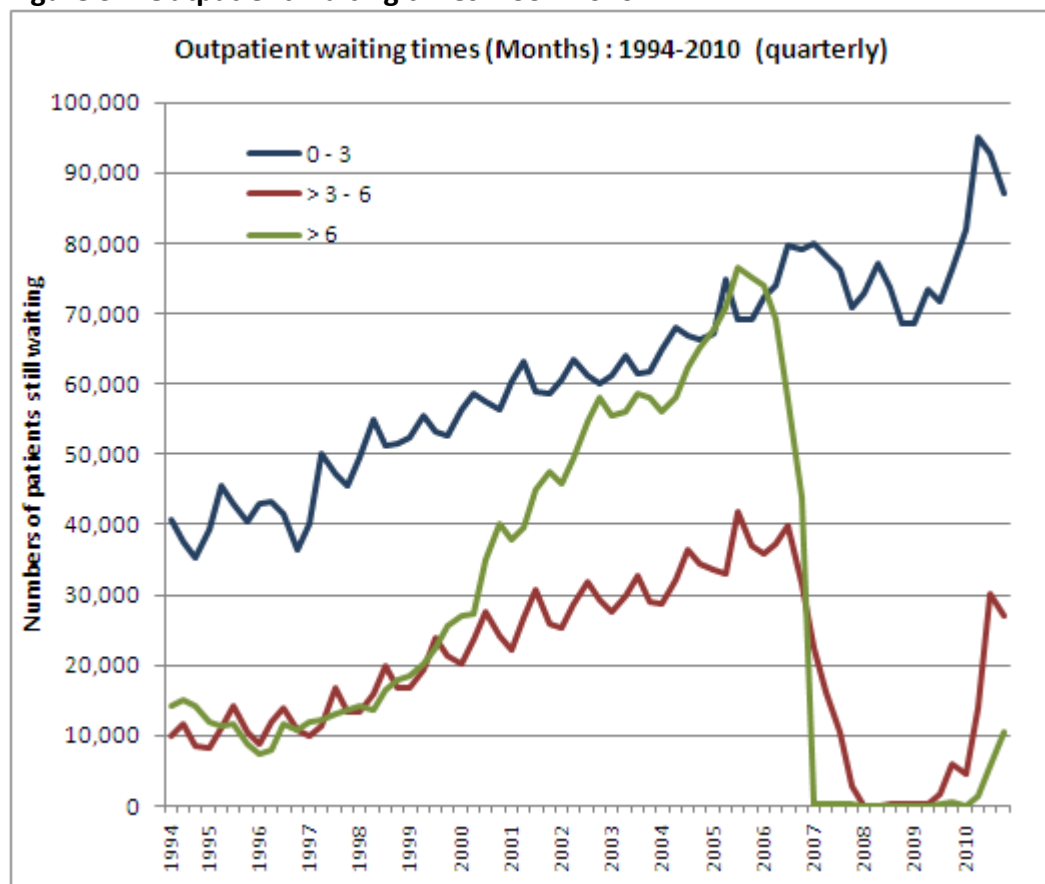
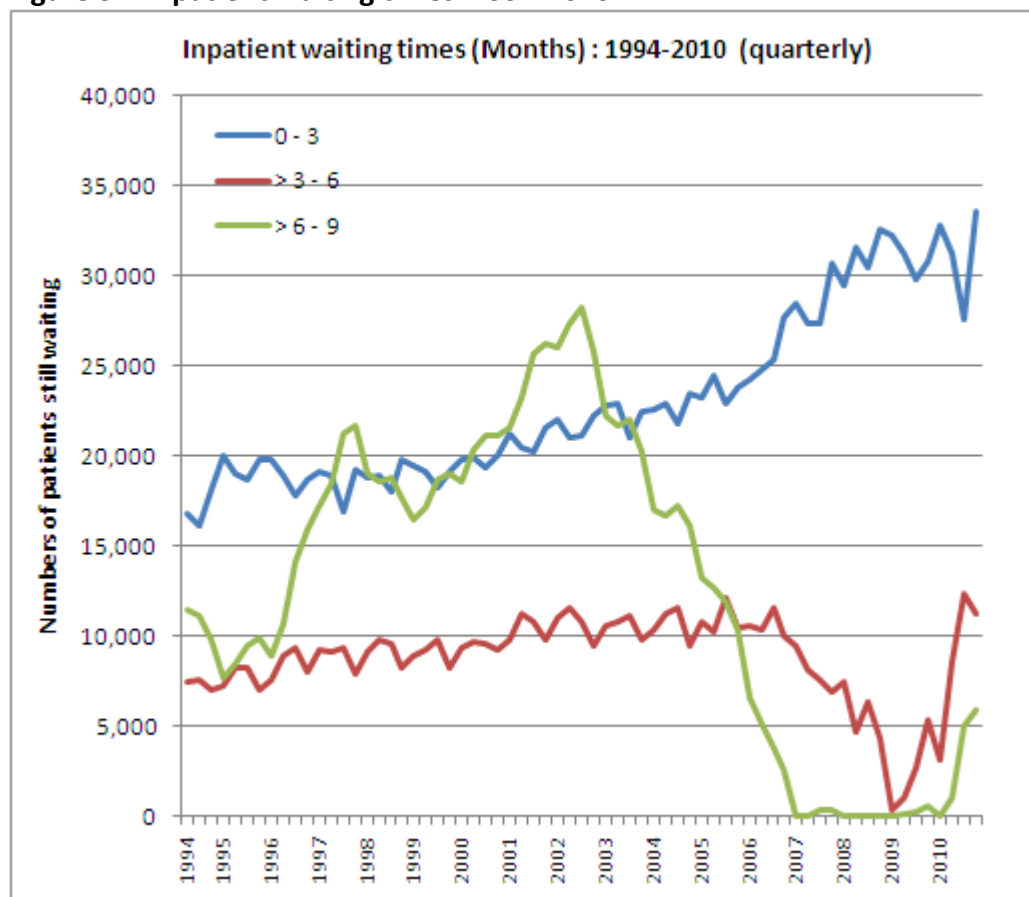


Figure 31: Outpatient waiting times: 1994-2010



Similarly, waiting times for patients on inpatient lists are also creeping up (see figure 32). Having briefly reduced the number of patients waiting 3 to 6 months to zero in 2009, there are now over 11,200 waiting this long. There are also around 5,900 patients now waiting over half a year to be admitted.

Figure 32: Inpatient waiting times: 1994-2010

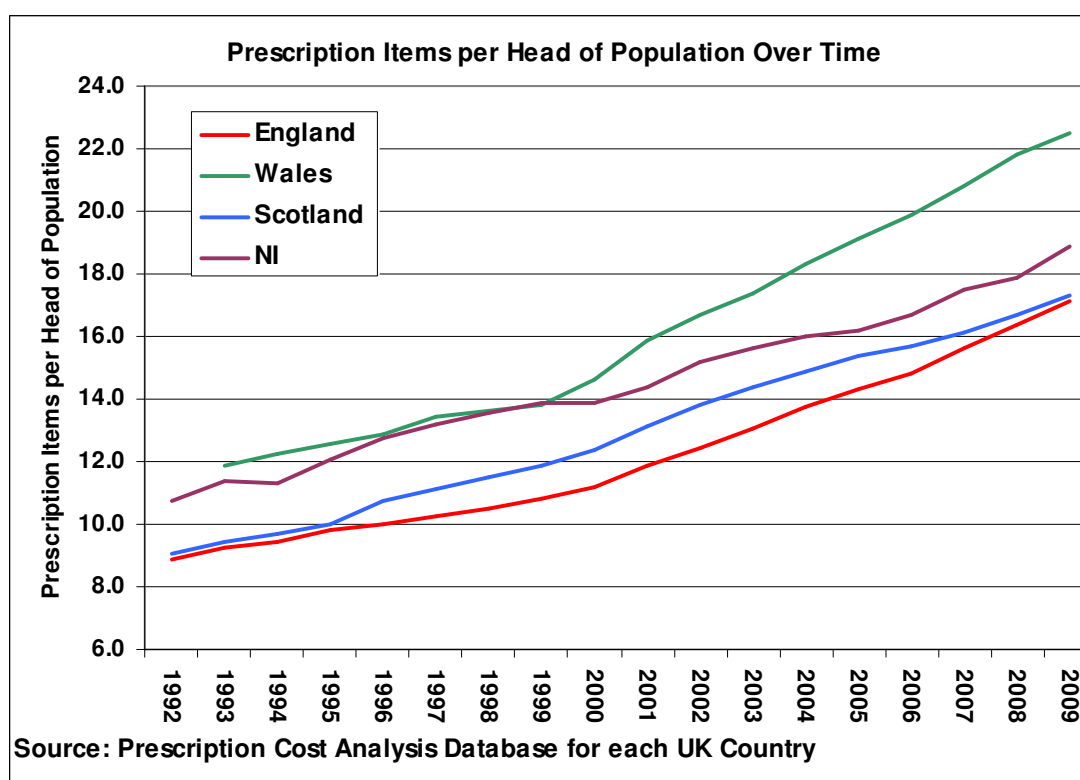


In addition, during the quarter ending 31 December 2010, while 81% of new and unplanned review attendances at A&E units (includes A&E and Minor Injury Units (Type 1, 2, 3)) in Northern Ireland were either treated and discharged or admitted within 4 hours of their arrival at A&E, this compared with 97% in England.

Pharmaceutical services

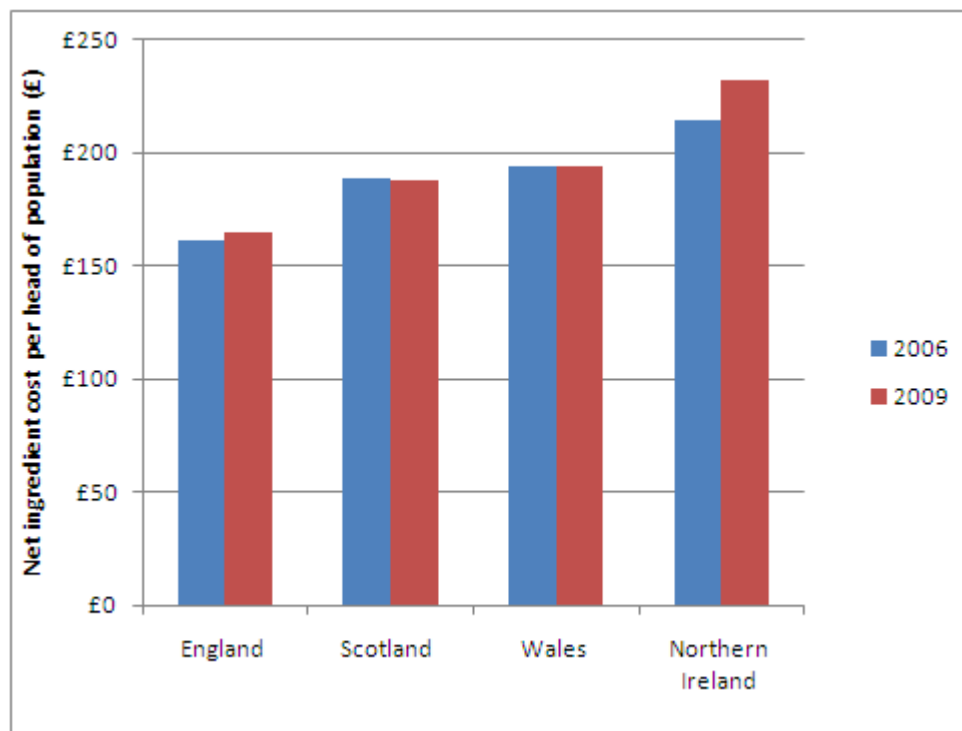
Prescribing rates in Northern Ireland remain around 12% higher per head of population than England and Scotland (see figure 33).

Figure 33: Prescription items per head of population: UK trends



However, generic dispensing rates have increased from around 50% in 2007 to around 62% in 2010 in Northern Ireland. Currently generic dispensing rates in England are around 68%. Despite this, the net ingredient cost of prescriptions per head of population in Northern Ireland remain relatively high - 31% higher than England in 2006 - and increasing at a faster rate - 8.3% between 2006 and 2009 compared with 2.2% in England (see figure 34).

Figure 34: Net ingredient cost per head of population: 2006 and 2009



Summary

- A system-wide measure of productivity for the Northern Ireland NHS suggests a small increase of productivity between 2005/6 and 2008/9 of just 1% - achieved largely from one year's slow down in input growth rather than growth in outputs over inputs.
- Applying England's unit HRG costs to Northern Ireland activity reveals large 'excess' costs of production: Provisional data for 2009/10 shows: Elective inpatients, 16% excess costs; non-elective inpatients, 29%; day cases, 5%. Overall, costs were 22% higher.
- There is considerable variation across providers when applying England's unit costs to their activity. Some hospitals appear to incur more than twice the cost that would be expected if they operated at England's unit HRG costs for elective inpatients.
- The total estimated 'excess' cost for elective and non-elective inpatient and day case activity was around £126 million in 2008/9.
- Accurate comparative data on workforce productivity has been difficult to produce. However, indicative data suggests Northern Ireland produces between 17% and 30% less inpatient, outpatient, day case and A&E activity per head of HCHS staff than England.
- Northern Ireland has over 20% more acute beds than England, but these are used less intensively; throughput per bed is around 25% lower than that

achieved in England. Patients also stay in hospital around 28% (1.2 days) longer than patients in England.

- Waiting lists for inpatients and outpatients are now rising rapidly since significant falls from 2006 to 2009.
- Around 5,900 patients are waiting over half a year year for admission to hospital as an inpatient and over 10,000 are still waiting over half a year for their first outpatient appointment.
- Pharmaceutical costs have risen faster in Northern Ireland than anywhere else in the UK between 2006 and 2009 - net ingredient costs per head of population have risen by over 8% and are now 40% higher than in England.
- Generic dispensing continues to improve - from around 50% in 2007 to 62% in 2009. This compares to 68% in England.

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APPENDIX I

Relative needs model descriptions

HMT NAS model

The NAS model employs a similar methodology for HCHS, FHS and PSS components of expenditure but differs in the groupings used to define population demographics, the chosen indicators of need and the costs of delivering services. The key components to the NAS model are

HCHS

- Population structure - the population is broken down by births and 7 selected age bands (0-4 through to 85+) and weighted by English HCHS expenditure weights.
- Morbidity - measured using SMR < 75 with a weighting of 0.6.
- Deprivation – based on a composite indicator consisting of 3 equally weighted factors: Isolated Elderly, Housing Conditions, and Income Support.
- Fertility – a measure of the average number of children that women would have over child bearing years assuming age-specific fertility rates.
- Sparsity – Proportion of people living in District Council areas with a population density of less than 1 person per hectare.
- Resource cost differences – based on additional HCHS expenditure experienced in Thames regions of England compared to total English HCHS allocation.
- Teaching Expenses adjustment

The factors are applied to the following percentage of expenditure:

Population structure: 100%

Morbidity: 77%

Deprivation: 7.5%

Fertility: 6%

Sparsity: 12.5%

FHS

- Population structure – Similar procedure to HCHS but using five age categories (0-4, 5-15, 16-64, 65-74, 75+) and weighted by English FHS expenditure weights.
- Morbidity – combination of SMR < 75 and an indicator of the percentage of population in physically demanding (manual) occupations. The two factors are weighted in ratio 0.8:0.2.
- Deprivation – based on a composite index consisting of the following factors: Isolated Elderly, Housing Conditions, IS recipients, Children in Lone Parent Families on IS, and Children in Lone Parent Families. The relative weightings applied to these are 0.3, 0.1, 0.4, 0.1, and 0.1 respectively.
- Fertility – as HCHS

- Sparsity - calculated by expressing total GMS expenditure including expenditure on Rural Practice Payments (RPPs) as a percentage of GMS expenditure without RPPs.

The factors are applied to the following percentage of expenditure:

Population structure: 100%

Morbidity: 40%

Deprivation: 30%

Fertility: 6%

Sparsity: 28%

PSS

(1) Elderly (population aged 65+):

- Population structure – divided into 3 sub-groups (65-74, 75-84, 85+) and weighted using weights 1.0, 4.5 and 14.2 respectively.
- Deprivation – Composite index consisting IS recipients, Isolated Elderly and Housing Amenities. The three factors are weighted in ratio 0.3, 0.6, 0.1 respectively.
- Disability – prevalence of disability among adult population.
- Sparsity – as with HCHS
- Resource cost differences – based on comparison of average earnings of PSS professionals.

The factors are applied to the following percentage of expenditure:

Deprivation: 50%

Disability: 2%

Sparsity: 50%

An overall index is calculated by multiplying the following factors:

Population; Deprivation, Disability and Sparsity; and Resource cost differences.

(2) Children (< 18):

- Population structure – single weight applied to under 18 age group.
- Deprivation – composite index consisting of IS recipients in under 60 age group, Children in Single Parent Families (2 versions of), Housing Conditions, Population density. These factors are weighted in ratio: 0.2, 0.125, 0.125, 0.05 and 0.5 respectively.
- Disability – as per PSS Elderly.
- Sparsity – as per PSS Elderly
- Resource Cost Difference – as per PSS Elderly.

The factors are applied to the following percentage of expenditure:

Deprivation: 60%

Disability: 2%

Sparsity: 50%

An overall index is calculated by multiplying the following factors:

Population; Deprivation, Disability and Sparsity; and Resource cost differences.

(3) Other:

- Population structure – single weight applied to 18 to 64 year age group.
- Deprivation – composite index consisting of IS recipients in under 60 age group, Children in Single Parent Families (2 versions of), Housing Conditions. These factors are weighted in ratio: 0.5, 0.2, 0.2, and 0.1 respectively.
- Disability – as per PSS Elderly.
- Sparsity – as per PSS Elderly
- Resource Cost Difference – as per PSS Elderly.

The factors are applied to the following percentage of expenditure:

Deprivation: 30%

Disability: 2%

Sparsity: 50%

An overall index is calculated by multiplying the following factors:

Population; Deprivation, Disability and Sparsity; and Resource cost differences.

An overall need factor for PSS is calculated by averaging the needs factors for the three sub-programmes using weights that are proportions of total PSS spending in England on each group. The weights are 46% for elderly, 34% for children and 20% for other adults.

Northern Ireland Capitation formulae

The individual formula from the nine programs of care from the NI regional capitation model were combined with the Drugs Bill in the Prescribing and Pharmaceutical Budget and the GMS allocation formula, the weights used are shown in Table 1 below.

Table 1 Expenditure data used for 2010-11 modelling excluding Capital Charges and Negligence

Programme of Care	Expenditure Weights
Acute Services Elective	20.02%
Acute Services Non Elective	15.66%
Maternity and Child Health	3.73%
Family and Child Care	5.67%
Elderly Care	17.90%
Mental Health	7.00%
Learning Disability	6.23%
Physical and Sensory Disability	2.65%
Health Promotion and Disease Prevention	2.92%
Primary Health and Adult Community	3.32%
Global sum	3.32%
Drugs bill in Prescribing and Pharmaceutical budget	11.59%
Total	100%

Each of the Individual Programmes are discussed below.

Elective Acute Services

Age effect

This is a two stage multiplicative model. The age-gender weights for this formula are set for 18 5 year age bands from 0-4 up to 85+ they are given in Table 3 below.

Additional need

The additional need for this POC is calculated as:

*(Proportion of 65+ not claiming AA) $^{-0.172}$ * (Standardised limiting long term illness) $^{0.173}$ * (Standardised cancer incidence rate) $^{0.095}$ * (Standardised Birth rate 2000-2004) $^{0.155}$ * (Proportion of households not owned outright) $^{0.146}$ * (Pro households with 2 or less children) $^{-0.460}$ * (Proportion of females 45-64) $^{0.109}$*

Non Elective Acute Services

Age effect

The age-gender weights for the non-elective acute are for the 18 5 year age bands as discussed in the elective formula the weights are given in Table 4

Additional need

The calculation of the additional needs index for the non elective acute formula is as:

*(Pro 65+ not claiming AA) $^{-0.312}$ * (Standardised self reported not good health) $^{0.248}$ * (Replacement for NI MDM 2005) $^{0.093}$ * (Standardised Birth rate 2000-2004) $^{0.185}$ * (Pro household not owned outright) $^{0.217}$*

The original result from research for this formula included the overall Northern Ireland multiple deprivation measure from 2005 in the model, however, this indicator is unavailable for England. In order to overcome this problem Demography and Methodology Branch (DMB) of the Northern Ireland Statistics and Research Agency (NISRA) recommended that a population weighted average of the income domain could be used in place of this indicator.

Maternity and Child Health

In this PoC there are no age gender weights, however, weightings are applied to births and the 0-4 population separately and then combined to give the overall allocation.

Additional need

The age of the mother is taken into consideration in the calculation of the needs index for births. All calculations involved in births weightings are given below.

Table 2 Calculation of additional needs index for Maternity and Child Health

Age of mother / indicator	25-29	30-34	35-39	40-44	LBW	Mult Birth	Prev Births
Coefficient	0.312	0.609	0.898	0.973	7.152	1.891	-1.477

Standardised mortality rates for those aged under 75 years are used as the additional needs index for the 0-4 population resulting in an increased share for NI.

Family and Child Care

Age effect

The age gender weights for this PoC are based upon four age bands 0-4, 5-9, 10-14, 15-19 and 20-44 they are included in Table 5.

Additional need

The calculation of the additional needs is as:

$$(Propn\ 16-18\ yr\ olds\ not\ in\ F-T\ Ed)^{0.205} * (Prop\ children\ in\ Own\ Occ\ Hsing)^{-0.599} * (Prop\ children\ in\ IS\ hholds)^{0.448}$$

In the original capitation formula for this PoC the Noble Social Environment score was a needs variable. As it was not possible to give overall scores for England and NI for this variable, the coefficients on the remaining needs variables were re-estimated.

Elderly Care

Age effect

The age weights for this PoC are based upon age bands of 65 to 69, 70 to 74, 75 to 79, 80 to 84 and 85 and over, they are given in Table 6.

Additional need

The calculation of the additional needs index is as:

$$(Pro\ elderly\ females\ under\ 85)^{1.479} * (SMR\ 65\ and\ over)^{0.128} * (65+ \ not\ claiming\ AA)^{-0.946} * (Pro\ pensioners\ not\ in\ social\ housing)^{-0.152} * (Potential\ years\ of\ life\ lost)^{0.069}$$

Mental Health

Age effect

The age-gender weights for this PoC are based upon seven age bands for the whole population and are given in Table 7 below.

Additional need

The calculation of the additional needs index is as:

*(Proportion of 16-64 year olds on Income Support) ^0.365**
*(Proportion of dependents not in single carer households) ^-1.393**
*(Proportion of persons in households with head in manual class) ^0.340**
*(Proportion of working age population who are students) ^0.250**
(Standardised Mortality Rates for those aged 65-74)^0.268

Learning Disability

Age effect

The age weights for this PoC are based upon the following four age bands 0-19, 20-34, 35-49 and 50+ they are given in Table 8

Additional need

The variables used in the calculation of the additional needs index are given in the table below.

*(Proportion of Persons in No Carer Households (where at least one person has a self-reported long-standing illness))^0.745**
*(Proportion of Children In Job Seekers Allowance Households)^1.452**
*(Proportion of Persons Aged 16-64 with no Qualifications)^0.587**
*(Proportion of Persons in Households without Central Heating)^0.914**
(Proportion of Children in Disability Living Allowance Households)^2.671

Physical and Sensory Disability

Age effect

The age gender weights in this PoC are based upon the age bands 0-24, 25-44 and 45-64 and are shown in Table 9.

Additional need

The variables used in the calculation of the additional needs index are given in the table below.

*(Standardised Limiting Long Term Illness (<65))^0.559**
*(16-64 year olds living in Disability Allowance Households) ^0.376**
(Noble Income Domain) ^0.114

Health Promotion and Disease Prevention

There are no age-gender weights in this PoC. To adjust for need, the total population is weighted by the under 75 Standardised Mortality Rates (SMR U75)

Primary Health and Adult Community

As in the health promotion and disease prevention PoC, there are no age-gender weights for this PoC. SMR U75 is used to adjust for need as before but is only applied to the population aged 16-64.

Prescribing

Age effect

The age-gender weights for this formula are based upon eight age bands from 0-4 to 75+, they are given in Table 10.

Additional Need

The calculation of the additional needs index is as:

121.967 (Proportion of Babies on the GP List) + 23.937 (Proportion of Dep children in lone parent HH) - 0.294 (% Persons 16-74 Students) + 0.2 (Education)

In the original model, the 2005 multiple deprivation education domain was used, however this is not available for England. Following consultation with DMB the proportion of 25-29 year olds with no or low qualifications taken from the 2001 Census was chosen to replace this education domain. The chosen indicator is now a major part of the 2010 updated education domain in Northern Ireland.

GMS

Age effect

The age-gender weights for this PoC are in seven bands from 0-4 to 85+ and are shown in Table 11

Additional need

The calculation of the additional needs index is as follows:

0.195 (Limiting long-standing illness) + 0.271 (Self-Assessed Health “not good”) + 0.049 (Unemployment rate) - 0.024 (Single Carer Households)

Age Gender Weights for all PoCs

**Table 3 Age-gender weights for
Elective Acute Service**

Age Band	Males	Females
0 to 4	274.22	221.39
5 to 9	133.96	108.26
10 to 14	102.82	94.49
15 to 19	114.34	96.63
20 to 24	127.66	129.52
25 to 29	110.56	140.67
30 to 34	122.31	187.36
35 to 39	158.58	223.04
40 to 44	191.18	267.39
45 to 49	221.98	310.46
50 to 54	284.77	336.59
55 to 59	394.66	408.36
60 to 64	529.02	479.28
65 to 69	648.77	521.93
70 to 74	799.88	550.9
75 to 79	880.05	650.17
80 to 84	820.72	621.1
85 and over	637.12	451.7

**Table 4 Age-gender weights for Non
Elective Acute Service**

Age Band	Males	Females
0 to 4	235.19	189.26
5 to 9	33.95	27.63
10 to 14	36.02	29.95
15 to 19	51.48	46.86
20 to 24	63.74	62.02
25 to 29	52.47	60.99
30 to 34	54.15	63.56
35 to 39	73.89	65.32
40 to 44	98.99	81.5
45 to 49	116.27	84.05
50 to 54	129.44	106.2
55 to 59	200.96	136.73
60 to 64	260.98	201.51
65 to 69	402.04	267.42
70 to 74	562.06	371.88
75 to 79	778.06	557.75
80 to 84	1006.13	844.67
85 and over	1350.79	1005.38

Table 5 Age Gender weights for the family and child care PoC

Age band	0-4	5-9	10-14	15-19	20-44
Male	1.14	1.36	1.37	1	0.1
Female	1.02	1.25	1.2	1.15	0.1

Table 6 Age Gender weights for the Elderly PoC

Age Band	65-69	70-74	75-79	80-84	85+
Males	299.08	596.3	1239.81	2453.25	4859.86
Females	270.61	652.47	1510.57	3380.58	6708.15

Table 7 Age-gender weights for Mental Health PoC

Age	0-4	5-14	15-44	45-64	65-74	75-84	85+
Male	0.0	0.2	1.0	1.5	1.6	1.6	1.4
Female	0.0	0.2	0.9	1.3	1.6	1.8	2.1

Table 8 Age-gender weights for Learning Disability PoC

Age	0-19	20-34	35-49	50+
Male	23.35	36.21	33.27	19.49
Female	14.33	25.71	27.06	15.86

Table 9 Age-gender weights for Physical and Sensory Disability PoC

Age	0-24	25-44	45-64
Male	7.6	10.4	29.6
Female	6.2	13.1	36.3

Table 10 Age-gender weights for Prescribing

Age	0-4	5-15	16-24	25-44	45-59	60-64	65-74	75+
Males	1.49	1.23	1.11	2.28	5.56	9.91	13.04	16.72
Females	1.25	1	1.52	3.02	6.49	10.1	12.71	16.39

Table 11 Age-gender weights for GMS

Age	0-4	5-15	16-44	45-64	65-74	75-84	85+
Males	2.47	1.00	1.26	2.88	4.58	5.22	7.67
Females	2.41	1.09	3.36	4.27	4.56	6.35	7.36

English allocation models

The English allocation models consist of separate formulae, concerning Hospital and Community Health Service (HCHS) Family Health Services (FHS) and Personal Social Services (PSS). Each of these is slightly different and each is discussed below.

HCHS

HCHS consists of four formulae Acute (67.5%), Maternity (2.9%), Mental health (16.1%) and HIV (1%). In addition to these there are three adjustments the Health inequalities adjustment which is used to allocate funds directly 12.4%); the Emergency Ambulance Cost Adjustment (EACA) and the Market forces factor (MFF) cost adjustment The resultant index for the MFF and EACA adjustments are applied to the overall share of each area.

Acute

The acute formula suite consists of 18 formulae, one for each 5-year age band from 0-4, 5-9 etc up to 80-84 and 85+ each of these formula consists of a number of variables from the table below plus the age specific death rate for each age band.

Table 12 Needs indicators and coefficients included in the acute models

Age Band	0-4	5-9	10-14	15-19	20-24	25-29
Age Specific Death Rate	202.5	541.5	494.5	465.7	883.1	209.5
Standardised No Qualifications	9.5	11.9	6.2			23.6
Young people not staying in education				13.7	20.6	
Standardised limiting long term illness				12.1	14.5	
pension credit claimants						
low birth weight births	5.4					
ID2004: income deprivation affecting children	13.7	10.4				
Disability living allowance claimants under 16			13.0			
New Deal for young people claimants						8.5
Disability living allowance claimants						16.3
Incapacity Benefit/Severe Disability Allowance						
DLA claimants over 60						
Constant	317.6	401.5	378.9	216.0	536.0	328.5

Table 12 Needs indicators and coefficients included in the acute models (continued)

Age Band	30-34	35-39	40-44	45-49	50-54	55-59
Age Specific Death Rate	316.5	344.9	418.0	292.2	285.6	294.1
Standardised No Qualifications	21.5		22.4	27.4	31.0	23.9
Young people not staying in education		7.1				
Standardised limiting long term illness		23.9	27.6	32.3	32.8	42.3
pension credit claimants				18.7	25.1	33.3
low birth weight births						
ID2004: income deprivation affecting children						
DLA claimants under 16						
New Deal for young people claimants	6.5					
DLA claimants	15.9					
Incapacity Benefit/Severe Disability Allowance		24.5	15.7			
DLA claimants over 60						
Constant	378.3	413.8	476.9	492.4	554.0	658.0
Age Band	60-64	65-69	70-74	75-79	80-84	85+
Age Specific Death Rate	173.5	211.9	180.2	148.8	117.5	21.8
Standardised No Qualifications	20.0			38.2	28.4	
Young people not staying in education						
Standardised limiting long term illness	33.5					
pension credit claimants	48.1	65.5	57.5	44.5	33.3	124.1
low birth weight births						
ID2004: income deprivation affecting children						
DLA claimants under 16						
New Deal for young people claimants						
DLA claimants						
Incapacity Benefit/Severe Disability Allowance						
DLA claimants over 60		36.3	62.1			258.2
Constant	818.4	985.2	1211.2	1423.9	1616.5	2705.0

Maternity

The maternity formula has no age specific element to it, instead it is based on a cost per birth approach. Where the average cost is calculated using the mean house price and the proportion of low birth weight births. This average cost is multiplied by the total births recorded and the share of this final pot is taken as the overall share.

This formula is calculated as:

$$2308.8 + 24.7(\text{proportion of low birth weight births}) - 96.06(\text{mean house price})$$

Mental health

The mental health formula is a two-stage formula with age weights for the same 18 individual age bands as the acute model.

The additional need element of the mental health formula is as:

0.385 + 0.358 (Comparative mortality factor under 65 years) + 0.338 (Proportion aged 60 and over claiming income support) + 0.034 (housing domain) + 0.636(psycho-social morbidity index)

HIV

The HIV formula consists of two elements HIV treatment and care and HIV prevention these are combined at 80% and 20% respectively. The treatment and care element depends upon the normalised prevalence of HIV observed in the Survey of Prevalent HIV Infections Diagnosed (SOPHID). The prevention consists of the SOPHID prevalence combined with the crude 15-44 population weighted at a weighting of 60% and 40% respectively.

Health inequalities adjustment

This is based upon the disability free life expectancy (DFLE) for each area, the population of each area is weighted by how many years below 70 its DFLE is. Each area's share of the total weighted population is used as its share of the health inequalities adjustment.

MFF

The MFF for HCHS is made up from the elements shown below

Staff (56.1%)

This is based upon analysis of the annual survey of hours and earnings (ASHE)

Medical and Dental London Weighting (13.8%)

Is based upon the location of the area and amount serving London.

Buildings (3.0%)

Is based upon location factors from Building Cost Information Service

Land (0.6%)

Is calculated based upon the valuation office agency's (VOA) valuation of the estates

Other (26.5%)

This is currently set at 1

EACA

The EACA is based upon the rurality index of the area, the number of urgent and emergency ambulance journeys and the proportion of these journeys, which are emergency.

FHS

FHS consists of two formulae Prescribing and Primary Medical Services (PMS) the adjustments that are applied to each are discussed below.

Prescribing

The prescribing formula is a two stage formula with a set of age gender weights applied to the crude population, with nine age bands ranging from 0-4 to 75+ the weight attributed to each age band increases with age.

The additional need element of this formula is constructed as follows:

*0.997 + 0.044 (Percentage Limiting Long-Term Illness) +
0.050 (Disability Living Allowance Claimants) + 0.006 (Low Income Scheme Index) +
0.007 (Proportion of Low Birthweight Births)*

The Health inequalities adjustment is also applied as 15% of allocation in this formula

PMS

The PMS formula is a two stage formula with a set of age gender weights applied to the crude population, with seven age bands ranging from 0-4 to 85+ the weight attributed to each age band increases with age.

The additional need element of this formula is constructed as follows:

*48.1198 + 0.26115 (Standardised Limiting Long Term Illness) + 0.23676 (Standardised
Mortality Rate for the under 65s)*

The Health inequalities adjustment is also applied as 15% of allocation in this formula
In addition, there is also a PMS MFF

PMS MFF

The building and other elements of the PMS MFF are the same as the HCHS MFF, practice pay is the same as staff in HCHS. The Land index is based on small site valuations rather than the trust estates. The GP pay index is adapted from the index of deprivation.

Table 13 Elements of PMS MFF

Element	Weight
GP Pay	44.9%
Practice Pay	30.7%
Buildings	5.8%
Land	1.2%
Other	17.5%

PSS

The PSS formula consists of three elements Children's, Younger Adults and Older Adults these are discussed below.

Children's

Children's social care is calculated as the population of 0-17 year old in each area multiplied by the basic amount (28.3003) plus a deprivation top up multiplied by foster care adjustment multiplied by the area cost adjustment for children

The deprivation top up constructed from:

262.56(Children without Good Health) + 148.735(IS/JSA claimants 18-64) + 185.4902 (Children of IS/JSA claimants) + 100.0765 (Children in Black Ethnic Groups) - 29.3071

The foster care adjustment constructed as:

14.8648 (People in other Ethnic Groups) + 34.3436 (People in mixed Ethnic Groups) + 14.0199 (16-74 attained Level 1 or 2) + 6.3347 (16-74 attained Level 4 or 5) + 20.0811 (Females 16-74 looking after home/family)-4.8612

The area cost adjustment calculated to reflect different costs of providing services across the country is based on ASHE data for the areas

Younger adults

Younger adults is constructed from the 18-64 year old population in the area this is multiplied by the basic amount (9.8049) plus the deprivation top up multiplied by an area cost adjustment for younger adults.

The deprivation top up is constructed as:

284.1943 (DLA Recipients 18-64) + 76.8918 (18-64 Long term unemployed) + 26.01(18-64 in Routine/Semi-routine occupations) + 21.7351 (Households with no family) -15.0541

The area cost adjustment is the same as the children's area cost adjustment

Older adults

The older adults formula is based upon over the 65 population of the area this is multiplied by the basic amount of (86.0387) + age Top up + deprivation top up the result

of this is multiplied by a low income adjustment then by the sparsity adjustment then by the area cost adjustment for older people.

The age top up is constructed from information on ratio of over 90 year olds to over 65 years old in each area.

The deprivation top up is constructed as:

*288.3107 (Older People on AA) +55.7551(Older people in rented acc.)+
74.6782(Older people living in one person Households) + 224.2339 (Older people on
PC/JSA)-77.6613*

The low income adjustment is constructed as:

*0.1042- 0.102(older people on income support / income based jobseekers allowance /
guarantee element of pension credit) + 0.126281166*

This is then divided by the area cost adjustment for older people and subtracted from 1

The sparsity adjustment is based upon the population density of the areas in which the over 65s live.

Area cost adjustment for older people is constructed based cost of providing services calculated from ASHE data for the areas

Appendix 2

**Table A2:1: Productivity improvement assuming English spending (from 2007/8)
applied to Northern Ireland**

		2008-9	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2007/20 15
HMT NAS									
+6.02%									
Solid Progress	%	1.2%	-0.5%	6.1%	7.0%	5.0%	5.8%	5.7%	51.2%
Slow Uptake	%	1.7%	-0.5%	6.1%	7.1%	5.3%	5.6%	5.5%	51.9%
Fully Engaged	%	0.9%	-0.7%	5.8%	6.8%	4.8%	5.5%	5.5%	48.8%
Solid Progress	£m	48	-23	286	352	270	325	341	1,600
Slow Uptake	£m	69	-20	290	356	285	317	331	1,628
Fully Engaged	£m	39	-33	274	338	256	308	322	1,504
NI Capitation +11.5%									
Solid Progress	%	1.5%	-0.2%	6.4%	7.3%	5.3%	6.0%	5.9%	53.8%
Slow Uptake	%	2.0%	-0.1%	6.4%	7.4%	5.5%	5.8%	5.7%	54.5%
Fully Engaged	%	1.2%	-0.4%	6.1%	7.1%	5.0%	5.8%	5.7%	51.4%
Solid Progress	£m	61	-9	301	370	283	342	359	1,708
Slow Uptake	£m	83	-6	306	374	299	333	348	1,737
Fully Engaged	£m	52	-19	289	355	268	324	338	1,606
England Capitation +17.2%									
Solid Progress	%	1.8%	0.1%	6.7%	7.6%	6.1%	6.6%	6.6%	56.5%
Slow Uptake	%	2.4%	0.2%	6.7%	7.6%	6.3%	6.4%	6.4%	57.3%
Fully Engaged	%	1.6%	-0.1%	6.4%	7.4%	5.8%	6.4%	6.3%	54.0%
Solid Progress	£m	75	5	318	387	332	383	405	1,905
Slow Uptake	£m	98	8	322	392	349	374	394	1,937
Fully Engaged	£m	65	-5	305	372	316	363	383	1,798
2005 Review judgement +7%									
Solid Progress	%	1.2%	-0.5%	6.1%	7.1%	5.7%	6.2%	6.2%	51.6%
Slow Uptake	%	1.7%	-0.4%	6.2%	7.1%	5.9%	6.0%	6.0%	52.4%
Fully Engaged	%	1.0%	-0.7%	5.9%	6.9%	5.5%	6.0%	6.0%	49.3%
Solid Progress	£m	51	-21	288	355	305	351	371	1,701
Slow Uptake	£m	72	-18	292	360	320	343	361	1,730
Fully Engaged	£m	42	-30	276	341	290	333	351	1,603
2011 Review judgement 9%									
Solid Progress	%	1.3%	-0.4%	6.2%	7.2%	5.8%	6.3%	6.3%	52.6%
Slow Uptake	%	1.8%	-0.3%	6.3%	7.2%	6.0%	6.1%	6.1%	53.3%
Fully Engaged	%	1.1%	-0.6%	6.0%	6.9%	5.5%	6.1%	6.1%	50.2%
Solid Progress	£m	55	-16	294	362	310	357	378	1,741
Slow Uptake	£m	77	-13	298	366	326	349	368	1,770
Fully Engaged	£m	46	-26	282	347	295	339	357	1,641

Appendix 3: Key drivers of overall spending paths in Wanless scenarios

	Solid Progress	Slow Uptake	Fully Engaged
National Service Frameworks - CURRENT	Delivering best practice in the five NSF disease areas - CHD, cancer, renal disease, mental health and diabetes. Extending the NSF approach to other areas of the NHS over the next 20 years. Delivering best practice in these five disease areas represents an average real terms increase approaching 8% a year. These (and new NSFs) are key to the NHS Plan's quality strategy for 'catching up'. Costs are over and above the impact of demographic change, and 'quality' is defined in terms of access, technology and other aspects of service delivery and outcome.		
National Service Frameworks - NEW	Extrapolation of the costs of improvements in existing NSF areas to other specific diseases. To do this, spending may need to increase by 6 to 8% a year in real terms over a period of 10 years. New NSFs are rolled out across other areas in phases, at an average rate of two per year, ensuring complete coverage over the 20 years of the Review. Future NSFs include estimates of the resources necessary for their delivery; be supported by improved information and information collection; and take account of the fact that patients may have co-existing conditions.		
...and medical technology	Contributes around 3 percentage points a year to growth in health spending	Contributes around 2 percentage points a year to growth in health spending	Contributes around 3 percentage points a year to growth in health spending
Fast access - waiting times	Maximum inpatient waiting time: 15 to 6 months (by 2005-06), to 3 months (by 2008-09), to 2 weeks (by 2022-23). Maximum outpatient waiting time (excluding cancer): 6 to 3 months (by 2005-06, maintained to 2008-09), to 2 weeks (by 2022-23). For all three scenarios, the additional cost of reducing waiting times to two weeks is estimated to be around £10 billion a year (2002 prices) by 2022-23.		
Clinical governance	Medical staff in hospitals and primary care move from 5% of time devoted to clinical governance to 10% by 2010-11. Nursing and other professional staff increase clinical governance time from 2% to 10% by 2010-11. Benefits realised after 5 years: (i) 15% reduction in hospital acquired infections (HAI) in acute care by 2012-13 (could lead to fall of 2.8% in all inpatient activity; (ii) 10% reduction in other adverse incidents in acute care by 2012-13 (could lead to an additional 0.6% reduction in inpatient activity; (iii) improvement in avoidable emergency admissions in the worst performing 25 per cent of health Authorities on this measure by 2012-13; (iv) 25% reduction in clinical negligence bill from reduction in number of incidents in obstetrics and gynaecology by 2005. The additional cost of improved clinical governance estimated to be around £1.4 billion a year by 2022-23, with most of this coming through in the first five years.		

Capital: Modernising the NHS estate	Over the next 20 years, one third of NHS hospital estates will be replaced; equipment (excluding ICT) is replaced every eight years; in new hospitals, 75 per cent of beds are in single en-suite rooms and a maximum of four beds per room: the entire primary care estate will be upgraded or replaced over the next 10 years		
...and ICT	Spend doubles in real terms by 2003-04: to 3% of total spend.	Spend doubles in real terms by 2007-08: to 3% of total spend	Spend doubles in real terms by 2003-04: to 3% of total spend
Pay and prices	Total HCHS pay rises by 2.4% a year in real terms (over and above GDP deflator inflation). Price inflation assumed to be 2.5% throughout the 20 year period. Pay in GMS sector assumed to rise by 2.2% a year in real terms. Pay in the PSS sector assumed to rise by 2.3% a year in real terms. Pay and productivity assumptions include Agenda for Change programme covering nurses, GP contract, and the Consultant contract. Pay modernisation assumed to be important in order to increase capacity and create a more flexible workforce with greater scope for team working and facilitating changes in skill mix.		
Workforce	Working Time Directive reduces working hours of hospital doctors to 48 hours a week. Staffing driven by changes in throughput and activity: Average length of stay in hospital falls in line with the estimates in the National Beds Enquiry: Emergency admissions - 7.76 (2000), 7.27 (2005), 6.35 (2010) and 5.43 (2015); Elective admissions - 4.86 (2000), 4.37 (2005), 3.88 (2010) and 3.38 (2015).		
Productivity	Increases from 2 to 2.5% a year in the first decade to 3% a year in the second	Increases from 1.5% a year in the first decade to 1.75% a year in the second	Increases from 2 to 2.5% a year in the first decade to 3% a year in the second
Population health and health seeking behaviour cost drivers			
UK life expectancy at birth	Men 80.0; Women 83.8	Men 78.7; Women 83.0	Men 81.6; Women 85.5
Long-term ill health amongst the elderly	No change in rates of ill health	Increase in long-term ill health (age specific rates of physical dependency increase by 1% a year)	Healthy life expectancy increase broadly in line with life expectancy
Acute ill health among the elderly	5% reduction by 2022	10% increase by 2022	10% reduction by 2022
	Meet current public health targets leading to reductions in hospital admissions and GP visits	No change	Go beyond current public health targets leading to greater reductions in hospital admissions and GP visits, combined with higher spending on health

Health promotion (smoking, exercise, diet etc)			promotion
	Health promotion expenditure growing in line with expenditure on GP and hospital care	Health promotion expenditure grows in line with population growth and inflation	Health promotion expenditure growing in line with GP and hospital care, plus an additional £250 million a year by 2007-08 (i.e. a doubling of spend)
	Less than 24% of adults smoke (Baseline: 27%)	Prevalence of smoking remains the same	Prevalence of smoking achieves solid progress faster before being exceeded
	Less than 15% of pregnant women smoke (Baseline: 18%)	Prevalence of smoking remains the same	Prevalence of smoking achieves solid progress faster before being exceeded
	Number of babies born to teenage mothers in England & Wales reduces to 41,000 in 2005 and to 24,000 by 2010 (Baseline: 48,000)	No change	Number of babies born to teenage mothers achieves the solid progress target faster before being bettered
	5% reduction in births requiring special or intensive care	No change	5% reduction in births requiring special or intensive care
Health promotion (smoking, exercise, diet etc) - continued	Trends in obesity slow and ultimately reverse. From 21% for women, and 17% for men, to 8 and 6%, respectively.	Levels of obesity remain the same	Trends in obesity achieve solid progress aims quicker before being exceeded
	10% reduction in hospital admissions, GP visits and prescriptions related to CHD and stroke for 15-64 year olds. Reductions largely due to reductions in prevalence of smoking, plus higher levels of physical activity and better diet	No change	25% reduction in hospital admissions, GP visits and prescriptions related to CHD and stroke for 15-64 year olds.
	5% reduction in all other hospital admissions, GP visits and prescriptions for 15-64	No change	15% reduction in all other hospital admissions, GP visits and prescriptions for 15-64 year

Health seeking behaviour among under 65s	year olds. Reductions partly due to reductions in prevalence of smoking, plus higher levels of physical activity and better diet		olds.
	By 2022 hospital and GP care use per head amongst over 75s will match current patterns of use among 65-74 year olds	No change in utilisation rates	By 2012 hospital and GP care use per head amongst over 75s will match current patterns of use among 65-74 year olds
	One additional GP visit per person per year on average by 2022	No change	One additional GP visit per person per year on average by 2022
Self-care	Switch of 1% of GP activity to pharmacists; reduction of 17% in outpatient attendances among 225,000 people using self-care	Switch of 1% of GP activity to pharmacists; reduction of 17% in outpatient attendances among 225,000 people using self-care	Switch of 2% of GP activity to pharmacists; reduction of 17% in outpatient attendances among 450,000 people using self-care (has been a step change in public engagement)
	Higher patient expectations	No change	Dramatic improvement in public engagement via ICT
Inequalities	Reduced age discrimination	No change	Successes demonstrated in solid progress are achieved quicker and then are exceeded
	Reduction in socio-economic inequalities in health	Inequalities in health between socio-economic groups of unchanged	Greatest reductions in socio-economic inequalities in health
	Gap in life expectancy between those in the poorest areas and the average falls by at least 10%	No change	Gap in life expectancy in solid progress scenario is achieved quicker before being exceeded
	Smoking amongst adults in manual socio-economic groups falls from 30 to 26% by 2010	No change	Smoking target quickly achieved and exceeded

Appendix 4:

NI HEALTH SERVICE PRODUCTIVITY MEASURE

Introduction

Northern Ireland have been measuring healthcare output since 2002/03 via their Cost Weighted Activity Index (CWAi). This work has been carried out in close liaison with the UK Centre for Measurement of Government Activity (UKCeMGA) and has fed into the UK national accounts (Blue Book). Professor John Appleby, as part of his work for DHSSPS to assess additional budgetary needs for the NI health service, asked that this work was expanded upon to give an estimate of NI productivity.

In order to produce a comprehensive NI estimate of productivity for the healthcare sector, additional analyses is required to produce a robust index of deflated expenditure (or inputs) as well as an assessment of non-tangible quality adjustments. Given the extremely short timeframe allocated for Professor Appleby's project, it was not possible to establish a full set of NI specific deflators and quality adjustments as required, and in some instances, UK adjustments have been applied to NI expenditure and output streams.

Reference years

The earliest reliable disaggregated expenditure stream data available for NI related to the 2005/06 financial year while the latest relates to 2008/09. The change in productivity is therefore calculated from 2005/06 to 2008/09. A separate output index is supplied showing change in output from 2003/04 to 2008/09 (the entire NI CWAi series). The output and input data in the NI calculations is based on financial year, which meant that the UKCeMGA data used have been converted from calendar to financial year.

Productivity

The methodology used to calculate productivity in this report is on a similar basis to that outlined in UKCeMGA's most recent productivity report ("Public Service Output, Inputs and Productivity: Healthcare 2010"). Productivity is calculated dividing the change in output by the change in input (see figure 1). The UK productivity for the same time period is set out in Figure 2, although it should be noted that this has will differ from that officially published by UKCeMGA as it has been converted to financial year from a calendar year basis (using a simplified methodology of 75%/25%). While the productivity estimates for the UK and NI were calculated on a similar basis, there are a number of key differences which should be borne in mind when comparing the estimates. The differences in methodology are discussed below.

The figures show that productivity within NI has grown by 0.9% in the period 2005/06 - 2008/09. This compares with 0.1% growth in the wider UK. This measure simply reports the relative change in productivity and does not compare absolute productivity levels. It should also be noted that productivity is subject to quite a lot of year-on-year fluctuation and therefore care should be taken in considering changes over such a relatively short time period.

Figure 1

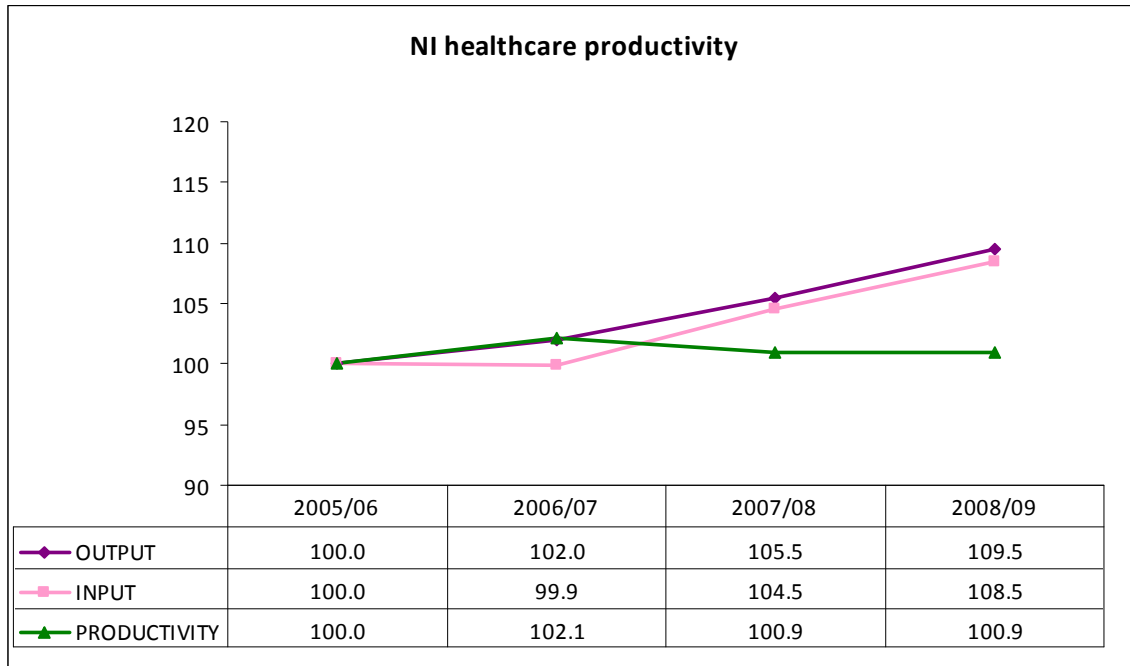
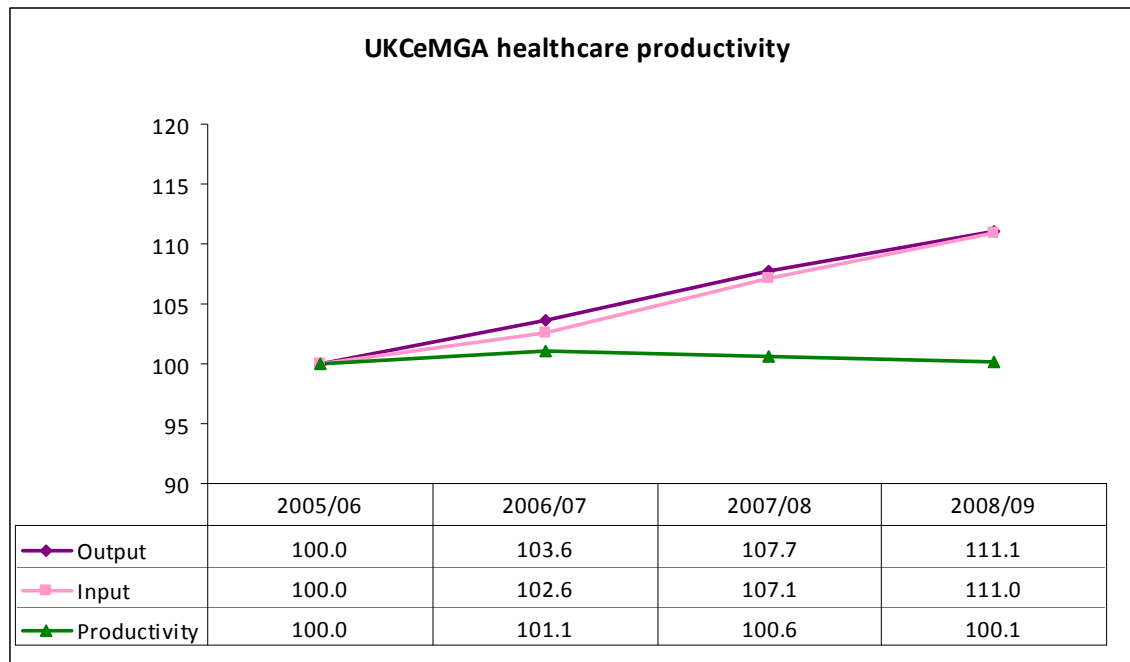


Figure 2



Triangulation

The aim of triangulation is to help users understand productivity estimates by providing additional contextual information, giving a wider picture than is possible in a single measure of healthcare productivity. The figures show that productivity within NI has grown by 0.9% in the period 2005/06 -2008/09 which was supported by some of the evidence set out in the UKCeMGA 2010 article ‘Public Service Output, Inputs and Productivity Healthcare Triangulation’. This included an increase in hospital elective day case rate (as opposed to overnight stay) and a reduction in average length of hospital stay. Both are major drivers in reducing costs and increasing productivity in healthcare services. Although the time frame for the UKCeMGA article was 1995/06 to 2007/08, these broad trends continued into the period covered in this paper.

Output

DHSSPS has supplied UKCeMGA with a healthcare output measure (Cost Weighted Activity Index) since 2002/03 which has been included in the UK National Accounts (Blue book). The most up to date notes (2008/09) on the methodology used to calculate CWAII can be found in appendix 1. This output measure does not include Personal Social Services as this is not included in the England healthcare service. The output measure has a coverage in excess of 80%.

Quality adjustments

Output is, by ONS, quality adjusted, using the York Centre for Health Economics method for quality adjustments. NI does not yet have a separate quality measure, and hence, the UK quality measure has been applied to the CWAi figures. The quality adjustments have been converted from calendar year to financial year. It is not known whether the scale of these quality adjustments are wholly appropriate for NI and further work would be needed to produce NI versions of these adjustments. This could not be completed within the relatively short time frame for Professor Appleby's work.

Figure 3 sets out the NI output index, both adjusted and unadjusted for quality. For comparison, figure 4 sets out the UKCeMGA output index, converted to financial year.

Figure 3

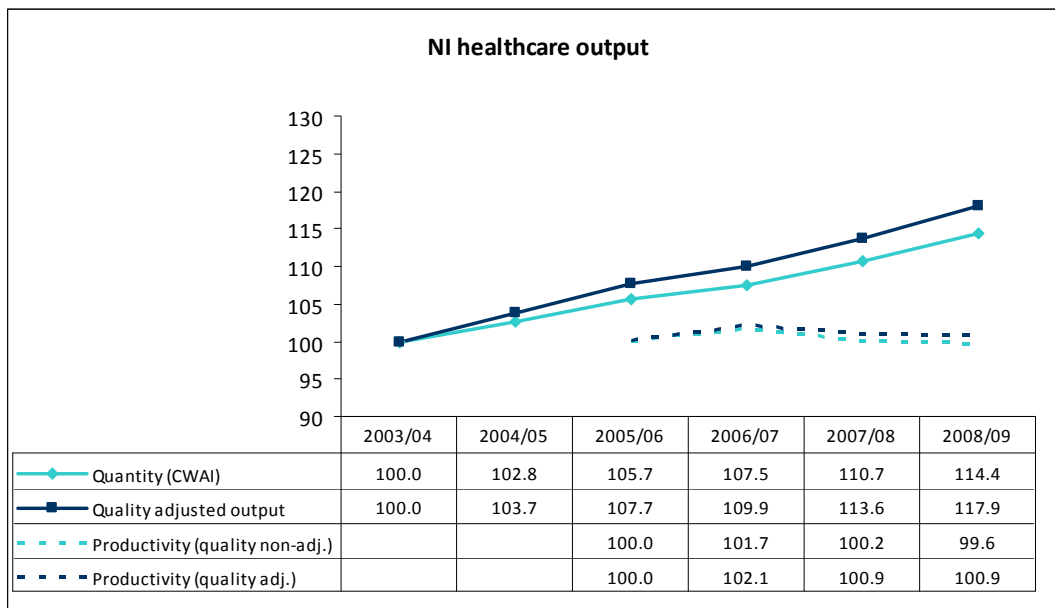
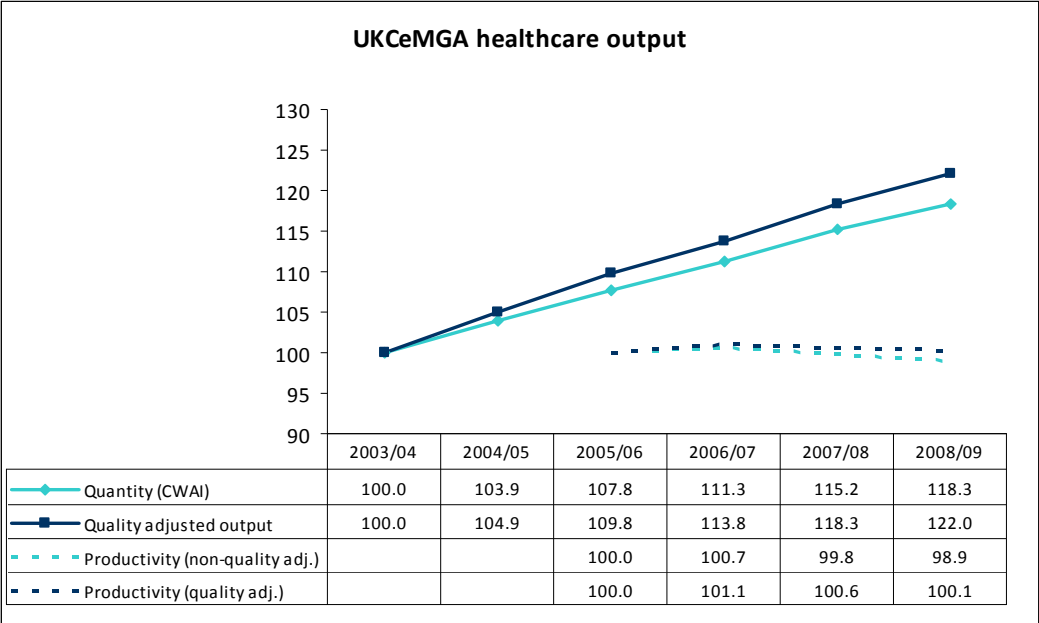


Figure 4



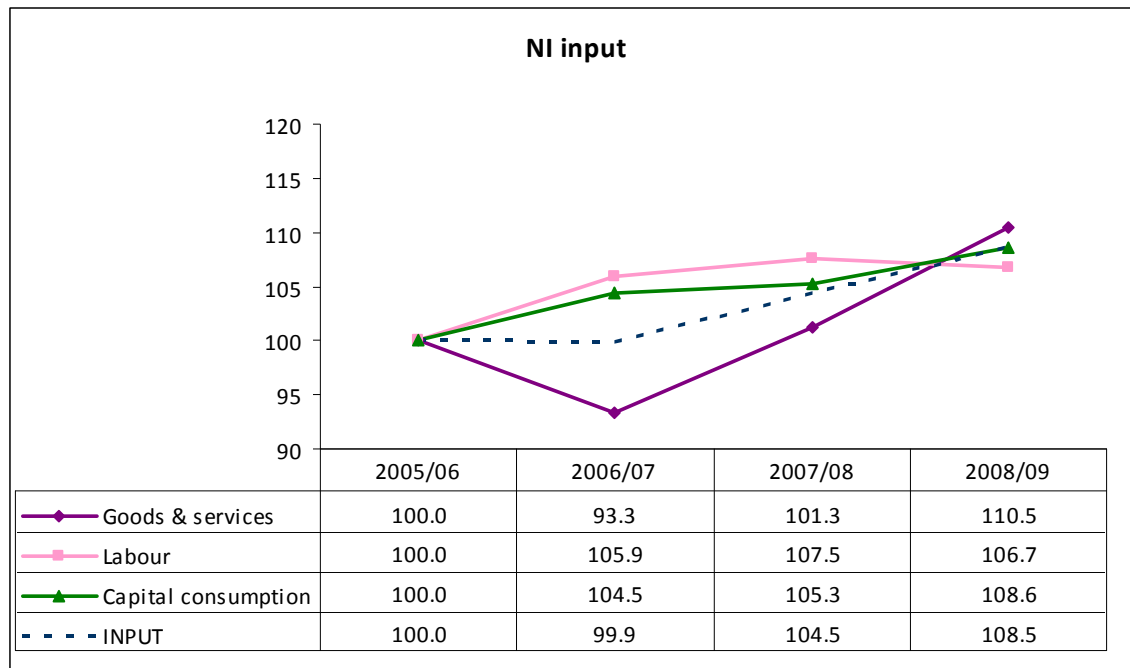
Input

The NI input index is calculated using expenditure for goods & services, labour and capital consumption. These are weighted according to their total expenditure to form the input index. In the UKCeMGA's UK productivity calculations, the expenditure streams are deflated by a separate deflator for each expenditure stream (table1). As mentioned above (and explained in more detail below) an overall UK deflator has been used for goods & services for the NI productivity measure. Overall there was an increase in healthcare inputs in real terms of 8.5% between 2005/06 and 2008/09.

Table 1

Expenditure category	Deflator used for UK	Deflator used for NI
HCHS Pay	Pay costs index	Pay costs index
DH Admin: Pay	DH Admin pay costs index	Pay costs index
Purchase of health care from non-NHS bodies	Weighted combination of Pay costs index and Health Services Cost Index	Overall UK deflator for goods & services. Calculated extracting the overall deflation from the UKCeMGA total expenditure on goods & services.
Other HCHS non-pay expenditure	Health Services Cost Index	
General and personal medical services: GPs' own income	GPs' own income deflator	
General and personal medical services: GPs' staff costs	GPs' staff costs deflator	
General and personal medical services: GPs' goods and services	GPs' goods and services deflator	
General and personal dental services: Net expenditure	Dental deflator	
General ophthalmic services gross expenditure	Sight tests deflator	
Pharmaceutical services: total payments to pharmacists	Pharmacists deflator	
Net expenditure on GP prescribed drugs	Drugs deflator	
Welfare food scheme	RPI Food	
<i>EEA costs – not applicable for NI as DH expenditure on this is for the UK</i>	Health Services Costs Index	
Other CHMS	Health Services Costs Index	
DH Admin: Non-pay	Health Services Costs Index	

Figure 5



Capital consumption

Capital consumption in the UK productivity measure, produced by UKCeMGA, is calculated for the whole of UK and it is not possible to extract the individual countries figures from the UK figure. As it is not possible to extract the exact NI figure, an identical percentage share of the total UK expenditure (generally around 2% of the total input) was added to the NI labour and goods & services expenditure as NI capital consumption. The UK deflator was applied to NI capital consumption, fig 5 shows that deflated capital consumption increased by 8.6% over the period.

Goods & services

Goods & services constitutes a range of expenditure streams, namely Hospital & Community Health Services (DHSSPS and non-DHSSPS activity), General Medical Practitioner services, General Dental Services, General Ophthalmic Services, Pharmaceutical services, Prescription Drugs, Central Health & Miscellaneous Services and the Department's admin expenditure. These expenditure streams are deflated to remove the effect of inflation. The expenditure streams have been extracted from the Final Outturn figures prepared by DHSSPS and submitted to Central Expenditure Division in the Department of Finance and Personnel. These figures are used to inform the final outturn reported in the final accounts of all entities within the DHSSPS budgeting boundary. Totals used reflect Outturn for Departmental Expenditure Limit (Admin and Other Resource) and exclude NI Fire and Rescue Service, Superannuation, Personal Social Services, Capital Expenditure, Annually Managed Expenditure, Depreciation and Impairment expenditure.

Goods & Services deflator

Due to time constraints, the overall deflator for UK goods and services, calculated by ONS for the UK health productivity measure, was applied to deflate the Northern Ireland expenditure on goods & services. In doing this we have made two assumptions. Firstly, that price changes in the goods and services bought to produce healthcare in Northern Ireland are the same as price changes in the goods and services bought to produce healthcare in the UK (in practice England) as a whole. Secondly, that the same kinds of items are bought in Northern Ireland as in England and in the same proportions. Although calculation and applying of local deflators would be the preferred method, as this was not possible, given the available time, using the UK deflator would seem to be reasonable.

Hospital and Community Health Services (HCHS)

HCHS is calculated excluding Personal Social Services (PSS) from both pay and non-pay as PSS is not included in the output measure.

Hospital and Community Health Services - Non-DHSSPS activities

Non-DHSSPS activities are goods & services purchased from non-DHSSPS bodies. These activities are split from the general hospital & community health services expenditure stream as a specific deflator is applied to it in the UKCeMGA input calculations (table 1). There was however difficulty extracting this expenditure stream for NI. Although the expenditure from the Final Outturn fall into bodies that are within the DHSSPS budgeting boundaries, the Department does not in itself purchase the services being provided by the HSCB etc, but only allocates the funding to do so. Therefore, this source of expenditure does not contain any details on what services may have been provided by non-DHSSPS bodies to those organisations that DHSSPS funds. As no separate NI deflator was to be applied to the non-DHSSPS activities in this NI exercise (the same deflator applied to all goods & services expenditure streams), it was not considered necessary to pursue a separate non-DHSSPS activities expenditure stream for NI, although it may pose problems when this work is updated in the future with specific NI information.

GP services

The blue book includes GP services as part of the goods & services expenditure, however the UKCeMGA calculation of productivity remove salaries to GP's and GP staff from goods & services and include this to the labour element of input. However, in NI, the General Medical Services cannot be split to differentiate between GP salary, staff salaries and other expenses (per GMS Branch). This because GPs have a contract for service as opposed to a salary and staff costs in a practice would be included within its expenses. As it is not possible to extract these elements from the total expenditure for Northern Ireland, all GP services (including GP pay) are included in goods & services.

General dental services

Expenditure on general dental services is the gross expenditure less receipts.

General ophthalmic services

Expenditure on general ophthalmic services is the gross expenditure.

Pharmaceutical services & Prescription drugs

According to the UKCeMGA calculations, the pharmaceutical implicit payments are added to the gross expenditure and then deflated with the appropriate pharmaceutical services deflator to create the pharmaceutical services index. The implicit payments together with receipts payments are then removed from the FHS Drugs expenditure and this total deflated with its appropriate drugs deflator. However, as the same deflator is used on all expenditure streams for NI, it has little effect on the results of this exercise.

Central Health & Miscellaneous Services (CHMS)

This expenditure stream includes welfare foods (e.g. Healthy Start programme) and other CHMS expenditures.

Department's administrative expenditure

This expenditure includes administrative cash and non-cash costs.

Labour

With the exception of 2005/06, labour accounted for the largest proportion of the total expenditure (average of 51%). The labour index (pay cost index) is calculated using a so called direct measure by calculating a Laspeyres index based on the average salary for different labour categories and the number of full time equivalent staff for the same categories.

It was not possible to get the labour WTE and salaries from the same source for the whole period. The 2005/06 - 2007/08 data were taken from the Payroll Extract (source: BSO ITS) and 2008/09 derived from payscales and paypoints held in Human Resource & Management System (HRMS). In order to make a consistent comparison, staff figures for the whole period were forced to total the annual HRMS staff figures, using the staff weights from the original source where it was not possible to make a direct conversion.

Conclusion

The methodology used to produce productivity estimates for NI is reasonable, given the limited time available. However it should be borne in mind that the results will be subject to a degree of revision once NI specific deflators and quality adjustments are calculated. As with the UKCeMGA calculation, the resultant figures produced from this exercise are not a complete picture of healthcare productivity and other information such as the triangulation information discussed earlier should also be considered. For instance workforce productivity figures produced by DHSSPS show persistently lower productivity figures for NI compared with England. Also, as the UKCeMGA productivity estimates produced for the UK over a longer period show a degree of year-on-year volatility, the question of considering the robustness of figures produced for a three-year period should be borne in mind when comparing against the overall UK figure.

This has been a very useful project and should mark the start of further investigative work and analyses to establish an ongoing estimate of productivity of the healthcare sector in NI.

18th February 2011

Project Support Analysis Branch – DHSSPS

Annex to Appendix 4:

NORTHERN IRELAND HEALTH COST WEIGHTED ACTIVITY INDEX (CWAi): 2008/09

Introduction

This index has been developed in response to the Atkinson Review recommendation that published UK output measures should be improved, where possible, via the incorporation of data from all four constituent countries. It will also form the basis of a future NI productivity/efficiency measure.

The model replicates, as far as possible given current data constraints, the DoH methodology that was first introduced in the 2004 UK national accounts. Although the main activity categories have been covered in respect of hospital, community and family health services, NI does not provide certain services which are available in England, e.g., NHS direct, Walk-in centres, etc. As with the English version, the model calculates a cost weighted average of all covered activity in each financial year and also calculates the overall percentage increase/decrease in cost weighted activity each year. The previous year's unit costs have been applied to both years' activity data which corresponds to the Laspeyres method although sufficient information is available within the model to calculate the index according to other methodologies such as the Paasche and Fisher methods.

Specific model notes: 2008/09

The 2008/09 NI CWAi essentially employs the same methodology as that used in previous years.

Inpatients

All of the inpatient HRG activity data is quality assured using information from the NI Hospital Episode Records System, which is regarded as being of excellent quality and is supplied with electronic downloads directly from hospital administration systems.

Activity on the whole has increased over the year, as it has in previous years. This has occurred across a number of HRGs/specialties and can be attributed largely to the target of treating patients within 4 hours of arrival at A&E. This means that a large volume of patients arriving at A&E are referred on to specialists (and therefore admitted) even if for a short time only before they are discharged.

As for last year's CWAi, unbundled HRGs have been included in their own section. Other activity is grouped into elective (including daycases) and non-elective sections also as in previous CWAis. The non-specialist mental health HRGs (WD codes) are compared by HRG by specialty. There have been some issues with changes in the current version of HRG v4.0 with some unbundled HRGs 'rebundled' into their parent HRG. This is the case for all the RA and RB codes, which due to no recorded unbundled activity in 2008/09 had a negative effect on the overall CWAi (around -0.6 percentage points).

There are some coding issues where the 2007/08 HRG codes have been removed for 2008/09. For most indicators this is due to the HRG codes having changed to include length of stay or age of the patient. As a result, one HRG code sees a major loss in activity (a code that is not used in 2008/09) while another related HRG code sees a large increase (where this activity is mapped to in 2008/09). In these instances a grouped indicator was created. In total 75 grouped indicators were created for Elective inpatients (including day cases) and 64 for Non-Elective inpatients. In the CWAI spreadsheet the HRG codes that are grouped are marked bold and the group indicator is highlighted light blue. (An overview of the grouped HRG codes is attached in appendix A.)

There was an issue with changes in the root mapping of the patients treatments in 2008/09 compared to 2007/08, especially for the FZ codes. This caused, for example, HRG FZ03A, who had an activity of 3 in 2007/08, to increase to 22,145 in 2008/09. Similarly, FZ26A (Endoscopic or Intermediate Large Intestine Procedures 19 years and over), FZ03A (Diagnostic and intermediate procedures on the upper GI tract 19 years and over), HA99Z (Other Procedures for Trauma), FZ34C (Large Intestinal Disorders without CC) and FZ35C (General Abdominal Disorders without CC) all experienced major shifts in activity.

As a result of this issue we were not able to compare activity and cost in 2007/08 and 2008/09 on a like-for-like basis. We could not map costs for 2007/08 to the same configuration as the new mapper and the NHS Information Centre were not able to advise as to how to overcome this problem. We finally settled on grouping 'Endoscopic Procedures Grouped', which contained 17 HRG codes (see appendix A), including one of the single high indicators, FZ26A.

By having to group a large number of HRG categories together we are essentially depressing the overall Index. We cannot be certain as to how much we are removing an effect caused by changes to the HRG grouper or depressing real growth by grouping the categories together. It was however assumed that the grouping detailed above was a reasonable compromise.

As in previous years, assisted delivery figures have increased across NI and are the highest rates in the UK

Outpatients

NI does not have Outpatient HRG reference cost data so instead has to rely on specialty costs. Not all listed specialties included in the English model are relevant in Northern Ireland and have been zeroed. In addition, some NI-specific specialties have been included.

A&E attendances are not shown separately in the NI model but are captured within the A&E outpatient specialty (both activity and unit cost). A separate A&E attendance unit cost is not available.

General Medicine activity in the Northern Trust increased by 43% and Obstetric attendances went up by 29% in the Southern Trust which contributed to the overall increase for these indicators.

Mental Health/Learning Disability

Generally, there has been a continuous decline in admissions to mental health hospitals which is line with key Government PSA targets to reduce both admissions to and long stays at these hospitals by 10% by 2011. The Bamford review (of mental health and learning disability) recommended that community service is strengthened to progress the resettlement of long-stay patients. However, for 'Mental Illness – Rehabilitation', Belfast City Hospital and Bluestone Hospital are reporting an increase in activity and the South Eastern Trust have an increase in Consultant sessions and Locum costs. The overall running cost at Lakeview hospital in the Western Trust has increased, causing an increase in cost for 'Learning Difficulty - Adult Long Stay'.

The decline in activity for 'Old Age Psychiatry' is partly attributed to a retraction of services in St Luke's hospital. However 'Old Age Psychiatry' has also seen an increase in cost. This is due to all specialties within the Tyrone and Fermanagh hospital site being allocated additional costs and overheads from the hospital main building. Also Belfast Trust saw an increase in cost due to pay and price increases at Knockbracken Healthcare Practice, in addition to better identification of overhead costs.

Physical and Sensory Disability

Altnagelvin Hospital has reported expenditure and activity against 'adults' in 07/08 but it has been reported against 'children' in 0809. We have therefore grouped adult and children activity for Physical and Sensory Disability.

Critical Care

Critical care within Coronary Care Units has seen an increase in 2008/09. This is due to an increase in activity in the Belfast Trust and rising nursing costs and purchasing of medical equipment in Daisy Hill Hospital in the Southern Trust. Recruitment of new consultants in the Northern Trust also added to the increase.

It should be noted that although demand for critical care in NI will tend to fluctuate more year-on-year than in England (due to its small geographic area), the overall level of cover in NI has to be maintained.

Pathology

There are no issues with this data, NI pathology figures (as in England) are based on 'Direct Access' activity only.

Chemotherapy

There are no NI HRG costs or activity information available.

Renal Dialysis

Only hospital-based data are available for this category.

Bone Marrow Transplant

Data on bone marrow transplants are already included in inpatient reference costs.

Spinal Injuries

This is included in the English index below HRG level. In NI, this information is not available at such a detailed level.

Community Services

The increase in District Nursing is partly due to improved data collection (previously estimated and now full year information is available). In the Northern and the Western Trusts 'Specialist Nursing' now also includes more teams of nursing including among others a respiratory team, stoma, rapid response and community stroke team. In the Southern Trust there have been investments in Marie Curie services.

Both the Northern and the Southern Trusts have improved their methodology to split acute and community care activity and cost. This has caused an increase in 'Occupational Therapy – FTF Contacts' activity and cost this year. The Northern and Western Trusts have also had additional investments in Community Mental Health Teams, which contributed to the increased cost.

Rehabilitation

The decrease in activity for 'Rehabilitation bed days - Elderly' is down to a large decrease in activity at Greenpark Hospital in Belfast Trust.

Emergency Ambulance Journeys

It should be noted that as there is a single provider for all NI (Northern Ireland Ambulance Service), it means that productivity depends on demand (as demands will always be met), with local demand in small areas creating greater year on year fluctuations than present in England.

FHS – Prescribing

Although the number of prescriptions for Lipid Regulating Drugs continues to increase, there are in general no data concerns. Based on DoH advice, unit costs are used before discount has been applied. An adjustment (based on aggregated data) has been made to costs in both years to take account of estimated public contributions. Prescribing information is still compared at BNF section level. It is currently not possible to follow the proposed new methodology (using more detailed GenProp coding level) in NI.

FHS – General Dental Services

There are no data concerns. The category excludes private activity and unit costs are net of receipts. FHS dental activity has the last years decreased due to NHS dentists taking on more

private work at the expense of NHS work. There has however been an increase in activity in 2008/09, but numbers are not back up to 2006/07 level.

FHS – General Ophthalmic Services

There are no data concerns. The category excludes private activity.

FHS GP Consultations

NI continues to be reliant on the Continuous Household Survey (in conjunction with population mid-year estimates) as the source of its consultation data. Due to smaller NI sample size, a three-year moving average is taken in order to increase the reliability of the estimate. Whilst nurse consultations can be separately estimated, if required, no other breakdown of consultation type is possible. The unit cost is based on the full cost of General Medical Services and it is not possible to obtain a separate unit cost for nurse consultations. The unit cost will therefore represent an average of all consultation types.

England and Scotland have moved to direct capture of consultations data from GP systems. If funding can be secured, it is hoped that the General Medical Services Information System project, after being successfully piloted, will be progressed and that it will be operational and providing reliable data within two to three years for NI.

Quality Assurance

Three main activities make up the bulk of quality assurance conducted on the data used in the Northern Ireland CWAI:

- a) checks for consistency of use of HRG activity, and coding between 2007/08 and 2008/09;
- b) checks for significant changes in activity between 2007/08 and 2008/09; and
- c) checks for significant changes in unit costs between 2007/08 and 2008/09.

Any discrepancies uncovered in the data were investigated with the data being either corrected where an error had been discovered or retained in the event that a satisfactory explanation was put forward by those who originally supplied the information. Any changes that affected previous year's figures were applied to update all the indices affected.

Coverage

The overall coverage has not yet been calculated for this year's CWAI (but will be forwarded as soon as complete). It is however expected to be in excess of the 80% coverage which was achieved in 2007/08.

When calculating coverage, it should be noted that Personal Social Services expenditure is excluded and that excess bed-day costs, which are quite significant, are included in the total expenditure denominator. As these do not count toward productivity, and never will, a case could be made for their exclusion.

Results

The Laspeyres index number is used for the CWAI as most of the information feeding into the national accounts does not have reliable cost information for the latest period. The results are shown by activity category in Table 1 overleaf.

Table 1: NI Health Cost Weighted Activity Index by Category (Laspeyres)

	2007/08	2008/09
Overall Health CWAI	3.0%	3.3%
Elective Inpatient Episodes	2.2%	7.1%
Non- Elective Inpatient Episodes	6.3%	7.4%
Unbundled HRGs	14.0%	-52.8%
Outpatient Attendances	2.6%	3.1%
Mental Health/Learning Disability	-8.3%	-3.3%
Physical & Sensory Disability	98.3%	-1.0%
Critical Care	-3.6%	2.0%
Pathology	3.8%	13.0%
Renal Dialysis	7.9%	3.9%
Community Services	-2.4%	4.0%
Rehabilitation	37.4%	-18.3%
Emergency Ambulance Services	8.1%	4.8%
FHS – Prescribing	6.7%	3.8%
FHS – General Dental Services	-7.0%	3.8%
FHS – General Ophthalmic Services	4.8%	4.8%
FHS – General Medical Services	1.6%	-0.4%

16th April 2010

Project Support Analysis Branch – DHSSPS

