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Productivity of the English National Health Service 2003-4 to 2009-10

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Productivity of the English National Health Service 2003-4 to 2009-10

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Executive summary

Objectives

We estimate output, input and productivity growth for the English NHS for the period 2003/4 to 2009/10 using the most detailed and comprehensive information at our disposal.

Methods

Productivity growth is calculated by comparing growth in the total amount of health care 'output' provided to NHS patients to growth in the total amount of 'input' used to produce this output.

Output consists of the volume of all health care services provided to NHS patients and also accounts for quality improvements. Inputs include the staff, general and clinical supplies, energy costs, equipment and capital resources that contribute to the production of health care.

The preferred measure of productivity growth has the following features:

- The volume of NHS outputs across all health care sectors is captured as comprehensively as possible, using the Hospital Episode Statistics and Reference Cost database and other data sources;
- The quality of NHS outputs is captured by inpatient and outpatient waiting times, 30-day hospital survival rates, and improved blood pressure control in primary care;
- The volume of NHS labour is measured using data about Full Time Equivalents from the Electronic staff record;
- The volume of prescriptions is measured using data by chemical composition from the Prescription Pricing Authority;
- The volume of all other inputs are derived from expenditure data compiled from the NHS organisational accounts;
- The output and input indices are consistent in how they account for services procured from non-NHS bodies.

Results

Over the full period considered we find that increases in inputs have been matched closely by increases in output.

Between 2003/4 to 2009/10 the number of staff has increased by 18 per cent, buildings and equipment by 24 per cent and all other inputs, such as clinical supplies and energy costs, by 76 per cent.

There was a corresponding increase in both the quantity and quality of output. The number of patients treated in hospital increased from 12.1m to 15.6m; outpatient attendances from 50m to 77m; community care contacts from 76m to 92m; and primary care consultations from 262m to 300m.

Hospital survival rates improved from 99.4% to 99.8% for elective patients and from 95% to 96% for non-electives. Average inpatient waiting times fell from 78 to 57 days, reaching a low of 51 days in 2008/9. Outpatient waiting times fell from 58 days to 24 days.

Conclusion

Our analysis demonstrates that productivity growth has been constant over time. These findings are not grounds for complacency however. Our related research suggests wide variations in productivity across the country. It is essential that, rather than across-the-board measures, future efforts to improve productivity are directed at reducing these variations.

1. Introduction

The national accounts are designed to measure the contribution of economic activity to social welfare (Eurostat/Commission of the European Communities et al., 1993, Atkinson, 2005). In the accounts the productivity of the health care sector is measured by comparing the total amount of health care 'output' produced to the total amount of 'input' used to produce this output (Eurostat, 2001). In this report, we construct comprehensive indices for both output and input growth in order to calculate productivity growth for the English National Health Service over pairs of years from 2003/4 to 2009/10. Challenges arise in specifying and measuring the output and input indices and we outline how we address these in section 2.

The data used to populate the output and input indices are described in section 3.The output index incorporates all healthcare activity provided by the NHS in England and allows for improvements in waiting times, survival rates, health outcomes and disease management. Section 4 describes how activity and quality has changed over time and reports growth in overall output. Our index of input growth captures all inputs into the production of healthcare activity and these are described in section 5, together with estimates of input growth.

Estimates of productivity growth are presented in section 6. We explore the sensitivity of these estimates to the choice of what data are used to measure growth in the amount of NHS labour and in how to account for healthcare services procured from non-NHS bodies.

2. Methods

Total factor productivity growth is calculated by dividing an index of output growth by an index of input growth:

$$\Delta TFP = \left[I / Z \right] - 1 \quad (1)$$

Where ΔTFP is total factor productivity growth, I is the index of output growth and Z is the index of input growth. In order to estimate total factor productivity, it is therefore necessary to correctly define and measure the output and input indices.

2.1 Measuring output

Our index of NHS output growth captures all the activities undertaken for NHS patients. We analyse information about every patient treated in hospital and we quantify the volume of activity conducted in mental health and community care settings, outpatient and accident and emergency departments, diagnostic facilities, and primary care. The datasets we use are comprehensive with the exception of consultations in primary care, for which we rely on nationally representative survey data.

The NHS provides care to people with diverse needs and there are a great many different types of health services. Our measurement thus involves the following steps:

1. Categorisation of the diverse types of healthcare output. We use 5,381 output categories to reflect this diversity, including version 4 Healthcare Resource Groups (HRGs) to describe care provided in hospitals and the numerous categories used in the Reference Costs data to describe care provided in other settings. Six categories describe consultations in general practice and prescribing activity is measured using the Prescription Cost Analysis database, which annually uses some 8,000 different categories to describe chemical composition of prescribed items.
2. Quantification of the number of patients in each output category. This information is derived from the Hospital Episode Statistics and Reference Cost data.
3. A means of determining the relative 'value' of each output category, so that activity across all categories can be aggregated into a single measure of total output. We use national average costs to reflect the relative value of different health care services. This is consistent with the convention used in the national accounts.
4. Assessment of the quality of care. We account for changes in hospital survival rates and health improvements, in inpatient and outpatient waiting times, and in the control of blood pressure in primary care. We calculate hospital survival rates and waiting times from individual patient records and provide summarised information to the Office of National Statistics (Office for National Statistics, 2011).

Our Laspeyres index of output growth compares quality-adjusted cost weighted output in the current period to the previous time period and is given by (Castelli et al., 2011):

$$I^{cq} = \frac{\sum_{j=1}^{J} x_{jt+1} c_{jt} \left[v_j \frac{q_{jt+1}}{q_{jt}} \right]}{\sum_{j=1}^{J} x_{jt} c_{jt}} \quad (2)$$

Where x_j is the number of patients who have output type *j*, where *j*=1…*J*; c_j indicates the cost of output *j*; and time is indexed by *t*. Cost-weighted output is scaled by the change in quality, where q_j represents a unit of quality for output *j*, and v_j is the value of a unit change in quality. Full details about the formulation of this index are provided elsewhere (Dawson et al., 2005).

2.2 Measuring input

Inputs into the health care system consist of:

- Labour, such as doctors, nurses, technicians and managers;
- Intermediate goods and services, such as drugs and clinical supplies and energy and premises costs;
- Capital, such as buildings and equipment with an asset life of more than a year

These inputs may be measured directly, by observing (say) the number of people working in the NHS or indirectly, by observing the expenditure on each input type. Expenditure growth, though, is driven by both price rises and increases in the amount of inputs being used. To use expenditure to assess input growth the data need to be purged of the impact of price rises. This is achieved by deflating expenditure by a deflator relevant to the type of input in question (see Table 1). Where there is a choice of measurement, the direct method is preferred (OECD, 2001).

For NHS staff, we have a direct measure available from NHS electronic staff records, compiled in the iView database which records full time equivalents (FTEs) in over 522 different staffing categories. Note that only twenty categories are used by the ONS (Office for National Statistics, 2011). We also have an indirect measure of staffing input from expenditure data. We assess whether estimates of input and productivity growth are sensitive to the choice of these alternative data sources. Growth in the amount of non-NHS staff, intermediate goods and services and capital inputs are measured using expenditure data from each NHS organisation.

Our 'indirect' index of input growth is given by:

$$Z^{Ind} = \frac{\sum_{n=1}^{N} \gamma_n E_{nt+1}}{\sum_{n=1}^{N} E_{nt}} \quad (3)$$

Where E_n is expenditure on input type *n*, where *n*=1…*N*; γ_n is the deflator applied to input *n* to wash out the effect of price rises in expenditure growth; and time is indexed by *t*.

For labour inputs information is available about the number (FTEs) of staff employed. We can substitute this information instead of data about expenditure on staff. The resulting 'mixed' direct and indirect input index can be specified as:

$$Z^{mix} = \frac{\sum_{n=1}^{L} z_{nt+1}\omega_{nt} + \sum_{n=L+1}^{N} \gamma_n E_{nt+1}}{\sum_{n=1}^{L} z_{nt}\omega_{nt} + \sum_{n=L+1}^{N} E_{nt}} \quad (4)$$

Where *n*=1…*L* are labour inputs and *n*=*L*+1…*N* are non-labour inputs; z_n is the volume of labour input of type *n* and ω_n is the average price of type *n*.

Table 1 Price deflators

The specific price deflators used to convert current expenditure into constant (real) terms with 2009/10 as the base year are as follows:

- Expenditure on labour (NHS and agency staff) is deflated using the NHS pay index from the Department of Health.
- We have calculated our own drug price deflator which we apply to community prescribing data. Details are in appendix 1.
- The NHS prices deflator is used to deflate expenditure on all other intermediate inputs.
- The NHS pay index is used to deflate expenditure on general medical dental and ophthalmic services, while the NHS pay and prices deflator is used to deflate expenditure on other family health services and centrally incurred administration costs.
- We apply different price indices to deflate expenditure on capital goods according to the type of the asset. These indices are constructed by the Office of National Statistics and we use those reported in the Plant & Machinery section of the 'MM17 Price Index Numbers Current Cost Accounting' publication (Office for National Statistics, 2009). These deflators are rebased to 2009/10.

2.3 Measuring productivity

There are different ways to formulate the output and input indices and choices about which data to use. In the absence of clear-cut preferences, we assess how sensitive estimates of growth are to these choices. The main areas for sensitivity analysis in constructing the output and input indices are:

- Whether to omit highly volatile Reference Cost categories;
- Whether to use the direct or indirect measure of labour input;
- Whether to use Reference Costs or Trust Financial Reports as the source of data about non-NHS spending;
- Whether to include NHS Direct and NHS Choices;
- Whether to include or exclude NHS Impairments.

We report estimates for four different formulations of the productivity index. Our MIXED indices of productivity growth apply the 'mixed' input index (equation 4) and take the form:

$$\Delta TFP = \left[I^{cq}/Z^{Mix}\right] - 1 \qquad (5)$$

This applies the direct method for measuring growth in NHS labour inputs using information recorded in Electronic Staff Records; and the indirect method using organisational expenditure data for non-NHS staff, all intermediates (other than community prescription items), and for capital.

Two forms of this index are presented, depending on how expenditure on services procured from non-NHS bodies is dealt with. The requirement for this sensitivity analysis is discussed in the next section.

Our INDIRECT indices of productivity growth are constructed by applying the 'indirect' input index (equation 3):

$$\Delta TFP = [I^{cq}/Z^{Ind}] - 1 \qquad (6)$$

This incorporates the indirect input index in which input growth is estimated using organisational expenditure data for NHS staff, non-NHS staff, all intermediate inputs and capital.

Again two forms of this index are presented, depending on how expenditure on services procured from non-NHS bodies is dealt with.

We also investigate the sensitivity of results to two other issues, namely:

- Whether or not to include activity provided by NHS Direct and NHS Choices in the output index and
- How to deal with accounting changes relating to capital impairments in the input index. These changes are discussed in the next section.

3. Data

3.1 Outputs

Hospital episode statistics

The hospital episode statistics (HES) are the prime data source for identifying the provision of hospital (inpatient and day case) services to NHS patients. HES covers all medical and surgical specialities and includes private patients treated in NHS hospitals. In addition, HES captures hospital care funded by the NHS but provided by the private sector – although the quality of data from some private providers is poor (Healthcare Commission, 2007, Street et al., 2010).

HES now comprises over 18 million patient episode records each year. Records are stored according to the financial year in which the period of care finished. Each record includes a number of data fields, containing demographic data (e.g. age, gender), waiting times, clinical information (e.g. diagnoses, procedures performed) and details of the hospital and specialty where the patient received treatment. We are also able to link HES data to death registry records, so deaths following discharge can be measured.

Each HES record is defined as a 'finished consultant episode' (FCE), which is the time that a patient spends under the care of a single consultant. During their course of treatment a patient may be treated by more than one consultant and may be transferred to another hospital, with a new record being created each time this happens. To account for this we construct continuous inpatient spells (CIPS) which track patients when transferred between consultants and hospitals as part of their care pathway (Lakhani et al., 2005, Castelli et al., 2008). We then count the number of patients (ie CIPS) in each Healthcare Resource Group (HRG), which form the basic means of describing different types of hospital output.

The cost of each CIPS is calculated on the basis of the most expensive FCE within the CIPS, with costs for each HRG derived from the Reference Cost data. We then calculate the national average cost per patient in each HRG. We exclude patients categorised to HRG SB97Z (same day chemotherapy admission/attendance) because this is excluded from the hospital Reference Cost collection and is intended to attract a zero tariff under Payment by Results.[a]

Reference Cost data

The Reference Costs capture data about activities conducted in mental health and community care settings, outpatient and accident and emergency departments, and diagnostic facilities. These activity data are reported in various ways, including attendances, contacts, bed days, and number of tests. We use costs to weight these diverse activities in order to convert them into a common metric that permits aggregation.

There have been concerns about the accuracy of the Reference Cost data, but errors are difficult to identify because there is little consistency in classifying activities across years (Castelli et al., 2011). However, data over longer time periods allow suspicious trends to be identified. We have noticed that for some types of Reference Costs categories there are implausibly large changes in volumes or costs from one year to the next. It is difficult to identify whether these changes are due to changes in Reference Cost categorisation, reflect a real increase in activity or are due to data error. Nevertheless we have implemented a systematic procedure that allows us to identify substantial changes between adjacent years. We then examine what may drive large swings in volume and/or

[a] http://www.ic.nhs.uk/webfiles/Services/casemix/HRG4%20Summary%20of%20Changes%20RC0910%20v1.3.pdf; http://www.hfma.org.uk/news/healthcare-finance/features/newsitem.htm?newsarticleid=563 accessed 07/12/2011

cost to determine whether the changes might be indicative of data error and, if so, how this should be addressed.

For some categories, there are implausible year-on-year changes in unit cost. To deal with this, we implement a 'minimum cost' rule which involves comparing the cost data in two adjacent years. If the ratio of the unit cost in year t-1 to that in year t (and vice versa) is higher than 5, we choose the minimum of the two values. This ensures that the category is retained in the index, but takes the more conservative of the two values.

Potentially other categories might be dropped from the index altogether (Table 2). This more drastic option might be taken when it is not possible to identify the source of the data disagreement. In 2009/10 compared to both 2007/08 and 2008/09, we have identified three categories with either a large increase or decrease in volume and/or cost. These are:

1. Chemotherapy (chemo) and high cost drugs (HCD)
   SB14Z (chemo) (Deliver complex chemotherapy, incl. prolonged infusional treatment at first attendance)
   XD21Z (HCD) (Immunomodulating drugs band 1).
2. Community Care
   CN130FO (School-based Children's Health Services – one to one services) and CN403FG (Health visiting services: all other services: face to face – group services).
3. Outpatient
   812 (Diagnostic imaging) and HB99Z (Other procedures for non trauma)

Table 2 Candidate reference cost categories for omission from output index

Setting and Category	Year					
	2007/8		2008/9		2009/10	
Chemotherapy & High Cost Drugs	*Activity*	*Cost*	*Activity*	*Cost*	*Activity*	*Cost*
SB14Z	127,723	£291	217,857	£298	176,276	£328
XD21Z	20,996	£600	18,850	£557	33,751	£1,309
Community Care						
CN103FO	3,516,268	£36	1,821,599	£38	1,975,944	£38
CN403FG	1,192,755	£44	492,410	£57	774,309	£43
Outpatient						
812	2,952,968	£30	3,257,527	£30	1,075,024	£28
HB99Z	216,804	£129	274,212	£136	5,097	£111

Following discussion with the Department of Health it was decided to retain these categories, as their omission would have little material effect but would come at the expense of comprehensiveness. As a sensitivity analysis, we report the impact on output growth should these categories be omitted.

Primary care data

Creating an output index for primary care involves measuring the volume and value of all primary care outputs. Our approach requires information on the volume and type of primary care consultations; quality data obtained from the Quality and Outcomes Framework (QOF) on disease prevalence and practices' performance on specific quality indicators; and the volume and cost of prescribing (Castelli et al., 2008).

In recent years, estimates of primary care consultations have been based on data collected as part of the QResearch database derived from the anonymised health records of over 9 million patients from a nationally representative sample of general practices (Fenty et al., 2006). QResearch were commissioned by the NHS Information Centre on behalf of the Department of Health and the Office for National Statistics to report on consultation rates in General Practice over time. Consultation rates derived from QResearch data are published on the NHS Information Centre's website. Separate consultation rates were produced for different types of consultation and a number of different methodologies have been employed to scale up the figures to produce an aggregate consultations figure for England.

However, an alternative approach to estimating the volume of primary care consultations was needed for 2009/10 because the latest QResearch consultation rates data published on the NHS Information Centre is for the 2008 calendar year. Accordingly, we carried out a review of primary care data which could be used for calculating primary care productivity, a summary of which is provided in Appendix 2.

Our review identified that there is no dataset which captures the volume of consultations for England as a whole. This means that all estimates of the volume of consultations must be extrapolated from samples of practices or from household surveys.

As we did not have access to large clinical databases such as QResearch, GPRD and THIN, which arguably provide the most comprehensive data on primary care consultations (though still for a sample of practices) we have had to estimate the number of primary care consultations in 2009/10 using a combination of earlier QResearch consultation data and data from the 2009 General Lifestyle Survey (GLF).

GLF data indicated that the average number of GP consultations per person per year and the average number of Nurse Practitioner consultations per person per year had not changed between 2008 and 2009. Consequently, with no other data on the total number of consultations in 2009/10 to suggest otherwise, we assumed that the total number of GP consultations, and the total number of Practice Nurse consultations across England had not changed between the two years. This proxy approach assumes that the population and practice-registered population did not change over time.

The GLF does not provide information on all the types of consultation covered by QResearch. For consistency we assumed that the relative mix of consultations of each type observed in 2008/9 remained the same in 2009/10, these types being GP home visits, GP telephone consultations, GP surgery consultations, GP other consultations, Practice Nurse consultations and other consultations.

As in earlier years, we obtained unit costs for different consultation types from PSSRU's Unit Costs of Health and Social Care (Personal Social Services Research Unit, 2010) (Table 10.8b for GP costs; Table 10.6 for Nurse Practitioner costs; and Table 10.7 (nurse advanced) was used to proxy other healthcare professionals' unit costs).

The quality adjustment using Quality and Outcomes Framework (QOF) data was carried out using the approach described elsewhere (Derbyshire et al., 2007, Castelli et al., 2008), with data on disease prevalence and achievement rates for particular quality indicators obtained from the NHS Information Centre website (The Information Centre for Health and Social Care, 2010d, The Information Centre for Health and Social Care, 2010c).

Prescribing data

Data about community prescribing are taken from the Prescription Cost Analysis (PCA) system, supplied by the Prescription Pricing Authority.[b] The data are based on a full analysis of all prescriptions dispensed in the community i.e. by community pharmacists and appliance contractors, dispensing doctors, and prescriptions submitted by prescribing doctors for items personally administered in England. Also included are prescriptions written in Wales, Scotland, Northern Ireland and the Isle of Man but dispensed in England. The data do not cover drugs dispensed in hospitals, including mental health trusts, or private prescriptions. Prescribers are GPs, nurses, dentists and hospital doctors. The number of different categories by chemical composition recorded for 2009/10 is over 8,000.

Data about other activities

Information about ophthalmic and dental services is derived from the Information Centre (The Information Centre for Health and Social Care, 2010a, The Information Centre for Health and Social Care, 2010b). We value eye tests according to the out-of-pocket payments reported by private opticians and dental costs based on the NHS fees charged to patients.

The Department of Health provided information on both volume and cost data for NHS Direct and NHS Choices. Unit costs for NHS Choices web visits were calculated by dividing total costs by the total amount of activity, i.e. web visits. Total costs cover the following areas of expense 'Strategy & planning', 'Design & Build', 'Hosting & Infrastructure', 'Content provision' and 'Testing & Evaluation'. We assume that the average cost of a web visit to the NHS Direct websites is the same as that for NHS Choices. There is some debate about whether these activities should be considered as health care 'outputs' and, if so, what value should be attached to them. Their inclusion depends on whether these information and advisory services can be considered to have a health impact, which might simply take the form of reassurance. Given a lack of consensus on the matter, we exclude these activities from our output index. We do, however, report as a sensitivity analysis the impact their inclusion has on output growth.

3.2 Inputs

We construct a comprehensive index of input growth, using the workforce data and financial returns made by all NHS organisations to quantify the amount of all inputs used in the production of care provided to NHS patients.

NHS staff data

Workforce and earnings data are obtained via the NHS iView database (https://iview.ic.nhs.uk/) which draws data directly from the Electronic Staff Records (ESR), and combined payroll and Human Resources system for the NHS. Available from 2007/8 and updated every month, the iView data offers a more accurate picture of the size and composition of the workforce than the annual NHS workforce census which provides a snapshot taken each September. Despite their differences, the iView and Workforce Census data are consistent: the rate of growth in FTEs between 2007/8 and 2008/9 are virtually identical in the two datasets.

iView data contain numbers of full time equivalent (FTEs) staff employed in the NHS by financial year. It also includes earnings data by occupation for both medical and non-medical staff employed in the NHS. The data are disaggregated by occupation code and report national average figures for each occupation. We use the national average earnings for each occupational group to construct a

[b] http://www.ic.nhs.uk/statistics-and-data-collections/primary-care/prescriptions

wage index by which to aggregate the total number of FTEs across occupational codes into a measure of total NHS labour input.

Expenditure data

To assess the amount of other inputs used in producing health services, we analyse financial data for all NHS providers, including acute hospitals, Foundation Trusts (FTs), mental health care and community Trusts, ambulance Trusts, and Primary Care Trusts (PCTs).

The financial returns detail expenditure on both NHS and agency staff by broad categories of labour input. As a sensitivity analysis we compare estimates of productivity when NHS labour is measured using iView data or expenditure data.

Intermediate inputs include drugs and gases used in hospital, clinical supplies, catering, hotel services, uniforms, laundry, bedding, energy, establishment and premises costs. We use pay and price deflators to wash out price changes in order to assess the amount of each type of input used.

The financial returns contain two forms of information about capital expenditure: current outlays on equipment and past expenditure reported as depreciation on assets. For capital outlays, we make assumptions according to the asset in question about what proportion is employed in the current period (Wallis, 2005, Street and Ward, 2009).

We also account for expenditure that does not appear in organisational financial returns, including expenditure on general medical, dental and ophthalmic services and central administration. Data on these forms of expenditure were provided by the Department of Health.

Expenditure on non-NHS bodies

The financial returns include purchases of health care from non-NHS bodies. This category accounts for the largest share of expenditure by Primary Care Trusts, capturing care purchased from the voluntary sector, charitable institutions and local authorities for older people and those with mental or physical disabilities, and acute care for NHS patients purchased from the private sector (Zerdevas, 2009).

The Reference Costs capture very few of the services procured from this expenditure, and hence most are not included in the output index. The guidance for the Reference Cost states that "The 2009/10 collection requires that ALL commissioners of services for NHS patients will be required to submit data as part of the reference costs collection, for services directly commissioned from and delivered by non-NHS providers, including Independent Sector Treatment Centres" (Department of Health, 2010a), (para 647, p.117). However "all activity commissioned from and delivered by some areas of the Charitable and Voluntary sector continues to be outside the scope of the reference costs. This exclusion covers the work of hospices and charitable organisations" (Department of Health, 2010a), (para 651, p117).

Table 3 reports the total value of services from non-NHS providers that are included in the Reference Costs collection and the total value of purchases made by PCTs as reported in their financial returns. There are two notable features. First, both expenditure series have increased rapidly over time, with (current) expenditure in 2009/10 around three times that in 2003/4. The former series has risen more erratically than the latter, as Figure 1 illustrates. Second, only a small fraction (around 3-4%) of PCT purchases from non-NHS bodies are captured in the Reference Cost collection. This means that the vast majority of services procured from non-NHS bodies are not captured in the output index.

Table 3 Current expenditure on services from non-NHS providers (pounds 000s)

	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10
A. Expenditure reported in Reference Costs[1]	92,293	112,009	152,953	196,757	194,398	229,603	334,167
B. PCT purchase of healthcare from non-NHS bodies	2,913,578	3,336,014	4,096,300	4,651,748	5,712,897	6,422,652	7,440,538
A / B (%)	3.2%	3.4%	3.7%	4.2%	3.4%	3.6%	4.5%

[1] This excludes expenditure on inpatient mental health care, this activity being captured in HES

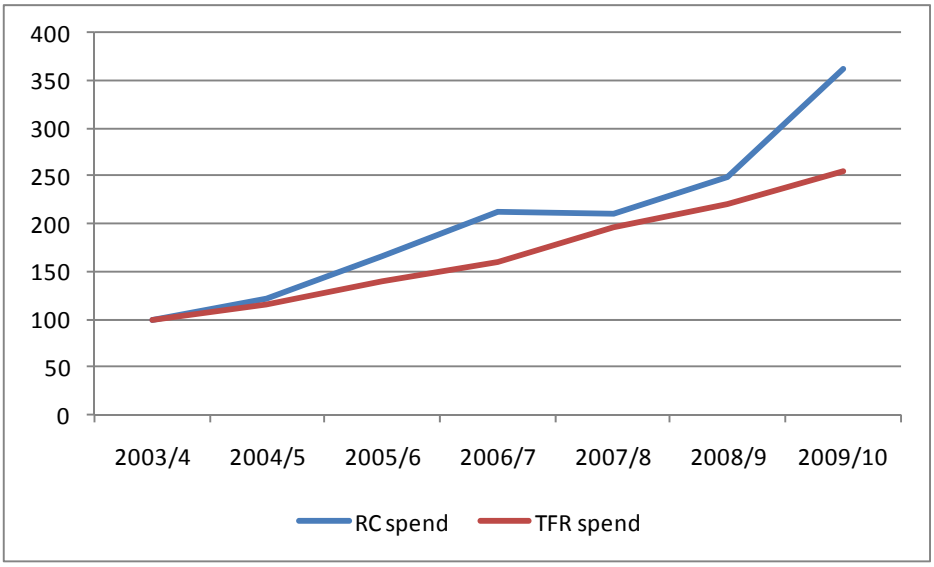

Figure 1 Growth in expenditure on non-NHS bodies (base=2003/4)

We have attempted to ascertain what types of services are being procured from non-NHS providers. Since September 2010, NHS organisations have been required to publish details of expenditure over £25,000. We have looked at the expenditures for three PCTs: Tameside & Glossop PCT; Barnsley PCT and Manchester PCT. This investigation shows that:

- These expenditures are not reported in any standardised form, thereby making it difficult to ascertain what has been procured at organisational, let alone, national level;
- Much of the procurement is of social care services, and these are not captured in the NHS output index.

Further details are provided in Appendix 2.

In view of the concern that the services procured from this expenditure are not being accounted for in the output index, we examine the extent to which the input growth is sensitive to omission of this expenditure. In our baseline productivity estimates, we do the following:

- The services purchased from non-NHS bodies as reported in Reference Costs are included in the output index
- The total expenditure on these services as reported in Reference Costs are included in the input index (ie row 1 in Table 3).

This ensures that the health care coverage of the output and input indices is as comprehensive as possible and that the indices are consistent with each other.

As a sensitivity analysis, in the input index we substitute the total expenditure on services as reported in the Reference Costs for the (much higher) expenditure as reported by PCTs in making their financial returns (ie row 2 in Table 3). As Figure 2 below shows, this is likely to have an impact: there has been a steady upward trend on expenditure on intermediate inputs, the slope being steeper when expenditure on non-NHS bodies is included.

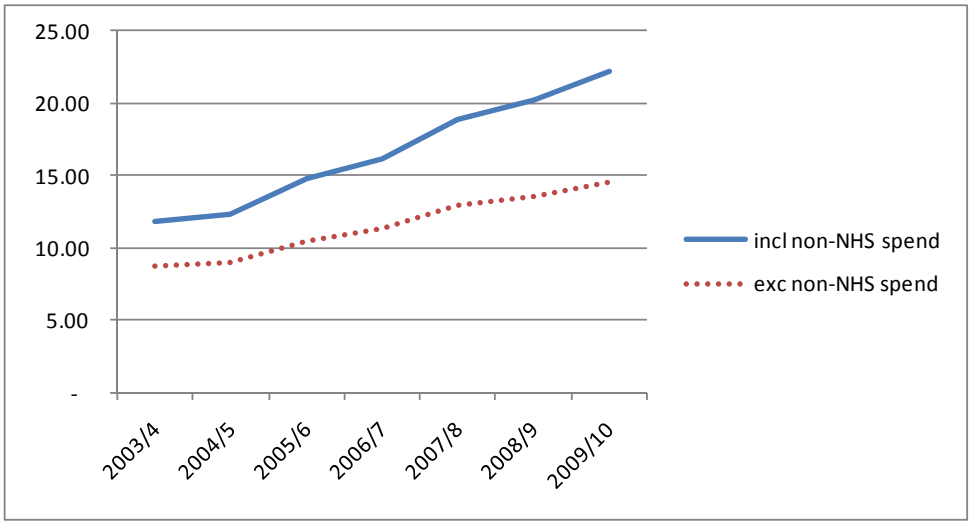

Figure 2 Growth in real expenditure on intermediates with and without expenditure on non-NHS bodies (£bn)

Changes in accounting practice relating to capital impairments

NHS Impairments are defined as occurring when 'something has happened to a fixed asset itself or to the economic environment in which it is used'.[c] Hence impairments of non-current assets result when assets fall in value, either because there has been deterioration in the service potential of an asset beyond normal depreciation, or because of general price reductions in the wider economy. An impairment can be charged against the revaluation surplus for the asset provided there is sufficient surplus against that asset in the reserves. If not, it is charged to expenditure (National Audit Office, 2010). Although impairments have been a feature of financial reporting for some time and therefore perhaps should be included in the productivity measure as 'standard', there are two extraordinary factors for 2009/10 which give cause for concern.

First, in 2009/10 the DH changed the policy relating to the central funding available to NHS Trusts (ie non-Foundation Trusts) in recognition of the impact of impairments on the income and expenditure account. This resulted in NHS Trusts being protected from losses occurring in changes in asset values. Under this new approach, the valuation is applied to a modern equivalent asset, rather than to the asset that actually exists. The outcome of this change, which is designed to offer NHS Trusts the same level of protection from such losses as Foundation Trusts, is that, in effect, impairments are entering NHS Trust financial reports for the first time.

Second, the size of impairments has greatly increased in 2009/10 largely as a function of exogenous influences rather than use of capital. Monitor states that in 2009/10 FTs reported impairments of

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http://www.info.doh.gov.uk/doh/finman.nsf/181c702d79584a960025673e003e9576/bfedac4500cb9aab00256a42005c1959?OpenDocument

£2.5 billion, a total increase of £1.3 billion from 2008/09 and attribute the increase to a fall in property prices and building costs coupled with a change in methodology used to value specialist assets (http://www.monitor-nhsft.gov.uk/sites/default/files/0295_0.pdf). The convention in Trust accounting is to present financial reports with impairments both included and excluded and to judge financial performance with Impairments excluded. Our baseline measure of productivity thus excludes the impact of exogenous property price shocks and changes in accounting procedures.

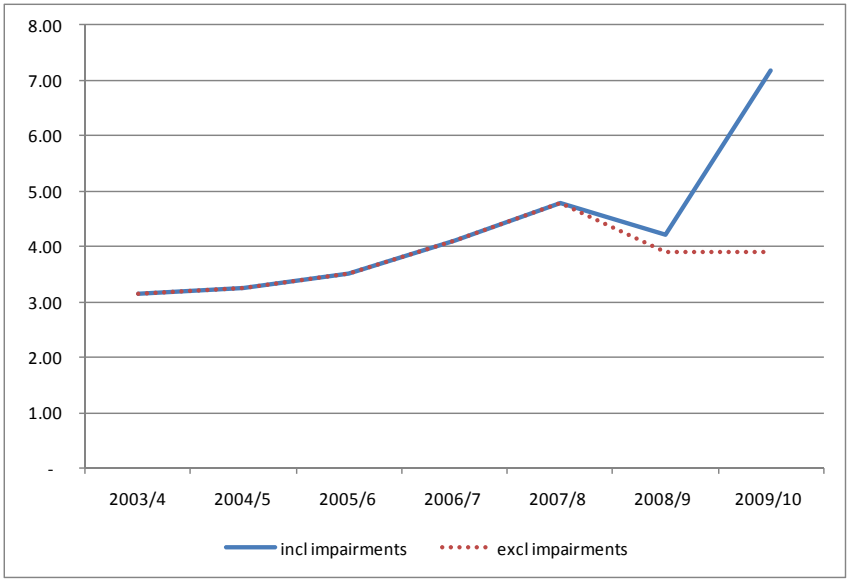

Figure 3 Expenditure on capital, with and without impairments (£bn)

As can be seen from Figure 3, these accounting changes have a significant impact. Capital expenditure including impairments suggests that capital expenditure increased by some £3bn between 2008/9 and 2009/10. As this is approximately 3% of total NHS expenditure, inclusion of these revised figures would have a significant impact on estimates of input growth and, hence, productivity growth. To avoid the inaccuracies that would arise, impairments have been excluded when calculating input growth.

4. Output growth

4.1 Trends in activity

Summarised information about the various activities included in the output index is provided below.

Table 4 Summary of the volume and quality of NHS activity

Data Source	NHS activity	Year						
		2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Hospital Episode Statistics (HES)	**Hospital output**							
	Elective and day cases							
	Volume of activity	6,401,519	6,433,933	6,864,612	7,194,697	7,598,796	8,148,229	8,474,088
	Activity weighted average unit cost	937	1,031	1,041	1,036	1,090	1,092	1,154
	Mean 30-day post discharge survival rate	99.36%	99.38%	99.47%	99.51%	99.72%	99.74%	99.76%
	Mean age	53.2	53.6	53.9	54.4	54.6	55.0	55.3
	Mean life expectancy	23.5	23.7	23.7	23.6	23.5	23.2	23.4
	80th percentile waiting times	119	104	95	89	74	60	65
	Average waiting times	78	71	67	65	57	51	57
	Non-electives							
	Volume of activity	5,723,817	6,009,802	6,291,117	6,363,388	6,593,136	6,826,035	7,151,256
	Activity weighted average unit cost	1,126	1,210	1,241	1,244	1,073	1,295	1,352
	Mean 30-day post discharge survival rate	94.92%	95.16%	95.49%	95.65%	95.79%	95.85%	96.05%
	Mean age	41.4	41.6	41.6	41.6	41.4	41.9	42.3
	Mean life expectancy	33.8	34.1	34.3	34.6	34.7	34.4	34.4
	Mental Health inpatient							
	Elective and day cases							
	Volume of activity	47,384	45,624	41,439	38,408	33,993	25,792	28,321
	Activity weighted average unit cost	676	689	673	656	1,141	1,133	1,195
	Mean 30-day post discharge survival rate	97.78%	97.72%	98.01%	98.15%	98.64%	98.71%	98.90%
	Mean life expectancy	29.7	30.1	30.0	30.6	29.9	29.0	29.4
	80th percentile waiting times	160	40	265	257	28	42	28
	Non-electives							
	Volume of activity	120,789	123,983	120,203	115,560	112,475	109,636	122,795
	Activity weighted average unit cost	937	1,012	1,012	1,012	1,364	1,319	1,365
	Mean 30-day post discharge survival rate	96.74%	96.96%	97.22%	97.38%	97.65%	97.56%	97.76%
	Mean life expectancy	28.1	28.7	28.9	29.0	27.7	27.3	27.7
Reference Costs	**Mental Health non-inpatient**							
	Volume of activity	15,168,410	16,389,891	17,738,894	19,259,205	21,751,043	22,674,811	23,440,616
	Activity weighted average unit cost	151	164	170	167	153	157	161
	Outpatient							
	Volume of activity	50,205,073	52,724,302	60,541,477	63,453,507	69,678,564	74,421,017	76,761,100
	Activity weighted average unit cost	98	106	103	93	94	98	99
	Mean waiting time (weeks)	8.3	7.4	6.5	5.9	3.4	3.1	3.4
	Community care							
	Volume of activity	31,342,436	75,673,792	85,092,838	83,895,139	85,470,688	88,513,663	92,412,727
	Activity weighted average unit cost	89	39	38	40	42	45	46
	Other NHS activity							
	Volume of activity	196,620,122	230,116,689	271,833,567	338,198,807	321,996,920	353,159,440	363,722,767
	Average unit cost				Activity specific			
Q Res + PPA	**Primary Care**							
	General Practice Consultations							
	Volume of activity (000 contacts)	262,100	265,600	283,100	293,000	292,500	300,400	300,400
	Activity weighted average unit cost	18	20	21	25	26	27	28
	Prescription items							
	Volume of activity (000 items)	659,400	691,949	733,011	762,632	803,297	852,482	897,727
	Activity weighted average unit costs	12	12	11	11	10	10	10

In terms of raw growth, the following trends are evident:

- Elective activity has increased year-on-year, with 8.5m patients (CIPS) admitted as electives in 2009/10 compared to 6.4m in 2003/4.
- Non-elective activity has increased gradually, from 5.7m patients in 2003/4 to 7.1m in 2009/10.
- The number of outpatient attendances has increased from 50m in 2003/4 to 77m in 2009/10.
- Growth in community mental health has increased from 15m contacts in 2003/4 to 23m contacts in 2009/10.
- There was a huge increase in the volume of community care contacts between 2003/4 and 2004/5. Much of this was due to improved data collection at that time. Since 2004/5, growth has increased steadily year-on-year from 76m contacts to 92m contacts in 2009/10.
- Large year-on-year increases in those Reference Costs categories that we have grouped into our "Other" category are evident, the total amounting to 364m services of various types in 2009/10.
- Initial growth in primary care consultations has slowed, the volume amounting to some 300m annually since 2006/7. However, note that national data on an equivalent basis to that available in previous years were unavailable in 2009/10.
- The volume of prescription items has increased steadily from 659m in 2003/4 to 898m in 2009/10.

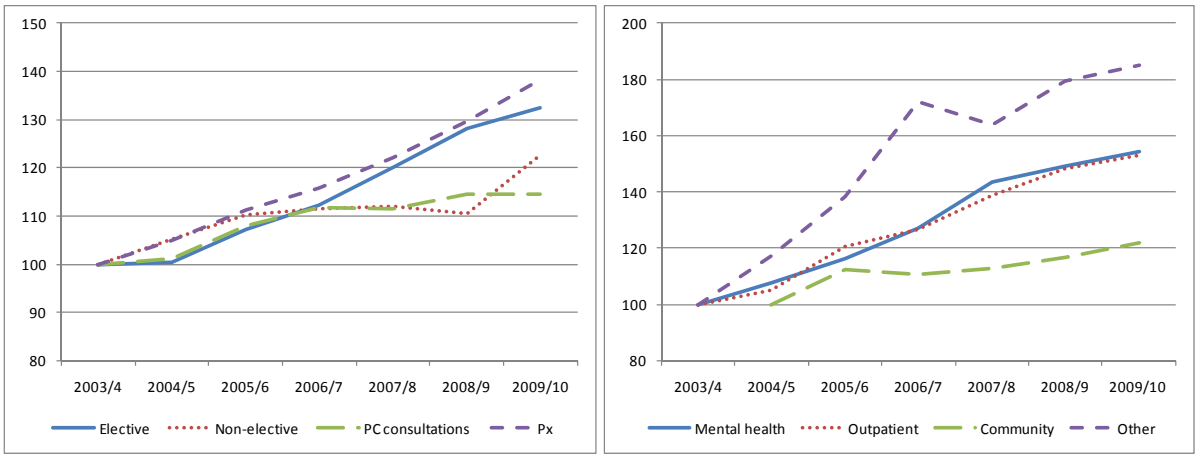

Figure 4 Growth in raw activity (base=2003/4)

4.2 Trends in quality

The quality of hospital care has been improving year-on-year. This is indicated by:

- Improvements in thirty-day survival rates for both elective and non-elective admissions;
- Reductions in inpatient waiting times, measured at both the mean and 80th percentile of the waiting time distribution, and in outpatient waiting times. However, after reaching a low in 2008/9, waiting times increased in 2009/10.

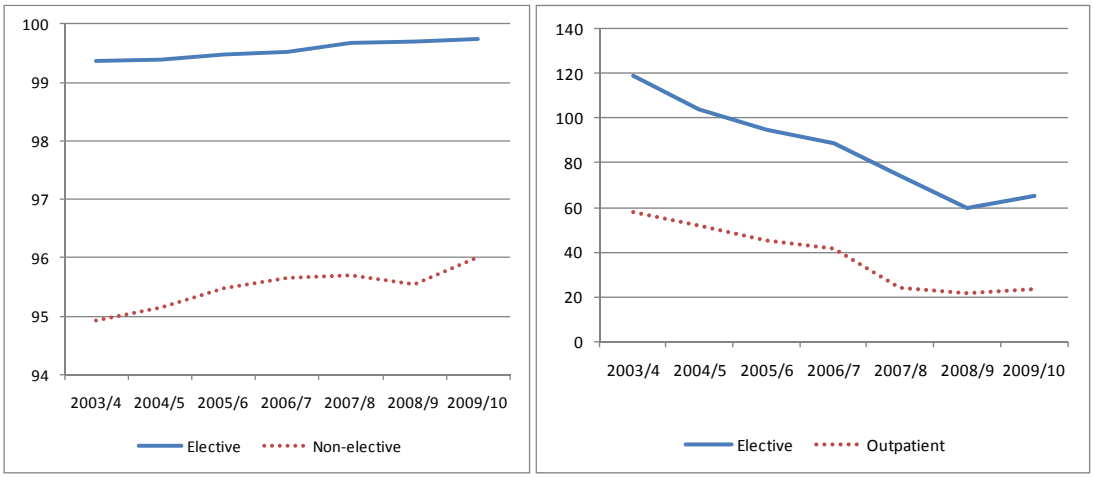

Figure 5 Changes in (a) 30-day survival rates (b) and waiting times

4.3 Output growth

Output growth is measured by combining activities of different types into a single index using costs to reflect their values. This generates our cost-weighted output growth index. We then re-scale each type of cost-weighted output according to changes in survival rates, health improvements and waiting times. This generates our quality-adjusted index. Quality improvements add about 0.09% to annual output growth for the NHS as a whole.

Table 5 Output growth

Output growth	All NHS	
	Cost-weighted growth	Quality adjusted CW growth
2003/4-4/5	27.9%	28.8%
2004/5-5/6	6.5%	7.1%
2005/6-6/7	5.9%	6.5%
2006/7-7/8	3.4%	3.7%
2007/8-8/9	5.3%	5.7%
2008/9-9/10	5.6%	5.5%
Growth excluding problematic Reference Cost categories		
2008/9-9/10	5.8%	5.7%

If we include NHS Direct and NHS Choices in our calculations for 2008/9-2009/10, the simple cost-weighted output growth index is equal to 7.1% and the quality-adjusted index is 7.2%.

5. Input growth

5.1 Trends in input use

Summarised from the ESR data, Figure 6 below shows gradual growth in most staffing groups, the exception being practice staff in GP practices.

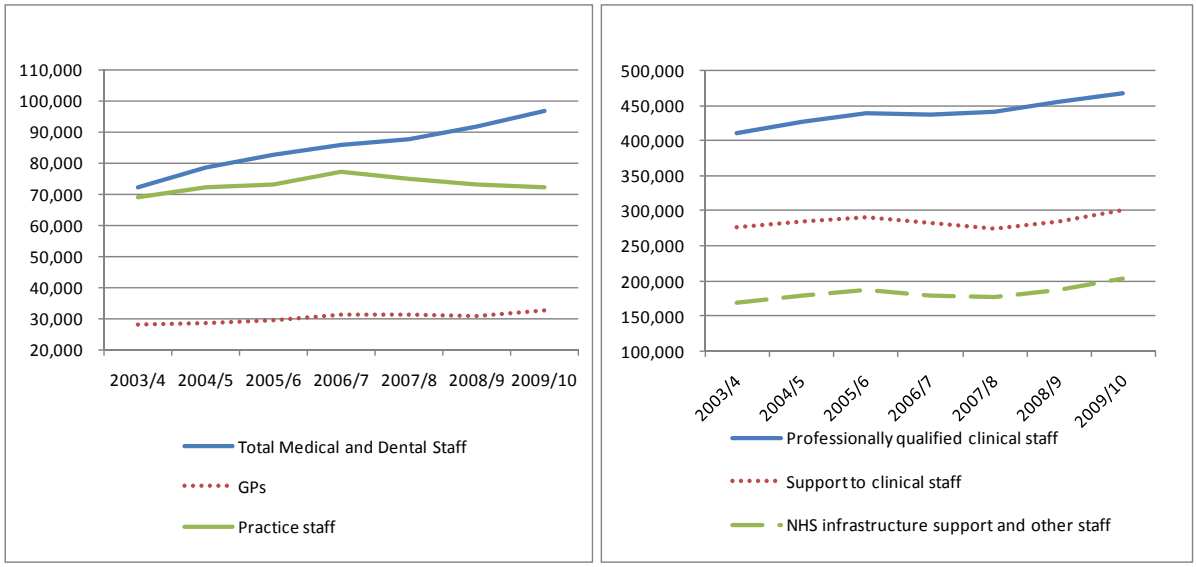

Figure 6 Growth in full time equivalents of (a) medical staff, GPs and practice staff and (b) non-medical staff

A detailed breakdown of current expenditure for Trusts, PCTs and SHAs is provided in Appendix 4. Changes in real expenditure (ie after washing out price effects) as reported in organisational financial accounts are shown in Figure 7 below. The first graph shows:

- Gradual, but slight, increases in NHS staffing levels
- Large year-on-year increases in the use of intermediate inputs
- Large increases in capital utilisation, but with a reduction from 2008/9. Note that the revised treatment of capital impairments in the accounts would suggest a major increase in capital utilisation, whereas this is due to the changed accounting practice
- Reductions in the use of agency staff, bottoming out in the years when organisations were trying to deal with deficit positions, and rising again recently.

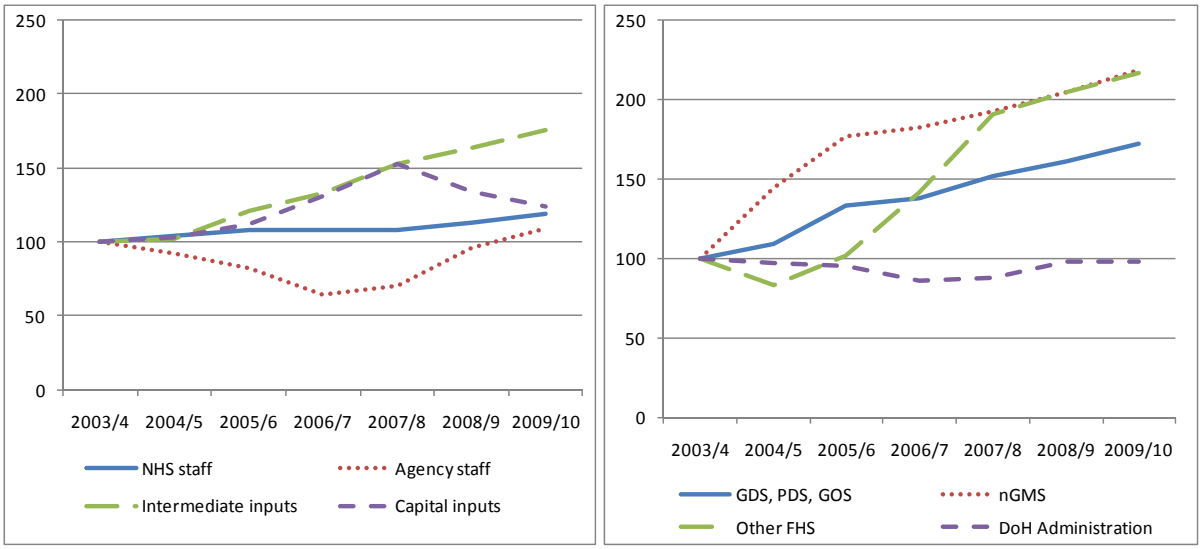

Figure 7 Trends in input growth (base=2003/4)

Real expenditure on other NHS inputs is derived from information compiled by the Department of Health. The second graph above shows:

- Rising real terms expenditure on general dental, personal dental and general ophthalmic services (GDS, PDS, GOS); on new general medical services (nGMS); and on other family health services (FHS)
- Reasonably stable expenditure on DH administration.

5.2 Input growth

Our estimates of input growth are reported in Table 6 below, differentiated according to the use of the Mixed or Indirect index and to what data source is used to account for expenditure on services procured from non-NHS bodies. The following are of note:

- Estimates of input growth are generally higher if using the Mixed rather than the Indirect input index. This is because the growth rate in labour input is generally higher if based on data from the Electronic Staff Record than if based on expenditure data deflated by the NHS pay index. The exception is when comparing growth between 2008/9 and 2009/10, when growth appears higher if using the latter data. Details of the two series of labour growth rates are provided in Table 7.
- Input growth is always lower if expenditure on non-NHS bodies accords with that reported in the Reference Costs rather than that reported in the financial returns. The impact is more pronounced if using the Indirect rather than the Mixed index, because of the use of the ESR to measure labour input in the latter index.
- The inclusion of revised figures to account for capital impairments has a dramatic impact, adding more than 3% to the input growth rate between 2008/9-2009/10 for the NHS as a whole.

Table 6 NHS Input growth

Input Growth	All NHS			
	Mixed	**Mixed**	**Indirect**	**Indirect**
	Non-NHS spend from RC	**Non-NHS spend from TFRs**	**Non-NHS spend from RC**	**Non-NHS spend from TFRs**
2003/4-4/5	6.9%	7.2%	6.8%	7.1%
2004/5-5/6	8.3%	8.9%	8.3%	8.9%
2005/6-6/7	3.3%	3.7%	2.7%	3.1%
2006/7-7/8	5.6%	6.6%	5.5%	6.5%
2007/8-8/9	4.9%	5.0%	4.8%	5.0%
2008/9-9/10	5.8%	6.5%	6.1%	6.9%
Figures below include capital impairments				
2008/9-9/10	9.3%	9.8%	9.8%	10.3%

Table 7 NHS Labour input growth

Labour input growth	Direct method: Electronic Staff Record	Indirect method: Deflated expenditure
2003/4-4/5	4.8%	4.5%
2004/5-5/6	3.4%	3.4%
2005/6-6/7	0.6%	-0.4%
2006/7-7/8	0.7%	0.4%
2007/8-8/9	4.3%	4.2%
2008/9-9/10	4.6%	5.6%

6. Productivity growth

Our estimates of year-on-year changes in productivity growth are reported in Table 8 below. Our preferred measure appears in the first column, and has the following features:

- The volume of NHS outputs across all health care sectors is captured as comprehensively as possible, using the Hospital Episode Statistics, Reference Cost database, the Prescription Cost Analysis database for prescribing and survey data for primary care;
- The quality of NHS outputs is captured by inpatient and outpatient waiting times, 30-day hospital survival rates and health improvement, and improved blood pressure control in primary care;
- The volume of NHS labour is measured using data about Full Time Equivalents from the iView data;
- The volume of prescription items is measured using data from the Prescribing Cost Analysis database compiled by the Prescription Pricing Authority;
- Expenditure on non-NHS bodies is based on Reference Cost data;
- The volume of all other inputs, including capital consumption, is derived from expenditure data compiled from NHS organisational accounts.

The second column has identical features, with the sole exception that expenditure on non-NHS bodies is taken from organisational accounts. The third and fourth columns mirror the first two, with the exception that labour input is derived from expenditure data.

Table 8 Year-on-year changes in NHS productivity growth

Productivity Growth	All NHS			
	Mixed	Mixed	Indirect	Indirect
	Non-NHS spend from RC	Non-NHS spend from TFRs	Non-NHS spend from RC	Non-NHS spend from TFRs
2003/4-4/5	20.5%	20.1%	20.6%	20.3%
2004/5-5/6	-1.1%	-1.7%	-1.1%	-1.7%
2005/6-6/7	3.1%	2.7%	3.7%	3.3%
2006/7-7/8	-1.9%	-2.8%	-1.7%	-2.6%
2007/8-8/9	0.8%	0.7%	0.9%	0.7%
2008/9-9/10	-0.2%	-0.9%	-0.6%	-1.2%

The following features are of note:

- The high estimates of productivity growth in 2003/4-2004/5 are due primarily to improved data collection about community care in the Reference Costs. Since then data collection has been more consistent.
- From 2004/5 onwards, year-on-year changes in productivity growth shift from negative to positive. This may reflect annual lags with increases (or decreases) in inputs not immediately realising a commensurate increase (or reduction) in output.
- The four variants of the productivity index are in broad agreement as to the direction of year-on-year productivity change.
- Generally, productivity growth is lower for the Mixed rather than Indirect indices, except for 2008/9-2009/10. This is because, for every pair of years except the last,

labour input appears to have grown faster if measured using iView rather than expenditure data (see Table 7).

As mentioned productivity growth has been somewhat erratic year-on-year. This may reflect a lag before output growth adjusts to changes in input growth. The pairs of shaded cells in Table 9 below have values that tend to be closer than those in the concurrent years. This might suggest a one-year lag between changes in input growth being realised in output growth.

Table 9 Lags between input and output growth

	Quality adjusted CW output growth	Baseline input growth
2003/4-4/5	28.8%	6.9%
2004/5-5/6	7.1%	8.3%
2005/6-6/7	6.5%	3.3%
2006/7-7/8	3.7%	5.6%
2007/8-8/9	5.7%	4.9%
2008/9-9/10	5.5%	5.8%

Table 10 and Figure 8 report output, input and productivity growth since 2003/4. This shows clearly the close relationship between the output and input series over the years in question. The net effect is shown by the productivity series, which compares output growth with growth in inputs. This suggests fairly constant returns: output increases more or less in proportion to increases in inputs.

Table 10 Output, input and productivity growth indices (base=2003/4-4/5)

	Output growth	Input growth	Productivity Growth	Year-on-year change in productivity growth (%)
2003/4-4/5	1.000	1.000	1.000	
2004/5-5/6	1.071	1.083	0.989	-1.1%
2005/6-6/7	1.141	1.119	1.020	3.1%
2006/7-7/8	1.182	1.182	1.000	-1.9%
2007/8-8/9	1.250	1.240	1.008	0.8%
2008/9-9/10	1.320	1.311	1.006	-0.2%

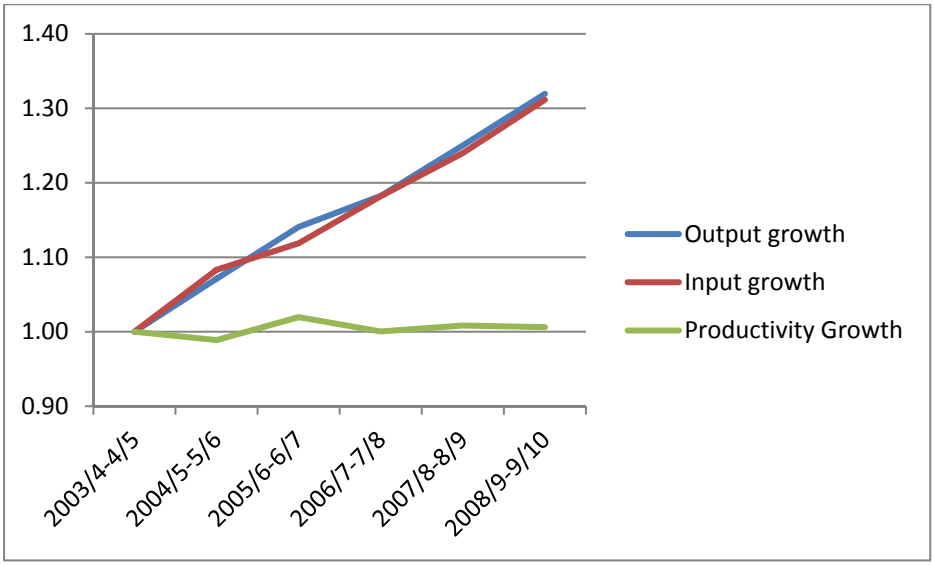

Figure 8 Output, input and productivity growth (base=2003/4-4/5)

7. Conclusions

The objective of this report is to estimate productivity growth in the English NHS for the period 2003/4 to 2009/10. We estimate productivity growth by comparing comprehensive output and input growth rates using the most detailed information available to us. Output consists of all health care services provided to NHS patients in the secondary, primary and community care sectors and prescriptions. The output measure also takes account of quality improvements by measuring changes in hospital survival rates and health outcomes, and inpatient and outpatient waiting times. Inputs include the staff, intermediate goods and services, and capital resources that contribute to the production of health care.

This figure represents our calculations based on a choice of a mixed (direct where possible, indirect expenditure otherwise) measures of inputs, with activity relating to NHS Choices and NHS Direct omitted from the measure of output growth, and with non-NHS spend as reported in the financial returns and capital impairments excluded from the input growth measure. In addition it should be noted that, due to changes in the availability of primary care data, we have assumed no change in the volume of consultations from the previous year.

As different data sources are available to measure the same conceptual inputs (e.g. direct and indirect sources for labour) sensitivity analyses have been conducted. For 2008/9-9/10 this shows a range of estimates from -0.2% to -1.2% depending on how expenditure on non-NHS bodies is accounted for and whether the direct or indirect measure of labour is used. Inclusion of non-NHS spending as reported in the financial returns is the option that tips the productivity measure (relative to our baseline measure) from positive to negative and then only in the case where the indirect measure of labour is used. This transpires because this raises the input growth by an additional 0.5%. However, most of the outputs obtained from the non-NHS expenditure are not captured in the Reference Cost database and, therefore, are omitted from the output growth. To ensure consistency of the output and input series, it would seem most appropriate that expenditure on such services is also omitted from the productivity calculation.

We have also excluded capital impairments from the measure of input growth. Impairments refer to revaluations of capital due to external influences (e.g. property price changes) and do not represent a real resource use by hospitals. The financial year 09/10 has not only seen a large increase in impairments on Foundation Trust financial returns due to falling property prices, but a change in accounting practice has led to significant increases in the value of impairments appearing on trust returns. Including such accounting entities would lead to an increase in input growth of an additional 3.5%. But this accounting change would be a misleading indicator of the resource use of the NHS in providing the measured output.

Our findings show that, from 2003/4 to 2009/10, increases in inputs have been matched closely by increases in output.

Between 2003/4 to 2009/10 the number of staff has increased by 18 per cent, buildings and equipment by 24 per cent and all other inputs, such as clinical supplies and energy costs, by 76 per cent. But there was a corresponding increase in both the quantity and quality of output. The number of patients treated in hospital increased from 12.1m to 15.6m; outpatient attendances from 50m to 77m; community care contacts from 76m to 92m; and primary care consultations from 262m to 300m. Over the same period hospital survival rates improved from 99.4% to 99.8% for elective patients and from 95% to 96% for non-electives. Average inpatient waiting times fell from 78 to 57 days, reaching a low of 51 days in 2008/9. Outpatient waiting times fell from 58 days to 24 days.

All in all, growth in activity and improvements in quality has tracked the growth in inputs, implying that productivity has been reasonably constant over the period.

These findings are not grounds for complacency however. Our related research suggests wide variations in productivity across the country (Bojke et al, 2012). It is essential that, rather than across-the-board measures, future efforts to improve productivity are directed at reducing these variations.

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Appendix 1: Construction of pharmaceutical price index

We've explored construction of pharmaceutical price indices using different datasets and assumptions about index construction. The following provides a summary.

Form of the indices

The price indices are specified as follows.

Laspeyres: $$P^{Las} = \frac{\sum_{j=1}^{J} x_t p_{t+1}}{\sum_{j=1}^{J} x_t p_t}$$

Paasche: $$P^{Paa} = \frac{\sum_{j=1}^{J} x_{t+1} p_{t+1}}{\sum_{j=1}^{J} x_{t+1} p_t}$$

Where *x* is the quantity prescribed of drug *j*, *p* indicates its price and *t* indexes time.

Data

There are two main sources of prescribing data.

1. Data aggregated to the 200 or so sub-chapters of the BNF. These chapters are (largely) consistent over time. The shortcomings of these data are that detail about precisely what products are prescribed is lost as a result of aggregation and switches from (expensive) branded to (cheaper) generic products will not be captured by the price index.
2. Data reported by chemical composition, of which there are 60,000 potential groups. In practice, 12,359 different categories are populated across the years we consider, but only around 8,000-9,000 contain data for any particular year. We impute missing values to ensure that all data are included (Castelli et al., 2011).

Price indices

Price indices are reported below, with the FHS drugs deflator shown for comparison. The price indices based on BNF data imply less dramatic year-on-year price reductions than do the indices based on chemical composition, with the exception of 2007/8-2008/9. The indices based on chemical composition are closer to the FHS deflator.

Table 11 Pharmaceutical price indices

Price indices						
	03/04 to 04/05	04/05 to 05/06	05/06 to 06/07	06/07 to 07/08	07/08 to 08/09	08/09 to 09/10
FHS						
Paasche	-5.20%	-9.28%	-3.14%	-3.24%		
	BNF chapter					
Laspeyres	-1.01%	-7.50%	-2.27%	-5.17%	-5.70%	
Paasche	-1.66%	-7.85%	-2.58%	-5.38%	-6.06%	
Fisher	-1.34%	-7.67%	-2.42%	-5.27%	-5.88%	
	Chemical Composition					
	03/04 to 04/05	04/05 to 05/06	05/06 to 06/07	06/07 to 07/08	07/08 to 08/09	08/09 to 09/10
Laspeyres	-3.69%	-9.57%	-2.61%	-3.25%	-4.74%	-3.54%
Paasche	-4.11%	-9.87%	-3.41%	-6.24%	-5.15%	-3.74%
Fisher	-3.89%	-9.72%	-3.01%	-4.75%	-4.95%	-3.64%

Appendix 2: Review of primary care datasets

Data and approach currently used to measure primary care outputs

Measuring the volume of primary care outputs

- To date the number of primary care consultations has been measured using two data sets: the General Household Survey, followed by QResearch consultations data.
- QResearch consultations data provide estimates of the total number of primary care consultations in England, and estimates of the total number of consultations by type (GP surgery consultation, GP home visits, GP telephone consultations, Other GP consultations, nurse consultations and other consultations).

Measuring the value of primary care outputs

- Measuring the value of primary care outputs is perhaps more complex than measuring the value of secondary care activities because (i) many conditions treated in primary care are long-term conditions where the treatment received is not curative and (ii) many consultations involve the provision of information and reassurance rather than interventions.
- Currently the value of consultations is estimated using unit costs (PSSRU) obtained using estimates of consultation length taken from the 2007 Workload survey.
- Values include some quality adjustments which take advantage of QOF achievement data (Derbyshire et al., 2007). Specifically, consultations for patients with certain QOF conditions that have their blood pressure controlled receive a greater weight than other consultations.
- Disease prevalence is captured either through Quality Management and Analysis System (QMAS) data (available for all practices in England) or through QResearch data on disease prevalence and blood pressure control which is grossed up to produce a national figure. However, QMAS data does not provide any information on co-morbidities so any adjustments based on these data may be double-counting patients with QOF comorbidities.
- Concerns about double-counting has informed the choice of QOF indicators which are used for quality adjustment, with indicators relating to cholesterol being omitted to avoid double counting arising from the value weight for statins.

While the approaches used to measure primary care outputs to date have acknowledged limitations, the scope for improving on existing measures of primary care output is determined largely by data availability. Given this, and the fact that QResearch consultations data were not available for 2009/10, we carried out a review of data which could be used to measure primary care outputs. To measure outputs in primary care we require information on the volume and value of primary care outputs, ideally along with some data on their quality, so our review focuses on datasets which cover one or more of these areas, rather than reviewing datasets on primary care more generally.

Currently, there is no dataset which provides information on the volume of consultations taking place in general practice for all practices. Rather, information on general practice activities is typically estimated either from data collected from a sample of practices (e.g. QResearch, GPRD, THIN), or from responses to household surveys, which only sample a fraction of the total number of patients registered at a general practice in England. Characteristics of these datasets are summarised in Table 12.

Table 12 Content of datasets with respect to measuring productivity in general practice

Dataset	Smallest analysis unit	Practice coverage	Small unit coverage	Timing	# consultations	# GP consultations	# nurse, other non-GP consultations	# consultations by patient type	# consultations broken down by another factor (e.g. activity type)	Practice's activities	Patient characteristics	Quality (practice activities)	Quality (access/waiting)	Quality (health status)
Trends in consultation rates in General Practice 1995-2009 (QResearch)	N	S	-	1995/6-2008/9	Y	Y	Y	-	Y	-	-	-	-	-
QResearch	I	S	S	Early 1990s	Y	Y	Y	Y	Y	Y	Y	Y	-	Y
GPRD	I	S	S	1987 -	Y	Y	Y	Y	Y	Y	Y	Y	-	Y
THIN	I	S	S	Nov 2002 -	Y	Y	Y	Y	Y	Y	Y	Y	-	Y
BHPS	I	N/A	S	Annual from 1990	B	B	-	B	B	Y	Y	-	-	-
Understanding Society	I	N/A	S	Annual from Jan 2009	-	-	-	-	-	-	Y	-	-	-
General Lifestyle Survey (raw data)	I	N/A	S	Annual from Jan 2008 (calendar yr)	Y	Y	Y	Y	Y	-	Y	-	-	-
GP Patient Survey (raw data)	I	A	S	Jan-Mar 2007; Jan-Mar 2008	Y	Y	-	-	-	Y	Y	Y	Y	-
	I	A	S	Quarterly from Jan-Mar 2009 to Jan-Mar 2011	R	R	R	R	R	Y	Y	Y	Y	-
GP Patient Survey (aggregate data)	P	A	-	Jan-Mar 2007; Jan-Mar 2008	Y/B	Y/B	-	-	-	Y	Y	Y	Y	-
	P	A	-	Quarterly from Jan-Mar 2009 to Jan-Mar 2011	R	R	R	R	R	Y	Y	Y	Y	-
QOF/QMAS	P	A	A	Annual from 2004/05	-	-	-	-	-	Y	Y	Y	Y	Y
RCGP Weekly returns	C	S	S	Weekly from 1999	W	-	-	W	-	Y	-	-	-	-
RCGP Weekly returns annual reports	C	S	S	Annual	Y	-	-	Y	-	Y	-	-	-	-
RCGP Weekly returns prevalence reports	C	S	S	Annual (04-07)	-	-	-	-	-	-	Y	-	-	-
General Practice Workload Survey	N	S	-	2006/7	Y	Y	Y	-	Y	Y	-	-	-	-
General Lifestyle Survey (aggregate output)	V	N/A	S	Annual from Jan 2008 (calendar yr)	Y	Y	Y	Y	Y	-	Y	-	-	-

Key

Code	Definition
A	All (though in some instances there could be a few exceptions)
B	Number of visits given in bands not as an integer
C	Groups of practices
G	GP level data
I	Individual patient data
N	National figure
P	Practice level data
R	Doesn't give number of consultations, but provides an indication of resource use
S	Sample
V	Varies
W	Weekly incidence rates per 100,000 for new episodes of illness.
Y	Yes

Categories for Table 12:

Heading	**Explanation**
Smallest analysis unit	What is the smallest data unit which we can obtain, e.g. individual, practice, national figure
Practice coverage	What proportion of practices are included in the dataset, e.g. all practices, or a sample of practices
Small unit coverage	Whether all or a sample of the 'smallest analysis unit' (e.g. individuals) are included in the dataset (e.g. the GP Patient survey includes data from a sample of individuals in each practice, across all practices).
Heading	**Whether the dataset ...**
# consultations	provides **any** information on the number of primary care consultations.
# GP consultations	provides **any** information on the number of GP consultations.
# nurse, or other non-GP consultations	provides **any** information on the number of nurse (or other non-GP) consultations
# consultations by patient type	provides/has the variables to create, the number of consultations disaggregated by one or more patient characteristics, e.g. age, sex, health problems etc.
# consultations broken down by another factor (e.g. activity type)	provides/has the variables to create, the number of consultations disaggregated by one or more factor(s) other than patient characteristics, e.g. it can distinguish between consultations carried out by telephone and those in the surgery.
Practice's activities	provides **any** information on the practice's activities, e.g. childhood immunisations. NB: In some cases this overlaps with the categories above, but it is included to illustrate that some datasets which do not provide the number of consultations do provide some information on a select number of activities (and the volume of these activities), are carried out in general practice.
Patient characteristics	provides **any** information on patient characteristics
Quality (practice activities)	provides any information which could be used to assess the quality of the practice activities
Quality (access/waiting)	provides **any** information which could be used to assess the quality in terms of waiting times, access to care
Quality (health status)	provides **any** information on change in health status (e.g. control of blood pressure)

With the exception of the first row - which shows the dataset previously used to estimate the volume of consultations in primary care output indices- the datasets are grouped by the smallest analysis unit they offer, specifically: individuals, practices, groups of practices or for England as a whole.

The first row of Table 12 provides information about 'Trends in consultation rates in General Practice 1995-2009', the aggregate level data summary produced by QResearch which was used to estimate the volume of consultations in CHE's 2008 productivity index.

Columns 2, 3 and 4 provide some information about the sampling and coverage of each dataset. The second column gives the smallest analysis unit, in this case national level statistics. The third column indicates that the data were obtained from a sample of practices.

Column 5 provides some information on the timing and frequency of the data collection, and the remaining columns provide information on the content of the data with regard to measuring activity and quality. Further details of the columns are provided in the key and table which follow Table 12. For instance, the Trends in consultation rates dataset provides information on the total number of consultations, the number of consultations with a GP and the number of consultations with nurses and 'other' clinicians. The number of consultations data are also broken down by the location of the consultation (surgery, home visit or telephone consultation). However, this dataset does not provide any information on the quality of primary care.

The most comprehensive sources of data on primary care consultations are the clinical databases, such as QResearch, GPRD (General Practice Research Database) and THIN (The Health Information Network). These large clinical databases are produced by extracting data from the clinical computer systems of a sample of practices in England. Access is not free and requires data protocols, ethics approvals, a clinician on the research team etc. More detail about each of these datasets is provided at the end of this appendix.

Alternatives to using clinical databases or data derived from these are scarce. Before QResearch became the preferred source of data on the volume of primary care consultations the General Household Survey (GHS) was used to produce an estimated number of primary care consultations, even though the GHS only asked about consultations with a GP and about other consultations in the two weeks prior to interview, rather than over the course of the year. The Lifestyle Survey (GLF), which in 2008 replaced the General Household Survey (GHS), still asks a question about whether the individual visited a GP in the last 2 weeks, but the GLF will not continue in its current form after January 2012.

The British Household Panel Survey used to ask respondents about use of healthcare services and health problems, but the survey has been integrated into a new survey called Understanding Society and, while the questions about health conditions are more detailed than those in the BHPS, the questions on healthcare utilisation have been dropped.

Turning to practice datasets, the GP Patient Survey in 2007 and 2008 included questions about the number of GP consultations, but in 2009 and subsequent years the emphasis shifted from the number of appointments to when the patient had last seen a doctor.

Data collected as part of the Quality and Outcomes Framework (QOF) does not contain any information on the number of consultations but does provide information on the practice population and records quality on a number of clinical and organisational dimensions.

Research agenda for measuring primary care outputs

The fundamental problem is that there is no dataset that captures the volume of consultations for England as a whole. Ideally, we require information on the number, type, cost and quality of consultations but few datasets provide good coverage of both volume/type of consultations and quality of consultations.

Large clinical databases which include a representative sample of patients across England appear to be the most promising sources of data for measuring productivity in primary care. Without these, or summaries of consultation volumes obtained from these, the volume of consultations will most likely have to be forecast using sampled or historic data.

It is also worth noting that the rationale for distinguishing between different types of consultations is that different types of consultation have different value to society. However, distinguishing between different types of consultations is only useful when measuring productivity if the value of different types of consultations can be accurately captured.

At present, the unit costs of some types of consultations are proxied and unit costs are calculated based on consultation length data collected in 2007. Furthermore, quality adjustments are only applied to a very small percentage of consultations. Without accessing a dataset which provides individual level data on consultations and the quality of these consultations (eg whether blood pressure was subsequently controlled) assumptions have to be made about the number of consultations for which the QOF quality adjustment should be applied.

QResearch

Background:

QResearch were commissioned by the NHS Information Centre on behalf of the Department of Health and the Office for National Statistics to report on consultation rates in General Practice over time. The reports present a longitudinal study of trends in consultation rates using the QResearch database.

Consultation rates for 1995 to 2009 derived from QResearch data are published on the Information Centre's website (Hippisley-Cox et al., 2007). The final two reports in the series were published in September 2009 -one relating to the calendar years 1995 to 2008, the other to the financial years 1995/6 to 2008/9 (Hippisley-Cox and Vinogradova, 2009a, Hippisley-Cox and Vinogradova, 2009b).

Coverage:

- 660 General practices submit data to the database
- All the practices use the EMIS computer system.
- Contains the anonymised health records of over 13 million patients, a mixture of current patients and historical patients (i.e. those who have died or left the practice).
- Patients can opt out of having their data included in the database.

Content:

- Clinical data extracted from participating practices' electronic patient records
- Contains socio-economic information based on the patient's postcode (e.g. Census data, Townsend score)
- Rurality measure
- Individual patient data has been linked to cause of death data
- QResearch has gained approval to link the database to hospital episode statistics (HES) and to cancer registries.

The spreadsheets accompanying the 'Trends in consultation rate' reports include, amongst others, the following tables [d]:

- Number of practices, patients, person-years consultations and rates in each year
- Consultation rates in England by sex, age-band and year
- England consultation rates by clinician type and year
- England consultation rates by location and year for consultations with a GP
- Estimates for the annual consultation rates for a typical practice and nationally
- Estimates of the national volume of consultations and percentage growth for England using "method 6"
- Estimates of the national volume of consultations by clinician (and location for GPs) by year for England (using "method 6")

[d] http://www.ic.nhs.uk/statistics-and-data-collections/primary-care/general-practice/trends-in-consultation-rates-in-general-practice--1995-2009 [Accessed 7/4/11]

where age-bands are of width 5 years; clinician type = GP[e], nurse[f], other[g]; and location = surgery, telephone, visit, or other.

Methods:

These rates are calculated using data from practices included in the database with at least 1000 registered patients and at least one consultation per person-year (Fenty et al., 2006). Patients registered at any point during the calendar year were included but temporary residents were excluded.

Consultations were excluded if they were:

- Computer medical "record openings" where the patient was not seen
- Repeat prescriptions where the patient was not seen
- Electronic pathology reports

The consultation rates obtained from QResearch were grossed up to produce consultation rates for England as a whole using several different methods[h].

- 1st approach:
  - Using QResearch calculate mean overall consultation rate for each age-band.
  - Multiply this by the mean number of patients in each age band each year (across practices) obtained from data provided by the Department of Health.
  - Sum over age-bands to estimate the number of consultations in a 'typical' practice.
  - Multiplied this figure by the number of practices in England.
  - Compared results with those obtained using median and upper/lower quartile consultation rates.

- 2nd approach:
  - Using QResearch calculate mean overall consultation rate for each year.
  - Multiply this by the estimated population of England (obtained from ONS mid-year population estimates).

- "Method 6" involved:
  - Using weighted linear regression, with age-sex standardised consultation rates as the dependent variable.
  - Multiply regression coefficients by national mean for each explanatory variable

[e] GPs inclues: GP partners, GP principals, GP Retainers, GP Associates, GP registrar, GPs with special interests, Co-op or out-of-hours doctors, and locums.

[f] Nurses includes: Practice nurses, nurse practitioners, nurse specialists, nurse prescriber, midwife, district nurse, Macmillan nurse, Health Visitor, School Nurse and Community Based Nurses.

[g] Other Clinicians includes: Pharmacists, Doctors who are not GPs (e.g. consultants), Medical and nursing students, Art therapists, Prosthetists and Orthotists, Physiotherapists, Speech and Language Therapists, Orthoptists, Chiropodists and Podiatrists, Dieticians, Operating Department Practitioners, Biomedical Scientists, Paramedics, Radiographers, Clinical Scientists, Occupational Therapists, Opticians, Phlebotomists, Vaccination Clinic, Mental Health Care, Other health care workers, Counsellor, Acupuncturist, Aromatherapist, Reflexologist, Psychologist, RELATE, Homeopath, Social Worker.

[h] 'Trends in Consultation Rates in General Practice 1995-96 to 2008-09 Tables [Datafile] Worksheet labelled "Methods". Retrieved from http://www.ic.nhs.uk/statistics-and-data-collections/primary-care/general-practice/trends-in-consultation-rates-in-general-practice--1995-2009

- Multiply average consultation rate by total registered population of England.

Robustness of the data:

The spreadsheets also contain information on the representative of the QResearch patients by comparing age-sex breakdowns with the 2001 Census, and comparing the consultation rates derived from QResearch with those obtained from the General Household Survey.

Access: The survey is held by the University of Nottingham. Access to the data is not free and is conditional upon a suitable protocol being accepted by QResearch and with the ethical committee's approval.

General Practice Research Database (GPRD)

Background:

"GPRD is managed by the GPRD Group within the Medicines and Healthcare products Regulatory Agency (MHRA)"[i].

Coverage:

- The GPRD GOLD Research Data [January 11 Release][j] contains data on 10.95 million patients:
  - 5 million active patients, and
  - 5.95 million inactive patients (e.g. transferred out or died).
- Data are collected from around 590 practices[k]
- Only practices using Vision software are included in GPRD[l]
- "The patient population captured in the database is broadly representative of the demographic breakdown of the UK population."[m]
- The database is updated monthly.

Content:

For each patient GPRD collects and makes available[n]:

- **Demographic information** including gender, year of birth, ethnicity and practice location (to Strategic Health Authority level).
- **All clinical information** including diagnoses, symptoms, procedures, and medical history.
- **All prescriptions issued** both acute and repeat, with dosage instructions (which can be translated to numeric form).
- **Referrals to secondary** care including hospital speciality, urgency, and nature of the referral (e.g. day case).
- **Immunisation details** including status, stage, and type, route of administration, reason and batch number.

[i] http://www.gprd.com/gprd/goldstandard.asp [Accessed 15/4/11]
[j] http://www.gprd.com/_docs/GPRD%20Practice%20Patient%20Populations%20Jan2011.pdf [Accessed 15/4/11]
[k] http://www.gprd.com/academia/primarycare.asp [Accessed 15/4/11]
[l] http://www.gprd.com/contributing/ [Accessed 15/4/11]
[m] http://www.gprd.com/academia/primarycare.asp [Accessed 15/4/11]
[n] http://www.gprd.com/academia/primarycare.asp [Accessed 15/4/11]

- **Tests results** including qualitative and quantitative test result values and also normal ranges for the laboratory.
- **Lifestyle information** including BMI, height, weight and details on smoking and alcohol consumption.
- **Patient registration details** including historic registration details, which are used to generate start and end dates of longitudinal electronic recording for person-time calculations.
- **Appointment and staff details** including duration of consultation and gender and role of the health professional concerned.
- **Adverse drug reaction details** including certainty and severity assessments for ADRs and drug intollerance and allergy.
- **Additional clinical details** which provide supplementary information on a variety of situations (e.g. contraception, child health surveillance, ante- and post-natal care) conditions (e.g. asthma, diabetes) and standard signs (e.g. Heart rate and Blood Pressure)
- **Anonymised free text** are available at additional cost for particular studies, including keyword searching facilities

In terms of consultations GPRD provides data on 21 different consultation types and 35 staff roles, namely:

Consultation types[o]:

- Surgery
- Clinic
- Emergency Consultation
- Acute visit
- Night visit, practice
- Night visit, deputising
- Night visit, local rota
- Out-of-hours, non practice
- Follow up/ routine visit (non-urgent visits to housebound patients for example)
- Mail to patient
- Mail from patient
- Telephone call to patient
- Telephone call from patient
- Third party encounter
- Administration (default for reception staff)
- Repeat issue (to record a repeat prescription)
- Discharge details (following hospital discharge)
- Results recording
- Letter from outpatients
- Other (for other contacts, e.g. solicitors letters)
- Casualty attendance

[o] GPRD (2004) Recording Guidelines for Vision Users , February 2004, P9, Available at: http://www.gprd.com/_docs/RecordingGuidelines.pdf [Accessed 15/4/11]

Referrals:

Consultant outpatient referrals, and other specialist referrals, including private referrals should be recorded in GPRD, but other referrals such as to a District Nurse or Physio are not compulsory.[p]
External linkage[q]:

GPRD has gained ethics, scientific and confidentiality approval to enable record linkage of GPRD data with other healthcare datasets via the patient's NHS number, sex, date of birth and Post Code. The linkage is done by an external NHS group in a way that GPRD does not see the identifying details. The additional data is returned using the GPRD anonymised research level identifier.

Additional data within GPRD
Socioeconomic class to small area level will be provided within the normal GPRD as will hospitalisation and death data. This adds an additional level of validation to that already within GPRD.

Full hospitalisation record - outcomes and pharmaco-economics
Full hospitalisation data including length of stay, ward types, more extensive disease coding, and procedural coding will now be available as an add-on to GPRD. Further details can be provided against specific requests for data. Such data is invaluable for health outcomes and detailed pharmaco-economic work.

GPRD - Disease registry links
Many population based disease registries are maintained in the UK. Work is already on-going on linkage with those for cancer and cardiovascular disease. Such links will enable detailed research on many hospital only and day care use medications. The options for linkage are developing all the time. Request specific information on your clinical area.

The Health Information Network (THIN)

http://www.epic-uk.org/index.html
Coverage:

- 479 practices
- Percentage coverage of UK in 2009: 5.7%
- Total patients: 9.15 million
- Active patients: 3.36 million
- Data collection began in November 2002.
- All practice submitting data to THIN use Vision software.
- Data are collected monthly after the initial full data collection (which includes retrospective data)

Content:

"THIN provides a comprehensive picture of a patient's data including:

- Diagnoses
- Anonymised commentary written by the health physician
- Symptoms

[p] GPRD (2004) Recording Guidelines for Vision Users, February 2004, p16, Available at: http://www.gprd.com/_docs/RecordingGuidelines.pdf [Accessed 15/4/11]
[q] http://www.gprd.com/products/links.asp [Accessed 15/4/11]

- Prescriptions issued
- Tests and results
- Measurements and readings taken in the practice
- Demographic information
- Dates of entry in and out of the database: These dates include information on death and outcomes of conditions and treatments."[r]

THIN data are organised into the following four categories:

1. Demographics

- Dates patients registered at practices
- Dates patients left practices
- Patient registration status
- Year of birth
- Gender
- Patients residing at the same address linked if at the same practice
- Members of the same family linked if at the same practice

2. Diagnoses

All conditions and symptoms are recorded on computer during consultations with the GP and patient. This logs the medical histories for patients at each consultation.

Medical conditions are recorded using the Read Clinical Classification version 2.

Information on referrals to secondary care, including the specialty of the secondary care service, is available in THIN.

Secondary care information and other related information received by the practice is entered retrospectively, including:

- Details on hospital admissions
- Discharge medication and diagnosis
- Outpatient consultation diagnosis
- Investigation and treatment outcomes

3. Prescribing

The GP will issue prescriptions to the patient by computer so all prescribing is logged into the system automatically.

The prescribing recorded in the computer logs the drug prescribed using the Multilex coding system, which automatically creates therapy records for THIN.

Acute treatments and medicines for a chronic condition can be temporally linked with a symptom or diagnosis although this is not comprehensive in THIN.

Details of prescriptions from ongoing outpatient specialist care or over-the-counter drugs may be summarised by the GP, but the degree of information depends on its direct relevance to the patient.

[r] http://www.epic-uk.org/our-data/our-data.html [Accessed 15/4/11]

4. Additional Health Information

A key element of THIN data is commentary from the GP entered into free text fields. This can sometimes contain confidential or identifying information so THIN checks and ensures these comments have been anonymised.

As well as GP consultations and details from other health care professionals, THIN Data contains information on lifestyle and health factors such as smoking and alcohol intake.

Tests and laboratory results are also accessible. More than 75% of THIN practices are now electronically linked to pathology laboratories and will receive test results electronically. This makes it easier for the practice to store results in the patient's electronic record.

5. Socioeconomic data from THIN

In addition THIN supplies data from other sources linked to the patient's postcode (zip code equivalent) whilst maintaining confidentiality.

The majority of patients in THIN Data are linked to postcode-based socioeconomic, ethnicity and environmental indicators.

The methodology used to make this link allows THIN Data to be linked to other postcode level indicators. The data are based on the patient's postcode so that individual socioeconomic data are available in the form of the Townsend score quintile, an established socioeconomic score indicator.

[Extracted from http://www.epic-uk.org/our-data/data-content.html Accessed 15/4/11]

Appendix 3: Expenditure on services from non-NHS providers

Expenditure over £25,000

Details of the services NHS organisations procure from non-NHS providers are not currently available in an aggregated or standardised form. However, since September 2010, as a part of a wider government initiative to increase transparency, NHS organisations have been required to publish details of expenditure over £25,000. Initially NHS organisations had to publish all expenditure over £25,000 from 1st April to 30th September 2010 by the 31st October 2010. Then the requirement switched to monthly reporting of expenditure over £25,000 by the 15th working day of each month (Department of Health, 2010b).

We chose three Primary Care Trusts (PCTs), namely NHS Tameside & Glossop, Barnsley PCT and Manchester PCT, and looked at the information they published in terms of expenditures over £25,000. The PCTs were selected as a convenience sample based on data availability and the range of reporting categories they employed.

We first provide a brief overview of the structure of the data, then we summarise the information we can glean on procurement from non-NHS providers for the three PCTs in turn, before discussing more generally how data on expenditure over £25,000 could be employed in the future with regard to identifying the types of goods and services being purchased from non-NHS providers for use in measuring productivity in the NHS.

Overview of data provided in expenditure data releases

We use data on expenditures over £25,000 which are published on the internet.

NHS Tameside & Glossop:
http://www.tamesideandglossop.nhs.uk/templates/PageBodyOnly____1520.aspx
Barnsley PCT:
http://www.barnsley.nhs.uk/Your-NHS-Barnsley/Buying-and-Procurement/invoices-over-25k.htm
Manchester PCT:
http://www.manchester.nhs.uk/getintouch/freedomofinformation/publicationscheme/what%20we%20spend%20and%20how%20we%20spend%20it.html

All three PCTs provided their expenditure information under the same eight headings:

- Department Family
- Entity
- Payment Date
- Expense Type
- Expense Area
- Supplier
- Transaction number
- Amount

However, using 'Expense Areas' as an illustration, the categories within each of these fields varies significantly between the PCTs:

- NHS Tameside & Glossop's expense areas provided some information on the type of organisation being paid for the goods and/or services and whether the expenditure

was on healthcare or not. 'Healthcare from Non-NHS bodies' is listed as an expense area.

- Barnsley PCT did not indicate the type of organisation the goods or services are procured from, focusing instead on the type of healthcare or non-healthcare expenditure, for example, primary care, pharmacy, community rehabilitation.
- Manchester PCT's expense areas included scheduled and unscheduled care in different geographical areas, individual health centres, commissioning and performance.

Similarly, 'Expense Types' also varies considerably across the three PCTs, with NHS Tameside & Glossop reporting 199 different expenditure types, Barnsley PCT reporting 60 and Manchester PCT providing 93.

Table 13 Categories listed under 'Expense Area'

NHS Tameside & Glossop	Barnsley PCT	Manchester PCT
CONSULTANCY	Comm Rehab	CENTRAL SCHEDULED CARE
EDUCATION TRAINING DEVELOPMENT	Continuing Care	CENTRAL UNSCHEDULED CARE
ESTABLISHMENT	Contrib to Ntss Group	CHIEF EXEC & BOARD
EXPENDITURE ON DATS	Estates	COMMISSIONING
EXTERNAL AUDIT FEES	Facilities	CORPORATE AFFAIRS
G&S FT'S NON-HEALTHCARE	Gp Contract	DIRECTOR OF ESTATES
G&S FT's - HEALTHCARE	HQ Services	FINANCE
G&S OTHER NHS - HEALTHCARE	HR	GM FACILITIES
G&S OTHER NHS - NON HEALTHCARE	Healthcare	GM NORTH
G&S OTHER PCTS - HEALTHCARE	Healthcare Contracts	HOSTED
G&S OTHER PCTS-NON HEALTHCARE	Information	HUMAN RESOURCES
HEALTHCARE FROM NON NHS BODIES	Inp Rehab	MCH MANAGEMENT
NON GMS SERVICES FROM GPS	Long Term Cond	MEDICAL
OTHER - NON PAY	Long Term Conditions	NETWORKS
OTHER – AUDITOR'S REMUNERATION	Opticians	NONE
PREMISES	Other	NORTH SCHEDULED CARE
PRMS INFRASTRUCTURE COSTS	Pharmacy	NORTH UNSCHEDULED CARE
SUPPLIES & SERVICES - CLINICAL	Prescribing	NPFIT
SUPPLIER & SERVICES - GENERAL	Prescription Payments	OTHER - ADULT
	Primary Care	P84030
	Prof Serv	P84051
	Property Rent	PERFORMANCE
	Service Level Agreement	PRISON SERVICES
	Sheffield Stop Smoking Service	PUBLIC HEALTH
	Specialist Commissioning Group	RESERVES & OTHER
		SEXUAL HEALTH & FAMILY PLANNING
		SOUTH SCHEDULED CARE
		SOUTH UNSCHEDULED CARE
		WITHINGTON COMMUNITY HOSPITAL

Summary of findings

NHS Tameside & Glossop 2010/11:

- Expenditure classed as 'Healthcare from non-NHS bodies' totals £15,337,790 and accounts for 5.3% of the total expenditure described in the data return on expenditures over £25,000.
- The largest expenditure on healthcare from non-NHS providers is to Tameside Metropolitan Borough Council for resettlements. Over £5 million were spent on resettlements, amounting to over 1/3 of all procurement on healthcare from non-NHS providers.
- Continuing health care which is 100% funded by the NHS is the second largest expenditure, followed by nursing care provided by Tameside Metropolitan Borough Council, and then mental health rehabilitation services provided by a combination of private sector organisations and the local authority.
- The types of activity captured in the 'Healthcare from non-NHS bodies' category include:
    - Resettlements
    - Nursing and social care services
    - Mental health rehabilitation
    - Learning disability services
    - Palliative care services
    - Home healthcare
    - Counselling, sexual health and detox services
    - Various diagnostic services
    - Unspecified services carried out by private healthcare providers
    - Specialist surgery – eg obesity surgery
- NHS Tameside & Glossop include some services purchased from other NHS organisations in their 'Healthcare from non-NHS bodies' category: namely diabetic eye screening provided by Oldham PCT, obesity surgery from Salford Royal NHS Foundation Trust, and other goods and services provided by North Wales NHS Trust.

Barnsley PCT 2010/11:

- Barnsley PCT does not include a category for expenditure on healthcare from non-NHS providers, so we had to deduce this information from the supplier names.
- We estimate around 45 per cent of Barnsley PCT's procurement was from non-NHS providers, the bulk of which was spent on healthcare goods or services. We estimate total expenditure on healthcare provided by non-NHS providers by removing procurement with an Expense Area of Estates, HQ Services, HR, Capital, Other, Property Rent, 'Contrib to Ntss Group', Information, and Facilities, and then applying our non-NHS provider filter. Over £137 million were spent on healthcare goods and services procured from non-NHS providers.
- Healthcare contracts and GP contracts were by far the largest expenditure types, but nursing care and continuing care expenditures also each exceed £1 million pounds.
- The local authority is the main non-NHS provider of healthcare.
- The accounts also include expenditure by the region's specialised commissioning group.

Manchester PCT 2010/11:

- Manchester PCT does not include a category for expenditure on healthcare from non-NHS providers. However, it does give an indication of the organisations from which services are being procured if one looks at the expense type and suppliers together.
- Almost £10 million were spent on healthcare from local authorities and almost £2 million on healthcare from the independent sector.
- The local authority is the largest provider of non-NHS healthcare, but healthcare is also procured from a number of independent hospitals and voluntary organisations.

An agenda for further evaluating non-NHS expenditures

Our examination of three PCTs' expenditures over £25,000 shows a lack of consistent recording of expenditures to non-NHS bodies in published accounts. Using these data to gain an authoritative picture of which services NHS organisations are purchasing from which non-NHS organisations is difficult for the following reasons:

1. Expense area and expense type categories vary considerably across PCTs.
2. Expense type categories are often not very specific as they are entered for accounting purposes rather than for classifying healthcare activities which are being purchased. In particular, it is not always clear whether the service being procured is a healthcare service or a social care service.
3. The type of supplier (NHS, independent sector, voluntary sector etc) cannot always be directly identified using the expense type, expense area and supplier fields so external sources may have to be consulted.
4. Many expense area and expense type fields contain acronyms and the categories are not explained on the spreadsheets.
5. Some healthcare expenses may be purchased for less than £25,000.
6. Some healthcare services may be purchased by some PCTs frequently but in small volumes while others may purchase exactly the same services but in one transaction. Thus purchasing and/or accounting practices may influence whether some activities are captured or whether they fall below the £25,000 threshold.

Given these challenges, we next provide a tentative agenda as to how this type of expenditure data could be examined in greater detail with a view to ensuring productivity figures capture non-NHS activity purchased by NHS organisations as fully as possible.

- Produce a mapping of expense area/expense type/supplier categories from different PCTs so that the expenditure of different organisations can be readily compared
    - Ideally this would involve discussion with NHS organisations to agree standardised accounting and purchasing mechanisms.
- Repeat the above exercise for other types of trusts, eg Hospital Trusts.
- Carry out triangulation exercises:
    - Calculate the total spend on different types of categories and compare these to annual report data to identify what proportion of expenditure is not being captured in the expenditure over £25,000 data releases.
    - Check the accounts of non-NHS organisations featuring prominently in the NHS accounts, eg Private sector hospitals.
    - Some NHS Organisations publish a list of contracts they have awarded to different organisations, which may include the supplier name, sector and total expenditure. Therefore it might be worth reviewing the information

NHS organisations publish on large contracts they award to see whether this corresponds with the picture arising from the expenditure over £25,000 analysis.

- Obtain a list of activities and/or organisations providing healthcare services to NHS organisations and check whether these activities are captured in Reference Costs.

Appendix 4: Expenditure on inputs, by organisational type

Table 14 Current expenditure on staff and wages (£000)

NHS STAFF Salaries and Wages - Current Expenditure (£'000)							
	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10
NHS Hospitals, foundation trusts and ambulance trusts							
Total Senior Managers & Managers	1,173,902	1,187,336	1,182,277	1,098,955	919,042	814,855	796,298
Total Medical Staff (including locums)	6,077,258	5,974,802	5,991,919	5,750,359	5,223,513	4,755,459	4,448,401
Total Dental Staff (including locums)	63,407	56,983	52,674	46,746	37,646	35,403	33,140
Total Nursing Midwifery & Health Visiting Staff	8,767,899	8,477,812	8,538,790	8,204,900	7,321,781	6,410,853	5,923,809
Total Scientific, Therapeutic & Technical Staff	3,020,549	2,942,535	2,994,992	2,904,196	2,581,216	2,310,988	2,192,407
Administrative and clerical	2,504,351	2,452,099	2,505,810	2,408,654	2,163,292	2,021,146	1,934,670
Healthcare Assistants and other Support Staff	1,176,027	1,115,684	1,166,179	1,130,289	1,017,431	944,590	878,497
Maintenance and works staff	233,171	219,448	210,717	195,169	173,882	149,775	134,844
Ambulance staff	555,659	662,651	737,866	773,365	832,961	915,701	961,293
Other employees	86,515	73,900	90,480	70,183	98,180	45,036	39,015
Chairman & Non-Executive Directors	20,523	30,925	41,226	54,201	86,419	117,783	138,779
Foundation Trust Staff		2,471,600	4,075,900	6,026,996	9,520,162	13,519,900	16,802,900
Total staff - all trusts	**23,679,261**	**25,665,773**	**27,588,830**	**28,664,013**	**29,975,525**	**32,041,487**	**34,284,053**
PCTs							
Total Senior Managers & Managers	599,322	780,970	863,892	825,938	808,074	891,739	1,041,803
Total Medical Staff (including locums)	294,357	340,367	359,456	386,793	379,779	447,445	449,359
Total Dental Staff (including locums)	62,661	76,315	81,672	79,642	93,216	97,205	104,662
Total Nursing Midwifery & Health Visiting Staff	2,197,615	2,389,454	2,652,729	2,714,685	2,720,984	2,808,387	2,961,335
Total Scientific, Therapeutic & Technical Staff	724,408	815,104	929,085	988,349	1,005,470	1,092,789	1,187,341
Administrative and clerical	638,785	772,569	910,954	1,004,588	1,079,280	1,264,287	1,458,809
Healthcare Assistants and other Support Staff	147,175	168,873	169,235	172,229	195,796	273,172	345,243
Maintenance and works staff	17,824	19,145	22,261	24,076	21,859	23,607	23,250
Ambulance staff	210	95	204	5,103	5,008	3,673	3,272
Other employees	40,873	31,311	49,201	49,731	84,346	71,614	63,784
Chairman & Non-Executive Directors	131,775	88,068	77,949	52,026	42,281	22,660	19,716
Total staff - PCTs	**4,855,005**	**5,482,270**	**6,116,638**	**6,303,160**	**6,418,594**	**6,996,578**	**7,658,575**
Total staff - SHAs	**155,084**	**186,209**	**221,279**	**210,336**	**145,865**	**175,388**	**202,473**
Total staff - NHS	**28,689,350**	**31,334,252**	**33,926,746**	**35,177,509**	**36,539,984**	**39,213,454**	**42,145,100**

Table 15 Current expenditure on intermediate inputs (£000)

Intermediate Figures - Current Expenditure (£'000)							
	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10
NHS Hospitals, foundation trusts and ambulance trusts							
Drugs & gases	2,227,972	2,591,885	2,647,598	2,814,027	3,115,381	3,460,008	3,773,131
Clinical supplies & services	370,874	405,985	594,689	748,493	942,142	1,119,410	1,307,254
General supplies & services	832,050	743,426	853,397	911,504	1,045,835	1,119,750	1,177,681
Establishment	974,825	951,971	981,559	982,216	1,085,634	1,104,583	1,099,538
Energy & premises	687,712	799,962	1,031,786	1,161,463	1,279,173	1,506,901	1,289,767
External purchasing	565,953	609,215	669,508	738,923	916,352	962,768	950,531
Miscellaneous	1,002,031	888,577	1,435,572	1,612,571	1,747,727	1,852,820	2,243,732
Total intermediate costs - all trusts	**6,661,416**	**6,991,023**	**8,214,109**	**8,969,197**	**10,132,245**	**11,126,240**	**11,841,634**
PCTs							
Drugs & gases	79,735	56,869	113,846	139,378	170,870	187,408	200,988
Clinical supplies & services	67,527	67,404	86,998	73,611	95,094	120,947	124,955
General supplies & services	143,080	125,328	150,141	152,845	152,477	174,110	183,420
Establishment	404,828	426,848	444,423	424,533	480,041	559,159	584,065
Energy & premises	165,463	184,047	266,208	355,355	431,229	517,808	476,204
External purchasing	148,627	168,392	224,553	271,140	331,264	467,227	595,314
Miscellaneous	792,889	679,358	703,698	920,175	1,148,231	729,554	792,681
Total intermediate costs - PCTs	**1,802,149**	**1,708,246**	**1,989,867**	**2,337,037**	**2,809,206**	**2,756,212**	**2,957,627**
Total intermediate costs - SHAs	**58,945**	**58,721**	**67,368**	**72,493**	**94,749**	**109,351**	**111,812**
Total intermediate costs - NHS	**8,522,511**	**8,757,990**	**10,271,344**	**11,378,727**	**13,036,200**	**13,991,803**	**14,911,074**

Table 16 Current expenditure on capital items (£000)

Capital costs - Current Expenditure (£'000)							
NHS hospitals, foundation trusts and ambulance trusts	**2003/4**	**2004/5**	**2005/6**	**2006/7**	**2007/8**	**2008/9**	**2009/10**
Equipment							
Medical & Surgical Equipment - Purchase	1,546,803	1,111,881	1,362,224	1,339,694	1,355,021	1,245,422	1,167,041
Medical & Surgical Equipment - Maintenance	104,759	96,787	106,021	112,531	114,218	107,030	107,579
X-Ray Equipment - Purchase	32,469	26,298	27,600	29,187	33,498	29,704	24,939
X-Ray Equipment - Maintenance	62,412	57,223	55,030	56,133	51,721	47,581	42,277
Appliances	292,608	263,890	285,000	281,882	292,970	285,790	249,936
Laboratory Equipment - Purchase	298,137	270,876	288,360	282,818	268,995	257,484	252,223
Laboratory Equipment - Maintenance	27,229	25,023	27,197	29,163	27,917	22,215	23,367
Furniture, Office & Computer Equipment	186,277	152,182	141,995	134,995	165,375	130,867	110,643
Computer Hardware-Maintenance & Data Processing Contracts	176,759	153,909	153,539	144,839	135,976	122,961	118,483
FT services and supplies	-	222,471	348,042	525,340	819,274	1,040,250	1,289,967
FT operating lease rentals	-	12,900	41,500	87,670	121,731	203,400	213,100
FT hire of plant & machinery	-	7,400	9,500	24,845	37,298	47,100	-
Premises							
Building and Engineering Equipment	103,365	88,141	85,151	86,569	95,776	79,577	75,322
Building & Engineering Contracts	221,215	186,380	197,368	210,435	243,097	196,779	122,817
FT premises - capital items	-	91,973	170,520	264,196	420,980	603,072	607,632
Business Rates	175,753	157,516	163,147	183,930	157,402	125,163	125,657
Total Depreciation and impairments	1,366,168	1,496,615	1,584,902	1,898,587	2,256,385	1,757,815	1,985,531
Total capital costs - all trusts	**4,593,955**	**4,421,465**	**5,047,096**	**5,692,814**	**6,597,634**	**6,302,210**	**6,516,514**
PCTs							
Equipment							
Medical & Surgical Equipment - Purchase	122,033	114,262	141,134	149,264	184,400	202,453	213,339
Medical & Surgical Equipment - Maintenance	9,320	9,179	10,449	13,611	15,587	14,085	16,785
X-Ray Equipment - Purchase	230	605	483	310	2,061	332	281
X-Ray Equipment - Maintenance	705	875	971	1,931	1,476	1,601	2,406
Appliances	75,127	76,628	92,845	93,524	119,113	127,138	117,031
Laboratory Equipment - Purchase	1,658	1,817	2,566	3,878	5,345	6,257	13,700
Laboratory Equipment - Maintenance	198	45	352	240	774	558	935
Furniture, Office & Computer Equipment	80,747	70,654	80,094	71,944	125,367	149,389	118,276
Computer Hardware-Maintenance & Data Processing Contracts	39,778	36,223	43,287	46,088	68,799	63,726	63,621
Premises							
Building and Engineering Equipment	21,944	29,255	24,040	26,888	48,240	48,939	49,961
Building & Engineering Contracts	42,025	39,315	46,128	37,675	77,803	102,408	77,041
Business Rates	40,897	41,416	49,829	62,083	65,901	71,700	81,760
Total Depreciation & Impairment	231,834	255,030	286,343	352,475	459,975	320,981	344,647
Total capital costs - PCTs	**666,498**	**675,303**	**778,521**	**859,911**	**1,174,841**	**1,109,566**	**1,099,782**
Total capital costs - SHAs	**20,935**	**18,746**	**14,048**	**15,638**	**12,117**	**14,255**	**19,094**
Total capital costs - NHS	**5,281,388**	**5,115,514**	**5,839,664**	**6,568,363**	**7,784,592**	**7,426,031**	**7,635,390**