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**Productivity Of The English
NHS: 2012/13 Update**

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CHE Research Paper 110

Productivity of the English NHS: 2012/13 update

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Executive summary

Productivity is one of the key measures against which NHS achievements can be judged and is the focus of this report. We update our previous analyses of NHS productivity growth since 2004/05, focussing on the change in NHS productivity between 2011/12 and 2012/13, the latter financial year being the latest for which data have been made available.

NHS productivity growth is measured as the rate of change in outputs over the rate of change of inputs. Positive productivity growth occurs when the relative growth in outputs exceeds the relative growth in inputs.

NHS output captures all activity for NHS patients using data from the Hospital Episode Statistics (HES), Reference Cost returns and primary care use survey data. Quality is captured by waiting times, 30-day survival rates, and blood pressure management in primary care.

Output growth amounted to 2.34% between 2011/12 and 2012/13, this being the lowest year-on-year growth rate over the full period since 2004/05. This is the first time over the full series in which quality-adjusted output growth has been lower than cost-weighted growth, which amounted to 2.58%. This is because some aspects of quality deteriorated between 2011/12 and 2012/13, with a reduction in survival rates for non-elective patients and further increases in waiting times.

NHS inputs include of NHS and agency staff, intermediates and capital. NHS staff input is measured using staff numbers as recorded in the Electronic Staff Record and also from expenditure data. All other inputs are measured by deflating expenditure data by relevant price indices to capture changes in the volume of resource use. We construct two overall measures of NHS inputs, with our preferred "mixed" index using NHS staff numbers and an "indirect" index, which uses expenditure data to calculate NHS staff input.

NHS input growth between 2011/12 and 2012/13 was 1.98% if labour input is calculated using NHS staff numbers or 2.63% if using expenditure data. This rate of input growth is relatively low for the series as a whole but it is the largest year-on-year increase since 2009/10.

Productivity growth between 2011/12 and 2012/13 is estimated to have been 0.36% based on the mixed input index but -0.28% if based on the indirect input index.

If measured using the preferred mixed index, the NHS has delivered overall total factor productivity growth of 10.4% since 2004/05, with 2011/12-2012/13 being the third consecutive period of year-on-year productivity growth.

1. Introduction

The National Health Service (NHS) provides care to millions of patients every year, with almost everyone having at least some form of contact with the health service annually. The NHS is also the single largest employer in England, accounting for 1 out of 18 in the workforce (Office for National Statistics 2015). In 2012/13 health spending (including spending by central government departments) amounted to £104 billion and accounted for 7.9 per cent of GDP.¹ As such an important part of the economy, it is essential to understand what the NHS achieves from the resources devoted to it.

Productivity is one of the key measures against which NHS achievements can be judged and is the focus of this report. We update our previous analyses (Bojke et al. 2012; Bojke et al. 2014), focussing on the change in NHS productivity between 2011/12 and 2012/13, the latter financial year being the latest for which data are available.

We follow national accounting conventions to measure the change in productivity over time (Eurostat 2001). This involves comparisons of changes in the total amount of health care 'output' produced with changes in the total amount of 'input' used to produce this output. We construct a set of paired year-on-year comparisons from 2004/05-2005/06 through to 2011/12-2012/13. These paired comparisons are then converted into a chained index that reports productivity change over the entire period.

The structure of the report is as follows. The form of the constituent elements of the output and input indices used to construct our productivity measure is presented in section 2. We describe the data used to populate the output and input indices in section 3, detailing the particular challenges that had to be addressed in comparing data between 2011/12 and 2012/13. The output index is populated in section 4 and section 5 reports the elements of the input index. Section 6 reports the productivity growth figures. A summary and concluding remarks are provided in section 7.

¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/285632/PSS_February_2014.pdf

2. Methods

In calculating productivity growth for the health care system, it is necessary to combine the multitude of outputs and inputs into single output and input measures. This requires the construction of an output growth index (X) and an input growth index (Z), with total factor productivity growth ΔTFP calculated by comparing growth in outputs with growth in inputs such that:

$$\Delta TFP = [X/Z] - 1 \quad (1)$$

In order to estimate total factor productivity, it is necessary to correctly define and measure the output and input indices.

2.1 Output growth

Quantification of health care output is a challenge because patients have varied health care requirements and receive very different packages of care. To address this, it is necessary to classify patients into reasonably homogenous output groupings, such as Healthcare Resource Groups (HRGs) or Reference Cost (RC) categories. Furthermore, in order to aggregate these diverse outputs into a single index, some means of assessing their relative value is required. Usually prices are used to assess value, but prices are not available for the vast majority of NHS services for which people do not have to pay at point of use. In common with the treatment of other non-market sectors of the economy in the national accounts, costs are used to indicate the value of health services. Costs reflect producer rather than consumer valuations of outputs, but have the advantage of being readily available.

As costs are not believed to truly reflect consumers' valuations, Atkinson suggests supplementing costs with information about the quality of non-market goods and services (Atkinson 2010). One way of doing this is by adding a scalar to the output index that captures changes over time in different dimensions of quality (Castelli et al. 2007). Thus, following Castelli et al (2007), the output growth index (in its Laspeyres form) can be calculated across two time periods as :

$$X_{(0,t)}^{cq} = \frac{\sum_{j=1}^J x_{jt} c_{j0} \left[\frac{v_{j0} q_{jt}}{v_{j0} q_{j0}} \right]}{\sum_{j=1}^J x_{j0} c_{j0}} \quad (2)$$

We define x_j as the number of patients who have output type j , where $j=1\dots J$; c_{jt} indicates the cost of output j ; q_j represents a unit of quality for output j , and v_j is the value of this unit of quality; and t indicates time with 0 indicating the first period of the time series. Our measures of quality include inpatient and outpatient waiting times, survival rates following hospitalisation, and blood pressure management in primary care.

2.2 Input growth

Turning to the input growth index (Z), inputs into the health care system consist of labour, intermediate goods and capital. Growth in the use of these factors of production can be calculated directly or indirectly (OECD 2001). A direct measure of input growth can be calculated when data on the volume and price of inputs are available. In its Laspeyres form, the input growth index can be calculated as:

$$Z_{(0,t)}^D = \frac{\sum_{n=1}^N z_{nt} \omega_{n0}}{\sum_{n=1}^N z_{n0} \omega_{n0}} \quad (3)$$

Where z_{nt} is the volume of input of type n at time t and ω_{nt} is the price of input type n at time t .

However, data about the volume of inputs are rarely available. It is, therefore, common practice to calculate input growth using expenditure data. Changes in expenditure are driven by both changes in the volume of resource use and in prices. Hence, to isolate the volume effect, it is necessary to wash out price changes by converting 'current' monetary values into 'constant' expenditure using a deflator π_{nt} . This deflator reflects the underlying trend in prices for the input in question, such that $\omega_{nt+1} = \pi_{nt} \omega_{nt}$.

If expenditure data and deflators are available, the input growth index can be specified as:

$$Z_{(0,t)}^{Ind} = \frac{\sum_{n=1}^N \pi_{nt} E_{nt}}{\sum_{n=1}^N E_{n0}} = \frac{\sum_{n=1}^N z_{nt} \pi_{nt} \omega_{nt}}{\sum_{n=1}^N z_{n0} \omega_{n0}} = \frac{\sum_{n=1}^N z_{nt} \omega_{n0}}{\sum_{n=1}^N z_{n0} \omega_{n0}} = Z_{(0,t)}^D \quad (4)$$

As shown, this is equivalent to using volume data, provided that deflators capture correctly the trend in prices for each input in question.

2.3 Productivity growth

The above equations show output or input growth over two periods from a base (0) to a current period (t). Usually, there is interest in assessing productivity growth over longer periods of time. There are two ways to do this. The first way is by means of a fixed base index, which applies the same set of output weights (c_j) and input weights (ω_j), usually that of the base year (year 0) throughout the full series. This has the advantage of using a common set of weights across all periods, allowing growth rates to be interpreted solely as changes in volumes. Use of a fixed base index is common when calculating growth rates for a specified basket of goods and services.

The drawback of this approach is that it requires the contents of the basket to remain unchanged over the full period. If this requirement cannot be met, the alternative is to use a chained index. This approach has long been recommended (Lehr 1885; Marshall 1887) as a way to overcome the problems arising when new commodities appear and old commodities disappear, making the use of weights of the base year practically impossible. By updating the weights in every period, it is possible to account for ongoing changes in the composition of the outputs and inputs being measured (Diewert et al. 2010).

The main advantages of using a chained index, over a fixed base index are:

- ease of handling changes in the type of outputs produced and inputs utilised in production, as these only need to be common across two adjacent periods rather than for the full series (Balk 2010);
- regular updates of the weights better reflect actual price and volume changes (de Boer, van Dalen, and Verbiest 1997);
- the difference (or spread) between the Laspeyres and Paasche formulations of the indices is lower than it would be if using a base index.

Using the Laspeyres output index as defined in eq. (2), a chained output index takes the following form:

$$X_{(0,T)}^{c,q} = \frac{\sum_{j=1}^J x_{jt} c_{j0} \left[\frac{v_{j0}^q q_{jt}}{v_{j0}^q q_{j0}} \right]}{\sum_{j=1}^J x_{j0} c_{j0}} \times \frac{\sum_{j=1}^J x_{j,t+1} c_{jt} \left[\frac{v_{jt}^q q_{j,t+1}}{v_{jt}^q q_{jt}} \right]}{\sum_{j=1}^J x_{jt} c_{jt}} \times \dots \times \frac{\sum_{j=1}^J x_{jT} c_{jT-1} \left[\frac{v_{jT}^q q_{jT}}{v_{jT}^q q_{jT-1}} \right]}{\sum_{j=1}^J x_{jT-1} c_{jT-1}} \quad (5)$$

This can be simplified as:

$$X_{(0,T)}^{c,q} = X_{(0,t)}^{c,q} \times X_{(t,t+1)}^{c,q} \times \dots \times X_{(T-1,T)}^{c,q} \quad (6)$$

where each link is represented by eq. (2) for the relevant two consecutive years. An analogous construction applies to the chained input index.

3. Data issues

3.1 Measuring output

Our NHS output index is designed to capture all activities provided to NHS patients whether by NHS or private sector organisations. Table 1 below summarises data sources used to measure activity, quality and costs and indicates specific measurement issues that have had to be tackled in constructing the output growth index for 2011/12-2012/13. The data and these specific issues are detailed in the remainder of this section.

Table 1 Summary of output data sources

Output type	Activity source	Cost source	Quality	Notes for 2012/13 data
Elective	HES	RC	30-day survival; health outcomes; waiting times	Replacement of HRG4 with HRG4+
Non-elective	HES	RC	30-day survival; health outcomes	Replacement of HRG4 with HRG4+
Outpatient	HES	RC	Waiting times	
Mental health	HES & RC	RC	30-day survival; health outcomes; waiting times	Community MH re-included, using MH clusters; some categorisation changes
Community care	RC	RC	N/A	Changes in organisational coverage; categorisation changes
A&E	RC	RC	N/A	Changes in organisational coverage; categorisation changes
Other (1)	RC	RC	N/A	Changes in organisational coverage
Primary care	Pre-2009/10 from QResearch Post-2009/10 from GP patient survey	PSSRU Unit Costs of Health and Social Care	QOF data	Uplift survey responses by population growth
Prescribing	Prescription cost analysis system	Prescription cost analysis system	N/A	
Ophthalmic and dental services	HSCIC	HSCIC	N/A	
Glossary	HES: Hospital Episode Statistics; RC: Reference Costs; MH: Mental Health; PSSRU: Personal & Social Services Research Unit; QOF: Quality and Outcomes Framework; HSCIC: Health and Social Care Information Centre; DH: Department of Health			
Note	(1) Radiotherapy & High Cost Drugs, Diagnostic Tests, Hospital/patient Transport Scheme, Radiology, Rehabilitation, Renal Dialysis, Specialist Services			

3.1.1 Hospital Episode Statistics

Elective and non-elective activity

The Hospital Episode Statistics (HES) is the source of data for both the amount of activity and for the measures of quality for elective and non-elective activity, including mental health care delivered in hospitals.² HES comprise almost 19.1 million patient records for 2012/13. We convert HES records, defined as Finished Consultant Episodes (FCEs), into Continuous Inpatient Spells (CIPS), using the official algorithm for calculating CIPS published by the Health and Social Care Information Centre³ for HES inpatient activity from 2010/11 onwards. We then count the number of 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 CIPS in each HRG. Reference Cost data contain their own system of activity classification which closely maps our own. Activities are divided into 'mapping pots' which capture which of the services the activity occurs in (e.g. 01_EI for elective and 02_NEI for non-elective services). They are then subdivided into department codes (e.g. DC for Day case, NEI_L for non-elective long stay and NEI_S for non-elective short stay) which capture the Point of Delivery. Full details are available in the Reference Cost documentation (Department of Health 2012).

For elective activity, the average cost for an HRG is calculated as the activity weighted average cost of all of the HRG activity contained in the reference cost data in the mapping pot '01-EI' and a department code of 'EI'. This intentionally excludes the use of day case costs in the calculation of average costs to avoid down-weighting the activity due to an increasing use of the less costly point of delivery. For non-elective activity, the average cost is the activity weighted average using both the 'NEI_S' and 'NEI_L' department codes from the '02_NEI' reference cost mapping pot.

The HES records include waiting times and can be linked to ONS death registry records. This allows us to calculate waiting times and 30-day survival rates which are used to assess the quality of hospital care.

Calculation of growth in hospital output between 2011/12 and 2012/13 is somewhat complicated by the change from HRG4 to HRG4+ to describe activity. HRG4 was first used for the 2006/07 reference cost collection exercise and originally comprised approximately 1,390 groups. HRG4 was designed to evolve year-on-year, allowing for a progressive expansion of categories and by 2011/12 it consisted of 1,657 HRGs.

In 2012/13 there was a substantive revision to the HRG classification system, referred to as HRG4+, which greater differentiation for complications and co-morbidities. The number of HRG codes increased to 2,100, with only approximately 600 HRGs being common between HRG4 and HRG4+ and most of the new HRGs dealing with patients requiring costly types of care.

The use of the different HRG4 and HRG4+ classification systems for the 2011/12 and 2012/13 HES data creates a challenge in constructing a chained index, as there is a structural break in the output categories. We overcome this by running the 2012/13 HES data through the HRG4 Grouper software, thereby reverting back to the former categorisation system. This approach is feasible because the move from HRG4 to HRG4+ is motivated primarily by a need to obtain greater granulation of patient complexity within the existing HRG4 categories rather than being a completely

² As in previous years, 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.

³ <http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1072>

different way of describing hospital activity. Therefore, the underlying codes for diagnoses and procedures are the same in both HRG4 and HRG4+. Reverting back to HRG4 is not perfect, however, because the Grouper software contains data quality checks which were relevant to the form in which data were coded in 2011/12 but may not apply to the 2012/13 data, for which the underlying primary classification for diagnoses has been updated to the ICD-10 4th Edition (NHS Information Centre 2012). If these quality checks fail, patients are allocated to the unspecified HRG UZ01Z. This applied to 13% of patients in the 2012/13 HES data, compared to 1.3% in 2011/12. We assign average costs to these patients.

Outpatient activity

In the past we used the Reference Costs (RC) to measure outpatient activity (Castelli, Laudicella, and Street 2008). Due to changes in reporting by Primary Care Trusts (PCTs) which affected the RC measure of outpatient activity in 2011/12, we now use the HES Outpatient Minimum Dataset rather than RC to assess outpatient activity. Comparison of historical values in both datasets prior to 2011/12 indicates a very close match in volume measures and therefore there is no major consequence of this change.

The HES Outpatient Minimum Dataset was first made available for the 2007/08 financial year, and contained more than 60 million records. By 2012/13 the data comprised 94 million records, detailing all outpatient appointments by NHS hospital trusts in England and those performed in the independent sector. Details include the type of attendance, main specialty of consultant providing treatment, and waiting time.

Outpatient waiting times up until 2009/10 were based on data published on the Department of Health (DH) performance website, but this collection has since been discontinued. From 2010/11, we calculate waiting times for first attendances using the HES Outpatient Minimum Dataset.⁴ These waiting times are somewhat higher than those reported previously, but year-on-year trends are virtually identical. Consequently, the move to the new data series has not had an impact on the estimates of output growth. However, to ensure consistent comparisons, growth rates up to and including 2008/09 - 2009/10 are based on data published on the DH performance website, whilst the NHS outpatient growth rates from 2010/11 onwards are based on the figures derived from the Outpatient Minimum Dataset.

3.1.2 Reference cost data

The Reference Cost returns are used to capture activity performed in most health care settings other than hospitals, outpatient departments and primary care. They also provide information on unit costs for these activities, including activity performed in hospitals. In particular, RC data cover activity conducted in accident and emergency (A&E) departments, mental health and community care settings, and diagnostic facilities. Activities are reported in various ways: attendances, bed days, contacts and number of tests. In order to aggregate these diverse activities and convert them into a common metric, we use unit costs as weights.

General RC data validation checks

There is a series of mandatory and non-mandatory validations of the Reference Cost data returned by NHS Trusts, as follows (Department of Health 2012):

- Mandatory validations included checks that all data (both activity and cost) are reported, unit costs are reported as positive integers to two decimal places, no fields are missing, etc.

⁴ <http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=890>.

- Non-mandatory validations include checking whether unit costs below £5 or over £50,000 are accurate and whether single professional outpatient attendance unit costs were less than multi-professional unit costs.
- Finally, checks on ‘year on year changes’ are carried out. In particular, any change in total cost or activity greater than 25% is flagged and followed up. The check is carried out by department code and HRG sub-chapter for acute services, or service code for non-acute services (only for outpatient attendances, outpatient procedures and emergency medicine).

Over and above these checks, we have implemented our own validation process (Bojke et al. 2014). These focus on identifying large increases/decreases in either volume or unit costs of activity for all non-acute services. In particular, we check 1) whether volumes of activity have registered either an increase or decrease of more than 500,000 units and 2) whether the value of such activity has changed by more than £25 million, either way. The validation checks performed with the RC 2012/13 data do not show any such unusual or implausible large changes.

RC data are always subject to some degree of change over time. Major changes from 2011/12 to 2012/13 involved changes in organisation coverage and changes in categorisation of some types of activity.

Organisational coverage

Table 2 provides details of the number and type of organisations submitting RC data since 2010/11. The 2011/12 data cover activity provided by NHS trusts (both Foundation and non-Foundation), Community and Mental Health Trusts, including activity sub-contracted out to independent sector organisations.⁵ Prior to 2011/12 the RC data also included data submitted by Primary Care Trusts (PCTs), which no longer exist, and Personal Medical Services (PMS). The 2012/13 RC data cover only activity provided by NHS trusts (both Foundation and non-Foundation).

Table 2 Organisations making Reference Cost returns

	2010/11	2011/12	2012/13
Primary Care Trusts	23	0	0
Acute Trusts	167	165	161
Community Trusts	2	5	5
Mental Health Trusts	0	9	9
All Trusts	192	179	175

In constructing our chained index of output growth, we include activity that is recorded by common organisations across adjacent periods. This minimises the risk of the output input index falsely capturing changes in activity that are actually due to changes over time in organisational coverage.

Mental health care

In 2011/12 there was a major overhaul of the way in which mental health care activity was defined in the RC data collection with the introduction of new mental health clusters. These ‘*reflect patient need over specific periods of time that range from four weeks to 12 months, and apply to both admitted patient and community care. The care clusters cover working age adults and older people only, and replace previous reference cost currencies for adult and elderly mental health services. They also include some services previously reported as specialist mental health services or mental health specialist teams. Existing reference cost currencies for children and adolescent, drug and alcohol, and*

⁵ In this case unit costs submitted are ‘in effect the price paid by the NHS for the service and *not* the cost to independent sector organisations (Reference costs 2011-12, p. 11 (2012))’ (emphasis added).

some specialist mental health services remain, but we have refined these in light of the introduction of the care clusters.' (Department of Health 2012).

Our comparative analyses of data for 2011/12 with that for previous years suggested that the introduction of clusters was not simply a reclassification of RC activity recorded in previous time periods, but also captured newly recorded activity. As we were unable to isolate newly recorded activity from redefined but previously recorded activity, it was necessary to omit RC Mental Health activity from the output growth calculation for 2010/11-2011/12. However, now that mental health clusters have been recorded in a consistent fashion for two consecutive years, it has been possible to include these activities in the construction of output growth for 2011/12-2012/13.

Although clusters have remained the same, there has been, however, a change in the way that other community mental health care activities are reported. The change has affected some of the service types and all the currency codes in which activity is recorded and reported. Up until 2011/12, 'other mental health care' activities were reported by the type of setting (e.g. inpatient) and then sub-divided by the type of patients treated (eg. children and adolescents, adults). In 2012/13, activity was reported by type of service/client group and then sub-divided by the type of setting in which the activity takes place. Examples of the old and new classification systems are shown in Table 3.

About 80% of categories reported in 2012/13 can be mapped to the classification system used in 2011/12, with 12 new categories left unmapped. Similarly, 96% of categories used in 2011/12 can be mapped to the new categories introduced in 2012/13, leaving only two unmapped categories recorded in 2011/12. Table 4 lists the categories unmapped, respectively for 2011/12 and 2012/13.

Table 3 Community mental health, 'Other mental health activity', old and new classification systems with mapping

NHS setting - 11/12	Currency Code - 11/12	Currency Description - 11/12	Service Code - 12/13	Currency Code - 12/13	Currency Description - 12/13
MHIP	MHIPC1	Children and Adolescents	CAMHS	CAMHSAPC	Children and Adolescent Mental Health Services, Admitted Patients
MHCOMM	MHCOM05	Children and Adolescent Other Services	CAMHS	CAMHSCC	Children and Adolescent Mental Health Services, Community Contacts
MHDCFRAD	DCF42	Mental Health Patients: Children and Adolescent	CAMHS	CAMHSDC	Children and Adolescent Mental Health Services, Day Care Facilities
MHOP	MHOP05	Children and Adolescent Other Services	CAMHS	CAMHSOP	Children and Adolescent Mental Health Services, Outpatient Attendances
MHIPSS	MHIPA2	Alcohol Services: Adult	DAS	ALCAAP	Alcohol Services, Adult, Admitted Patient
MHCOMM	MHCOM02	Alcohol Services : Adult	DAS	ALCACC	Alcohol Services, Adult, Community Contacts
MHOP	MHOP02	Alcohol Services : Adult	DAS	ALCAOP	Alcohol Services, Adult, Outpatient Attendances
MHCOMM	MHCOM04	Alcohol Services: Children and Adolescents	DAS	ALCCCC	Alcohol Services, Children and Adolescents, Community Contacts
	-	-	DAS	ALCCOP	Alcohol Services, Children and Adolescents, Outpatient Attendances
MHIPSS	MHIPA1	Drug Services: Adult	DAS	DRUAAP	Drug Services, Adult, Admitted Patient
MHCOMM	MHCOM01	Drug Services : Adult	DAS	DRUACC	Drug Services, Adult, Community Contacts
MHOP	MHOP01	Drug Services : Adult	DAS	DRUAOP	Drug Services, Adult, Outpatient Attendances
MHCOMM	MHCOM03	Drug Services: Children and Adolescents	DAS	DRUCCC	Drug Services, Children and Adolescents, Community Contacts
MHOP	MHOP03	Drug Services: Children and Adolescents	DAS	DRUCOP	Drug Services, Children and Adolescents, Outpatient Attendances

Table 4 Unmapped RC community 'other mental health care' categories, 2011/12 and 2012/13

2011/12			
Service code	Service description	Currency code	Currency description
-	-	MHIPC2	Drug Services: Children and adolescents
-	-	MHIPC3	Alcohol Services: Children and adolescents
2012/13			
Service code	Service description	Currency code	Currency description
DAS	Drug and Alcohol Services	ALCCOP	Alcohol Services, Children and Adolescents, Outpatient Attendances
MHST	Mental Health Specialist Teams	MHSTDA	Drug and Alcohol Services, Adult and Elderly
MHST	Mental Health Specialist Teams	MHSTDAC	Drug and Alcohol Services, Children and Adolescents
MHST	Mental Health Specialist Teams	MHSTEDA	Eating Disorder Services, Adult and Elderly
MHST	Mental Health Specialist Teams	MHSTEDC	Eating Disorder Services, Children and Adolescents
MHST	Mental Health Specialist Teams	MHSTFA	Forensic Community, Adult and Elderly
MHST	Mental Health Specialist Teams	MHSTFC	Forensic Community, Children and Adolescents
MHST	Mental Health Specialist Teams	MHSTIAPTA	IAPT, Adult and Elderly
MHST	Mental Health Specialist Teams	MHSTIAPTC	IAPT, Children and Adolescents
SCU	Secure Mental Health Services	SCU12	High Secure Unit: Dangerous and Severe Personality Disorder
SPMHS	Specialist Mental Health Services	SPHMSEDSACC	Eating Disorder Services, Adults, Community Contacts
SPMHS	Specialist Mental Health Services	SPHMSEDSAOP	Eating Disorder Services, Adults, Outpatient Attendances

Community care

In 2012/13, four new community services groupings were created: Allied Health Professionals, Health Visiting and Midwifery, Medical and Dental, and Nursing. These amalgamated the 17 different groups in which community care services were previously categorised. Table 5 below lists the old and new groupings and provides a mapping of the old groups to the new ones. However, service codes used to classify community services within the different groupings have changed, so no further mapping of activity has been possible and we use the imputation method to impute missing cost information (Castelli et al. 2011).

Table 5 Community Services, new and old groupings with mapping

Community Services groupings, 2012/3	Community Services groupings, 2004/5 - 2011/2
Community Health Services - Allied Health Professionals	Community Therapy Services Community Rehabilitation Teams Other Community Services*
Community Health Services - Health Visiting and Midwifery	Community Nursing Services: Health Visiting Services: Core Services Community Nursing Services: Health Visiting Services: All Other Services Community Nursing Services: Health Visiting Services: Vaccination and Immunisation Community Nursing Services: Health Visiting Services: Post-Natal Visits Community Midwifery Services: Visits
Community Health Services - Medical and Dental	Community Medical Services: Other Services Other Community Services*
Community Health Services - Nursing	Community and Outreach Nursing Services: Specialist Nursing Community Nursing Services: Nursing Services for Children Community Nursing Services: District Nursing Services Community Nursing Services: School-based Children's Health Services: Core Services Community Nursing Services: School-based Children's Health Services: Other Services Community Nursing Services: School-based Children's Health Services: Vaccinations

* Activity recorded under grouping 'Other Community Services' are now split between 'Community Health Services - Allied Health Professionals' and 'Community Health Services - Medical and Dental'

Accident & emergency

In 2004/05 and 2005/06 Accident & Emergency services were recorded under only three macro categories: 'Accident & Emergency HRG data', 'Minor Injury Unit Data' and 'Observation/Pre-admission/Medical Assessments Units (HRG codes)'. In 2006/07 a complete overhaul of A&E categorisation took place, with the introduction of four macro categories: 'Emergency Departments', 'Minor Injury Units', 'NHS Walk in Centres' and 'Specialist Emergency Departments'. A&E activity leading to admission to hospital is recorded separately from activity that does not lead to admission. Patients treated in observation wards, whether subsequently admitted to hospital or not, continued to be reported.

The four major A&E categories have since remained in place but in 2012/13, the RC data collection substituted the 'headings' for four categories using generic T01 – T04 codes, each of which continued to be sub-divided into patients that were subsequently admitted to hospital (AD) and those that were not (NA). The definition of type of Accident and Emergency departments provided in the HES A&E dictionary have allowed us to correctly map A&E activity reported in the RC 2012/13 collection to the categorisation system used in previous years.

In 2011/12 for Accident & Emergency services, paramedic activity was discontinued and replaced with a new set of ambulance service currencies. The 'Reference costs 2011-12' document states that *'these currencies have been developed and agreed with ambulance trusts and commissioners to support the contracting and payment of emergency and urgent ambulance services from April 2012. The four currencies are: (a) calls; (b) hear and treat or refer; (c) see and treat or refer; and (d) see and treat and convey'*. (Department of Health 2012)(1, p. 46). The 2011/12 classification was also used for the 2012/13 RC data collection.

3.1.3 Primary care activity

Comprehensive data on the activities performed in primary care settings remain unavailable. In their absence, nationally representative survey data have been used instead. For the period 2004/05 to 2008/09 the volume of GP consultations was obtained from QResearch (Fenty et al. 2006; QResearch 2009). When this survey was discontinued, we used the General Lifestyle Survey instead, from 2009/10 to 2010/11 (Bojke et al. 2012) and since 2010/11 we have used data from the GP Patient Survey (<https://gp-patient.co.uk/>). The survey has been conducted twice a year since 2011, with 1,380,000 patients sent an invitation every six months. The current response rate is around 35%.⁶ To assess how much activity is undertaken in primary care, we look at the percentage of participants who answered that they had seen or spoken to their GP in the last 3 months. The responses are weighted to ensure they are representative of the general population.

Survey data maintain the same target sample size over time. Consequently, there is an argument for adjusting responses for population growth, estimates for which are available from the Office of National Statistics.⁷

We derive information on costs of primary care activity from the annual estimates calculated by PSSRU, which is available online.⁸

We use blood pressure measurement results for three specific conditions for which data are collected as part of the Quality Outcomes Framework (QOF) as our proxy for quality measurement. The selected conditions are:

⁶ <http://gp-survey-production.s3.amazonaws.com/archive/2013/June/June%202013%20Technical%20Annex.pdf>

⁷ <http://www.ons.gov.uk/ons/rel/pop-estimate/population-estimates-for-uk--england-and-wales--scotland-and-northern-ireland/2013/sty-population-changes.html>

⁸ The following link is for 2012/13 edition: <http://www.pssru.ac.uk/project-pages/unit-costs/2013/>

1. Coronary heart disease (CHD06)
2. Stroke (Stroke06)
3. Hypertension (BP05)

The numbers for prevalence come from Annex 1 of QOF report.⁹ Data about success rates come from the Clinical results tables, available in the same report.

Community prescribing

Data about community prescribing are taken from the Prescription Cost Analysis (PCA) system, supplied by the Prescription Pricing Authority via the HSCIC Prescription Drugs Team. The data are based on a full analysis of all prescriptions dispensed in the community, summarised into almost 8,000 categories defined according to chemical composition. The data include information about the Drug code (PropGenLinkCode), Net Ingredient Cost (NIC), Quantity of Drug Dispensed in 1000's and Number of Prescription Items. The data are complete and prices are available for all items across the years. The number of categories changes throughout the years, with the peak in 2001/02 (9,512 categories) and the low in 2012/13 (7,699 categories used). We impute past prices when new chemical compositions appear.

3.2 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;
- Capital, such as buildings and equipment with an asset life of more than a year.

Table 6 Summary of input data sources

Input type	Data source	Deflator	Notes for 2011/12-2012/13
NHS staff	Electronic staff record	CHE pay index from ESR data	
NHS staff	Organisational accounts	CHE pay index from ESR data	
Agency staff	Organisational accounts DH	CHE pay index from ESR data	No longer possible to identify agency spend from accounts
Intermediates	Organisational accounts	NHS prices index	
Capital	Organisational accounts	NHS prices index	No longer possible to identify expenditure on specific capital items
General medical, dental, ophthalmic care	DH	NHS pay index and NHS pay & prices index	
Prescribing	Prescription cost analysis system	CHE pharmacy price index	
Central Administration	DH	NHS pay & prices index	

We construct a comprehensive index of input growth, using the workforce data and organisational accounts submitted by all NHS organisations to quantify the amount of all inputs used in the production of health care provided to NHS patients. These data sources are summarised in Table 6.

⁹ <http://www.hscic.gov.uk/catalogue/PUB12262>

3.2.1 NHS Staff Data

Workforce and earnings data are obtained from 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. The data contain numbers of full time equivalent (FTEs) staff and earnings by 480 different occupational groups for all staff employed in the NHS, by organisation.¹⁰ Where 5 or less staff members are employed in a particular staff group, the organisation randomly reports either 5 or 0. For this reason, the reported total number of staff constructed using the ESR source data differs from the aggregated figures published by the HSCIC.¹¹

The number of organisations captured in ESR changes every year (Table 7). This is partly due to creation of new organisations, discontinuation of others, and mergers. However, the difference is also due to increasing scope of organisations that report to ESR.

Table 7 Number of reporting entities by organisation type

Organisation type	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Care Trusts	10	10	11	11	10	10
NHS Bodies ^a				3	3	5
Non-geographical staff ^b					1	1
PCTs	147	147	147	148	143	133
SHA	10	10	10	10	10	10
Special Health Authorities ^c	12	12	12	10	10	12
NHS Trusts	230	230	231	236	249	249
CCGs						9

^a NHS Bodies include Choose and Book (X09), NHS England (X24), HSCIC (X26), Primary Care Support Service (YDD85), Sussex Health Informatics Service (YDD81).

^b Non-Geographic Central Staff; code AHO

^c Examples of Special Health Authorities included in the list are NICE, National Patient Safety Agency, NHS Blood and Transplant and National Treatment Agency.

There have also been changes in the number of occupational codes used over years. Table 8 presents the mean number of occupational codes used by different organisational types.

Table 8 Mean number occupational codes

Organisation type	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Care Trust	39.4	41.9	41.2	42.1	36.5	30.4
NHS Bodies				3	2.7	2.8
Non-geographical staff					91	73
PCTs	44.3	45.9	46.3	45.3	36.1	14.5
SHA	5.2	6	5.7	5.1	5	4.7
Special Health Authorities	8.8	9.27	9.2	10.4	8.3	7.83
NHS Trusts	77.3	79.7	81.3	83.2	88.6	91.4
CCG						7.2

Incidentally it is possible to look at individual occupational codes over time. We observe increases in FTEs for several occupational codes; one of the biggest increases is for N6A (1st level Acute, elderly & general nurses), with an average increase of around 3,000 FTEs per year.

¹⁰ We drop ESR returns made by private providers.

¹¹ <https://iview.hscic.gov.uk/DomainInfo/WorkforceMonthly>. Note that HSCIC does publish small numbers in some of their workforce data releases, for examples visit http://www.hscic.gov.uk/catalogue/PUB13776/comp-of-neur-data-work_V2.xlsx

Table 9 Expenditure on labour in current prices (£m)

Organisation type	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Care Trust	374	402	444	466	380	365
NHS Bodies				54	65	61
Non-geographical staff					146	138
PCT	5,022	5,490	5,994	5,851	3,792	1,320
SHA	90	113	129	131	112	109
Special Health Authorities	493	524	576	502	424	435
NHS Trusts	23,790	25,514	27,171	28,160	31,196	33,269
CCG						7

The data on staff earnings come from a separate dataset, also provided by HSCIC, which includes all earnings data submitted by NHS organisations for staff paid directly by the NHS. This dataset contains average earnings by occupational group. The following fields are available:¹²

- Basic Pay Per Fte 12 Month
- Total Earnings 12 Month
- Basic Pay 12 Month
- Non Basic Pay 12 Month

In our calculation we sum together Basic Pay Per Fte 12 Month and non-basic pay to get total earnings for a particular staff group. As non-basic pay is no longer reported by FTEs, but only by headcount, we multiply that number first by an appropriate ratio to get the equivalent FCE number (as advised by HSCIC). With the earnings information, we can also observe the change in associated cost by different organisation types, as summarised in Table 9.

3.2.2 Expenditure data

The source of expenditure data has changed over time, by type of organisation, as summarised in Table 10. Data for Foundation Trusts is derived from the Consolidated NHS Financial Trust Accounts, the format of which has remained unchanged over the full period. These accounts are less detailed than Trust Financial Returns (TFRs), which were reported by NHS trusts, PCTs and SHAs up to and including 2011/12 and provided a detailed breakdown of expenditure on different types of NHS and agency staff, intermediate inputs and capital items.

The TFRs were discontinued in 2011/12 for PCTs and SHAs. For these organisations we have relied on aggregated information as reported in the DH Annual Report and Accounts.

For NHS Trusts, TFRs were replaced with Financial Monitoring and Accounts, with both reporting systems used in 2011/12. The Financial Monitoring and Accounts are much less detailed than the TFRs, reporting information for very broad categories of input type, making it no longer possible to report time series for input types. For instance, it is not possible to identify expenditure by NHS Trusts on agency staff from this information.¹³ Instead, we have used data provided by the Department of Health to identify recent expenditure on agency staff.

¹² In the past we had information on total earnings per month, without separation in basic/non-basic

¹³ <http://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/Commons/2014-10-22/211600/>

Table 10 Source of financial information

Foundation Trusts	2004/5 - 2012/13 Consolidated NHS Financial Trust Accounts	
NHS Trusts	2004/5 - 2011/12 Trust Financial Returns	2011/12 - 2012/13 Financial Monitoring and Accounts
PCTs/SHAs	Trust Financial Returns	DH Annual Report and Accounts

Other than loss of detail, the more aggregated data has two major implications for the construction of the input index:

1. Rather than input-specific price deflators, we now have to apply deflators for each aggregated input category. This may generate inaccuracy in distinguishing the contributions of changes in volume and prices to expenditure growth.
2. The detail in the financial returns made it possible to account for utilisation of different types of capital in each period, albeit subject to various assumptions about asset life and depreciation (Street and Ward 2009). The annual accounts, however, do not identify all items of capital. This makes it impossible to ascertain how much has been spent on capital in each period, let alone how much of the capital acquired has been utilised.

The financial reporting lines designated as intermediate and capital items in the most recent financial data are listed in Table 11 for NHS Trusts and PCTs/SHAs.

Table 11 Intermediate and capital items

	Intermediates	Capital
NHS Trusts <i>Source:</i> <i>Financial Monitoring & Accounts</i>	Services from Other NHS Trusts Services from PCTs Services from Other NHS Bodies Services from Foundation Trusts Purchase of Healthcare from Non-NHS Bodies Supplies & Services - Clinical Supplies & Services - General Consultancy Services Transport Audit fees Other Auditors Remuneration Clinical Negligence Research & Development (excluding staff costs) Education & Training Other	Establishment Premises Impairments & Reversals of Receivables Inventories write downs Depreciation Amortisation Impairments & Reversals of Property, Plant & Equipment Impairments & Reversals of Intangible Assets Impairments & Reversals of Financial Assets Impairments & Reversals for Non Current Assets held for sale Impairments & Reversals for Investment Properties
PCTs/SHAs <i>Source:</i> <i>DH Annual Report & Accounts</i>	Consultancy Services Transport Clinical Negligence Costs Education, Training & Conferences Supplies & Services - Clinical Supplies & Services - General Inventories consumed Research & Development Expenditure Other	Establishment Premises Impairment of Receivables Rentals under operating leases Depreciation Amortisation Impairments & reversals

Reassuringly, at national level the TFRs, FT consolidated accounts and Financial Monitoring and Accounts provide a similar indication of the total amount of expenditure for aggregated types of input as does the DH Annual Report and Accounts. This is shown for comparison of expenditure on NHS staff in 2010/11 and 2011/12 in Table 12, although the Financial Monitoring and Accounts tend to record slightly higher amounts of expenditure.

Table 12 Comparison of alternative sources of financial information

	2010/11			2011/12			2012/13		
	TFRs or FTAs	DH Accounts	%diff	TFRs or FTAs	DH Accounts	%diff	FMA or FTAs	DH Accounts	%diff
Trusts (+)	18,848,608	18,774,442	0.40%	19,708,849	19,821,928	-0.57%	19,239,185	19,321,825	-0.43%
FT (*)	19,374,343	19,654,469	-1.43%	22,939,040	23,140,959	-0.87%	24,558,750	24,667,368	-0.44%
PCTs (+)	7,175,399	7,362,709	-2.54%	2,328,314	2,358,373	-1.27%	n/a	n/a	n/a
SHAs (+)	243,378	263,983	-7.81%	256,504	259,805	-1.27%	n/a	n/a	n/a
TOTAL	45,641,728	46,055,603	-0.90%	45,232,708	45,581,065	-0.76%			

Note: (+) TFRs: Trust Financial Returns; (*) FTA: Consolidated NHS Financial Trust Accounts; FMA Financial Monitoring and Accounts; DH Accounts: DH Annual Report and Accounts.

3.3 Measuring productivity

We report estimates for two different formulations of the productivity index. These differ in how they account for growth in NHS labour inputs. Our MIXED index uses information recorded in the Electronic Staff Records; our INDIRECT method uses expenditure data only.

4. Output growth

4.1 Hospital activity

Summary statistics about the volume of and quality of elective, non-elective and outpatient activity are reported in Tables 13-15. Trends in the volume of activity, 30-day survival rates and waiting times from a baseline of 2004/05 are shown in Figures 1-3.

Note that there is a break in the data series in 2011/12 for elective and non-elective activity, due to a change in the method used to calculate continuous inpatient spells (CIPS). We present figures using both methods for 2011/12, and the dual set of figures ensures that year-on-year comparisons are not compromised by the change in the CIPS methodology.

Table 13 Hospital output: electives and day cases

Year	Hospital output						
	<i>Elective and day cases</i>						
	Volume of activity	Average cost (c)	Quality indicators				Mean waiting times
30-day survival rate			Mean age	Mean life expectancy	80 th percentile waiting times		
2004/05	6,433,933	1,031	99.38%	53.6	23.7	104	71
2005/06	6,864,612	1,041	99.47%	53.9	23.7	95	67
2006/07	7,194,697	1,036	99.51%	54.4	23.6	89	65
2007/08	7,598,796	1,091	99.72%	54.6	23.5	74	57
2008/09	8,148,229	1,147	99.74%	55.0	23.2	60	51
2009/10	8,465,757	1,227	99.76%	55.3	23.4	65	57
2010/11(a)	8,755,081	1,263	99.78%	55.7	23.4	76	62
2011/12(a)	8,947,134	1,287	99.78%	56.0	23.3	85	67
2011/12(b)	8,946,909	1,287	99.45%	56.0	23.19	85	67
2012/13 (b)	9,030,530	1,341	99.50%	56.0	23.18	119	73

Notes: (a) Volume of NHS activity using CIPS calculated with the new method; (b) 2012/13 update of methodology to calculate CIPS; (c) The reported average cost does not include high-volume HRGs LA08E, PB03Z and SB97Z as they are excluded from RC;

Table 14 Hospital output: non-electives

Year	Hospital output				
	<i>Non-electives</i>				
	Volume of activity	Average cost (c)	Quality indicators		
30-day survival rate			Mean age	Mean life expectancy	
2004/05	6,009,802	1,210	95.16%	41.6	34.1
2005/06	6,291,117	1,241	95.49%	41.6	34.3
2006/07	6,363,388	1,244	95.65%	41.6	34.6
2007/08	6,593,136	1,237	95.79%	41.4	34.7
2008/09	6,826,035	1,354	95.85%	41.9	34.4
2009/10	6,951,379	1,413	96.07%	42.1	34.6
2010/11(a)	7,109,358	1,460	96.05%	42.2	34.8
2011/12(a)	7,054,224	1,506	96.12%	42.7	34.7
2011/12(b)	7,049,528	1,498	96.62%	43.0	34.6
2012/13 (b)	7,327,228	1,532	96.45%	44.0	34.1

Notes: (a) Volume of NHS activity using CIPS calculated with the new method; (b) 2012/13 update of methodology to calculate CIPS; (c) The reported average cost does not include high-volume HRGs LA08E, PB03Z and SB97Z as they are excluded from RC

Table 15 Hospital output: outpatients

Year	Hospital Output			
	<i>Outpatient</i>			
	Volume of activity	Volume of activity (b)	Average cost	Quality indicator
Mean waiting times				
2004/05	52,724,302		106	52
2005/06	60,541,477		103	46
2006/07	63,453,507		93	41
2007/08	69,678,564		94	24 37
2008/09	74,421,017		98	22 34
2009/10	76,761,100		99	24 36
2010/11(a)	81,263,904	80,404,193	105	37
2011/12(a)	75,863,819	82,197,237	108	37
2012/13	77,222,725	83,853,264	111	38

Notes: (a) Due to changes in PCT reporting, the activity numbers for 2011/12 are not comparable to data reported in previous years; (b) Derived from the HES Outpatient Minimum Database.

Table 13 and Figure 1 show a 40.4% increase in the volume of elective activity between 2004/05 and 2012/13, with the increase amounting to 0.9% in the final pair of years. In terms of quality, 30-day survival rates have continued to improve year-on-year, as indicated in Figure 2. For elective patients, the 30-day survival rate was 99.78% in 2011/12, up from 99.38% in 2004/05. The change in how CIPS are calculated means that survival rates are not comparable to previous years, but elective survival rates continued to improve between 2011/12 and 2012/13, from 99.45% to 99.50%.

Trends in inpatient and outpatient waiting times are depicted in Figure 3. Waiting times declined year-on-year from 2004/05 to 2008/09, when they reached their lowest level, amounting to 51 days

at the mean and 60 days at the 80th percentile of the distribution. But, as can be seen, inpatient waiting times (measured at both the mean and the 80th percentile) have been lengthening year by year since 2008/09, the mean being 73 days and the 80th percentile being 119 days in 2012/13.

Outpatient waiting times also fell year-on-year between 2004/05 and 2008/09, before starting to increase in 2009/10; in 2012/13 the wait was 38 days compared to 34 days in 2008/09.

As shown in Table 14, the volume of non-elective activity increased by 21.9% between 2004/05 and 2012/13, the increase amounting to 3.9% between 2011/12 and 2012/13. 30-day survival rates improved year on year up to 2011/12. The rate for non-elective patients was 96.12% in 2011/12 compared to 95.16% in 2004/05. However, survival rates based on CIPS constructed with the new methodology decreased between 2011/12 and 2012/13, from 96.62% to 96.45%.

Data about outpatient attendances is summarised in Table 15. There has been a 28.3% growth in outpatient attendances over the period 2004/5 to 2012/13, with a 2.0% increase between 2011/12 and 2012/13.

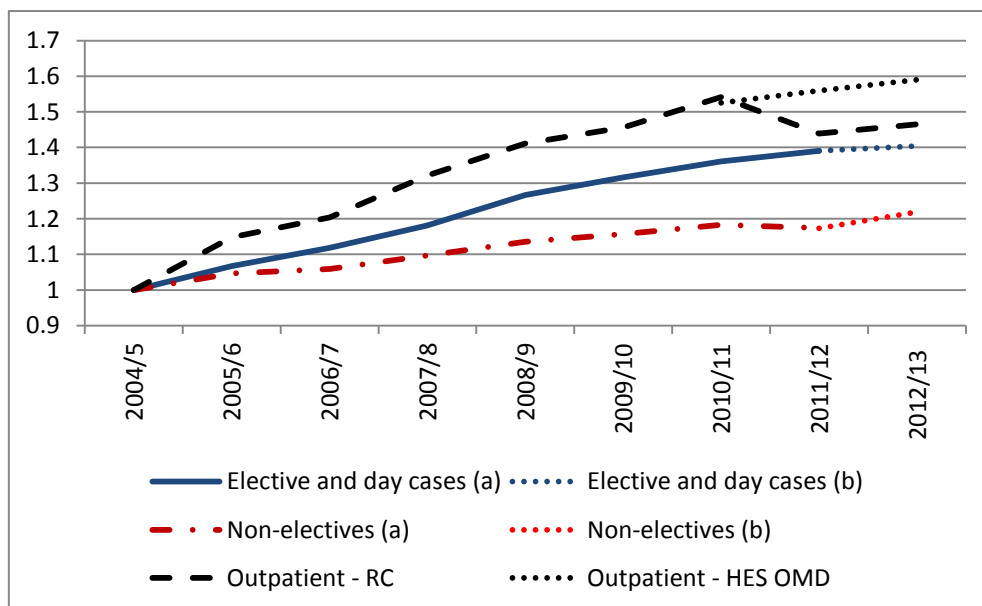


Figure 1 Trends in hospital activity

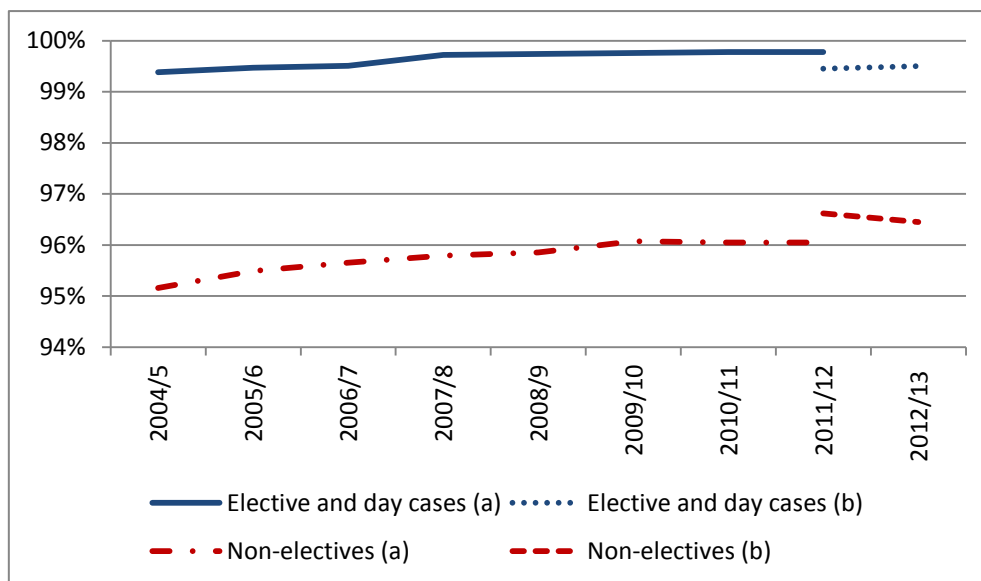


Figure 2 30-day survival rates

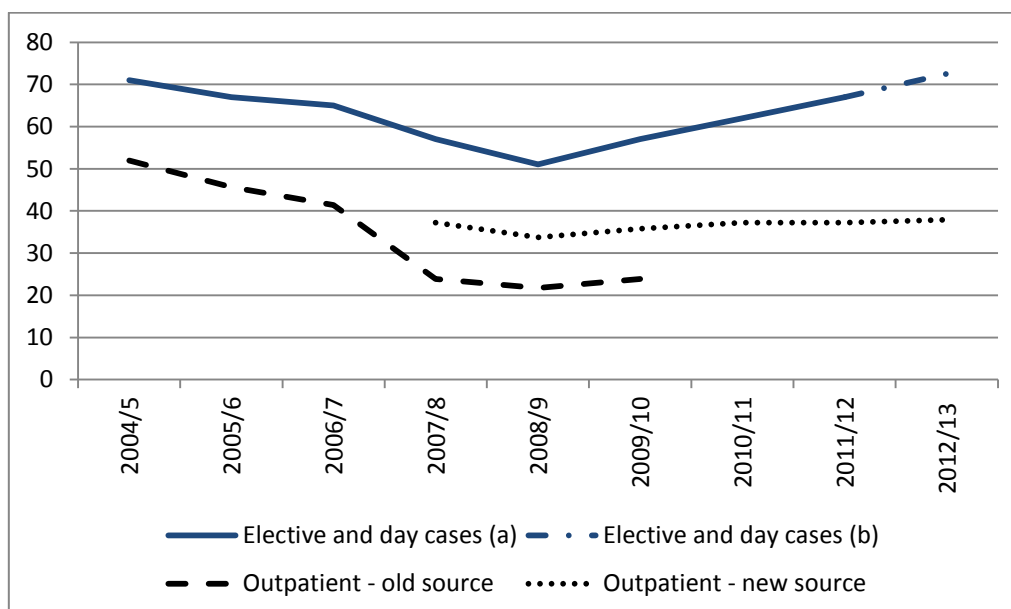


Figure 3 Trends in mean waiting times

4.2 Inpatient and community mental health

Summary statistics reporting the constituent elements used to assess the output of care delivered to mental health patients treated in hospital following elective admission are shown in Table 16, with similar statistics for non-elective admissions in Table 17 and for those treated in community and mental health trusts in Table 18.

In all three tables there is a break in how data were reported in 2011/12. For elective and non-elective activity, this was due to the change in the CIPS methodology, as explained in the previous section. The ability to calculate CIPS in 2011/12 using both methods means that the change can easily be accommodated in our calculation of output growth.

Unfortunately, the same cannot be said of the change in the approach to the Reference Costs collection of activity in community and mental health trusts. The approach was subject to a

complete overhaul in 2011/12, including the introduction of mental health clusters, with subsequent data not being comparable to that collected in previous years. In our previous report, this non-comparability forced us to omit these activities from our calculation of output growth (Bojke et al. 2014). However, now that two years' worth of data using the new Reference Cost categories are available, it has been possible to incorporate the information into our calculation of output growth between 2011/12 and 2012/13.

Patients admitted to hospital with mental health problems are identified if allocated to HRGs WD. There was a gradual reduction in elective mental health patients from 2004/05 to 2008/09, after which activity has increased slightly, though elective admissions remain substantially below 2004/05 levels. Waiting times are very volatile for this group of patients.

Considerably more patients with mental health problems are admitted to hospitals as non-electives, and the number of such patients also fell year-on-year between 2004/05 and 2008/09, but have been increasing annually since then. Non-elective admissions are now above the level in 2004/05, even allowing for the methodological change in how CIPS are calculated.

Activity and unit costs reported by community and mental health trusts are reported in Table 18. The much more disaggregated categorisation of community mental health activity from 2011/12, is reflected in both the ten-fold increase in the volume of activity and the marked reduction in the average cost of a unit of activity. A summarised breakdown of broad types of community mental health activities in 2011/12 and 2012/13 is provided in Table 19. All, Community MH outpatient activity is reported in terms of attendances, Community MH community Contacts and Specialist Teams activities are reported by Care Contact, and Community MH day care facilities are reported by Patient Day.

Table 16 Hospital output: mental health, electives and day cases

Year	Hospital output - Mental Health				
	<i>Elective and day cases</i>				
	Volume of activity	Average cost	Quality indicators		
30-day survival rate			Mean life expectancy	80 th percentile waiting times	
2004/05	45,624	689	97.72%	30.1	40
2005/06	41,439	673	98.01%	30.0	55
2006/07	38,408	656	98.15%	30.6	45
2007/08	33,993	1,141	98.64%	29.9	28
2008/09	25,792	1,133	98.71%	29.0	42
2009/10	28,143	1,195	98.61%	29.4	28
2010/11(a)	30,714	1,297	98.85%	30.2	37
2011/12(a)	30,882	1,318	98.90%	31.2	37
2011/12(b)	31,142	1,318	98.83%	31.1	37
2012/13 (b)	31,078	1,358	98.41%	29.6	52

Table 17 Hospital output: mental health, non-electives

Year	Hospital output - Mental Health			
	<i>Non-electives</i>			
	Volume of activity	Average cost	Quality indicators	
30-day survival rate			Mean life expectancy	
2004/05	123,983	1,012	96.96%	28.7
2005/06	120,203	1,012	97.22%	28.9
2006/07	115,560	1,012	97.38%	29
2007/08	112,475	1,364	97.65%	27.7
2008/09	109,636	1,319	97.56%	27.3
2009/10	121,610	1,365	97.68%	27.7
2010/11(a)	125,823	1,445	97.63%	27.8
2011/12(a)	130,654	1,489	97.70%	27.8
2011/12(b)	135,315	1,318	97.78%	27.3
2012/13 (b)	150,382	1,358	97.61%	26.9

Notes: (a) 2011/12 update of methodology to calculate CIPS; (b) 2012/13 update of methodology to calculate CIPS; (c) Due to reclassification of activity in Community Mental Health 2011/12 data are not comparable with data reported in previous years.

Table 18 Community mental health

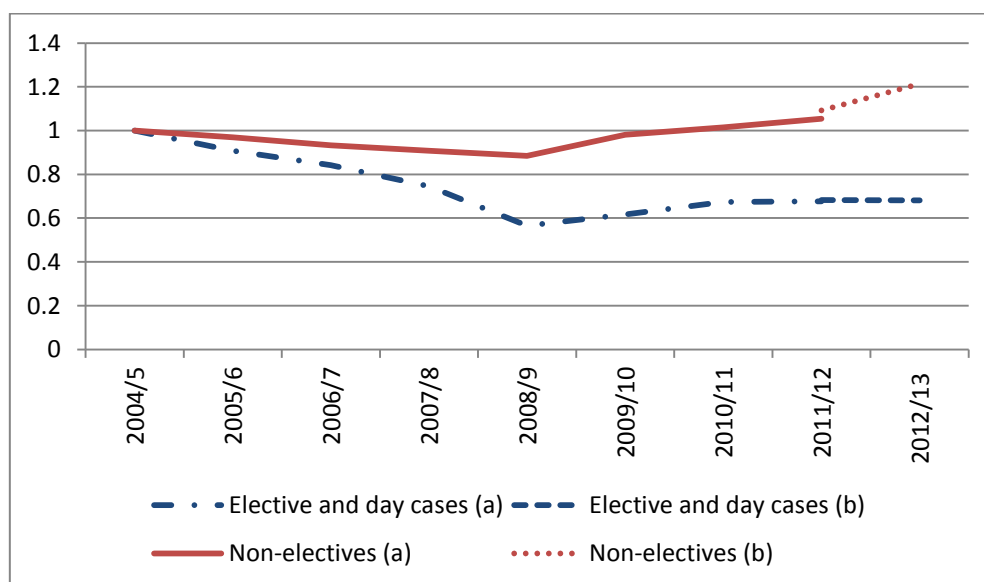
Year	Community Mental Health		
	Volume of activity	Volume of activity (a)	Average cost
2004/05	16,389,891		164
2005/06	17,738,894		170
2006/07	19,259,205		167
2007/08	21,751,043		153
2008/09	22,674,811		157
2009/10	23,440,616		161
2010/11	24,341,950		159
2011/12		224,329,080	28
2012/13		260,266,214	24

Notes: (a) Due to reclassification of activity in Community Mental Health, data is not directly comparable with data reported in previous years.

Table 19 Community mental health activity, 2011/12 & 2012/13

Community mental health	2011/12		2012/13	
	Volume of activity	Average cost (£)	Volume of activity	Average cost (£)
Care Clusters				
Mental Health – Care Clusters – Admitted Patient Care	5,900,173	334	5,548,751	348
Mental Health - Care Clusters - Non-Admitted Patient Care	208,657,970	11	244,072,900	9
Mental Health – Care Clusters – Initial Assessment	418,356	251	816,112	264
Total volume ‘Mental Health Care Clusters’	214,976,499	20	250,437,763	17
Other Mental Health				
Secure Units	1,537,140	523	1,526,840	532
Day Care Facilities: Regular Attendances	28,782	294	34,969	294
Outpatient Attendances*	1,343,458	156	615,632	217
Community Contacts	3,309,410	135	2,970,529	161
Specialist Teams	3,133,791	140	4,680,481	120
Total volume Other Mental Health	9,352,581	204	9,828,451	203.28
Total volume of Community MH activity	224,329,080	28	260,266,214	24

Community mental health outpatient attendances (marked with *) were reported for the first time in 2011/12. With two years’ worth of data, we are now able to include this activity in the productivity measure for 2011/12 – 2012/13. Figure 4 shows the trends in the volume of both elective and non-elective MH activity.

**Figure 4 Trends in mental health activity**

4.3 Community care

While the provision of community care has increased over time, the year-on-year trends in activity have not always been positive (Table 20 and Figure 5). Indeed, activity declined between 2005/06 and 2006/07 and then again between 2009/10 and 2010/11. There was a steep decline between

2010/11 and 2011/12, with the number of contacts declining from 90.7m to 78.3m. Some of this decrease may have been genuine, but some may have been due to less comprehensive data collection in the NHS, with data previously reported by the since abolished PCTs not being captured fully in the data returns made by the organisations that took over responsibility for this activity (Bojke et al. 2014). Organisational coverage is more likely to have been consistent between 2011/12 and 2012/13, the data suggesting a 1.8% increase in community care activity.

Table 20 Community care activity

Year	Community care	
	Volume of activity (a)	Average cost
2004/05	75,673,792	39
2005/06	85,092,838	38
2006/07	83,895,139	40
2007/08	85,470,688	42
2008/09	88,513,663	45
2009/10	92,412,727	46
2010/11	90,724,524	47
2011/12 (a)	78,315,576	50
2012/13 (a)	79,709,044	52

Notes: (a) In 2011/12, PCTs and PMS ceased to report activity about community care. Total volume of activity from 2011/12 is, therefore, not comparable with previous years.

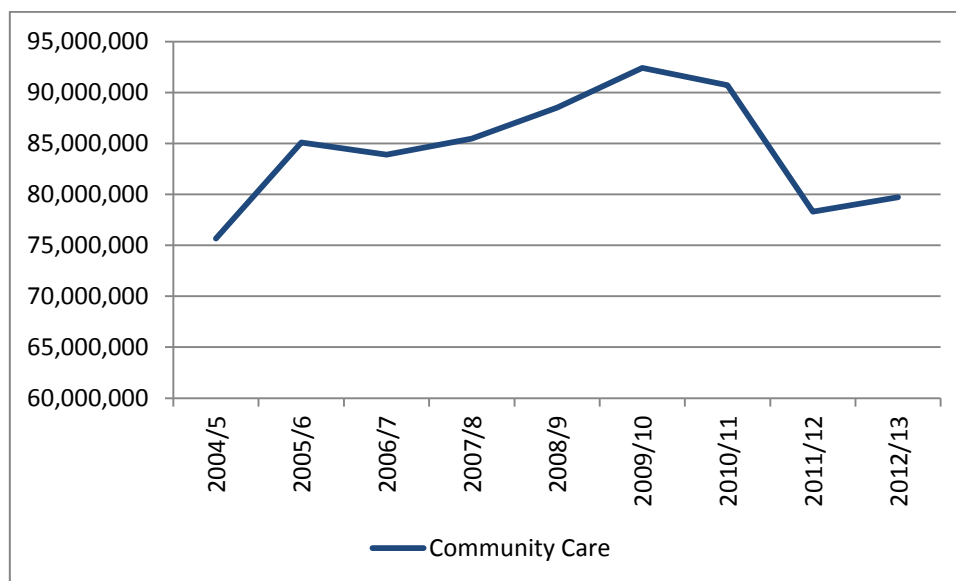


Figure 5 Trends in community care activity

4.4 Primary care

Primary Care consultations

Data about the number and cost of consultations are reported in Table 21, broken down by consultation type. Prior to 2008/09, data about the volume and type of consultations were derived from QResearch (Fenty et al. 2006). After 2008/09, we have had access only to aggregated data from the GP Patient Survey from which it is possible to derive estimates of the number but not the type of consultations by survey respondents. Consequently, the breakdown of consultation types is based on the 2008/09 QResearch data with the assumption that the mix of consultations has remained constant over time.

From 2009/10 we have used the weighted GP Patient Survey responses, which are adjusted to make the data more representative of the population as a whole. Responses are weighted by local factors including deprivation, crime levels, ethnicity, marital status, overcrowding in households, household tenure and employment status.¹⁴ The GP Patient Survey suggests that the number of consultations fell between 2009/10 and 2010/11 but have increased subsequently. Trends in the volume of primary care activity are depicted in Figure 6.

Table 21 Primary care consultations derived from survey data

		GP Home visit	GP Telephone	GP Surgery	GP Other	Practice Nurse	Other Clinicians	Total
2004/05	Activity	5,800	12,500	148,300	4,200	84,600	10,200	265,600
	Cost	69	30	24	24	10	15	20
2005/06	Activity	6,000	14,000	153,900	4,800	93,700	10,700	283,100
	Cost	69	27	24	24	10	15	20
2006/07	Activity	5,900	15,100	156,600	5,000	99,000	11,400	293,000
	Cost	55	21	34	34	9	14	25
2007/08	Activity	5,900	16,200	155,800	4,800	98,500	11,300	292,500
	Cost	58	22	36	36	11	15	26
2008/09	Activity	6,000	18,700	158,800	5,500	100,600	10,800	300,400
	Cost	117	21	35	35	11	14	27
2009/10(a)	Activity	6,000	18,700	158,800	5,500	100,600	10,800	300,400
	Cost	120	22	36	36	12	17	28
2010/11(a)	Activity	5,844	18,212	154,659	5,357	97,977	10,518	292,567
	Cost	121	22	36	36	13	25	29
2011/12(a)	Activity	6,067	18,909	160,578	5,562	101,726	10,921	303,764
	Cost	110	26	43	43	14	25	33
2012/13(a)	Activity	6,160	19,200	163,047	5,647	103,290	11,089	308,433
	Cost	114	27	45	45	13	25	34

Note: (a) General Practice consultations are estimated using the GP Patient Survey

¹⁴ <https://gp-patient.co.uk/faq/weighted-data>

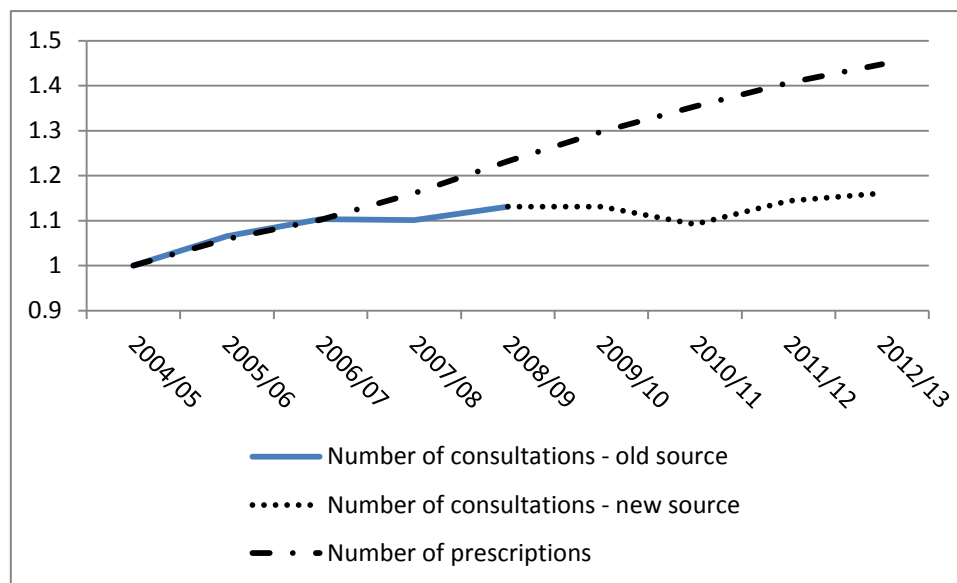


Figure 6 Trends In primary care consultations and prescribing

The GP patient survey aims to maintain a constant sample size in successive waves, and responses need to be scaled up by population size in order to derive annual estimates of the number of consultations for the English population as a whole. The ONS estimates for population growth for the last 10 years for the UK as a whole are in Table 22. After taking account of increases in the size of the population, growth in the volume of consultations between 2011/12 and 2012/13 is estimated to be 2.39% rather than 1.54%.

Table 22 Estimates of population growth

Mid-Year	Mid-Year Population (millions)	Annual Percentage Change
2004	60.0	0.53
2005	60.4	0.77
2006	60.8	0.68
2007	61.3	0.81
2008	61.8	0.82
2009	62.3	0.71
2010	62.8	0.80
2011	63.3	0.84
2012	63.7	0.66
2013	64.1	0.63

Our estimates of primary care activity also allow for changes in the quality of consultation. This is captured by improvements in blood pressure control for patients with coronary heart disease (CHD), stroke and hypertension.

Table 23 reports the trends in prevalence and achievement as measured in the Quality and Outcomes Framework (QOF) for these conditions. The trend in QOF achievement has been positive for all three conditions since 2004/05, with almost universal year-on-year improvements.

Table 23 Rates of prevalence and achievement in reducing blood pressure

Year	Prevalence			QOF achievement		
	CHD	Stroke	Hypertension	CHD	Stroke	Hypertension
2004/05	3.57	1.63	10.41	78.60	73.13	64.33
2005/06	3.57	1.66	11.48	84.44	81.22	71.05
2006/07	3.54	1.61	12.49	88.86	86.92	77.62
2007/08	3.50	1.63	12.79	89.41	87.51	78.35
2008/09	3.47	1.66	13.13	89.68	87.88	78.56
2009/10	3.44	1.68	13.35	89.77	88.12	78.72
2010/11	3.40	1.71	13.52	90.16	88.57	79.30
2011/12	3.38	1.74	13.63	90.14	88.61	79.65
2012/13	3.40	1.70	13.68	90.57	89.26	80.79

Growth in primary care consultations is reported in Table 24. The survey data suggest that the number of primary care consultations increased by 1.54% between 2011/12 and 2012/13. Scaled up to account for the population growth, such activity is estimated to have increased by 2.39%. Finally after taking account of the quality of consultations, the growth in primary care consultations amounts to 2.45%.

Table 24 Growth in primary care consultations

	Number of visits	Population adjusted number of visits	Population and quality adjusted number of visits	Growth rate	Population adjusted growth rate	Population and quality adjusted growth rate
2004/05	265,600*	265,600	274,122			
2005/06	283,100*	283,100	295,289	6.59%	6.59%	7.15%
2006/07	293,000*	293,000	309,501	3.50%	3.50%	4.01%
2007/08	292,500*	292,500	311,375	-0.17%	-0.17%	-0.07%
2008/09	300,400*	300,400	322,662	2.70%	2.70%	2.79%
2009/10	300,400	311,959	325,487	0.00%	2.75%	2.82%
2010/11	292,567	305,435	319,456	-2.61%	-1.11%	-0.99%
2011/12	303,764	319,661	334,468	3.83%	4.66%	4.70%
2012/13	308,433	327,301	342,667	1.54%	2.39%	2.45%

* These figures, derived from QRResearch, are already population adjusted

Community prescribing

Summary statistics about community prescribing are presented in Table 25. Drugs are categorised according to their chemical composition and the number of categories changes throughout the years, with the peak in 2004/05 (8,779 categories) and the low in 2012/13 (7,699 categories).

Table 25 Community prescribing, summary data

Year	Unique drug codes observed	Total Price	Total Quantity	Total Spend
2004/05	8,779	691,948,868	64,042,525,435	£8,094,174,944
2005/06	8,535	733,010,929	67,468,607,795	£8,013,483,226
2006/07	8,218	762,631,738	70,369,213,090	£8,250,323,893
2007/08	8,769	803,297,137	73,093,309,000	£8,303,500,918
2008/09	8,276	852,482,281	77,363,704,790	£8,376,264,432
2009/10	8,072	897,727,347	81,139,818,758	£8,621,421,130
2010/11	7,860	936,743,859	83,740,259,688	£8,880,735,344
2011/12	7,856	973,381,568	84,155,589,191	£8,777,964,802
2012/13	7,699	1,001,825,994	84,869,903,981	£8,397,492,181

From the data we can observe changes in average cost of prescription and in unit (ie item) cost over years (Table 26). Prescription and item costs differ because a single prescription may be for multiple items.

Table 26 Costs of prescribed items

	Activity weighted average unit cost	Unweighted average unit cost	Activity weighted average prescription unit cost
2004/05	0.13	6.99	11.7
2005/06	0.12	7.92	10.93
2006/07	0.12	8.86	10.82
2007/08	0.11	8.73	10.34
2008/09	0.11	8.94	9.83
2009/10	0.11	9.18	9.6
2010/11	0.11	10.77	9.48
2011/12	0.1	11.11	9.02
2012/13	0.1	11.55	8.38

Output and price indices for community prescribing are reported in table 27. Prices have fallen year-on-year over the whole period, the drop amounting to -7.18% between 2011/12 and 2012/13, which is much lower than that recorded in previous years. The volume of prescriptions has increased annually, the most recent year-on-year increase amounting to 3.07%, which is somewhat lower than previous annual increases.

Table 27 Community prescribing: price and volume growth

Year	Paasche Price	Laspeyres Volume
2004/05 to 2005/06	-9.87%	9.84%
2005/06 to 2006/07	-3.41%	6.59%
2006/07 to 2007/08	-6.24%	7.35%
2007/08 to 2008/09	-5.15%	6.36%
2008/09 to 2009/10	-3.74%	6.93%
2009/10 to 2010/11	-1.67%	4.76%
2010/11 to 2011/12	-4.36%	3.35%
2011/12 to 2012/13	-7.18%	3.07%

Taking the base year as 2004/05, trends in the volume and prices of pharmaceuticals are shown in Figure 7.

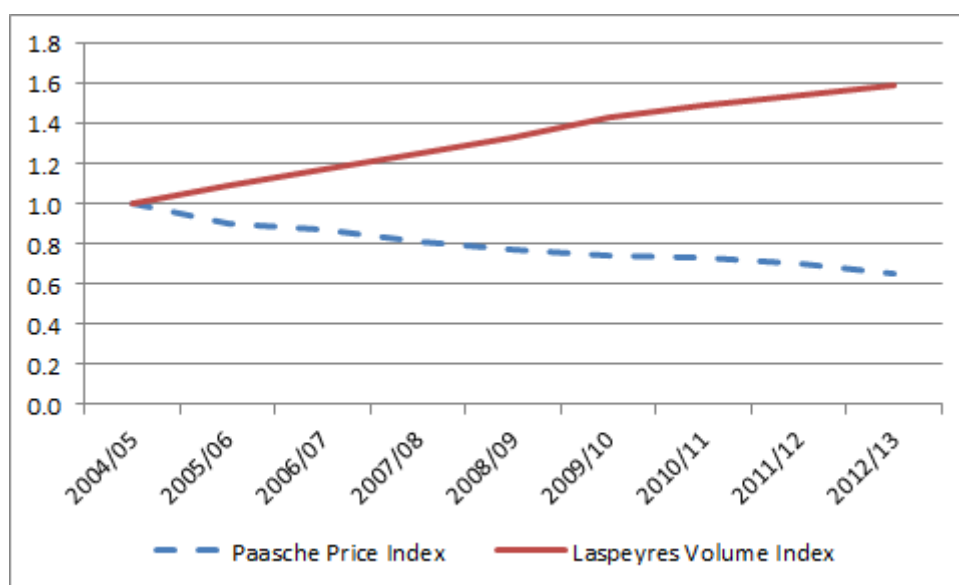


Figure 7 Price and volume changes for community prescribed pharmaceuticals

4.5 A&E activity and ambulance services

Table 28 reports summary statistics for A&E services provided in Emergency Departments and Other A&E services according to whether patients were subsequently admitted to hospital (AD) or not (NAD).

Emergency departments offer a consultant-led 24 hour service with full resuscitation facilities and designated accommodation for the reception of A&E patients.¹⁵ Between 2011/12 and 2012/13 there was a slight increase (1.3%) in the total number of emergency department attendances, but a substantial shift toward more people being admitted.

Other A&E services capture activities carried out in either of the following departments: 'Consultant led mono specialty accident and emergency services (e.g. ophthalmology, dental) with designated accommodation for the reception of patients', 'Other type of A&E/minor injury activity with designated accommodation for the reception of accident and emergency patients' and 'NHS Walk-in-Centres'.

¹⁵ <http://www.hscic.gov.uk/article/3966/HES-AE-Data-Dictionary>

Table 28 A&E activity

Year	Emergency Departments				Other A&E services			
	AD		NAD		AD		NAD	
	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost
2006/07	3,464,869	107	10,327,147	83	281,135	50	3,900,718	36
2007/08	3,326,719	121	9,058,765	89	531,498	70	3,769,765	43
2008/09	3,566,642	118	9,708,958	99	1,000,986	49	4,184,796	49
2009/10	4,047,176	134	10,075,701	103	1,090,650	49	3,628,469	50
2010/11	4,004,868	141	9,881,747	108	1,145,125	62	3,800,261	55
2011/12	4,040,760	157	10,405,762	108	616,812	83	3,253,452	52
2012/13	4,345,100	160	10,292,933	115	362,656	90	3,426,231	59

Legend: AD – leading to admitted patient care; NAD – Not leading to admitted patient care

Table 29 provides further details of about the particular location in which A&E attendances took place. It is notable that the amount of recorded activity in each location is often subject to considerable year-on-year volatility, the exception being for Emergency Departments. This volatility might not reflect true variations in activity within each location but, instead, may be reflective of other factors, including:

1. Re-organisation of A&E services, particularly Minor Injuries Units and Walk in Centres.
2. With PCTs being replaced by CCGs in 2011/12, comprehensive data returns cannot be guaranteed, and data quality may have suffered. Note that the HSCIC think that this might also have affected A&E HES: "During the period covered (2011-12 and 2012-13) not all NHS trusts have provided data submissions to A&E HES and data quality can be poor for some fields."¹⁶
3. There may have been changes in policy regarding admission.

Table 29 A&E activity, by setting

	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
Emergency Departments (AD)							
Volume of activity	3,464,869	3,326,719	3,566,642	4,047,176	4,004,852	4,040,760	4,345,100
Average cost (£)	107	121	129	134	141	150	160
Tot nr data submissions	761	1,264	1,375	1,397	1,440	1,454	1,451
Max nr categories	12	12	12	12	12	11	11
Emergency Departments (NAD)							
Volume of activity	10,327,147	9,058,765	9,708,958	10,075,701	9,881,745	10,405,762	10,292,933
Average cost (£)	83	89	95	103	108	108	115
Tot nr data submissions	1,239	1,238	1,389	1,389	1,417	1,447	1,476
Max nr categories	12	12	12	12	12	11	11
Minor injury unit (AD)							
Volume of activity	157,485	229,423	445,511	526,556	555,123	199,816	203,738
Average cost (£)	51	82	50	48	64	74	64
Tot nr data submissions	162	162	200	155	193	153	184
Max nr categories	12	12	10	10	11	11	10
Minor injury unit (NAD)							
Volume of activity	1,777,341	1,719,295	2,082,587	1,765,714	1,982,216	1,606,657	1,917,816
Average cost (£)	43	51	53	55	61	60	63
Tot nr data submissions	298	241	357	325	335	330	386
Max nr categories	12	12	12	12	12	11	11
NHS Walk in centre (AD)							
Volume of activity	103,148	201,979	454,852	392,242	306,514	92,610	9,397
Average cost (£)	39	51	36	48	31	42	128
Tot nr data submissions	24	20	19	26	26	6	18
Max nr categories	18	10	5	10	12	3	10
NHS Walk in centre (NAD)							
Volume of activity	1,955,262	1,635,562	1,675,406	1,605,476	1,557,066	1,251,374	1,002,613
Average cots (£)	29	34	37	40	40	42	43
Tot nr data submissions	83	59	86	96	118	36	35
Max nr categories	18	10	11	11	11	11	10
Specialist Emergency Departments (AD)							
Volume of activity	20,640	100,096	100,623	171,852	283,488	324,386	149,521
Average cost (£)	95	81	105	54	90	100	122
Tot nr data submissions	34	56	50	67	63	24	104
Max nr categories	10	10	10	11	11	11	11
Specialist Emergency Departments (NAD)							
Volume of activity	167,977	414,908	426,803	257,279	260,979	246,717	505,802
Average cost (£)	42	44	70	75	88	53	77
Tot nr data submissions	42	79	82	103	82	25	151
Max nr categories	10	10	12	12	11	11	11

Ambulance services were first reported using the current classification system in 2011/12. Table 30 reports summary statistics for 2011/12 and 2012/13. The unit of activity is measured in terms of calls received for the category 'Calls; Patients for the category 'Hear' and Incidents for the category 'See'.

Table 30 Ambulance services

	2011/12	2012/13
Ambulance Services		
Calls		
Volume of activity	8,530,563	9,120,422
Average cost (£)	8	7
Hear and treat or refer		
Volume of activity	338,022	423,821
Average cost (£)	44	47
See and treat or refer		
Volume of activity	1,862,892	1,997,327
Average cost (£)	173	174
See and treat and convey		
Volume of activity	4,895,376	4,984,296
Average cost (£)	230	230

4.6 Other activities

Other types of activity reported in the Reference Costs are summarised in the following tables (31-37). The way of classifying these activities has changed somewhat over time, so rarely are the series recorded in a consistent fashion across all years. Sometimes, some recording of some types of activity are discontinued, or subsumed under other broad categories.

Table 31 Chemotherapy, radiotherapy, high cost drugs, bone marrow transplant

Year	Chemotherapy		Radiotherapy		High Cost Drugs		Bone Marrow Transplant	
	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost
2004/05	777,312	363	1,622,278	113	-	-	1,855	37,363
2005/06	763,806	432	1,634,156	126	-	-	1,955	39,834
2006/07	1,642,444	280	1,743,490	123	26,277,491	17	-	-
2007/08	846,425	406	1,613,135	559	1,332,996	305	-	-
2008/09	1,428,561	448	1,710,525	157	1,322,354	473	-	-
2009/10	1,414,872	505	1,835,695	163	2,412,988	384	-	-
2010/11	1,515,845	515	2,001,798	161	1,288,460	818	-	-
2011/12	1,769,727	505	2,492,431	137	1,372,131	902	-	-
2012/13	2,525,935	387	2,717,024	127	1,511,644	878	-	-

Note: In 2006/7, high cost drugs were recorded as number of procurements, after which recording was by number of patients

Table 32 Directly accessed services and radiology

Year	Directly Accessed Diagnostic Services		Directly Accessed Pathology Services		Radiology	
	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost
2004/05	369,988	44	180,676,234	3	5,152,720	31
2005/06	465,622	44	221,966,384	2	5,784,605	33
2006/07	735,569	41	236,269,050	2	23,918,500	59
2007/08	776,368	41	257,249,379	2	7,614,437	103
2008/09	804,607	46	278,917,852	2	7,852,498	102
2009/10	1,063,744	43	300,010,031	2	8,347,404	104
2010/11	1,458,025	39	320,418,662	2	8,491,834	97
2011/12	5,640,762	34	333,108,317	2	8,758,136	93
2012/13	6,339,016	30	335,941,593	2	9,381,616	92

Note: In 2004/05 and 2005/05, radiology was recorded as number of tests; in 2006/7 it comprised number of tests and interventions; from 2007/08 it was number of patients.

Table 33 Rehabilitation, renal dialysis, critical care, palliative care, cystic fibrosis

Year	Rehabilitation		Renal Dialysis		Critical Care		Specialist Palliative Care		Cystic Fibrosis	
	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost
2004/05	4,095,087	178	8,232,432	52	2,184,333	828	-	-	16,317	1,919
2005/06	4,509,489	185	6,819,136	64	2,197,135	895	-	-	13,704	2,316
2006/07	3,028,598	241	4,200,298	104	2,468,777	840	93,880	269	13,944	2,290
2007/08	2,732,048	259	3,980,793	114	2,165,060	931	208,410	219	15,383	2,349
2008/09	3,277,757	265	4,091,245	120	2,354,447	967	262,305	216	20,756	2,116
2009/10	3,277,430	279	4,050,658	129	2,439,661	1,003	359,121	192	20,323	2,468
2010/11	3,314,085	285	4,088,817	129	2,470,065	1,011	512,972	162	19,942	2,631
2011/12	2,897,721	278	4,166,150	129	2,570,571	998	550,417	166	9,852	8,476
2012/13	2,715,650	301	4,135,914	128	2,669,343	984	600,848	169	9,735	8,709

Table 34 Coronary care, spinal injuries, cancer team meetings

Year	Coronary Care Units		Specialist Spinal Injuries		Cancer Multi-Disciplinary Team Meetings	
	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost
2004/05	-	-	112,149	412	-	-
2005/06	-	-	109,292	438	-	-
2006/07	381,993	450	-	-	-	-
2007/08	393,790	465	-	-	-	-
2008/09	415,446	451	-	-	-	-
2009/10	425,055	453	-	-	-	-
2010/11	462,474	436	-	-	-	-
2011/12	-	-	-	-	837,418	114
2012/13	-	-	-	-	1,079,297	106

Table 35 Regular admissions, ward attenders and day care

Year	Regular admissions		Ward attenders		Day Care	
	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost
2004/05	122,447	248	846,342	95	735,070	124
2005/06	177,131	245	-	-	649,963	131
2006/07	179,927	271	694,667	93	439,932	135
2007/08	164,651	324	-	-	384,048	137
2008/09	198,573	341	-	-	345,371	159
2009/10	152,079	393	-	-	319,706	156
2010/11	176,169	431	-	-	321,386	148
2011/12	176,877	428	-	-	275,819	140
2012/13	210,984	371	-	-	237,040	157

Table 36 Hospital at home, transport services

Year	Hospital at Home/Early Discharge Schemes		Patient Transport Services		Hospital Travel Cost Scheme	
	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost
2004/05	434,698	73	-	-	-	-
2005/06	593,586	60	-	-	-	-
2006/07	470,737	74	6,421,047	26	275,478	14
2007/08	405,271	73	7,046,578	29	607,712	18
2008/09	522,047	68	6,808,600	28	749,833	18
2009/10	495,961	81	435,669	13	427,766	12
2010/11	364,352	91	-	-	435,669	13
2011/12	323,213	113	-	-	-	-
2012/13	285,754	108	-	-	-	-

Table 37 Audiological services, dietetics, ophthalmology

Year	Audiological Services		Dietetics		Ophthalmology	
	Volume of activity	Average cost	Volume of activity	Average cost	Volume of activity	Average cost
2004/05	1,902,390	41	151,191	35	10,148,978	33
2005/06	1,692,721	40	-	-	10,354,682	35
2006/07	2,905,175	50	-	-	10,484,922	36
2007/08	3,447,049	51	-	-	11,047,890	28
2008/09	3,716,333	51	-	-	11,278,474	28
2009/10	3,807,539	52	-	-	11,811,651	28
2010/11	3,927,780	51	-	-	11,938,529	28
2011/12	4,033,290	50	-	-	12,305,727	28
2012/13	4,030,693	52	-	-	12,339,253	28

Information about dentistry is derived from the HSCIC website¹⁷ with dental activity differentiated into dental bands, reflecting the relative costs of different courses of treatments, as shown in Table 38. The HSCIC publication on NHS Dental Statistics also reports a weighted measure of courses of

¹⁷ <http://www.hscic.gov.uk/catalogue/PUB11625>

treatments, Units of Dental Activity (UDA), which we use in our output growth measure. The UDA is also used in the funding of NHS dental activity. Up until 2011/12, we have used unit costs of dental treatment as weights. We found that actual unit costs are equivalent to the underlying weights used by the NHS to determine the UDAs.

Table 38 Dental services

Year	Dentistry					
	Band 1	Band 2	Band 3	Urgent	Other	Total
	(UDA)					
2004/05*	-	-	-	-	-	68,983,268
2005/06*	-	-	-	-	-	69,863,311
2006/07	19,012,890	32,063,007	18,349,548	3,457,446	767,309	73,650,200
2007/08	19,275,334	32,975,610	20,214,444	3,759,851	735,804	76,961,043
2008/09	19,803,371	34,468,755	22,314,288	4,012,151	755,832	81,354,397
2009/10	20,346,012	35,098,905	25,034,148	4,210,866	767,980	85,457,911
2010/11	20,718,874	35,414,322	26,249,796	4,338,032	743,265	87,464,289
2011/12	20,886,648	35,586,987	26,604,720	4,422,493	742,657	88,243,506
2012/13	21,016,444	35,252,547	26,871,444	4,454,437	502,932	88,097,804

* Units of Dental Activity are reported from 2006/7 onwards, for 2004/5 and 2005/6 we calculated equivalent UDAs by multiplying volumes of activity by the average weight for dental courses of treatment for 2006/7

4.7 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, which increased by 2.58% between 2011/12 and 2012/13. 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, which increased by 2.34% between 2011/12 and 2012/13.

Table 39 Output growth

Output growth	All NHS	
	Cost-weighted growth	Quality adjusted CW growth
2004/05-2005/06	6.48%	7.11%
2005/06-2006/07	5.81%	6.50%
2006/07-2007/08	3.42%	3.66%
2007/08-2008/09	5.34%	5.73%
2008/09-2009/10	3.44%	4.11%
2009/10-2010/11	3.61%	4.57%
2010/11-2011/12	2.38%	3.15%
2011/12-2012/13	2.58%	2.34%

This is the first time over the full data series in which quality-adjusted output growth is lower than cost-weighted growth. There are two explanations as to why the quality-adjustment is negative. First, quality deteriorated between 2011/12 and 2012/13 because of further increases in waiting times and a reduction in survival rates for non-elective patients. Second, we overcame the problem of HRG4 being replaced by HRG4+ by grouping all hospital activity in 2012/13 using the HRG4 grouper, thereby maintaining a consistent categorisation system. However, because of changes to diagnostic and procedure coding in the most recent year of data, 13% of patients in 2012/13 could not be allocated to an HRG, and were allocated instead to the UZ01Z code. As costs are not reported for patients in this ungrouped HRG, we assigned average cost and quality values to them. If true (unobserved) values are higher than average, this would depress the quality-adjusted estimates of productivity growth.

5. Input growth

5.1 Staff numbers

The number of NHS staff, measured as Full Time Equivalents (FTEs), is reported in Table 40. Numbers of GPs and practice is taken from the Workforce Census. The method used to count practice staff was revised in 2011/12, though the counts for both methods are available for this year. We do not use the numbers of GPs and practice staff directly in our calculation of input growth but use expenditure data instead, as will be described in section 5.2. The numbers are presented in the table for information only.

Prior to 2007/08, we also used data from the Workforce Census to count the number of other types of staff working in the NHS. But, since it was made available in 2007/08, we have used the Electronic Staff Record (ESR) data to calculate growth in labour inputs.¹⁸ Information in the ESR is summarised from 480 staff categories which are aggregated into major staff groups in Table 40. Figures 8 and Figure 9 present this information graphically.

The number of staff working for the NHS peaked in 2010/11, at 1,169,872 FTEs, including GPs and practice staff. Since then, numbers have declined year on year, but not across all staff groups. Between 2010/11 and 2012/13, the number of hospital Medical staff increased by 5.6%, GPs by 2.2% and practice staff by 3.3%, and there was a large increase of 18.3% in Nursing, Midwifery and Health Visiting Learners (albeit this category comprising relatively small numbers, increasing from 2,644 to 3,115). There have been decreases in all other staff groups, most notably reductions of 7.8% in Administration and Estates and 4.5% for Nursing, Midwifery and Health Visiting. Overall, the number of NHS staff fell by 2.1% between 2010/11 and 2012/13, with the reduction in FTEs amounting to 2.5% between 2011/12 and 2012/13, as shown in the penultimate row of Table 40.

The final row of Table 40 reports the growth in labour input, which takes account of both the number of FTEs and the wage rate for each occupational group. Over time there may have been changes in the staffing mix, and a simple count of the numbers employed fails to capture changes in the composition of staffing. The index of labour input growth overcomes this by weighting the number of staff of each type by their respective wages. This shows a reduction in labour input of 1.95% between 2011/12 and 2012/13.

For the entire period since 2004/05, the year-on-year index of labour input growth is often greater than the growth in FTEs. This occurs if there is a shift of staff toward higher wage categories, as seems to be the case over much of the period including between 2011/12 and 2012/13 (with -1.95% > -2.5%).

¹⁸ We excluded one organisation from the ESR data reported in 2011/12 that had not appeared in previous years.

Table 40 NHS Staff numbers

	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
GPs (a)	33,564	34,855	35,944	36,420	37,720	40,269	39,409	39,780	40,265
GP Practice staff	69,140	72,006	72,990	75,085	73,292	72,153	73,306		
GP Practice staff – new method							82,802	84,609	85,546
Medical staff (b)	78,462	82,568	85,975	84,811	90,460	93,393	95,531	99,331	100,878
Ambulance staff				21,149	23,084	24,489	25,056	24,908	24,566
Administration and Estates staff				237,264	243,018	262,479	263,723	250,539	242,980
Health care assistants and other support staff				101,114	106,406	112,710	114,786	116,643	116,018
Nursing, midwifery and health visiting staff and learners				366,520	372,132	379,841	380,114	377,948	363,781
Scientific, therapeutic and technical staff and healthcare scientists				141,754	150,056	159,538	165,454	168,750	164,312
Unknown and Non-funded staff				4,327	3,595	3,462	3,351	3,055	2,652
Professionally qualified clinical staff	412,013	425,044	425,983						
Support to clinical staff	271,347	278,994	273,202						
NHS infrastructure support staff	178,530	186,510	178,230						
Volume Index FTE		3.32%	-0.39%	-0.63%	2.88%	4.24%	1.50%	-0.21%	-2.50%
Labour Index		3.44%	0.64%	0.64%	4.22%	4.55%	1.29%	-0.24%	-1.95%

Notes: (a) Data for GPs and GP practice staff is not available from ESR; Workforce Census data is used instead; there were also changes in counting of GP Practice staff therefore 2010/11 and 2011/12 years are not comparable to previous years. This includes GPs and GP trainees working in hospital http://www.hscic.gov.uk/media/9377/NHS-Occupation-Code-Manual-v10/pdf/NHS_Occupation_Code_Manual_Ver_10.pdf

(b) FTE data prior to 2007/08 is taken from the Workforce Census data. FTE data from 2007/08 onwards is taken from organisational returns of Electronic Staff Records. When there are 5 or less people employed in an occupational group, organisations report either 5 or 0; these totals therefore will differ from those derived from national level data. Data reported by private providers for 2011/12 and 2012/13 are excluded.

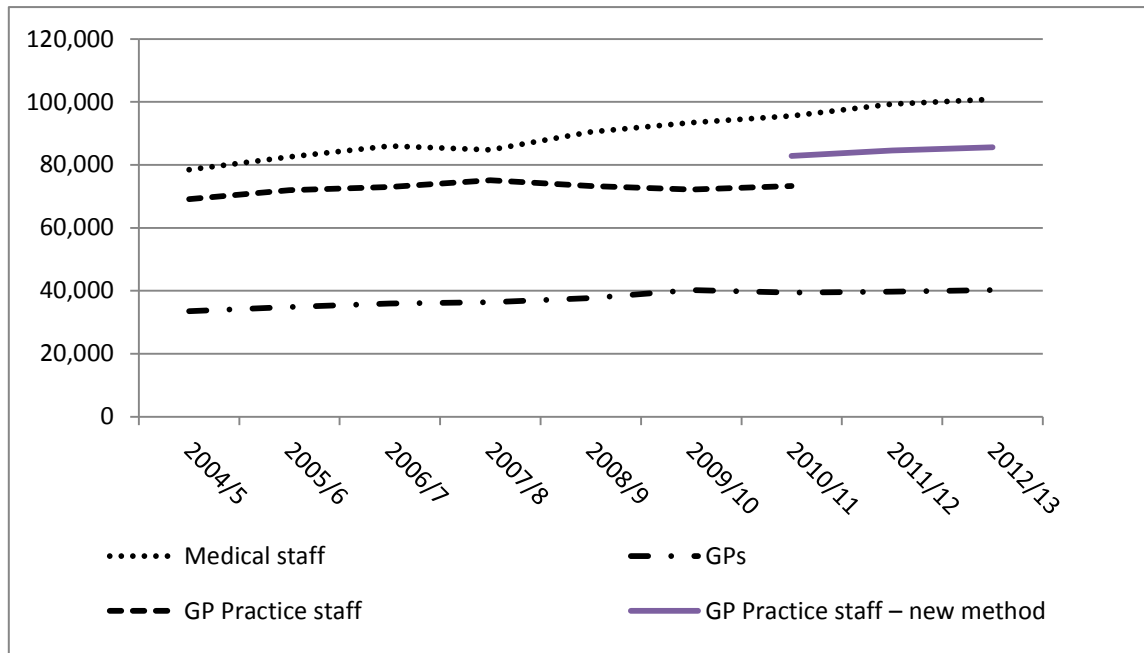


Figure 8 Trends in numbers of medical staff, GPs and practice staff

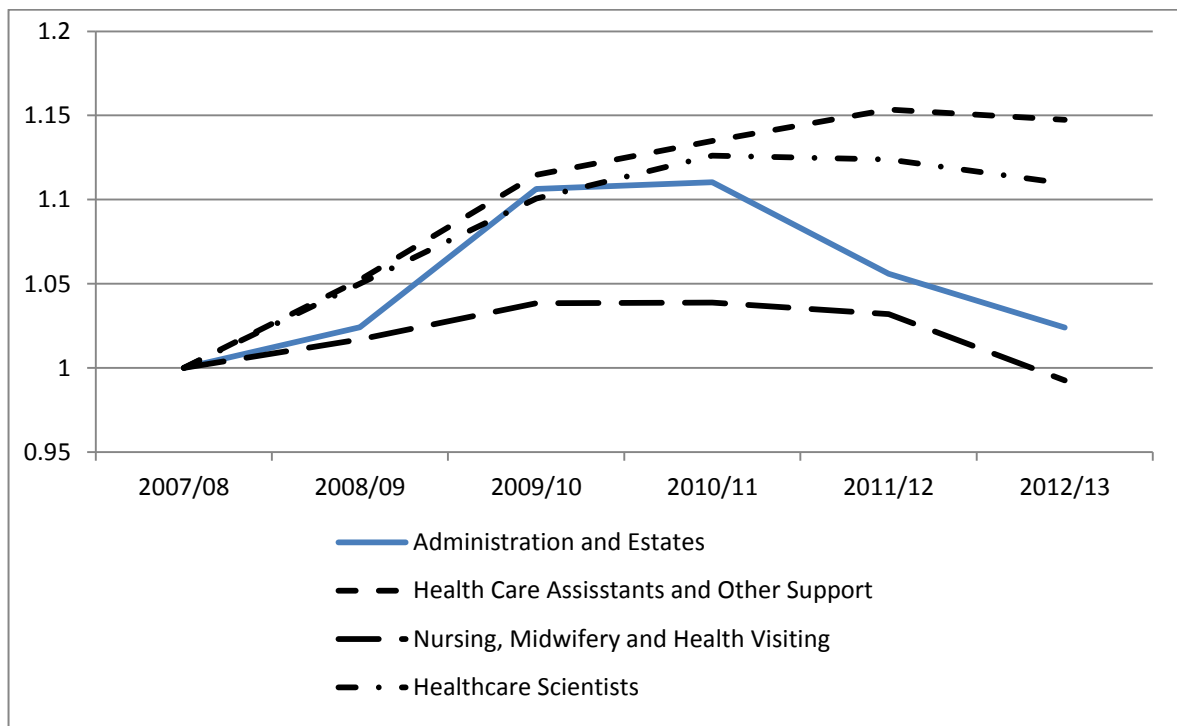


Figure 9 Growth in non-medical staff

5.2 Input use derived from expenditure data

In Tables 41 and Table 42 we present a breakdown of expenditure by broad types of input for PCTs and all Trusts, respectively.

Table 41 Current expenditure by PCTs (£000)

Current	Labour	Intermediates	Capital
2007/08	6,701,228	2,617,114	1,174,841
2008/09	7,478,953	2,526,610	1,247,997
2009/10	8,230,341	2,623,459	1,703,974
2010/11	7,175,399	2,638,638	1,171,813
2011/12	2,328,314	2,052,029	892,604
2011/12*	2,358,373	860,860	1,721,795
2012/13*	1,938,770	885,265	1,814,809

Note: * Data prior to 2011/12 from Financial Returns and from 2011/12 data from DH Annual Report and Accounts. Intermediate and capital items are identified differently in each source

Table 42 Current expenditure by NHS Trusts (£000)

Current	Labour	Intermediates	Capital
2007/08	30,884,556	10,140,836	6,452,630
2008/09	33,435,219	11,322,441	6,340,019
2009/10	35,983,781	12,115,273	6,529,977
2010/11	38,222,951	12,961,217	6,839,898
2011/12	42,647,889	14,941,588	7,278,435
2011/12*	42,701,684	17,477,370	12,097,485
2012/13*	43,797,935	19,681,855	12,377,259

Note: * For NHS Trusts, data from prior to 2011/12 from Financial Returns and from 2011/12 data from Financial Monitoring and Accounts. Intermediate and capital items are identified differently in each source

As would be expected, there has been a substantial reduction in expenditure by PCTs, especially in terms of staffing. The drop is mirrored by a substantial increase in expenditure by Trusts, which partly reflects a transfer of personnel from PCTs to Trusts.

We report expenditure in current (Table 43) and constant (Table 44) terms across all the major expenditure categories. To derive estimates of volume growth in input use from the expenditure data, it is necessary to wash out price changes from the expenditure series. By applying a price deflator, current expenditure is converted into constant expenditure. Consequently, changes in constant expenditure are driven by changes in the volume not the price of inputs. The constant expenditure series shows that total input use increased considerably over time, from £70.4bn in 2004/05 to £88.9bn in 2011/12, an increase of 26.4%. Input growth amounted to 2.6% from 2011/12 to 2012/13.

The different data sources used to measure inputs from 2011/12 mean that they are not directly comparable to previous years. Nevertheless, over the full series, from 2004/05 to 2012/13, input growth amounted to 29.3%.

Table 43 Total NHS current expenditure (£000)

Current	NHS Staff	Agency	Intermediate	Capital	Prescribing	Primary Care	DH Admin	TOTAL
2004/05	31,334,252	1,557,282	8,757,990	5,115,514	8,094,175	9,569,836	278,000	64,707,050
2005/06	33,926,746	1,459,936	10,271,344	5,839,664	8,013,483	11,162,141	262,000	70,935,314
2006/07	35,177,509	1,185,244	11,378,727	6,568,363	8,250,324	11,209,422	229,000	73,998,589
2007/08	36,561,167	1,207,654	13,036,200	7,784,592	8,303,501	11,697,639	226,000	78,816,753
2008/09	39,264,185	1,895,423	13,991,803	7,426,031	8,376,264	12,074,672	242,958	83,271,336
2009/10	42,104,673	2,302,578	14,911,074	7,635,390	8,621,421	12,683,418	241,608	88,500,162
2010/11	43,513,839	2,127,889	16,077,609	8,025,361	8,880,735	12,962,081	212,245	91,799,759
2011/12	43,360,622	1,872,598	17,221,673	8,265,079	8,777,965	13,250,874	453,000	93,201,811
2011/12*	43,457,477	1,862,385	19,154,991	13,892,358	8,777,965	13,250,874	453,000	100,849,049
2012/13*	43,654,591	2,345,552	21,442,537	14,273,017	8,397,492	13,419,803	457,000	103,989,992

* For NHS Trusts, data from prior to 2011/12 from Financial Returns and from 2011/12 data from Financial Monitoring and Accounts. Agency costs, intermediate and capital items are identified differently in each source

Table 44 Total NHS constant expenditure (base year 2011/12) (£000)

Current	NHS Staff	Agency	Intermediate	Capital	Prescribing	Primary Care	DH Admin	TOTAL
2004/05	38,346,300	1,674,940	9,095,402	3,308,036	5,931,102	11,670,405	331,183	70,357,368
2005/06	39,655,155	1,445,800	10,873,689	3,578,676	6,514,497	13,001,164	300,986	75,369,967
2006/07	39,497,699	1,093,340	11,885,321	4,190,683	6,944,133	12,542,013	253,689	76,406,878
2007/08	39,664,411	1,310,158	13,647,977	4,292,293	7,229,236	12,911,230	248,419	79,303,724
2008/09	41,345,323	1,995,888	14,437,459	4,134,163	7,655,849	12,939,203	257,034	82,764,919
2009/10	43,559,337	2,382,128	15,751,862	4,568,449	8,168,866	13,351,213	254,082	88,035,937
2010/11	43,666,672	2,135,363	16,388,184	4,120,671	8,524,415	13,234,285	216,702	88,286,292
2011/12	43,360,622	1,872,598	17,221,673	4,013,538	8,777,965	13,250,874	453,000	88,950,270
2011/12*	43,457,477	1,862,385	19,154,991	13,892,358	8,777,965	13,250,874	453,000	100,849,049
2012/13*	43,311,466	2,327,116	21,063,396	14,020,645	9,046,974	13,273,791	452,028	103,498,236

* For NHS Trusts, data from prior to 2011/12 from Financial Returns and from 2011/12 data from Financial Monitoring and Accounts. Agency costs, intermediate and capital items are identified differently in each source

Trends in the volume of inputs, derived from the expenditure data, are shown in the figures below. Figure 10 shows that trends in estimates of growth in labour input vary according to the data source used, with ESR and expenditure series suggesting different year-on-year changes in growth. Given the importance of labour input, we produce two estimates of overall input and productivity growth that differ according to how labour input is calculated.

The use of agency staff is subject to considerable year-on-year variation, as shown in Figure 11. The substantial increase of 24% between 2011/12 and 2012/13 will contribute to increased overall input growth.

Figure 12 shows that the use of intermediate input has increased progressively year-on-year, while the estimated consumption of capital is subject to volatility, part of which will be due to how capital is accounted for in the organisational financial returns. Although the smallest element of inputs, there is a notable increase in DH administration spending (Figure 13), which is taken from the Department of Health annual accounts spend tables. As the format of the tables changed in 2011/12, this might have affected the categorisation of individual spending lines, contributing to the apparent growth in DH administration spend over the last three years.

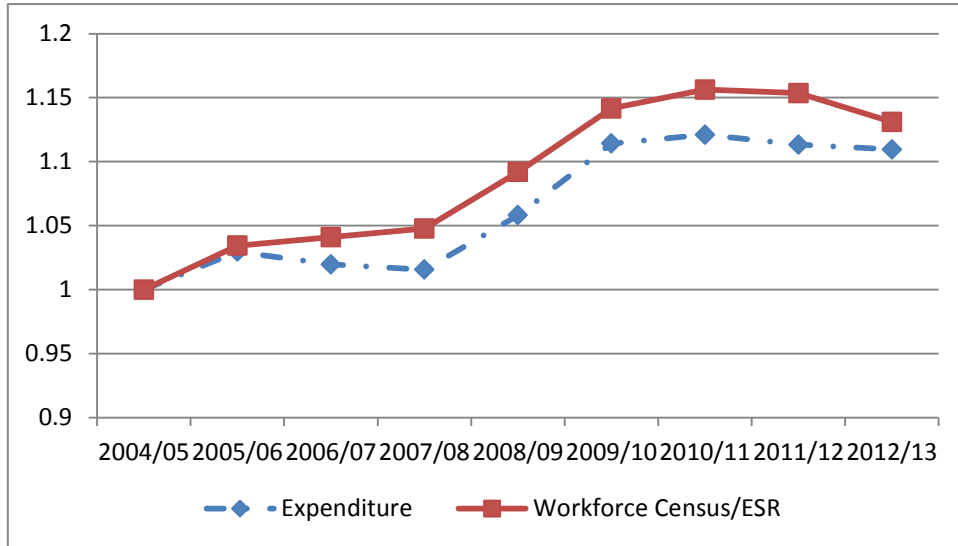


Figure 10 Trends in NHS staff growth, by data source

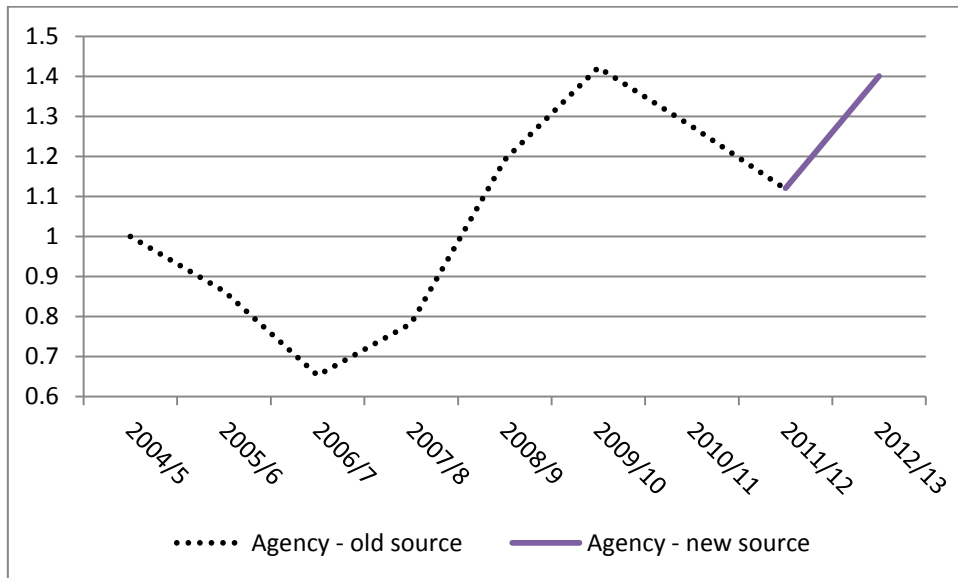


Figure 11 Trends in use of agency staff

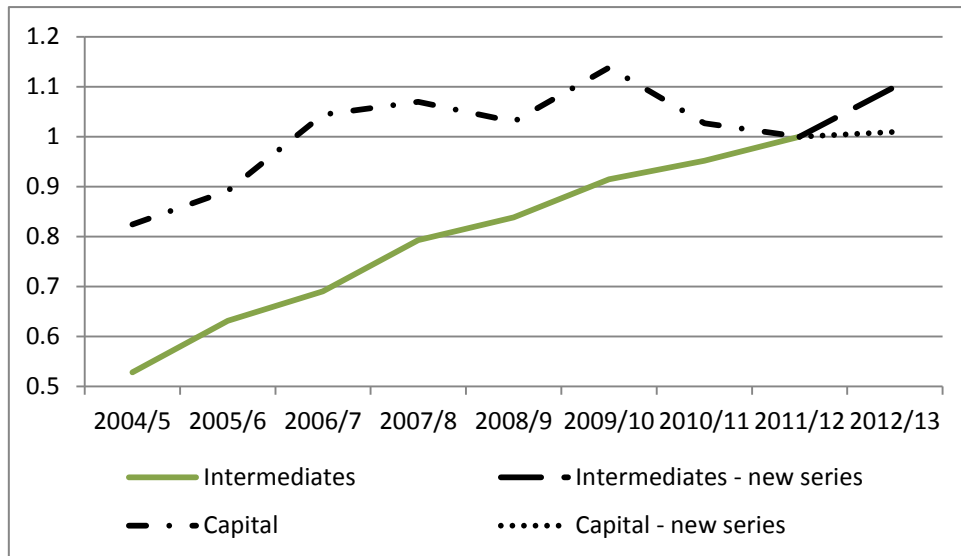


Figure 12 Trends in growth of intermediate and capital inputs

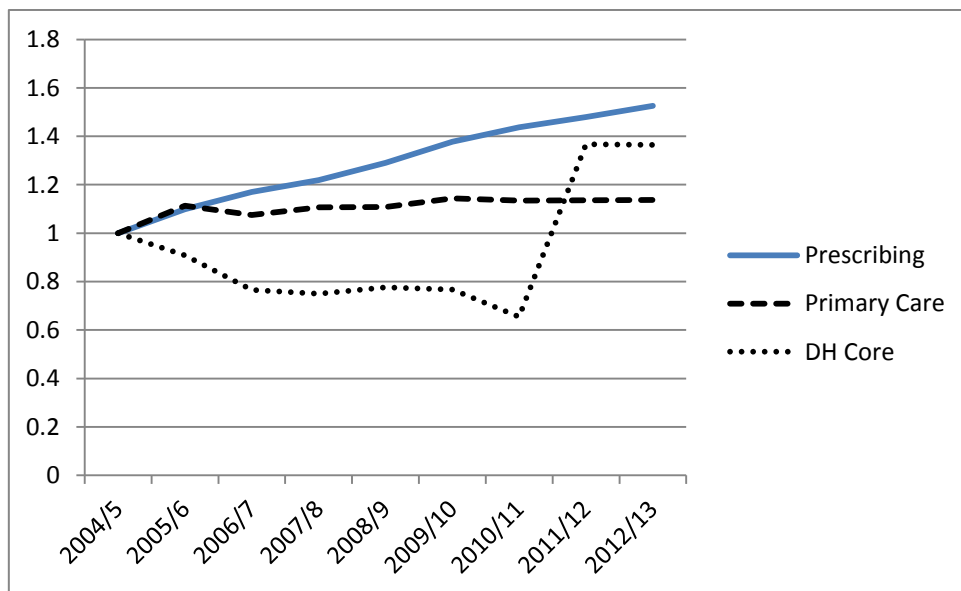


Figure 13 Trends in primary care inputs and DH administration

5.3 Input growth

Our measures of input growth are reported in Table 45, differentiated according to the use of the mixed or indirect index. Estimates of input growth have generally been higher if using the mixed rather than the indirect input index. However, that is not the case for 2011/12-2012/13, where the mixed index suggests a growth rate of 1.98% while the indirect index suggests that input growth amounted to 2.63%.

Table 45 Input growth

Input Growth	All NHS	
	Mixed	Indirect
2004/05 – 2005/06	7.19%	7.10%
2005/06 – 2006/07	1.92%	1.36%
2006/07 – 2007/08	3.88%	3.70%
2007/08 – 2008/09	4.23%	4.24%
2008/09 – 2009/10	5.43%	5.83%
2009/10 – 2010/11	1.33%	0.80%
2010/11 – 2011/12	1.00%	0.75%
2011/12 – 2012/13	1.98%	2.63%

The difference between the mixed and indirect input indices is due to the fact the growth rates in labour input differ if based on data from ESR rather than on expenditure data. The differences are shown in Table 46. Consider the change from 2011/12 to 2012/13, according to the expenditure data reported in Table 44, expenditure on NHS staff in constant terms appears to have decreased by -0.33%, while the ESR data suggest that staffing inputs decreased by -1.95%.

Table 46 Differences in estimates of labour input growth

Years	Expenditure growth	Expenditure growth index	ESR FTE growth	ESR FTE growth index	ESR growth	ESR growth index	Labour expenditure as a % of total expenditure
2004/05 - 2006/07	2.96%	1.03	3.32%	1.03	3.44%	1.03	55%
2005/06 - 2006/07	-0.96%	1.02	-0.39%	1.03	0.64%	1.04	53%
2006/07 - 2007/08	-0.40%	1.02	-0.63%	1.02	0.64%	1.05	52%
2007/08 - 2008/09	4.18%	1.06	2.88%	1.05	4.22%	1.09	50%
2008/09 - 2009/10	5.30%	1.11	4.24%	1.10	4.55%	1.14	50%
2009/10 - 2010/11	0.62%	1.12	1.50%	1.11	1.29%	1.16	50%
2010/11 - 2011/12	-0.70%	1.11	-0.21%	1.11	-0.24%	1.15	49%
2011/12 - 2012/13*	-0.33%	1.11	-2.50%	1.08	-1.95%	1.13	49%

* The drop in the Labour % is primarily due to the change in the source data for NHS Trusts, from Financial Returns to Financial Monitoring and Accounts.

6. Productivity growth

Year-on-year quality adjusted productivity growth figures over the pair of years from 2004/05-2005/06 to 2011/12-2012/13 are provided in Table 47. We find that, if we use the mixed approach to capture input growth, productivity growth for the last three pairs of years has been positive, although the growth rate has been declining over time. This conclusion is sensitive to how NHS staff inputs measured: productivity growth for 2011/12-2012/13 is estimated to have been 0.36% based on the mixed method and -0.28% if based on the indirect method.

Table 47 Productivity growth year on year

Productivity growth	All NHS	
	Mixed	Indirect
2004/05 – 2005/06	-0.07%	0.01%
2005/06 – 2006/07	4.50%	5.07%
2006/07 – 2007/08	-0.21%	-0.04%
2007/08 – 2008/09	1.44%	1.43%
2008/09 – 2009/10	-1.25%	-1.63%
2009/10 – 2010/11	3.21%	3.74%
2010/11 – 2011/12	2.13%	2.38%
2011/12 – 2012/13	0.36%	-0.28%

A third consecutive year of positive productivity growth adds to the general trend of total factor productivity growth since 2004/5. Depending on the index used, overall total factor productivity growth has amounted to between 10.4% and 11% since 2004/05 as shown in Table 48 and Figure 14. Growth in quality-adjusted output, inputs and productivity based on the mixed indices is shown in Figure 15.

Table 48 Total factor productivity index

	Output index	Input indices		Productivity indices	
	Quality adjusted	Mixed	Indirect	Mixed	Indirect
2004/05	1.000	1.000	1.000	1.000	1.000
2005/06	1.071	1.072	1.071	0.999	1.000
2006/07	1.141	1.092	1.086	1.044	1.051
2007/08	1.182	1.135	1.126	1.042	1.050
2008/09	1.250	1.183	1.173	1.057	1.065
2009/10	1.302	1.247	1.242	1.044	1.048
2010/11	1.361	1.264	1.252	1.077	1.087
2011/12	1.404	1.276	1.261	1.100	1.113
2012/13	1.437	1.302	1.294	1.104	1.110

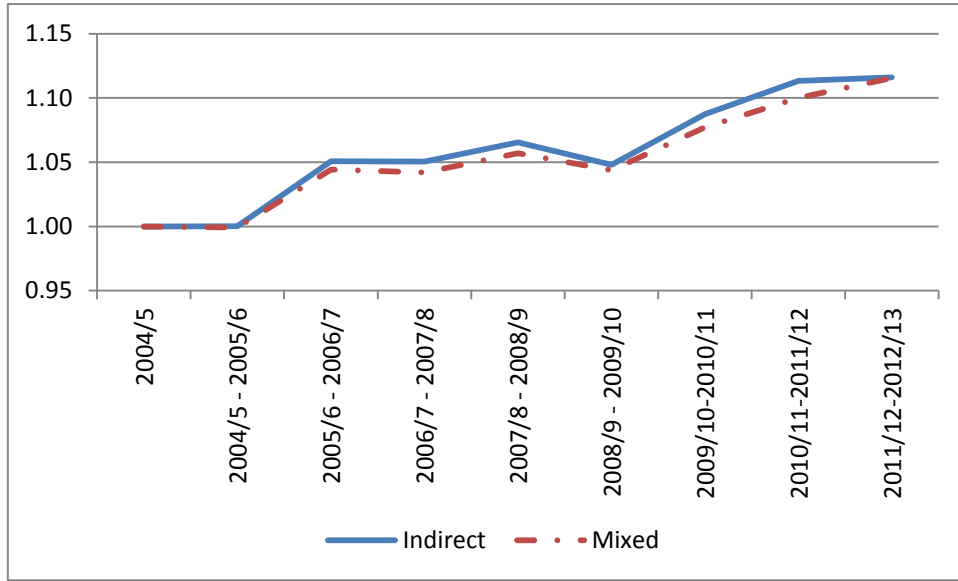


Figure 14 Total factor productivity growth

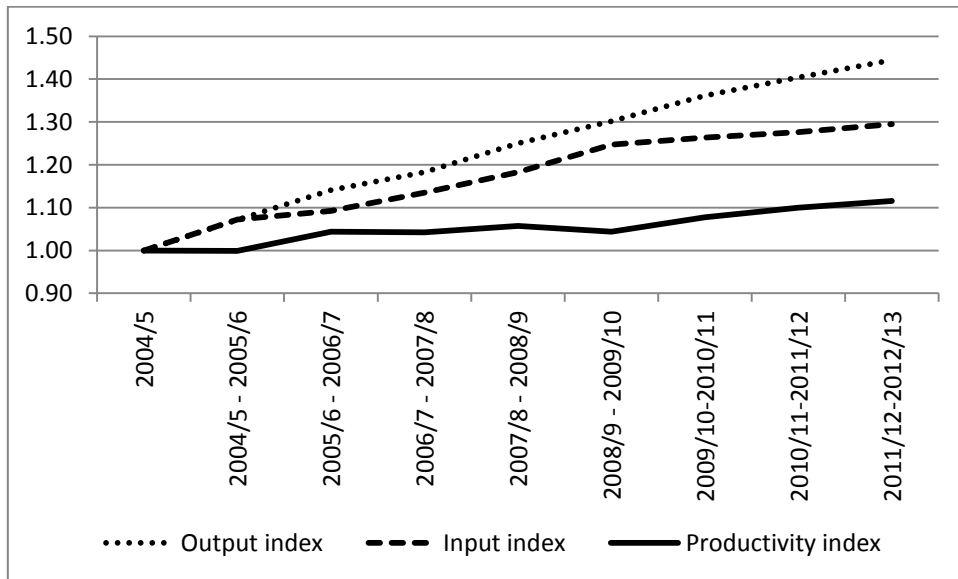


Figure 15 Growth in NHS output, input, and productivity; mixed indices

7. Conclusions

The following key elements have contributed to output growth since 2004/05:

- A 40% increase in the volume of elective activity, from 6.4m patients in 2004/05 to 9m in 2012/13.
- Annual improvements in 30-day survival rates for elective patients.
- Reductions in elective waiting times between 2004/05 and 2008/09, although these gains have since been largely eroded.
- An increase of 21% in the volume of non-elective hospital activity, from 6m patients in 2004/05 to 7.3m in 2012/13
- Annual improvements in 30-day survival rates up to 2011/12, though these deteriorated slightly in 2012/13.
- A 46% increase in outpatient activity, from 53m attendances in 2004/05 to 77m in 2012/13.
- Reductions in outpatient waiting times between 2004/05 and 2008/09, although waiting times have increased subsequently.
- Increases in the overall volume of mental health care provision. 7% more patients were treated in hospitals over the full period. Community MH activity grew by 49% 2004/05 and 2010/11, and by 16% between 2011/12 and 2012/13.
- Increases in the amount of community care activity (although it is not possible to generate a complete data series, given regular revisions to how such activities are defined).
- Increases in the volume and quality of primary care consultations, amounting to a 30% increase between 2004/05 and 2012/13, and year-on-year in community prescribing.
- Overall growth in A&E activity of 9% between 2004/05 and 2012/13.
- General increases in most other types of health care provision.
- Overall, output growth between 2004/05 and 2012/13 amounted to 44%.
- Output growth between 2011/12 and 2012/13 was 2.34%.

Although output growth amounted to 2.34% between 2011/12 and 2012/13, this is the first time over the full data series in which quality-adjusted output growth has been lower than cost-weighted growth. This is a consequence primarily of further increases in waiting times and a reduction in survival rates for non-elective patients.

The following elements have contributed to input growth since 2004/05:

- The number of NHS staff has increased by 16% between 2004/05 and 2010/11, but has decreased subsequently. Reductions between 2010/11 and 2011/12 are concentrated among administrative and estates staff, nurses, midwives, and health visitors, and healthcare assistants. Since 2004/05, labour input measured using Workforce Census and ESR data, has increased by 13%.
- A slightly different picture of year-on-year labour input growth appears from looking at expenditure data. These data suggest that labour input increased by 11% since 2004/05, with recent reductions less pronounced than for the Workforce Census/ESR series.
- There have been substantial annual increases in the use of intermediate inputs.
- The use of capital inputs has increased over time, though not always year-on-year.
- Overall, input growth between 2004/05 and 2012/13 amounted to 30%.
- Input growth between 2011/12 and 2012/13 was 1.98% if labour input is calculated using NHS staff data or 2.63% if using expenditure data.

If measured using our preferred mixed index, the NHS has delivered overall total factor productivity growth of 10.4% since 2004/05, with 2011/12-2012/13 being the third consecutive period of year-

on-year productivity growth. Our figures are consistent in qualitative terms, though not quantitative terms, to the most recent estimates published by the Office of National Statistics (Office for National Statistics 2015).¹⁹ Productivity growth between 2011/12 and 2012/13 is estimated to have been 0.36% based on our mixed index which uses NHS staff numbers to calculate labour input but -0.28% if based on the indirect index, which uses expenditure data to calculate labour input.

¹⁹ http://www.ons.gov.uk/ons/dcp171766_393405.pdf

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