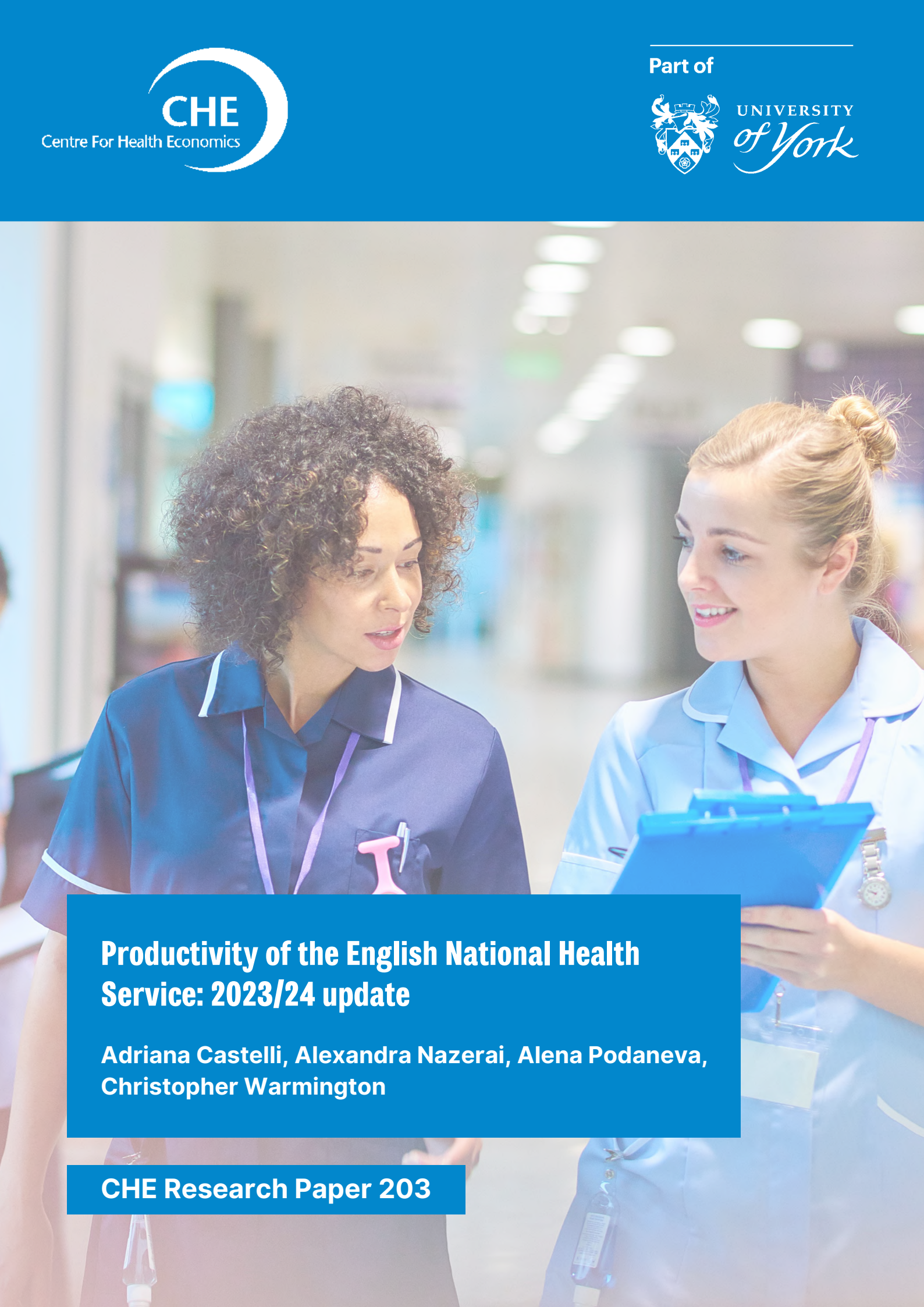




Productivity of the English National Health Service: 2023/24 update

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CHE Research Paper 203

Productivity of the English National Health Service: 2023/24 update

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Ethics approval

No ethical approval was required. Conflicts of interest The authors do not have conflicts of interest to disclose

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Summary

Healthcare expenditure is one of the largest elements, and a growing proportion, of public spending. In the context of limited resources, it is essential for patients and policymakers to understand the return on investment in health care. Productivity, the ratio of output produced to input used, is therefore a key performance metric for the English NHS. In addition, measuring NHS productivity growth is an important tool for assessing future funding needs. Finally, in the aftermath of the COVID-19 pandemic, evaluating the extent to which the NHS has recovered to pre-pandemic levels of productivity is of great policy relevance.

In this report we extend previous investigations into NHS productivity growth carried out at the University of York. Embedded in National Accounting Systems, we use an index number approach, to calculate growth in both NHS inputs, outputs and productivity. Outputs are also adjusted for the quality of care provided. This report has two objectives, (1) to provide an update on NHS productivity between 2022/23 and 2023/24, and (2) similarly to last year's report (Arabadzhyan et al., 2024) to evaluate whether the NHS system has recovered from the effect of the COVID-19 pandemic by determining the productivity growth between 2019/20 and 2023/24.

Our findings indicate that NHS productivity continued to grow between 2022/23 and 2023/24, rising by 3.00% under the indirect method and 3.25% under the mixed method. However, when compared with 2019/20, productivity in 2023/24 is equal to -9.15% and -10.39%, respectively. NHS productivity has been steadily recovering since the 2020 Covid-19 pandemic, with this most recent period showing a small year-on-year improvement, with increases of 1.58% (indirect method) and 0.23% (mixed method) compared to 2022/23.

Executive Summary

This report forms part of the time series of the English National Health Service (NHS) productivity growth calculated at the Centre for Health Economics (CHE), University of York. In this update, we focus on growth from 2022/23 to 2023/24. These two financial years are no longer directly affected by the COVID-19 pandemic, which had previously disrupted the normal provision of healthcare in England. From 2021/22, all NHS organisations, including primary care providers, have returned to the ‘business as usual’ provision of healthcare services. However, many of the service innovations introduced during the pandemic, for example, phone and/or virtual appointments in primary care, constitute now integral modes of delivering healthcare.

In January 2023, NHS England published its ‘2023/24 priorities and operational planning guidance’. The primary focus is the recovery of core services, specifically targeting improvements in ambulance response times, accident and emergency waits, and the reduction of elective care backlogs. Long-term ambitions involve transforming digital infrastructure through the NHS App and enhancing specialised support for mental health and learning disabilities. To achieve these goals, the guidance emphasises local empowerment within Integrated Care Systems, allowing regional leaders to tailor health objectives to their specific populations. Additionally, the strategy highlights the necessity of workforce retention and financial efficiency to ensure the healthcare system remains sustainable. Progress is supported by significant funding allocations intended to expand bed capacity and modernise diagnostic services. This continues from the 2022 NHS England ‘Delivery plan for tackling the COVID-19 backlog of elective care’, which emphasised a focus on maximising NHS capacity to support the delivery of about 30% more elective activity by 2024/25.

As NHS England’s focus is still on recovery, in this report we also investigate how NHS outputs, inputs and productivity compared to pre-pandemic levels, i.e. 2019/20.

Between 2022/23 and 2023/24, overall NHS output increased by 7.87% when adjusted for quality (incorporating survival rates, changes in health status before and after treatment, life expectancy, and waiting times). This marks a third consecutive year of positive output growth, aligning with the objectives set out by NHS England. Within this framework, quality of care improved significantly in hospital inpatient settings. Conversely, the other two settings—hospital outpatient and primary care, both of which are adjusted for changes in waiting times—experienced a decline in this quality indicator. Whilst this change was merely marginal for outpatient care, it was far more pronounced in primary care. By comparison, the baseline cost-weighted NHS output growth rate prior to quality adjustment was 7.49%. Our analysis of how individual indicators contributed to the overall measure shows that growth was primarily driven by survival and life expectancy and, to a lesser extent, by improvements in waiting times.

Expanding the quality indicators to include avoidable emergency readmissions and hospital-acquired infections (HAIs) reduces the overall NHS output growth rate slightly to 7.86%. These two additional indicators are factored into the measure as deadweight losses (see Section 3 for further details on the methodology). This minor deceleration in overall growth was predominantly driven by avoidable emergency readmissions.

NHS inputs grew by 4.48%, when measured using a mixed (direct and indirect) approach, and by 4.73%, when measured using an entirely indirect approach, between 2022/23 and 2023/24.

This leads to a growth in NHS productivity between 3.25% (mixed approach) and 3.00% (indirect approach). A slightly lower productivity growth rate is yielded when we also include avoidable emergency readmissions and HAIs, respectively equal to 3.23% for the mixed approach and 2.99% for the indirect approach.

Comparing growth in NHS outputs, inputs and productivity with the pre-pandemic year, 2019/20, productivity in 2023/24 remains lower, between -10.39% and -9.15% respectively for the mixed and indirect productivity measures.

Taking a longer-term view from 2004/05 to 2023/24, growth in NHS quality adjusted outputs averaged 3.30% per annum, and that for inputs averaged 3.01% per annum for the mixed NHS input measure, resulting in annual average NHS productivity growth of 0.47% per annum.

If we consider the period from 2004/05 to 2018/19, i.e. leaving out all financial years affected by the pandemic (2019/20, 2020/21 and 2021/22), average NHS output growth per annum would be higher at 3.76% per annum. Average NHS input growth would be lower at 2.64% for the mixed measure. The resulting NHS productivity (mixed measure) would be, on average, 1.11% per annum.

Finally, when comparing total factor productivity in the NHS to the broader UK economy, we find that in the post-pandemic period, all measures except for Market Sector (MFP), have shown a rising trend, with the Overall Economy index LP index surpassing its pre-pandemic level. NHS productivity, while still substantively lower than its pre-pandemic level, shows steady growth, indicating the system is on the path of recovery, and of the three measures shows the fastest growth, also surpassing the growth in the economy as measured by the Market Sector (MFP) index.

* * *

As well as the headline figures described above, we provide an in-depth analysis of each NHS setting, highlighting where appropriate, the specific challenges faced in constructing the output growth measure. For example, around data quality. The impact of the COVID-19 pandemic is multifaceted and may have differed across parts of the healthcare system. We therefore also consider how NHS outputs and inputs in 2023/24 compared to the pre-pandemic year, 2019/20, in individual NHS healthcare settings and in terms of specific inputs used by the NHS.

Further highlights of this report:

- Avoidable emergency readmissions and hospital acquired infections, Clostridium Difficile (C-Diff) and Methicillin Resistant Staphylococcus Aureus (MRSA) quality indicators are included as part of a wider set of quality indicators. Details can be found in sections 3 and 6.2.6.

- **Primary Care:** Our measure of primary care output includes COVID-19 vaccinations carried out by GPs and/or PCNs. To account for the shift to remote consultations (telephone and video/online) during the pandemic, we continue to assign the same cost weight to GP face-to-face appointments, telephone and video/online appointments. Results with alternative weights are reported as a sensitivity check (section 6.6.5). Primary care activity is adjusted for the time patients wait to see a healthcare professional. We are still not able to incorporate the Quality and Outcomes Framework quality adjustment due to payment protection of these indicators being reintroduced in 2023/24. However, we include a sensitivity check, which reintroduces the QOF adjustment to understand how it impacts our baseline results (see section 6.6.5).
- The National Cost Collection (NCC) data are still affected by quality issues, albeit at a much smaller scale, previously summarised in Arabadzhyan et al. (2022). We therefore continue to calculate the output growth in settings covered by the NCC dataset by limiting our analysis to NHS Trusts reporting data in both years, therefore ensuring a like-for-like comparison. This year, it was also necessary to make some further *ad-hoc* exclusions across all providers for specific sub-settings or lower levels of aggregation. This correction is applied for both the 2022/23 – 2023/24 and the 2019/20 – 2023/24 links. Full details in section 6.4.

Glossary of acronyms

A&E	Accident & Emergency
AD	Admitted
CCG	Clinical Commissioning Group
CHD	Coronary Heart Disease
CIPS	Continuous Inpatient Spell
CSU	Commissioning Support Unit
DHSC	Department of Health and Social Care
ESR	Electronic Staff Record
EQ-5D	EuroQol five dimensions standardised instrument for measuring generic health status
FCE	Finished Consultant Episode
FOI	Freedom of Information
FTE	Full-time Equivalent
GPPS	GP Patient Survey
HCHS	Hospital and Community Health Services
HES	Hospital Episode Statistics
HRG(4/4+)	Healthcare Resource Group (version 4/4+)
ISHP	Independent Sector Health Care Provider
IAPT	Improving Access to Psychological Therapies
MH	Mental Health
NAD	Not admitted
NCC	National Cost Collection
NHS	National Health Service
ONS	Office for National Statistics
PCA	Prescription Cost Analysis
PCN	Primary Care Network
PCT	Primary Care Trust
PROMs	Patient Reported Outcome Measures
PSSRU	Personal & Social Services Research Unit
QOF	Quality and Outcomes Framework
RDNA	Regular Day and Night Attendance
TAC	Trust Accounts Consolidation

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1. Introduction

This report forms part of the time series of the English National Health Service (NHS) productivity growth calculated at the Centre for Health Economics, University of York. This report focuses on growth from 2022/23 to 2023/24. These two financial years are no longer directly affected by the COVID-19 pandemic, which had previously disrupted the normal provision of healthcare. From 2021/22, all NHS organisations, including primary care providers, were asked to return to a ‘business as usual’ provision of healthcare services. However, safety protocols and measures were still heightened compared to provision before the pandemic.

In January 2023, NHS England published its ‘2023/24 priorities and operational planning guidance’. The primary focus is the recovery of core services, specifically targeting improvements in ambulance response times, accident and emergency waits, and the reduction of elective care backlogs. Long-term ambitions involve transforming digital infrastructure through the NHS App and enhancing specialised support for mental health and learning disabilities. To achieve these goals, the guidance emphasises local empowerment within Integrated Care Systems, allowing regional leaders to tailor health objectives to their specific populations. Additionally, the strategy highlights the necessity of workforce retention and financial efficiency to ensure the healthcare system remains sustainable. Progress is supported by significant funding allocations intended to expand bed capacity and modernise diagnostic services. This continues from the 2022 NHS England ‘Delivery plan for tackling the COVID-19 backlog of elective care’, which emphasised a focus on maximising NHS capacity to support the delivery of about 30% more elective activity by 2024/25.

As NHS England’s focus is still on recovery, in this report we investigate how NHS outputs, inputs and productivity compare to pre-pandemic levels, i.e. 2019/20, as well as comparing 2022/23 with 2023/24.

The York NHS outputs, inputs and productivity growth measures follow national and international accounts’ recommendations (Eurostat, 2001). These recommend, for public sector services, to measure changes (growth) in either inputs used or outputs produced through the direct approach. That is by using physical units, at as granular a level as possible, weighted by their respective unit costs. If information (data) on physical units is not available, an indirect approach is advised using expenditure data and appropriate deflators.

Our measures of NHS output, input and productivity growth are calculated by means of a Laspeyres volume chain index, where different NHS inputs and outputs are valued in terms of their cost in the first (base) year, in order to identify volume changes in the next year. As our method employs a chain index, the base year changes with each new update. We measure growth in NHS outputs and NHS staff (direct labour measure) using the direct approach. We also use the indirect approach to measure growth in labour (NHS Staff, bank, and agency), materials, and capital using expenditure data. When using expenditure data, we need to use appropriate deflators for each type of input in order to disentangle changes due to volumes from those due to prices. Finally, we calculate a mixed NHS input growth measure using the direct NHS labour growth measure, where available, alongside an indirect measure for all other inputs.

For the NHS output growth measure, we also employ available measures of quality, in recognition that the value of outputs may not be entirely reflected by the cost of their provision, especially outside of a competitive market context. Specifically, we use short-term survival rates for both elective and non-elective hospital care, changes in health status, and waiting times for elective hospital care only. We also adjust for waiting time for first outpatient appointments. Finally, activity delivered in the primary care setting is adjusted based on the changes in the time patients wait to see a primary care professional, and historically also on changes in blood pressure monitoring.

This report includes the two new quality indicators - emergency readmissions and hospital acquired infections (HAIs), namely Methicillin Resistant Staphylococcus Aureus (MRSA) and Clostridium Difficile (C-Diff), first introduced in Arabadzhyan et al. (2023). These new quality adjustments are still to be considered experimental, and NHS output and productivity growth measures are reported both with and without them. See section 3 for further details.

Similarly to Arabadzhyan et al. (2023) and Arabadzhyan et al. (2024), test and trace services were not included as an output, as we did not have access to this information. So far as these services were delivered by NHS staff as part of their NHS role, the costs of these services would be included in our measure of NHS inputs, but they are not in our measure of NHS outputs.

The remainder of the report is organised as follows: in section 2, we summarise the methods used in calculating the productivity of the English health care system. In section 3, we present the impact of the new experimental quality indicators on the NHS output and productivity growth measures. Our findings for NHS productivity growth are presented in section 4; we then consider increasingly small constituent parts of this overall result, beginning with NHS outputs and NHS inputs in section 5. Individual items of NHS outputs and inputs are investigated in sections 6 and 7, respectively. Historical results are largely presented as graphs in the main text, with tables of figures limited to the Online Appendix.

Section 9.1 of the Appendix, outlines the new costing method (equivalisation of cost weights) for procedures performed across elective inpatient, day case, and outpatient settings. Sections 9.2 and 9.3 then provide detailed summaries overall hospital inpatient and outpatient care activity using the old costing approach, respectively. Section 9.4 details further investigations into community prescribing, whilst Section 9.5 outlines the input deflators used in our analysis. Next, Section 9.6, we present output, input and productivity growth results specifically for NHS Trusts. Finally, Section 9.7 provides a table detailing the working days and total days for the recent years, which are used to adjust NHS output growth measures.

2. Methods

The growth in Total Factor Productivity of the healthcare system, ΔTFP ,¹ is measured as the ratio of an output growth index (X) and an input growth index (Z), such that:

$$\Delta TFP = X/Z \quad (E1)$$

To estimate Total Factor Productivity, it is necessary to correctly define and measure both 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 other healthcare categories as reported in the National Cost Collection (formerly National Schedule of Reference Cost) data. Furthermore, 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, which are provided free at the 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 Eurostat (2001).

As costs are not expected to fully reflect consumers' valuations, Atkinson suggests supplementing costs with information about the quality of non-market goods and services (Atkinson, 2010, Atkinson, 2005). One way of doing this is by adding a scalar to the output index that captures changes over time in different dimensions of quality. Thus, following Castelli et al. (2007), the output growth index (in its Laspeyres form) can be calculated across two time periods as:

$$X_{(0,t)}^{cq} = \frac{\sum_{j=1}^J x_{jt} c_{j0} \left[\frac{v_{j0} q_{jt}}{q_{j0}} \right]}{\sum_{j=1}^J x_{j0} c_{j0}} \quad (E2)$$

We define x_j as the number of patients who have output type j , where $j=1...J$; c_j 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 the time with 0 indicating the first period of the time series. Our measures of quality include inpatient and outpatient waiting times, health improvements, survival rates following hospitalisation, and for primary care the time patients wait to see a primary care professional, and historically also on changes in blood pressure monitoring.

2.2. Input growth

Turning to the input growth index (Z), inputs into the health care system consist of labour, material 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

¹ Both X and Z are indices with values around one, for example, 1.05 indicates a 5% increase and 0.98 indicates a 2% decrease. Therefore, the productivity growth calculated using them will also be an index, which can be transformed into a percentage by subtracting 1 and multiplying by 100.

data on the volume and price of inputs are available. In its Laspeyres form, the direct input growth index can be calculated as:

$$Z_{(0,t)}^D = \frac{\sum_{n=1}^N z_{nt} \omega_{n0}}{\sum_{n=1}^N z_{n0} \omega_{n0}} \quad (\text{E3})$$

where z_n is the volume of input of type n and ω_{n0} is the price of input type n ; and t indicates the time with 0 indicating the first period of the time series.

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 an appropriate 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:

$$Z_{(0,t)}^{Ind} = \frac{\sum_{n=1}^N E_{nt} / \pi_{n0}}{\sum_{n=1}^N E_{n0}} = \frac{\sum_{n=1}^N z_{nt} \omega_{nt} / \pi_{n0}}{\sum_{n=1}^N z_{n0} \omega_{n0}} = \frac{\sum_{n=1}^N z_{nt} \omega_{n0}}{\sum_{n=1}^N z_{n0} \omega_{n0}} = Z_{(0,t)}^D \quad (\text{E4})$$

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

2.3. Productivity growth

The above equations show output or input growth over two consecutive periods from a base (0) to a current period (t). Usually, there is interest in assessing productivity growth over longer periods. We do this by means of a chained index that involves updating weights in every period, thereby making it possible to account for ongoing changes in the composition of the outputs and inputs being measured (Diewert et al., 2010).

Using the Laspeyres output index as defined in eq. (E2), a chained output index takes the following form:

$$X_{(0,T)}^{cq} = \frac{\sum_{j=1}^J x_{jt} c_{j0} \left[\frac{v_{j0} q_{jt}}{q_{j0}} \right]}{\sum_{j=1}^J x_{j0} c_{j0}} \times \frac{\sum_{j=1}^J x_{jt+1} c_{jt} \left[\frac{v_{jt} q_{jt+1}}{q_{jt}} \right]}{\sum_{j=1}^J x_{jt} c_{jt}} \times \dots \times \frac{\sum_{j=1}^J x_{jT} c_{jT-1} \left[\frac{v_{jT-1} q_{jT}}{q_{jT-1}} \right]}{\sum_{j=1}^J x_{jT-1} c_{jT-1}} \quad (\text{E5})$$

This can be simplified to:

$$X_{(0,T)}^{cq} = X_{(0,t)}^{cq} \times X_{(t,t+1)}^{cq} \times \dots \times X_{(T-1,T)}^{cq} \quad (\text{E6})$$

where each link is represented by eq. (E2) for the relevant two consecutive years. An analogous construction applies to the chained input index.

2.4. Working days adjustment

Our measure of productivity growth captures the growth in outputs overgrowth in inputs between two financial years. However, financial years do not always have the same number of working days, with this number being affected by the number of public holidays in each financial year (e.g. financial years may include between zero and four Easter public holidays) and the position of weekends during the year. The total number of days will also vary due to leap years.

It is expected that changes in the number of working days in a given year will impact the level of output produced in the NHS and hence impact the productivity of the system. Therefore, we adjust the Laspeyres output growth measure to capture the effect of changes in the number of working and total days between pairs of years. Expressions (E7) and (E8) present the Laspeyres output growth formulae (for the cost-weighted measure) with working days (WD) and total days (TD) adjustment respectively. For example, if the number of working days in year $t=0$ is smaller than the number of working days in year $t=1$, then the working days adjustment should indicate both lower output and productivity growth estimates, with respect to the same measures with no working days adjustment. The same logic applies to the total days' adjustment.

$$X_{(0,t)}^{wd} = \frac{\sum_{j=1}^J \frac{x_{jt}c_{j0}}{wd_t}}{\sum_{j=1}^J \frac{x_{j0}c_{j0}}{wd_0}} \quad (E7)$$

$$X_{(0,t)}^{td} = \frac{\sum_{j=1}^J \frac{x_{jt}c_{j0}}{td_t}}{\sum_{j=1}^J \frac{x_{j0}c_{j0}}{td_0}} \quad (E8)$$

Whilst the productivity of all NHS care settings will be affected by the total number of days in a given year, we conjecture that not all the settings will be affected by the total number of working days. Some settings, such as A&E services or non-elective inpatient care, should not be affected by variation in weekends and public holidays, as it is expected that these operate on a 24/7 basis. Finally, the great majority of NHS inputs, for example, salaried staff and capital costs, are not affected by the number of working days. Therefore, no adjustment is applied to them. Some materials, e.g. bandages, may be affected. However, their contribution to overall NHS input growth is small, and the effect of not adjusting these inputs for the number of working days is negligible.

Table 1 contains the list of NHS settings, as developed for our NHS output growth measure, and indicates whether the working days or total days adjustment is applied. It is important to note that adjusting for working days, by definition, recognises a change in total days.²

² A table reporting working and total days for the financial years 2018/19 onwards is presented in section 9.7 in the Appendix.

Table 1: NHS settings and their working days/total days adjustment

Setting	WD Adjustment	TD Adjustment
Inpatient Elective and day cases	x	
Inpatient Non-elective		x
Outpatient	x	
Primary care	x	
Community Prescribing		x
Community Mental Health		x
Community care	x	
A&E		x
Chemo- /Radiotherapy/High Cost Drugs	x	
Specialist Services	x	
Ophthalmology & Dentistry	x	
Radiology	x	
Diagnostic Tests	x	
Rehabilitation	x	
Renal Dialysis		x
Other	x	

2.5. Alternative approaches to deal with missing NHS Trusts in the National Cost Collection data

The measurement of NHS output in 2019/20 was affected by data quality issues and missing data in the National Cost Collection (NCC) data series (previously known as the National Reference Costs data), which led to non-comparability with previous years of data. The NCC data are still affected, albeit to a lesser extent, by quality issues, previously summarised in Arabadzhyan et al. (2022). We refer to Arabadzhyan et al. (2022) for in-depth details of the four approaches developed to deal with missing Trusts data. Here it suffices to say that all approaches made use of the organisational (Trust) level NCC data. However, these data had their own issues because of missing activity (and therefore, unit cost) information, as small numbers (any activity information smaller than eight units) are suppressed by NHS England.

Our preferred approach (approach 3 in Arabadzhyan et al. (2022)) is (methodologically) the closest to our traditional measure. That is to directly measure growth in NHS outputs, and it also requires only a minimum set of additional assumptions. Its only shortcoming is that we need to impute missing values for some output categories. Further, our preferred approach makes maximum use of comparable, and high-quality data from Trusts with published NCC data, having met the rigorous data quality standard set by NHS England and NHS Improvement. In fact, NHS Trusts submitting data of insufficient quality do not have their data published in the National Cost Collection data. Limiting our analysis to Trusts reporting data in both years also means we have a like-for-like comparison, which is not the case if Trusts reporting data in only one year are included. For the growth rate estimates to be applicable to the NHS as a whole, we assume that observed data are representative of the NHS as a whole.

In this report, we continue to calculate the output growth in settings covered by the NCC dataset by limiting our analysis to NHS Trusts reporting data in both years, therefore ensuring a like-for-like comparison. This correction is applied for both the 2021/22 – 2022/23 and the 2019/20 – 2022/23 links.

3. Experimental quality adjustment for hospital inpatient activity

The English National Health Service (NHS) is under perpetual pressure to minimise cost and thus improve levels of productivity (outputs/inputs). This may create a race to the bottom in terms of costly quality (Chalkley and Malcomson, 1998), thereby negatively affecting patients.

Although national plans such as the NHS Five Year Forward View, the Next Steps on the NHS Five Year Forward View³ and the NHS Long Term Plan⁴ prioritise investing in the quality of care and closing quality gaps, unwarranted variation may still exist across England. Initiatives such as the Right Care Programme⁵ and Getting it Right the First Time⁶ aim to improve outcomes, but measuring quality remains complex, particularly as NHS services lack market prices.

Current practice in accounting for the quality of healthcare services makes use of routinely available information in order to capture the Quality Adjusted Life Years (QALYs) associated with treating patients, by combining information on survival rates, life expectancy and a measure of change in health status before and after treatment. The process of care delivery is also captured by measures of treatment waiting times. This approach may overlook other important characteristics of the quality of healthcare.

To address this, Bojke et al. (2018) proposed a refined framework to incorporate broader quality characteristics into NHS output measures. After reviewing indicators from the NHS Outcomes Framework indicators and NHS Safety Thermometer,⁷ they identified 17 potential quality adjusters, focusing particularly on emergency readmissions and two hospital-acquired infections—C-Diff and MRSA—as negative outcomes with significant cost and patient impact. Both types of events lead to additional treatment, which the current productivity measure evaluates as additional output, but which de facto do not yield additional benefits to patient care.

Our work refines the present NHS output and productivity measure by explicitly recognising activity induced by emergency readmissions and C-Diff and MRSA, which does not represent additional value from the perspective of the patient. For further detail on the methodology see Arabadzhyan et al. (2023) and Arabadzhyan et al. (2024).

3.1. Impact of incorporating new quality indicators on NHS output and productivity growth measures

In this section we present a summary of the volume and costs associated with these two quality indicators – emergency readmissions and hospital acquired MRSA and C-Difficile (C-Diff) infections, and the impact of including them in the NHS output and productivity growth measure.

In this years' update, we have introduced a new costing approach for a limited number of HRG procedures that are delivered as either inpatient admissions with an overnight stay, as days-cases or in outpatient clinics. This is also known as the equalisation of cost weights. Further details on the approach and the justification for its introduction can be found in

³ [NHS Five Year Forward View](#) (last accessed 11/04/2026).

⁴ [NHS Long Term Plan](#) (last accessed 11/04/2026).

⁵ [Right Care Programme](#) (last accessed 11/04/2026).

⁶ [Getting it Right the First Time](#) (last accessed 11/04/2026).

⁷ NHS Safety Thermometers have been discontinued in 2019.

section 9.1. We report, therefore, activity-weighted average costs obtained with the old and the new costing method. These are in most cases very similar across both costing methods. Finally, we have excluded from our sample private patients treated in NHS trusts.

3.1.1. Emergency readmissions

Table 2 presents the volume, proportion of total activity, and unit cost of avoidable emergency readmissions for the financial years 2019/20, 2022/23, and 2023/24. The definition and method followed to determine these is our preferred, blended method. This definition incorporates characteristics of the potentially avoidable readmission presented in Blunt et al. (2015) and the definition most often used in readmission figures published by the NHS.⁸

The volume of avoidable emergency readmissions increased by around 13.13% between 2022/23 and 2023/24, while the unit cost of readmissions increased by approximately 0.5 percentage points. Interestingly, the volume of avoidable emergency readmissions has not reached the level observed in 2019/20, a potential indication of increased quality of hospital care provided during a patient's initial (index) admission. This cannot be said of unit costs, which have increased by roughly 33% between 2019/20 and 2023/24, well over the compound Consumer Price Inflation, including housing costs (CPIH), of 25% (ONS 2024) between 2019/20 and 2023/24.⁹ Changes in activity weighted average unit costs over two financial years may also be due to treating a different case-mix of patients, which may in part explain the greater increase in the unit costs between 2019/20 and 2023/24. These are not usually detectable when reporting at the level of aggregation used here. Overall, the volume of avoidable emergency readmissions in each of the years included in our NHS output growth calculations does not exceed 0.02% of total activity.

Table 2: Volume and unit cost of avoidable emergency readmissions (excluding private patients)¹⁰

Year	Volume	Proportion of total volume of activity	Average cost (£)	
			Old Costing Method	New Costing Method
2019/20 [^]	322,397	0.02%	2,042	2,042
2022/23 ^{§,^}	277,992	0.02%	2,711	2,710
2023/24 ^{§,^}	314,492	0.02%	2,724	2,724

[§] Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data. Also, excluded are private patients who use NHS facilities to receive inpatient care. Note that NHS private patients are excluded.

3.1.2. Hospital Acquired Infections: MRSA and C-Diff

Table 3 and Table 4 presents volumes and unit costs of the hospital acquired MRSA and C-Diff infections, respectively. Cases of MRSA are relatively low. The increase over years was also relatively stable. A much higher increase (33%) in MRSA cases is recorded in 2023/24 compared to 2019/20. We note that their unit costs are substantial relative to the average for inpatient care. The high unit cost of MRSA cases arises partially from patients staying an

⁸ See [Indicator specification](#) for more detail (last accessed 24/03/2026).

⁹ See [CPIH annual rate](#) (last accessed 24/03/2026).

¹⁰ Including private patients results in slightly higher volume of emergency admissions, 323,357 in 2019/20, 278,573 in 2022/23, and 315,301 in 2023/24. Unit costs are also slightly higher by max 0.05 percentage points for the financial year 2019/20; these differences are the same independently of the costing method adopted.

average of 13 additional days in hospital if they contract this infection, based on external literature (see Arabadzhyan et al. (2023)).

Table 3: Volume and unit cost of hospital acquired infections: MRSA (excluding private patients)¹¹

Year	Volume	Average cost (£)	
		Old Costing Method	New Costing Method
2019/20 [^]	260	4,000	4,000
2022/23 ^{§,^}	295	5,326	5,326
2023/24 ^{§,^}	346	5,128	5,127

[§] Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data. Also, excluded are private patients who use NHS facilities to receive inpatient care. Note that NHS private patients are excluded.

Note that the hospital-onset data for the *Clostridioides difficile* infection were updated for all the historic time series. The figures were first updated in the version published in June 2025¹², and these figures were still up to date in January 2026 when we used them in our analyses. Therefore, the figures that we present in our current report for the years 2019/20 and 2022/23 differ from the figures that we have presented in our previous reports to reflect the updated version of the available data.

Compared to the updated figures, the volume of C-Diff infections increased by approximately 5% and unit costs were 0.2 percentage points lower than in 2022/23. Compared to 2019/20, the volume of C-Diff cases rose by just under 41%, whilst unit costs were about 37% higher. The unit cost of C-Diff from additional days in hospital is more similar to the unit cost for inpatient care overall. However, the total costs of C-Diff infections are between 8 and 10 times, depending on the year, larger than that of MRSA due to the higher volumes of C-Diff cases.

¹¹ Including private patients in the calculations of the deadweight loss associated with MRSA does not affect the volume of MRSA cases, which are published by the UK Health Security Agency. However, unit costs may be affected as these are determined using the Hospital Episode Statistics Admitted Patient Care data in combination with the National Cost Collection data. We find only a small difference (detected at the second decimal point) in unit costs for MRSA cases when including private patients for the years 2019/20 and 2022/23. A much higher difference is found for 2023/24 of about £7.50.

¹² [MRSA, MSSA, Gram-negative bacteraemia and CDI: quarterly report](#)

Table 4: Volume and unit cost of hospital acquired infections: C-Diff (excluding private patients)¹³

Year	Volume	Average cost (£)	
		Old Costing Method	New Costing Method
2019/20 [^]	5,358	1,534	1,534
2022/23 ^{§,^}	7,183	2,105	2,106
2023/24 ^{§,^}	7,537	2,101	2,104

[§] Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data. Also, excluded are private patients who use NHS facilities to receive inpatient care. Note that NHS private patients are excluded.

3.1.3. Impact on NHS output and productivity growth

In comparing 2023/24 with 2022/23, including avoidable emergency readmissions as a quality adjustment decreased the NHS inpatient output growth from the baseline 8.02% (which accounts for survival rates, life expectancy, PROMs, and waiting times) to 7.92%. This indicates that both the volume and the overall negative value (deadweight loss) of avoidable emergency readmissions increased between these two years. The impact of hospital-acquired infections (HAIs) was positive adding 0.02 percentage points, thus reaching 7.95%.

When comparing 2023/24 with 2019/20, including avoidable emergency readmissions and HAIs as quality adjustment led to a 0.28 percentage point increase in the NHS inpatient output growth rate bringing it to 10.16% from 9.88%. The observed difference was driven by positive changes in both avoidable emergency readmissions and HAIs.

Between 2022/23 and 2023/24, NHS productivity growth stood at 3.23% under the mixed approach when outputs were further adjusted for avoidable emergency readmissions and HAIs. Given that productivity growth under the baseline quality adjustment was 3.25%, accounting for these two additional indicators exerted a minor negative impact, driven entirely by the rise in avoidable emergency readmissions. Finally, when evaluating the longer-term trend between 2019/20 and 2023/24, NHS productivity growth under this fully adjusted mixed approach was -6.24%. This represents a marginal improvement over the baseline quality-adjusted productivity growth of -6.30%, owing to progress made across both avoidable emergency readmissions and HAIs.

¹³ Including private patients in the calculations of the deadweight loss associated with C-Diff does not affect the volume of C-Diff cases, which are published by the UK Health Security Agency. However, unit costs may be affected as these are determined using the Hospital Episode Statistics Admitted Patient Care data in combination with the National Cost Collection data. We find only a small difference (detected at the first decimal point) in unit costs for C-Diff cases when including private patients for the years 2019/20 and 2022/23. A much higher difference is found for 2023/24 of about £5.

4. NHS Productivity growth

Overall NHS productivity growth between 2022/23 and 2023/24 was 3.25% when using the mixed measure and 3.00% using the indirect measure. Our preferred measure for the 2023/24 NHS productivity update uses the mixed measure.

In Table 5 we present productivity growth measures, both mixed and indirect, for the financial years from 2020/21 – 2021/22, to 2022/23 – 2023/24. We also include measures of productivity recovery from the pre-pandemic year 2019/20 for the last three financial years, up to 2023/24.

To calculate a measure of productivity recovery, NHS outputs and NHS inputs growth measures between 2019/20 and 2023/24 are calculated by comparing NHS outputs produced and NHS inputs used in 2019/20 with the respective NHS outputs produced and inputs used in 2023/24, for each NHS care setting, and each type of NHS input. An alternative would be to use a chain-link method, but this relies on the assumption that the basket of goods (outputs and inputs) is similar across years, which we know not to be the case.¹⁴

All the growth measures are adjusted for the number of working and total days in all financial years. Productivity growth figures for previous years, beginning with growth from 2004/05 to 2005/06, can be found in the Online Appendix.

After the stark negative 2019/20 – 2020/21 productivity growth due to the COVID-19 pandemic, the NHS has been on a steady trajectory towards recovery. The substantial increase in productivity, in both the mixed and indirect measures, recorded in 2021/22, was not continued in 2022/23. This is not surprising as the big increases recorded between 2020/21 and 2021/22 can be ascribed to the fact that all elective activity was cancelled in the NHS for the greater part of 2020/21, whilst in 2021/22 the NHS hospitals had a return to more normal working conditions. Nonetheless, we find that NHS output has continued to grow in 2023/24, as has NHS input (see section 5).

¹⁴ The chain-link method yields similar results: NHS productivity calculated with the mixed approach is -12.06%, -11.14%, and -8.25%, respectively for the years 2021/22, 2022/23 and 2023/24, all measured from 2019/20. NHS productivity calculated with the indirect approach is -12.49%, -11.72%, and -9.07%, respectively for 2021/22, 2022/23, and 2023/24, also measured from 2019/20.

Table 5: NHS Productivity Growth¹⁵

Years	Mixed	Indirect
2020/21 – 2021/22	14.14%	15.18%
2021/22 – 2022/23*	1.05%	0.88%
2022/23 – 2023/24	3.35%	3.00%

Recovery		
Years	Mixed	Indirect
2019/20 – 2021/22	-13.30%	-12.45%
2019/20 – 2022/23*	-10.39%**	-10.96%**
2019/20 – 2023/24	-10.39%	-9.15%

* Excludes Frimley Health NHS Foundation Trust (RDU). Provider excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders.

** Correction made to both mixed and indirect productivity growth rates, previous growth rates were -10.16% and -10.73% respectively.

When comparing the pre-pandemic financial year, 2019/20, with 2023/24, the resulting productivity growth rates amount to -10.39% and -9.15% when mixed and indirect input growth measures are used respectively.

The details of changes in both NHS outputs and inputs are shown in Figure 1.

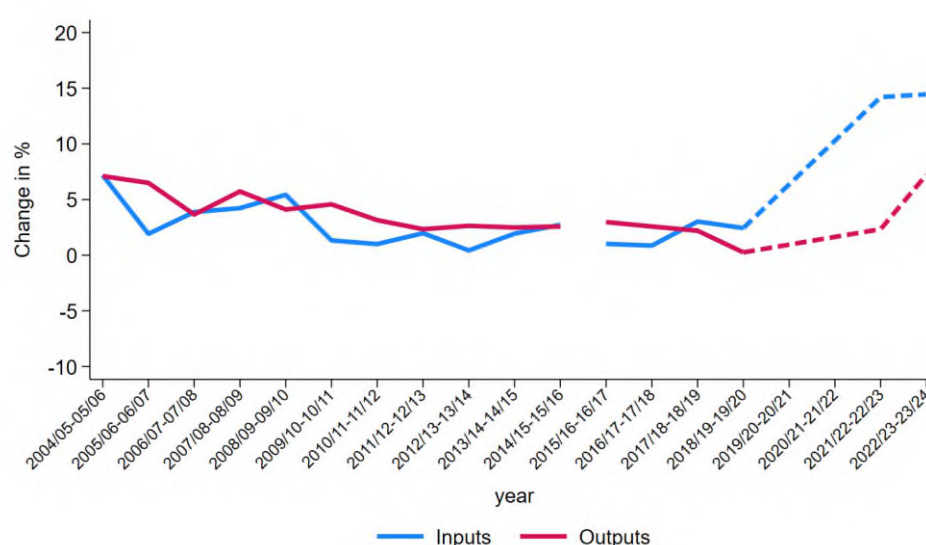
Figure 1: NHS Output and Input changes (growth rates) 2004/05-2005/06 to 2022/23-2023/24¹⁶

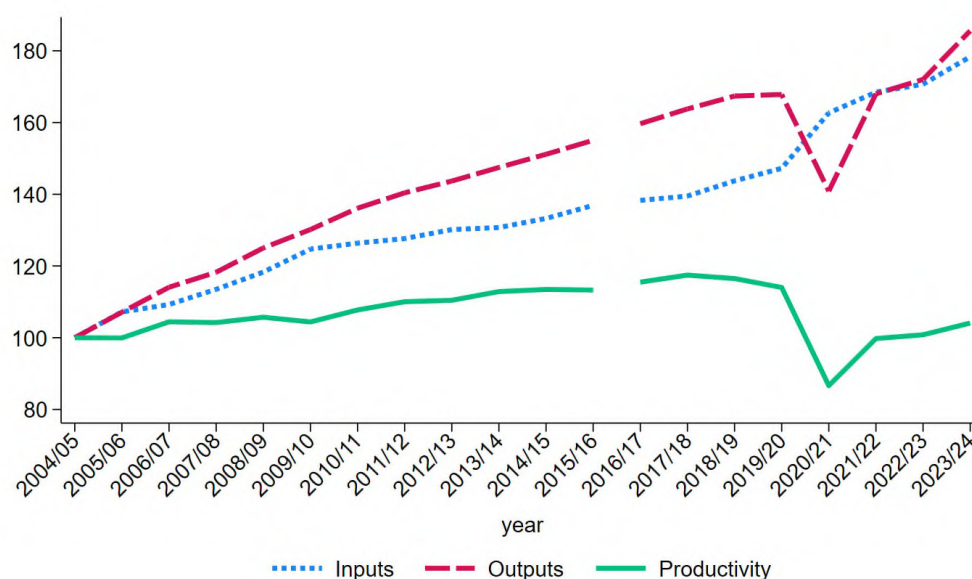
Figure 2 presents the cumulative NHS outputs, inputs, and productivity indices over time, using 2004/05 as the base year. The chart clearly illustrates that the dramatic decline in productivity during the Covid-19 pandemic was driven by a dual shock: a sharp contraction in output volume alongside a substantial, concurrent rise in inputs. Since this pandemic trough

¹⁵ Working and total days adjusted figures.

¹⁶ The mixed input growth is used as the baseline and depicted in this graph. The 2019/20-2021/22 and 2020/21-21/22 growth rates are omitted, and the 2019/20-21/22 growth rates are presented instead (dashed lines). The interruption of the series reflects re-calculation of the figures due to a coding error corrected (first noted in Arabadzhyan et al., 2021).

in 2020/21, the NHS has demonstrated a steady recovery in both output and overall productivity. Notably, between 2022/23 and 2023/24, output accelerated sharply, outstripping the growth rate of inputs. However, a direct comparison with the pre-pandemic baseline of 2019/20 reveals a lingering structural imbalance; whilst both output and input levels are now significantly higher than their 2019/20 baselines, the cumulative expansion of inputs over the last four years has outpaced total output gains. Consequently, despite its clear recent upward trajectory, overall productivity in 2023/24 has yet to recover to its pre-pandemic peak.

Figure 2: Cumulative NHS Output, Input and Productivity Indices (2004/05 = 100)¹⁷



Finally, we compare the productivity growth of the NHS to the growth of the UK economy as a whole. Productivity growth in the wider economy can be measured both using the Gross Value Added per Hour (LP) measure, a measure of Labour Productivity of the whole economy, and the Multi-Factor Productivity (MFP) series, both produced by the Office of National Statistics (ONS). The latter is a measure of productivity comprising all inputs (labour, capital, and materials) but is limited to the market sector. Both measures are important productivity statistics, and while the methodology differs across sectors, the overall objectives are the same as our NHS specific measure.^{18,19,20}

Figure 3 presents the Overall Economy (LP) and the market sector Multi-Factor Productivity indices dynamics along with the NHS productivity index. Unsurprisingly, the healthcare sector was deeply affected by the pandemic, hence the substantial reduction in productivity observed in 2020/21. Neither the Overall Economy LP nor the MFP measure has changed significantly since 2020/21.

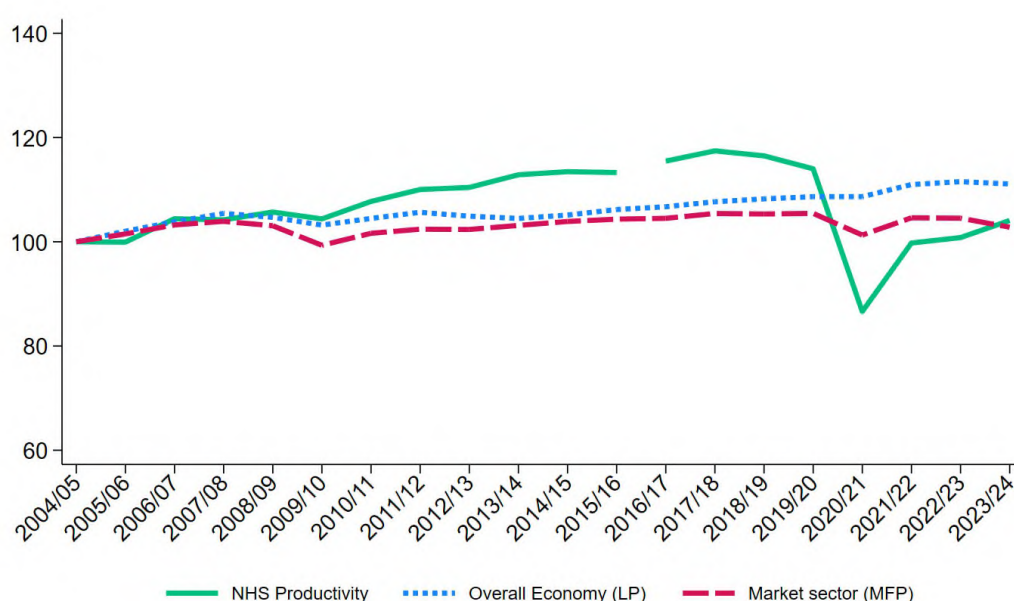
¹⁷ Up to 2018/19-2019/20 the mixed input index is used as the baseline and depicted in this graph, whilst the indirect input index is used for the 2019/20-2020/21 link. The interruption of the series reflects re-calculation of the figures due to a coding error corrected (first noted in Arabadzhyan et al., 2021).

¹⁸ See [ONS note on GVA and GDP](#) (last accessed 25/06/2026).

¹⁹ See [ONS labour productivity data](#) (last accessed 25/06/2026).

²⁰ See [ONS multifactor productivity estimates](#) (last accessed 25/06/2026).

Figure 3: Cumulative NHS productivity, Overall Economy (LP) and Multi-Factor Productivity (MFP) indices



In the post-pandemic period, all measures except for the Market Sector (MFP), have shown a rising trend. The Overall Economy index LP index surpassed its pre-pandemic level. NHS productivity, while still substantively lower than its pre-pandemic level, shows steady growth, indicating the system is on the path of recovery, and of the three measures shows the fastest growth, also surpassing the growth in the economy as measured by the Market Sector (MFP) index.

5. Overall NHS output and NHS input growth

5.1. Output growth

Output growth is measured by combining activities of different types into a single index, using costs to reflect their values. We report in Table 6, the cost-weighted and quality-adjusted output growth measures, both also adjusted for the number of total and working days. The quality adjusted output growth rate includes changes in survival, in health outcomes following hospital treatment, life expectancy, and waiting times.

Between 2022/23 and 2023/24, the cost-weighted and cost and quality adjusted NHS output growth rates amount to 7.49% and 7.87% respectively (see Table 6). This is a second year of positive post-pandemic output growth.

If we expand the quality indicators to include avoidable emergency readmissions and hospital acquired infections, the NHS output growth increases to 7.86%. These two additional indicators are factored into the measure as deadweight losses (see Section 3 for further details on the methodology). This minor deceleration in overall growth was predominantly driven by avoidable emergency readmissions. Further details are provided in section 6.2.6. When comparing 2023/24 with the pre-pandemic 2019/20, the resulting output growth rates were 6.62% (cost-weighted) and 7.23% when adjusted for quality, respectively.

Quality adjusting NHS output had a positive impact on the overall NHS output growth. Our analyses of the contribution of quality indicators to the overall quality-adjusted NHS output growth measure show that this was driven by both survival and life expectancy, and to a smaller extent by improvements in waiting times between 2022/23 – 2023/24. When comparing 2019/20 with 2023/2, the main positive drivers of quality adjustment were life expectancy and to a lesser extent by survival and other quality indicators.

Table 6: NHS output growth

Years	Cost-weighted growth (CW)	Quality-adjusted CW growth
2020/21 – 2021/22	19.45%	19.26%
2021/22 – 2022/23*	2.32%	2.39%
2022/23 – 2023/24*	7.49%	7.87%

Recovery		
Years	Cost-weighted growth (CW)	Quality-adjusted CW growth
2019/20 – 2021/22	-1.45%	-1.53%
2019/20 – 2022/23*	1.89%	2.34%
2019/20 – 2023/24	6.62%	7.23%

* Excludes Frimley Health NHS Foundation Trust (RDU). Provider excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders

5.1.1. Contribution by settings

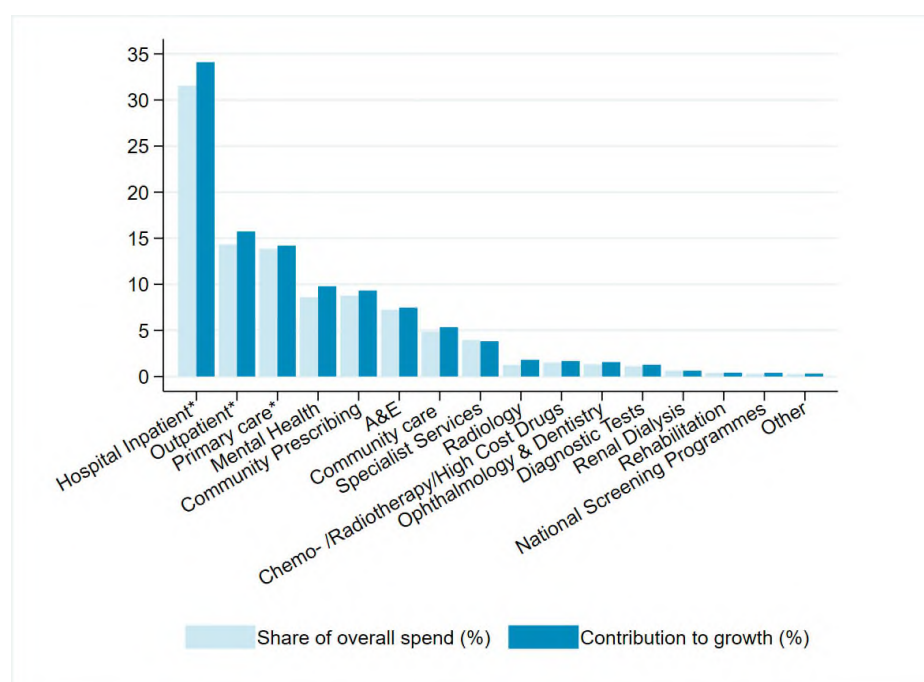
Different settings contribute differently to the output growth index.

Figure 4 shows the share of overall spend for each of the settings as well as their contribution to growth, calculated as a share of overall spend multiplied by the output growth of the setting, using growth rates obtained when estimating missing Trust activity for 2023/24.

Table 7 and Table 8 include more information on the contribution to overall NHS output growth by setting, for 2022/23 – 2023/24 and 2019/20 – 2023/24 respectively.²¹ Similarly to our previous two updates, the growth rates for the NHS settings covered by the National Cost Collection data, were obtained following our preferred approach in accounting for missing Trust activity (see section 2.5 of this report or Arabadzhyan et al. (2022) for the full details). The output growth rates for the Hospital Inpatient, Outpatient, Primary Care, Community Prescribing, and Ophthalmology & Dentistry settings are not affected by missing NHS Trusts activity data. Not correcting for missing Trust in the National Cost Collection data may result, on average, in the uncorrected growth rates being biased.

²¹ Community mental health setting has been excluded from our analysis (see section 6.4.2 for further detail).

Figure 4: Contribution to output growth by setting, 2023/24



* Hospital Inpatient, Outpatient and Primary care activity are quality-adjusted.

Overall, Hospital Inpatient activity was the largest contributor to the output index, accounting for approximately 34.10% of overall output growth (and 31.56% of total spend) in 2023/24, and 36.00% (32.76% of total spend) across the 2019/20 – 2023/24 link. For the 2023/24 financial year, the other sizeable contributors—listed in descending order of their output growth contribution—were Outpatient, Primary Care, Mental Health, and Community Prescribing. All remaining settings each contributed less than 7.5% to the total value of output growth. Similarly, for the 2019/20 – 2023/24 link, the most significant contributors behind Inpatient care were Outpatient, Primary Care, Community Prescribing, and Community Care.

A detailed breakdown of output growth for each NHS setting is presented in section 6.

Table 7: Contribution to overall NHS output growth by NHS setting, 2023/24

Setting	Growth	Setting specific growth index	Value of Activity (22/23 prices)	Share of overall spend	Contribution to overall growth rate**
Hospital Inpatient*	8.02%	108.02%	37,171,497,990	31.56%	34.10%
Outpatient*	9.87%	109.87%	16,867,039,365	14.32%	15.74%
Primary care*	2.56%	102.56%	16,300,139,877	13.84%	14.20%
Mental Health	13.76%	113.76%	10,128,279,540	8.60%	9.78%
Community Prescribing	6.25%	106.25%	10,341,383,168	8.78%	9.33%
A&E	3.13%	103.13%	8,533,573,558	7.25%	7.47%
Community care	9.70%	109.70%	5,742,170,749	4.88%	5.35%
Specialist Services	-3.13%	96.87%	4,653,975,310	3.95%	3.83%
Radiology	43.37%	143.37%	1,489,309,079	1.26%	1.81%
Chemo-/Radiotherapy/High Cost Devices	11.23%	111.23%	1,772,886,422	1.51%	1.67%
Ophthalmology & Dentistry	17.66%	117.66%	1,567,477,480	1.33%	1.57%
Diagnostic Tests	14.61%	114.61%	1,313,765,555	1.12%	1.28%
Renal Dialysis	-0.09%	99.91%	741,743,936	0.63%	0.63%
Rehabilitation	0.48%	100.48%	484,464,984	0.41%	0.41%
National Screening Programme	35.27%	135.27%	348,145,915	0.30%	0.40%
Other	17.47%	117.47%	308,666,016	0.26%	0.31%
Total/NHS output growth rate			117,764,518,942		7.87%

* Hospital Inpatient, Outpatient and Primary care activity are quality-adjusted. ** The contribution of each setting to growth in 2023/24 is expressed as a percentage of the total output in 2022/23. Where numbers in this column are lower than numbers in the preceding column, this represents negative growth in outputs for that setting.

Table 8: Contribution to overall NHS output growth by NHS setting, 2019/20-2023/24

Setting	Growth	Setting specific growth index	Value of Activity (19/20 prices)	Share of overall spend	Contribution to overall growth rate***
Hospital Inpatient*	9.88%	109.88%	29,298,239,740	32.76%	36.00%
Outpatient*	6.47%	106.47%	13,696,746,525	15.32%	16.31%
Primary care*	14.98%	114.98%	11,985,569,329	13.40%	15.41%
Community Prescribing	13.97%	113.97%	8,907,754,496	9.96%	11.35%
Community care	1.46%	101.46%	9,200,335,197	10.29%	10.44%
A&E	1.54%	101.54%	5,940,131,149	6.64%	6.75%
Specialist Services	-4.18%	95.82%	3,569,336,097	3.99%	3.82%
Ophthalmology & Dentistry	-11.23%	88.77%	1,993,128,218	2.23%	1.98%
Radiology	26.57%	126.57%	1,001,663,448	1.12%	1.42%
Diagnostic Tests	12.17%	112.17%	1,069,974,823	1.20%	1.34%
Chemo-/Radiotherapy & High Cost Devices**	3.95%	103.95%	876,545,874	0.98%	1.02%
Renal Dialysis	-7.92%	92.08%	612,417,454	0.68%	0.63%
Rehabilitation	-56.83%	43.17%	906,494,088	1.01%	0.44%
Other	-19.49%	80.51%	361,096,463	0.40%	0.33%
Total/NHS output growth rate			89,419,432,900		7.23%

* Hospital Inpatient, Outpatient and Primary care activity are quality-adjusted. ** In 2022/23, part of Chemotherapy activity was moved to the High Cost Drugs sub-setting. Since High Cost Drugs data are no longer available, we excluded Chemotherapy from the growth rates calculation of Chemotherapy, Radiotherapy and High Cost Devices setting for the 2019/20-2023/24 link to avoid downward bias. *** The contribution of each setting to growth in 2022/23 is expressed as a percentage of the total output in 2019/20. Where numbers in this column are lower than numbers in the preceding column, this represents negative growth in outputs for that setting.

5.2. Input growth

Table 9 presents the growth in inputs for the last two links, 2021/22 – 2022/23 and 2022/23 – 2023/24, as well as for all recovery periods from 2019/20 – 2021/22 to 2019/20 – 2023/24, using the mixed and indirect methods.

The indirect method uses expenditure data for all types of inputs, derived from Hospital Trusts' and other NHS organisations' financial accounts. The mixed method uses Electronic Staff Record (ESR) data to calculate growth in NHS labour inputs and combines this information with expenditure data from published accounts for the remaining inputs used in the production of healthcare goods and services.

Table 9: Indirect and Mixed NHS input growth

Years	All NHS	
	Mixed	Indirect
2020/21 – 2021/22	4.49%	3.55%
2021/22 – 2022/23	1.33%	1.49%
2022/23 – 2023/24	4.48%	4.73%

Recovery		
Years	All NHS	
	Mixed	Indirect
2019/20 – 2021/22	13.58%	12.48%
2019/20 – 2022/23	14.21%*	14.93%*
2019/20 – 2023/24	19.67%	18.04%

* Correction made to both mixed and indirect input growth rates, previous growth rates were 13.91% and 14.63% respectively.

The difference between the mixed and indirect input indices is due to the data sources used to measure NHS Staff inputs, and so growth rates in NHS labour inputs differ. Considering the change between 2022/23 and 2023/24, ESR data (direct method) suggest that NHS staff increased by 4.67%, whilst the equivalent growth rate calculated using expenditure data (indirect method) was 5.23%. Please note that NHS Trusts labour expenditure was corrected for the one off payment made to NHS staff in the summer of 2023. This non-consolidated, central government payment (ONS 2023) cost approximately £2.7 billion (DHSC 2024).

Finally, when comparing 2019/20 to 2023/24, we note that NHS inputs are still growing compared to 2019/20, which is in line with expectations as NHS England continues to inject further resources to support the elective recovery programme.

In terms of the major contributors to overall input growth, these were, in order, labour, materials and primary care, similar to the 2022/23 NHS productivity growth update (Arabadzhyan et al., 2025).

6. Growth in output categories

6.1. Measuring output

Our NHS output index is designed to capture all activities provided to NHS patients, whether by NHS or private sector organisations.²² Table 10 summarises the data sources used to measure activity, quality and costs. It should be noted that we have two alternative sources of volume of activity for outpatient output: the Hospital Episode Statistics (HES) outpatient dataset, and the National Costs Collection (NCC) database. In this report, we compare outpatient activity derived from both datasets but use the HES outpatient figures in our NHS output growth measure. Summaries for each output type and any data issues are detailed in sections 6.2 to 6.7.

Table 10: Summary of NHS output data sources

Output type	Activity source	Cost source	Quality
Elective	HES	NCC	In-hospital survival; health outcomes & waiting times
Non-elective	HES	NCC	In-hospital survival & health outcomes
Outpatient	HES (or NCC)	NCC	Waiting times
Mental health	HES & NCC	NCC	In-hospital survival; health outcomes & waiting times
Community care	NCC	NCC	N/A
A&E	NCC	NCC	N/A
Other*	NCC	NCC	N/A
Primary care	QResearch (up to 2008/09); General Lifestyle Survey (2008/09-09/10); GP patient survey (from 2009/10) NHS Digital Appointments in General Practice data (from Nov 2017)	PSSRU Unit Costs of Health and Social Care + other sources	QOF data (up to 2018/19; 2019/20 had a change in the way indicators were recorded; no QOF data collected in 2020/21) Waiting times
Prescribing	Until 2017/18, Prescription cost analysis system (PCA) From 2018/19, NHS Business Service Authority (BSA)	PCA system & BSA	N/A
Ophthalmic & de services	NHS England	NHS England	N/A

*Chemo-/Radiotherapy & High Cost Drugs and Devices, Diagnostic Tests, Radiology, Rehabilitation, Renal Dialysis, Specialist Services, 'Other' NHS activity.

²² NHS activity provided by non-NHS providers was included in the output growth series up to 2010/11. Hospital inpatient (elective and non-elective) and outpatient activity paid for by NHS Trusts and provided by non-NHS providers is still included in our measure of NHS output.

6.2. Hospital physical and mental health inpatient

- **Overall cost-weighted and working days adjusted Laspeyres output growth for hospital inpatient activity was 5.90% between 2022/23 and 2023/24.**
- **Measures of quality improved over this period, leading to a growth rate of 8.02% after quality-adjustment.**

day case, elective and non-elective hospital inpatient care is calculated from the HES Admitted Patient Care (APC) dataset. Information in this dataset is recorded at the Finished Consultant Episode (FCE) level. An FCE represents a period of treatment under the same hospital consultant. The dataset includes both physical and mental health inpatient care. As in our previous year's report, we excluded data on regular day and night attenders (RDNA). This activity is captured through the NCC data (see section 6.4.2).

This year we implemented two changes: (1) we updated the costing methodology for inpatient elective and day cases (and outpatient) activity, introducing an equalisation of cost weights for activity performed in either an inpatient setting, elective with an overnight stay and day cases, and in outpatient clinics; (2) we excluded private patients treated by NHS as out of scope for measurement of NHS output growth. In 2023/24, over 21 million inpatient FCEs were recorded, an increase of 6% compared to 2022/23. This is similar to the increase reported by NHS England.²³ Our figures and the activity growth are exactly the same as those reported by the NHS England in the sample where we do not exclude private patients treated by the NHS.

Table 11 presents activity in terms of FCEs across different provider types. Note that we exclude from our analysis Frimley Health NHS Foundation Trust (RDU) due to technical issues that prevented it from submitting data for most of the months of the financial year 2022/23.²⁴ Also, we excluded South West Yorkshire Partnership NHS Foundation Trust (RXG) as it did not submit any activity data to the HES APC data in 2023/24.

In 2023/24, NHS Trusts covered 96% of total FCEs hospital inpatient activity provided in the NHS similarly to 2022/23. The number of FCEs delivered by private providers in 2023/24 decreased by around 3% from 2022/23, whilst the number of FCEs delivered by 'Other' providers remained a very small proportion of the total, at less than 1%. However, the increasing trend of FCEs provided by 'Other' providers continued in 2023/24, with an increase of around 74% compared to 2022/23. Details of a longer time trend can be found in the Online Appendix.

²³ See "[Hospital Admitted Patient Care Activity, 2023-24](#)" publication (last accessed 20/01/2026).

²⁴ For more information see "[Hospital Activity publications supporting information, NHS England Digital](#)" (last accessed 26/03/2025).

Table 11: Organisational coverage of HES activity, FCEs

Year	NHS Trusts	Private providers	Other*	Total
2019/20	21,736,268	633,558	404	22,370,228
2019/20 [^]	20,107,088	633,531	404	20,741,024
2020/21 ^{***}	16,993,469	359,880	3,518	17,356,867
2021/22	20,309,952	584,590	32,801	20,927,343
2021/22 ^{**}	18,721,096	581,548	32,801	19,335,444
2022/23 ^{**}	19,125,360	704,289	90,100	19,919,748
2022/23 ^{**,^}	19,029,136	704,289	90,100	19,823,524
2023/24 ^{**,^}	20,210,870	682,425	156,979	21,050,274

* Some new providers in 2022/23 are reclassified from 'Other' to 'Private providers'. ** Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. *** Correction made to counts in 2020/21. 'Other' category previously reported as 2,715 as 803 observations contributed to total observations but were not attributed to any specific category. ^ Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data. Also, excluded are private patients who use NHS facilities to receive inpatient care.

6.2.1. Methodology

The differing types of NHS activity performed in an inpatient setting are identified through HRGs. Output within an HRG is the count of Continuous Inpatient Spells (CIPS) allocated to that HRG. A CIPS can contain multiple FCEs. This occurs if a patient is transferred to the care of a different hospital consultant within the same Trust or a different Trust as part of their care. We construct CIPS following our own algorithm, which is similar to the official algorithm published by NHS England.^{25, 26}

The cost of each CIPS is the highest cost reported for an individual FCE within the CIPS (Bojke et al., 2017). Costs are reported in the National Cost Collection (NCC) dataset. The NCC dataset reports a separate unit cost for day case, elective care, and non-elective care activity for each HRG. As we use unit costs as a proxy for the relative health value of different activities, we acknowledge the significance of appropriate day case care by assigning it equal value as elective care (Bojke et al., 2016).²⁷ Having assigned a cost to each CIPS, we then calculate the national average cost per CIPS in each HRG.

It can be that some HRGs do not have associated costs in consecutive years, due to new HRGs being introduced (old HRGs being retired). This can also arise if there was no activity in a given HRG for a specific year. Additionally, the unit costs for some HRGs have a negative cost. In such cases we deflate (inflate) costs from the year where a cost was observed, using the imputation method as described in Castelli et al. (2011).

This year we introduce a new costing approach²⁸, also known as the 'equivalisation of cost weights' for elective activity that is delivered either as an elective with an overnight stay, as a day case or in an outpatient clinic as evidenced in the National Cost Collection data. For all other hospital inpatient activity delivered as either an overnight stay or day case, we follow

²⁵ [NHS Digital CIPS and Spells methodology](#) (last accessed 27/03/2025).

²⁶ A note detailing the differences between the CHE and the NHS Digital algorithms to construct CIPS is available as [supplementary material](#) published alongside the NHS productivity update for 2018/19 (Arabadzhyan et al., 2021).

²⁷ This equal weighting ensures that the output index is not biased downwards if delivery of treatment moves from overnight to day case settings over time.

²⁸ We would like to note that activity has been shifting from non-elective admission to A&E treatment, and, more generally, from secondary care to primary care. Whilst we are able to pick up some of these shifts in care, others cannot be detected due to a lack of data.

our usual costing approach described above. Below, we briefly motivate the introduction of this new approach. The methodology and motivation for its introduction are more fully presented in Appendix 9.1.

Current National health care policies lead to shifts from more intensive to less intensive care settings, i.e., from elective care to day cases, and from day cases to outpatient clinics. To ensure that we correctly capture the value of healthcare services provided to patients, we needed to update our costing approach. Our method is to work with an ‘equivalisation of cost weights’ which corresponds to the calculation of the activity weighted average unit cost of procedures performed in either of the three settings (inpatient elective admission, day case and outpatient clinics), limited to those procedures that are common across the three settings. Therefore, we move from using the actual unit costs for inpatient physical elective care and day cases reported in the NCC dataset, to assigning the new equivalised cost. It is important to highlight that the new equivalisation of cost weights method does not affect non-elective (emergency) care. Therefore, costs assigned for non-elective care follow the usual method described in Appendix 9.1.2.

To calculate the activity weighted average unit cost across the three modes of delivery, we use the NCC data for both volume of activity and unit costs at the HRG and year level. Where activity and therefore unit costs are suppressed in line with NHS England small number policy, but we know the total cost of activity, we follow Arabadzhyan et al. (2022) and impute the missing value for activity by setting it equal to 4. We then proceed to calculate the activity weighted average unit costs for the set of procedures that are delivered as either an inpatient stay, a day case or an outpatient procedure.

Finally, we implement one additional change. We excluded private patients treated in NHS facilities to ensure that we measure NHS funded activity only. Table A6 in section 9.2.2 shows that this activity is consistently low, accounting for just under 0.5% of total activity in 2019/20, 2022/23, and 2023/24. Therefore, removing these patients from total inpatient activity has a negligible impact on total NHS inpatient output growth.

The remainder of this section presents the analysis of the NHS inpatient activity using the new costing methodology. The findings of our analyses using the old costing approach are summarised in section 9.2.

6.2.2. Physical elective, day case, and non-elective activity

- **Cost-weighted and working days adjusted Laspeyres output growth for elective and day case physical care was 7.81% between 2022/23 and 2023/24. Non-elective physical care Laspeyres output growth was 4.12% over the same period, leading to an overall NHS cost-weighted and working days adjusted activity output growth of 5.91 %.**
- **Measures of quality indicated an increase of around 1.6 percentage points between 2022/23 and 2023/24 for elective and day case care in physical health, resulting in growth of 9.45%. For non-elective physical care activity, the effect of adding quality indicators was also positive, and this increase was approximately 2.6 percentage points, leading to a growth rate 6.70%. The overall quality adjusted Laspeyres output growth for physical health care overall was equal to 8.03%.**

Between 2022/23 and 2023/24, the combined volume of day case, elective and non-elective physical healthcare rose by 6.20%. This increase was observed both within elective and day-case care, at just under 6.17%, and in emergency activity, at 6.23%.

Table 12 presents the volume of activity and activity-weighted average unit cost for elective and day case and non-elective care for 2019/20, 2022/23 and 2023/24. We find that raw volumes of both elective and non-elective physical care increased between 2022/23 and 2023/24. Activity-weighted average unit costs decreased from £2,128 to £2,101 (equivalent to a 1.24% decrease) for elective care and increased from £2,522 to £2,553 (equivalent to a 1.22% increase) for non-elective care. The percentage change (both for elective and non-elective care) is well under the mean Consumer Price Inflation, including housing costs (CPIH), of 3.3% (ONS 2024).²⁹ Changes in activity weighted average unit costs over two financial years may also be due to treating a different case-mix of patients. These are not usually detectable when reporting at the level of aggregation used here. Unit costs in 2023/24 were well above those observed in 2019/20, especially for emergency health care activity. It is worth noting that elective care activity in 2023/24 surpassed, for the first time, pre-COVID-19 pandemic levels.

Activity-weighted average unit cost of elective care calculated using the equivalisation of costs methods are lower compared to those obtained when not implementing this approach (see Table A3, section 9.2.1.1). This is in line with our expectation, as the equivalisation method averages costs across more (overnight admissions) and less expensive (day case and outpatient procedures) settings.

Results do not differ substantially when including private patients. See Table A9, in section 9.2.3, for the summary information on volumes and activity-weighted average unit costs including private patients.

Table 12: Number of CIPS and average cost for electives and non-electives

Year	Elective and day case activity		Non-elective activity	
	# CIPS	Average cost (£)	# CIPS	Average cost (£)
2019/20 ^{*, ^}	8,725,893	1,627	8,031,972	1,851
2022/23 ^{§, ^}	8,437,941	2,128	7,541,496	2,522
2023/24 ^{§, ^}	8,958,819	2,101	8,011,221	2,553

Notes: * Measures calculated using corrected ordering of FCEs within CIPS. § Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. ^ Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data. Also, excluded are private patients who use NHS facilities to receive inpatient care.

The cost-weighted and working days adjusted Laspeyres output growth for elective and day-case physical care was 7.81% between 2022/23 and 2023/24. Non-elective output grew by 4.12% over the same period, bringing the overall NHS cost-weighted and working days adjusted activity output growth for inpatient physical care to 5.91%.³⁰

²⁹ See [CPIH annual rate](#) (last accessed 24/03/2026).

³⁰ The total number of working days was 251 and 250 in 2022/23 and 2023/24, respectively.

Including private patients slightly increased these figures. As discussed in Appendix 9.2, the working days adjusted Laspeyres output growth rate for elective and day case physical care increased by 7.85% between 2022/23 and 2023/24, whilst on-elective output grew by 4.13%. This resulted in an overall NHS cost-weighted and working days adjusted Laspeyres output growth of 5.96%.

6.2.3. Physical elective, day case, and non-elective activity: quality adjustment

For our main measure, we use four metrics to adjust for changes in the quality of care provided in the inpatient setting, which is calculated at the HRG level, and separately for elective and non-elective care. Specifically, we account for:

1. **In-hospital survival rates and mean life expectancy.** We use information on in-hospital survival rate, which is obtained directly from the HES APC dataset, and mean life expectancy, taken from mid-year life tables published annually by ONS,³¹ and combine it with estimate changes in health outcomes following treatment (see subsequent bullet point) to capture changes in the expected discounted sum of lifetime Quality Adjusted Life Years (QALYs) conditional on treatment survival.
2. **Estimated change in health outcomes following hospital treatment** to assess the impact that treatments have on patients' health status over time. We use changes in the ratio of health status before and after care. Smaller ratios represent a larger health improvement associated with the treatment. We use two separate data sources:
 - i. Patient Reported Outcome Measures (PROMs) for all patients undergoing unilateral hip or knee replacement.³² This survey is offered to all patients shortly before surgery and six months following treatment. It includes the generic EQ-5D measure, which can be converted to QALYs through an official valuation from the general population of health states. Change in the ratio of before divided by after procedure EQ-5D QALY scores are used for related HRGs.
 - ii. For treatments (HRGs) where no such information is available, or the proportion of activity with PROMs information for a given HRG is small and unlikely to be representative in either year considered (< 100 observations) we assume that the ratio is constant over time and equal to 0.8 for elective care/day-cases and 0.4 for non-elective care (Dawson et al., 2005). We also assign the above constant ratios to CIPS with error code UZ01Z (Castelli et al., 2019).
3. **Waiting times** to account for adverse health implications of delayed treatment along with direct patient dissatisfaction from waiting for care. We use the 80th percentile of waiting time, also calculated from HES APC, and apply this as a scaling factor, multiplying the health effect (Castelli et al., 2007). This adjustment applies only to elective and day case activity.

Table 13 presents average values of the measures for the quality elements for the years 2019/20, 2022/23, and 2023/24. It highlights that between 2022/23 and 2023/24, life expectancy did not change significantly for either elective/day case or non-elective patients. On average, it increased slightly for elective and day case patients, whilst experiencing a larger decrease for those receiving non-elective (emergency) care. Compared to 2019/20, life

³¹ ONS life tables can be found [here](#) (last accessed 27/03/2025).

³² From 2018/19, PROMs for varicose vein surgery and groin hernia repair were discontinued.

expectancy in 2023/24 was marginally higher for elective and day cases, whereas non-elective care showed a more distinct cumulative decline, dropping from 31.8 to 31.4.

On average, the 80th percentile waiting time increased by two days, between 2022/23 and 2023/24, and by 23 days compared to 2019/20. Over the same one year period, survival rates remained the same for elective care activity but improved for non-elective cases. Comparing 2023/24 to 2019/20, we find that both for elective and day cases and non-elective survival rates slightly fell. It is important to note that these aggregate values mask considerable variation within single HRGs and for each HRG across years. Consequently, Table 17 in section 6.2.6 reports the incremental impact of individual quality measures and their combinations.

Table 13: Quality adjustment for elective and day case and for non-elective activity

Year	Elective and day case activity			Non-elective activity	
	In-hospital survival rate	Mean life expectancy	80 th percentile waiting times	In-hospital survival rate	Mean life expectancy
2019/20	99.96%	22.1	85	98.36%	31.8
2019/20 ^{*, ^}	99.94%	22.7	88	97.45%	31.7
2020/21 [*]	99.93%	21.7	104	96.63%	30.7
2021/22 [*]	99.95%	21.5	104	97.38%	31.5
2021/22 [§]	99.94%	22.1	104	97.38%	31.5
2022/23 [§]	99.94%	22.1	108	97.17%	31.7
2022/23 ^{§, ^}	99.94%	22.1	109	97.17%	31.7
2023/24 ^{§, ^}	99.94%	22.2	111	97.52%	31.4

^{*} Measures calculated using corrected ordering of FCEs within CIPS and updated life tables used for 2020/21 and 2021/22. [§] Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data. Also, excluded are private patients who use NHS facilities to receive inpatient care.

Table 14 presents descriptive statistics for patient reported outcome measures (PROMs) for hip and knee replacement for the past four years. Because NHS England has temporarily paused the dissemination of PROMs data, we were unable to incorporate specific figures for these procedures in our 2022/23 – 2023/24 update. Therefore, for this link, we assumed a health gain ratio of 0.8 for all elective care, including hip and knee replacements, when calculating the quality adjustment between 2022/23 and 2023/24.

Table 14: Ratio of pre to post health status, based on EQ-5D

Year	Hip replacement	Knee replacement
2019/20	0.39	0.44
2020/21	0.31	0.50
2021/22	0.32	0.39
2022/23	0.41	0.07

Between 2022/23 and 2023/24, the quality adjusted Laspeyres output growth rate, (when adjusted for in-hospital survival rates, life expectancy, PROMS, and waiting times) was 9.45%

for elective and day case physical health care and 6.70% for non-elective physical health care. Overall, improvements in the quality of care during this period translated to a quality adjusted Laspeyres output growth of 8.03% for physical health care, representing a contribution of more than two percentage points.

Finally, including private patients treated in the NHS, the results do not differ significantly. Specifically, the quality-adjusted Laspeyres output growth rate between 2022/23 and 2023/24 was 9.51% for elective and day case care, and 6.72% for non-elective physical care. Overall, changes in quality drove an improvement in Laspeyres growth of nearly two percentage points, bringing the total to 8.08% for physical health.

6.2.4. Mental elective, day case, and non-elective activity

- **The cost-weighted and working days adjusted Laspeyres mental health inpatient output growth measure was 4.13% between 2022/23 and 2023/24.**
- **After accounting for changes in quality, the total Laspeyres output growth of NHS mental health activity increased by 1.3 percentage points to 5.44%.**

Table 15 shows the number of CIPS and the activity-weighted average costs for mental health care for the years 2019/20 to 2023/24. In contrast to physical health, elective mental health activity volume decreased by 2.33% between 2022/23 and 2023/24. Non-elective mental health activity increased by 5.11% over the same period. Finally, the overall mental health activity in 2023/24 was around 17% lower than the pre-COVID-19 year of 2019/20. Mental Health Trusts are no longer mandated to report their activity in the HES APC dataset, instead, all care they provide is now captured in the Mental Health Services Dataset. It is, therefore, difficult to assess whether changes in the volume of mental health activity, for either elective and day cases or non-elective activity, truly reflect changes in actual care delivery or merely changes in reporting practice.

Table 15: CIPS and average cost for inpatient mental health patients

Year	Elective and day case activity		Non-elective activity	
	# CIPS	Average cost (£)	# CIPS	Average cost (£)
2019/20	17,360	1,494	142,321	1,516
2019/20 ^{*, §}	16,640	1,494	136,877	1,516
2019/20 ^{*, ^}	16,524	1,494	13,6037	1,516
2020/21 [*]	13,258	1,506	128,382	1,528
2021/22	13,351	1,538	125,165	1,561
2021/22 [§]	13,275	1,532	124,107	1,554
2022/23 [§]	12,497	1,641	109,584	1,665
2022/23 ^{§, ^}	12,417	1,641	107,707	1,665
2023/24 ^{§, ^}	12,128	1,690	113,212	1,715

* Measures calculated using corrected ordering of FCEs within CIPS and updated life tables used for 2020/21 and 2021/22. ** Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. ^ Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data. Also, excluded are private patients who use NHS facilities to receive inpatient care.

The cost-weighted and working days adjusted Laspeyres mental health inpatient output growth measure was 4.13% between 2022/23 and 2023/24. Elective and day cases recorded negative growth at -1.94%, while non-elective activity grew by 4.82 %. Including private patients treated in the NHS in the analysis yielded similar results: elective and day case growth remained negative at -1.63%, and that for non-elective mental health inpatient care remained positive at 4.76%.

6.2.5. Mental elective, day case, and non-elective activity: quality adjustment

Table 16 presents quality adjustment measures for mental health inpatient care. We use the same set of quality adjustment measures as for inpatient physical care. Compared to 2022/23, survival rates for patients receiving either elective or non-elective mental health care were higher in 2023/24. In particular, for non-elective mental health care the survival rate increased by more than 0.3 percentage points. Mean life expectancy increased slightly for elective mental health patients (by 0.06% which is detectable at the second decimal point) while it decreased, on average, by 0.5% for recipients of emergency mental health care. Finally, the 80th percentile waiting time increased from 73 to 82 days. As already noted in section 6.2.3, these mean values are made up of highly variable values at the HRG level within the year, which also change over time.

Table 16: Quality adjustments for mental health activity

Year	Elective and day case activity			Non-elective activity	
	In-hospital survival rate	Mean life expectancy	80 th percentile waiting times	In-hospital survival rate	Mean life expectancy
2019/20	99.63%	30.8	43	99.10%	24.4
2019/20 ^{*,^}	99.43%	30.8	41	98.21%	24.4
2020/21	99.25%	30.8	52	97.97%	23.8
2021/22	99.48%	31.1	50	97.90%	23.1
2021/22 [*]	99.48%	31.2	49	97.90%	23.1
2022/23 [*]	99.49%	31.1	73	97.35%	22.4
2022/23 ^{*,^}	99.49%	31.1	73	97.31%	22.2
2023/24 ^{*,^}	99.55%	31.1	82	97.65%	22.1

^{*} Excludes Frimley Health NHS Foundation Trust (RDU). Provider excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). Provider excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data. Also, excluded are private patients who use NHS facilities to receive inpatient care.

After accounting for changes in quality, the overall quality-adjusted Laspeyres output growth for mental health activity was 5.44%. This represents an improvement in quality of more than 1.3 percentage points. Finally, including private patients in the analysis does not make any material difference, with a quality-adjusted output growth rate of 5.43%.

6.2.6. Breakdown of quality measures for inpatient care

In sections 6.2.3 and 6.2.5 we presented descriptive statistics for quality adjustment measures for inpatient physical and mental health respectively, along with the overall impact of these quality adjustments on Laspeyres growth. In this section we examine the incremental impact of introducing these quality indicators and their various combinations. A detailed breakdown of the quality adjustments' impact is presented in Table 17.

Adjusting for survival alone increases overall inpatient output growth by 0.42 percentage point. The most impacted activities were non-elective physical health care and mental health overall activity. In particular, output growth for non-elective physical health care increased by 0.58 percentage points, whilst mental health activity (across elective and day cases, and non-elective settings) increased by 0.36 percentage points. A further improvement in output growth is observed when including PROMs adjustment (representing health gain). Due to data unavailability for the 2023/24 financial year, PROMs values for hip and knee replacement were held constant by design. They were set at 0.8 for elective and day case activity, in line with all other inpatient healthcare activity. However, this adjustment still magnifies the impact of survival for elective care.

Applying the life expectancy adjustment had a large and positive effect, increasing overall inpatient output growth by more than one percentage point. This effect was consistent across both types of physical health care activity, with the greatest improvement seen in non-elective care (almost 1.4 percentage points). For overall mental healthcare activity, the increase was more modest at approximately 0.6 percentage points. When adjusting for both waiting times and life expectancy together, the overall output growth measure increased by roughly 1.2 percentage points. Under this combined adjustment, the highest positive impact was observed in physical nonelective activity with an almost 1.4 percentage points increase, whilst mental health output growth improved by just over 0.6 percentage points.

Overall, Table 17 indicates a general improvement in the quality of care provided by the NHS in the hospital inpatient setting. The combined impact of changes in survival, pre- and post-treatment health status, life expectancy and waiting time was substantial adding around 2.11 percentage points to the Laspeyres cost-weighted output growth rate. The largest improvement was for physical non-elective activity, where the quality of care as measured here added almost a 2.6 percentage points to the cost-weighted output growth measure.

Table 17: Quality adjustment breakdown with working day/total day adjustment 2022/23 – 2023/24

	Cost-adjusted	Quality-adjusted (Survival, PROMs, LE & WT)	QA only Survival	QA only Survival & PROMS	QA only survival & PROMS & LE	QA only LE	QA only WT & LE
Physical + Mental Health Inpatient (all)	5.90%	8.02%	6.32%	6.73%	8.00%	7.16%	7.18%
Physical Inpatient (all)	5.91%	8.03%	6.33%	6.74%	8.01%	7.17%	7.19%
Physical Inpatient (Elective)	7.81%	9.45%	8.06%	8.29%	9.40%	8.93%	8.97%
Physical Inpatient (Non-Elective)	4.12%	6.70%	4.70%	5.27%	6.70%	5.51%	5.51%
Mental Health Inpatient (all)	4.13%	5.44%	4.49%	4.79%	5.42%	4.75%	4.77%

Further, we added two additional into the quality adjusted Laspeyres output growth measure: avoidable emergency readmissions and Hospital Acquired Infections (HAIs), specifically MRSA and C-Diff.

Adjusting solely for avoidable emergency readmissions, decreases the overall NHS output growth measure by 0.09 percentage points to 7.92%. The impact of correcting for avoidable

emergency admissions was higher for physical non-elective activity, which decreased by 0.19 percentage points, whilst that for physical elective activity only fell by 0.02 percentage points. This indicates that either the volume or the (negative) value of avoidable emergency readmissions is higher in cases when these occur after an emergency index admission.

Finally, we accounted for the deadweight-loss associated with HAIs. Because the impact of this quality indicator cannot be disentangled between elective and day case and non-elective activity, for both physical and mental health care we report only the overall effect. The Laspeyres inpatient output growth measure increased to 7.95%, which is 0.02 percentage higher than when adjusting for avoidable emergency readmissions alone.

6.2.7. Comparison of 2019/20 with 2023/24

Comparing NHS inpatient output reported in 2023/24 to the pre-pandemic year of 2019/20 shows a 6.90% increase in the cost-weighted and working day adjusted Laspeyres output growth rate. This represents a significant improvement over previous years, indicating a strong recovery from the pandemic. After adjusting for changes in quality, inpatient growth increased by nearly 3 percentage points, reaching 9.88%.³³

Adjusting for survival alone leads to a higher overall inpatient output growth by more than 0.5 percentage points. The most significantly impacted activities were elective and day case physical healthcare activity and non-elective physical healthcare output, which saw growth increases of more than 0.4 and 0.6 percentage points, respectively. In contrast, the output growth for mental health deteriorated further upon adjusting for survival rate, decreasing from -16.92% to -17.02%.

Introducing the PROMs adjustment amplifies the positive impact of the survival adjustment, with the greatest improvement seen for non-elective physical healthcare activity.

Adjusting for life expectancy alone improved the overall output growth by more than 2 percentage points. The most substantial effect was observed in non-elective physical health activity, which increased by 3.2 percentage points. This adjustment likewise exerted a positive effect on mental health activity, albeit much smaller in magnitude, by 0.03 percentage points.

All results are presented in Table 18.

³³ In the sample where NHS private patients are included, the cost and working day adjusted inpatient activity growth was 6.83% and it increased to 9.74% after adjusting for quality indicators.

Table 18: Quality adjustment breakdown with working day/total day adjustment 2019/20 – 2023/24

	Cost-adjusted	Quality-adjusted (Survival, PROMs, LE & WT)	QA only Survival	QA only Survival + PROMS	QA only survival + PROMS + LE	QA only LE	QA only WT & LE
Physical + Mental Health Inpatient (all)	6.90%	9.88%	7.42%	7.85%	10.20%	9.11%	8.78%
Physical Inpatient (all)	7.09%	10.09%	7.61%	8.05%	10.42%	9.32%	8.99%
Physical Inpatient (Elective)	8.31%	9.78%	8.75%	9.10%	10.45%	9.52%	8.84%
Physical Inpatient (Non-Elective)	5.93%	10.39%	6.52%	7.04%	10.39%	9.13%	9.13%
Mental Health Inpatient (all)	-16.92%	-17.08%	-17.02%	-17.08%	-17.05%	-16.89%	-16.92%

Further, when we added the quality indicator avoidable emergency readmissions to the quality adjusted Laspeyres output growth measure we found that overall output growth improved by 0.23 percentage points bringing it to 10.11%. The impact of this quality indicator was more pronounced for physical non-elective activity than for elective physical care. Similarly, the growth of mental health activity improved when including avoidable readmissions. More specifically, overall mental health growth improved to -16.75%, equivalent to a 0.33 of a percentage point increase. Finally, accounting also for the deadweight-loss associated with HAIs the overall Laspeyres inpatient output growth decreased to 10.10%.

Overall, findings for inpatient care suggest that inpatient output substantially improved between 2022/23 and 2023/24, in large part due to a continuously progressed return to a more standard form of care following the COVID-19 pandemic.

6.3. Hospital outpatient setting

- **The cost-weighted and working days adjusted Laspeyres output growth measure for outpatient activity was 9.91 % between 2022/23 and 2023/24.**
- **After adjusting for waiting times, the Laspeyres output growth measure was 9.87%,**

Two data sources are available to measure growth in the outpatient setting: the HES Outpatient (OP) dataset and the National Cost Collection data. In this section, we summarise the results of using our preferred data source, the HES OP dataset. HES OP activity data are combined with unit costs data taken from National Cost Collection (NCC) to calculate the output growth rate of the hospital outpatient setting. See section 6.4, for the summary of the outpatient growth measure calculated using NCC data for both activity and unit costs.

This year we implemented three changes: (1) we updated the costing methodology for outpatient procedures, introducing an equalisation of cost weights for activity performed in either an inpatient settings, elective with an overnight stay and day cases, and in outpatient clinics; (2) we excluded private patients treated by NHS trusts as out of scope for the

measurement of NHS output growth; and (3) included NHS funded outpatient care provided by all types of organisations.

6.3.1. Method

As more elective procedures are shifted, where clinically appropriate, from an inpatient overnight admission (elective admission) to day case theatres to outpatient clinics, our methods to evaluate these procedures needs to change accordingly as failing to do so may result in output growth rates that do not correctly reflect the value of healthcare services delivered to patients. In particular, shifting patients from the more costly inpatient setting to the less costly day case setting and/or outpatient clinics may result in a decrease in NHS output growth, whilst value of care and benefits to patients remain unchanged. Therefore, we move from using the actual unit costs for outpatient procedures reported in the NCC dataset, to assigning them the activity weighted average unit cost of procedures performed in either of the three settings (inpatient elective admission, day case and outpatient clinics), limited to those procedures that are common across the three settings. This method is also referred to as 'equivalisation of cost weights'.

To calculate the activity weighted average unit cost across the three modes of delivery, we use the NCC data for both volume of activity and unit costs at the HRG and year level. Where activity and therefore unit costs are suppressed in line with NHS England small number policy, but we know the total cost of activity, we follow Arabadzhyan et al. (2022) and impute the missing value for activity by setting it equal to 4. We then proceed to calculate the activity weighted average unit costs for the set of procedures that are delivered as either an inpatient stay, a day case or an outpatient procedure. We use this new set of unit costs to weigh outpatient procedures only. For all other healthcare services delivered in an outpatient clinic that are not procedures, we continue to use the methodology used in previous NHS productivity reports. A more detailed presentation and discussion of our new costing methodology for outpatient procedures is provided in Appendix 9.1.³⁴

In the 2019/20 and 2022/23 NCC datasets, a small number of Trusts recorded outpatient attendances within the outpatient procedures sheet (specifically codes WF01A-WF01D and WF02B). These codes have been removed from the procedures list, and unit costs have been assigned using the methodology from previous NHS productivity reports.

Finally, two additional changes were implemented. First, we excluded private patients treated in NHS facilities to ensure that we measure the growth of NHS funded activity only. Table B3 (see Appendix B) shows that this activity is consistently low, accounting for approximately 0.4% of the total across 2019/20, 2022/23, and 2023/24. Consequently, removing this patient group has a negligible impact on overall NHS outpatient output growth.

Second, we included publicly funded outpatient activity from all organisations in the HES OP dataset, rather than limiting the scope to NHS trusts as in previous years. This broader scope now includes NHS Foundation and non-Foundation trusts, independent sector providers, clinical commissioning groups, and "other provider organisations".

³⁴ Please note that the same activity weighted unit costs as derived above are used to cost elective and day case inpatient activity.

The remainder of this section presents the analysis of the NHS outpatient activity using the new costing methodology. The analysis using the previous costing approach is available in Appendix 9.3, Section 9.3.1.

6.3.2. HES outpatient: activity

Table 19 presents the volume and share of outpatient activity by provider type for the years 2019/20, 2022/23, and 2023/24. Notably, NHS Trusts consistently delivered the vast majority of outpatient activity (around 94%), with other providers contributing stable shares across the same period. Therefore, expanding the analysis to include all providers, rather than limiting it to NHS Trusts, is unlikely to affect output growth measures, provided that the case-mix of patients treated by other providers remains consistent over time.

Table 19: HES volume and share of outpatient activity by provider type for the years 2019/20, 2022/23 and 2023/24

Provider	Activity volume 2019/20*	Share of Activity 2019/20	Activity volume 2022/23**	Share of Activity 2022/23	Activity volume 2023/24**	Share of Activity 2023/24
CCG	-	-	47,432	0.05%	51,475	0.05%
ISHP	5,410,648	5.64%	5,368,176	5.63%	6,110,850	5.95%
Other	7,123	0.01%	710	0.00%	6,745	0.01%
Trust	90,528,420	94.35%	89,936,170	94.32%	96,546,260	93.99%
Total	95,946,191		95,352,488		102,715,330	

* Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2019/20, but not in 2023/24 in the HES OP data. The year 2022/23 is not impacted as the provider did not report activity in 2022/23 as well. ** Volume and average unit cost figures are calculated excluding Frimley Health NHS Foundation Trust.³⁵

Table 20 presents volume and unit costs of outpatient activity for the years 2019/20, 2022/23, and 2023/24. In the table we report two figures for each year. The first set of figures corresponds to outpatient activity delivered by all providers (NHS trusts and other providers), but excluding private patients treated in the NHS. We found that raw outpatient activity increased by 7.72% and the corresponding activity weighted average unit cost increased by 7.01% between 2022/23 and 2023/24. The second set of figures corresponds to outpatient activity, including private patients, also delivered by all types of organisations. This activity increased by 7.74% between 2022/23 and 2023/24, with its activity weighted average unit cost increased by 6.98% over the same period.

³⁵ This was due to technical issues with data submission experienced by the NHS Trust from June 2022 - March 2023. Details of the technical issue are reported by NHS England on the [Data Quality section](#) of their supporting information for HES Outpatient activity (last accessed 17/12/2025).

Table 20: HES outpatient volume and average cost over time

Year	Hospital Outpatient Activity			
	All providers, excl. private patients		All providers, incl. private patients	
	Volume	Activity weighted average Cost (£)	Volume	Activity weighted average Cost (£)
2019/20*	95,946,191	142.75	96,348,256	142.77
2022/23**	95,352,488	176.89	95,731,628	176.94
2023/24**	102,715,330	189.29	103,142,591	189.28

* Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2019/24, but not in 2023/24 in the HES OP data. The year 2022/23 is not impacted as the provider did not report activity in 2022/23 as well. ** Volume and average unit cost figures are calculated excluding Frimley Health NHS Foundation Trust³⁶

The cost-weighted Laspeyres growth for total outpatient activity, excluding private patients, was equal to 9.91% after working-day adjustment, between 2022/23 and 2023/24. The higher rate of increase in this metric compared to raw volume, suggests a shift towards more complex and costly care in 2023/24 compared to 2022/23. Similar shifts were also seen between 2021/22 - 2022/23 and 2020/21 - 2021/22 (Arabadzhyan et al., 2025), (Arabadzhyan et al., 2024). The working-day adjustment also played an important role in comparing raw and adjusted outpatient growth. Without working-day adjustment, the cost-weighted Laspeyres growth in outpatient activity was lower at 9.47%. Further, excluding private patients did not significantly affect outpatient growth rates given the small proportion of private outpatient patients treated in NHS trusts. Including private patients yielded a cost-weighted Laspeyres growth rate also of 9.91%.

Finally, we calculated the Laspeyres growth rate for outpatient activity for NHS trusts only, aligning with previous reports. Similarly to Table 2, in Table B2 (Appendix B, Section 2) we report two sets of outpatient volume and unit costs figures, both excluding and including private patients. From 2022/23 to 2023/24, volume growth was similar in both scenarios (7.35% excluding private patients vs. 7.37% including them), as was the rise in weighted average unit costs (7.21% vs. 7.18%). This yielded a cost-weighted Laspeyres output growth rate for NHS trusts of 9.72%³⁷ after working-day adjustment, when either excluding or including private patients, between 2022/23 and 2023/24.

Overall, NHS outpatient activity growth is higher under the new costing methodology than the previous approach (see Appendix 9.3, section 9.3.1). This confirms that failing to capture shifts between modes of care delivery may lead to an underestimation of NHS output growth

6.3.3. HES outpatient: quality adjustment

Outpatient activity is quality-adjusted for the 80th percentile of waiting times for all first appointments, encompassing both face-to-face and non-face-to-face consultations. This aligns with post-pandemic delivery models where virtual care has now become an integral part of care delivery (see (Arabadzhyan et al., 2024)). To ensure robustness and facilitate comparison with previous reports, results using the 80th percentile waiting time for face-to-face first appointments only are also included.

³⁶ This is due to technical issues with data submission experienced by the NHS Trust from June 2022 - March 2023. Details of the technical issue are reported by NHS England on the [Data Quality section](#) of their supporting information for HES Outpatient activity (last accessed 17/12/2025).

³⁷ The cost-weighted Laspeyres growth rate without adjusting for the total number of working days and without/with private patients was 9.28%.

Mean and 80th percentile waiting times for the main sample of our analysis, i.e., including outpatient activity delivered by all providers, are presented in Table 21. In the table we report two sets of figures for mean and 80th percentile waiting time per year. The first set of figures for each year corresponds to the waiting times of outpatient activity excluding private patients treated in the NHS. Please note that the figures for 2019/20 are the same for the samples with and without private patients. Between 2022/23 and 2023/24, mean and 80th percentile waiting times increased substantially. Mean waiting times increased by 7 days both when considering all first appointments or face-to-face first appointments only. The increase for the 80th percentile was even larger, at 10 days for all first appointments and 11 days for face-to-face first appointments only. The results presented in the second set of figures per year confirm that the waiting times are not importantly affected when we include private patients treated in the NHS. Specifically, we observe that including private patients decreased the 80th percentile waiting time by one day only for face-to-face first appointments.

Table 21: Mean and 80th percentile outpatient waiting times

Year	All providers, excl. private patients				All providers, incl. private patients			
	Face-to-face first appointments		All face-to-face appointments		Face-to-face first appointments		All face-to-face appointments	
	Mean	80 th Percentile	Mean	80 th Percentile	Mean	80 th Percentile	Mean	80 th Percentile
2019/20	48	68	48	67	48	68	48	67
2022/23	65	89	65	89	65	88	65	89
2023/24	72	100	72	99	72	99	72	99

Mean and 80th percentile waiting time figures calculated excluding Frimley Health NHS Foundation Trust for the years 2022/23 and 2023/24.³⁸

When quality adjusting for the 80th percentile waiting time measure for all first appointments, we found that the cost-weighted and working day-adjusted Laspeyres growth was equal to 9.87%. This is a mere 0.05 of a percentage point lower compared to the non-quality adjusted outpatient growth rate. When adjusting for the waiting times of only face-to-face first appointments, the growth rate dropped slightly to 9.86%.³⁹ This is to be expected given their slightly higher 80th percentile waiting time (see Table 21).

Given the low proportion of private patients, their removal from the sample had no material effect on the resulting outpatient quality and working day adjusted cost-weighted Laspeyres growth. Re-including private patients in the sample, yields the same quality-adjusted growth rates.

To ensure consistency with previous reports, we calculated the quality and working-day adjusted cost-weighted Laspeyres growth for outpatient activity delivered by NHS trusts only. This yielded a growth rate of 9.67%.⁴⁰ Notably, this figure remained identical regardless of whether private patients were included or excluded, or whether the waiting time adjustment relied on all first appointments versus face-to-face first appointments only.

³⁸ This is due to technical issues with data submission experienced by the NHS Trust from June 2022 - March 2023. Details of the technical issue are reported by NHS England on the [Data Quality section](#) of their supporting information for HES Outpatient activity (last accessed 17/12/2025).

³⁹ The cost-weighted Laspeyres growth rate without adjusting for the total number of working days was: 9.43% adjusting using all first appointments, and 9.42% adjusting using face-to-face first appointments only.

⁴⁰ The cost-weighted Laspeyres growth rate without adjusting for the total number of working days was: 9.23% independently of whether we adjusted for all first appointments, only face-to-face first appointments, or whether included/excluded private patients.

6.3.4. Comparison of 2019/20 with 2023/24

The COVID-19 pandemic had large and multifaceted impacts on activity, especially in the year 2020, but also in subsequent years. To ascertain the extent to which NHS outpatient activity has already and might continue to recover compared to pre-pandemic years, in this subsection, we compare activity in the year 2019/20 with that in 2023/24.

Activity in 2023/24 was 8.58% higher than in 2019/20 when excluding NHS private patients (or 8.60 % when included). Similarly, activity-weighted average unit costs increased by 32.25% when excluding private patients (or 32.22% when private patients are included). The cost-weighted, working-day adjusted Laspeyres volume growth was 6.61 % excluding private patients and 6.63% including them. The working-day adjustment had a significant impact on these figures; prior to adjustment, the growth rates were notably lower at 4.93% and 4.95%, respectively.

For NHS-funded activity, the cost-weighted, quality and working-day adjusted output growth was 6.47% both using the 80th percentile waiting time for all first appointments and using face-to-face appointments only. Since the deterioration in waiting times between 2019/20 and 2023/24 was more severe than in the two most recent financial years (see Table 21), the quality adjustment exerted a larger negative impact on growth over this period.

Including private patients does not have a significant impact on the overall results, with the cost weighted, quality and working day adjusted output growth equal to 6.49%, irrespective of whether all first appointments or only face-to-face first appointments are used for the waiting time adjustment.

In the analysis restricted to NHS Trusts (see Appendix 9.3, section 9.3.2), the inclusion of private patients had a minimal impact. Activity increased by 8.32 % excluding private patients versus 8.34% including them, while unit costs rose by 32.39% and 32.36% respectively. The working-day adjusted Laspeyres growth (2019/20-2023/24) was 6.39% excluding private patients and 6.41% including them. When further adjusted for waiting times, these rates dropped to 6.25% and 6.27%. Notably, these results were identical whether using all first appointments or only face-to-face appointments.

6.4. National Cost Collection data

The National Cost Collection⁴¹ (NCC) data are used in the NHS output and productivity series to capture health care activity delivered but not included in our definitions of primary care, including community prescribing, hospital inpatient and outpatient settings, and ophthalmology and dentistry. It captures activity conducted in accident and emergency (A&E) departments, including ambulance services, mental health, and community care settings, and diagnostic facilities. Activities are reported in various ways: attendances, bed days, contacts, number of tests, etc.

NCC data also provide information on average unit costs for all recorded activities, including activity performed in hospitals in both inpatient and outpatient settings. NCC data were checked for both accuracy and activity coverage.

⁴¹ Previously known as the National Reference Cost data.

The 2023/24 NCC publication was not accompanied by any supporting documentation, which typically includes information on settings or sub-settings of healthcare activity which are not comparable with previous years due to changes in data collection, grouping or any other data quality related issues. We therefore relied on the Integrated National Cost Collection guidance, discussions with the NHS England costing team and our internal data quality checks to determine data comparability across years.

As in previous reports (Arabadzhyan et al., 2022, Arabadzhyan et al., 2023, Arabadzhyan et al., 2024, Arabadzhyan et al., 2025) we used both the national-level and the Trust (organisational)-level NCC data to inform and calculate the output growth rates for healthcare services delivered outside of primary care and of hospital inpatient care.

Further, when using the organisational-level NCC data, we removed Trusts that were not included in the NCC data collection in either 2022/23 or 2023/24 when calculating the output growth rate between these two financial years. We also compared the number of Trusts present in 2019/20 and 2023/24 and kept only those that appeared in both financial years when calculating the 2019/20-2023/24 growth rates. In 2019/20, 209 out of 223 providers were included in the dataset. In 2022/23 206 out of 212 providers were included and in 2023/24 205 out of 210 providers were included.⁴² Failing to account for the different number of providers submitting data in different years may result in an underestimation of the growth rates for the 2022/23-2023/24 link, and, generally, an overestimation for the 2019/20-2023/24 link. After removing Trusts that did not submit data in one of the two years of interest, we were left with 201 Trusts for the 2022/23-2023/24 link and 193 Trusts for the 2019/20-2023/24 link.

Below we outline the approaches taken to make the national level NCC data comparable across 2022/23 (2019/20) and 2023/24 years for all the NHS settings that were affected by changes. This should be considered when interpreting the 2022/23-2023/24 and 2019/20-2023/24 output growth rates for the NHS settings covered by the NCC.

A&E and Ambulance

In previous years, A&E activity was recorded under four separate service codes (01EC-04EC), corresponding to consultant-led 24-hour emergency departments (01EC), consultant-led mono-specialty accident services (02EC), other types of A&E/minor injury units (03EC), and NHS walk-in centres (04EC). In 2023/24, two additional service codes were introduced: same-day emergency care (05EC) and Unknown. We classified Unknown as a separate group and included them in our baseline Laspeyres output growth measure, working with the assumption that these observations corresponded to activity previously recorded under one of the 01EC-04EC groups in 2022/23. We rely on the imputation method (Castelli et al., 2011) to impute the unit costs for the Unknown A&E category using the NHS Cost Inflation Index for Pay and Prices. Same-day emergency care (05EC) was also classified as a separate group, but as we do not have any corresponding data in 2022/23, we deemed it as not comparable and therefore excluded it from the baseline NHS total output growth rate. For completeness, we also reported growth rates including same-day emergency care alongside the main estimates.

⁴² The difference in the total number of NHS Trusts between financial years is due to several mergers and acquisitions.

Community Care

We were able to compare Community Care settings between 2022/23 and 2023/24, where we additionally conducted an overview of two sub settings: maternity and wheelchair activity. In 2023/24, maternity-related currencies were recorded across a more granular set of settings than in 2022/23. In addition to CHS, these currencies appeared under consultant led outpatient care (OP-CL), non-consultant led outpatient care (OP-NCL), and outpatient procedures (OPROC). Specifically, OP-CL included community midwife, ante natal visits (N01A, N01P), health visitor, new baby review and other clinical intervention (N03B, N03F), and HIV/AIDS specialist nursing (N18AF, N18AN); OP-NCL included all OP-CL currencies plus parent craft (N03H); and OPROC included N01A and N01P. All these currencies were also identified in the newly introduced “Maternity Care Contacts” sheet of the 2023/24 NCC dataset. As no equivalent activity for N01* and N03* currencies were recorded within OP or OPROC in the 2022/23 NCC data, these were excluded from the NHS output growth calculations. Similarly, activity for both N18AF and N18AN recorded as OP-CL in 2023/24 were excluded due to the absence of recorded activity in 2022/23 and their extremely large unit costs. In contrast, activity for both N18AF and N18AN recorded as OP-NCL were included as it appears to be comparable between 2022/23 and 2023/24, but we reassigned them to CHS and compared them within the maternity sub-setting.

In 2022/23, wheelchair services were recorded under the service codes WCE* within CHS only. In 2023/24, in addition to WCE*, new service codes WCC* were introduced for the first time for non-consultant led outpatient care activity (OP-NCL). Similar to maternity activity, it is unclear how this activity was recorded across settings in 2022/23, we retain only WCE* and compare these between 2022/23 and 2023/24. To ensure comparability between 2019/20 and 2023/24, both WCE* and WCC* were excluded.

The ‘NZ*’ currency codes were no longer recorded under community care and were instead classified under outpatient activity in both 2022/23 and 2023/24. We therefore retained them within this setting. These currencies could be compared across years, excluding two codes: NZ30A and NZ40Z, which we identified as outliers. Between 2022/23 and 2023/24, their total value (cost) increased by ten and fifty-nine times, respectively. To ensure comparability between 2019/20 and 2023/24, all NZ* currencies were excluded when calculating output growth rates.

Chemo-/Radiotherapy and High Cost Devices

In 2022/23, NHS England mandated that chemotherapy and radiotherapy services be collected using PLICS, with both types of activity reported in both the Admitted Patient Care (APC) and Outpatient Procedures (OPROC) NCC worksheets. We followed the approach of Arabadzhyan et al. (2025), and activity from APC was compared using service code and currency code, while activity from OPROC was compared using department code and currency code. In 2023/24, High Cost Drugs data were not available at the Trust level because this information was deemed commercially sensitive. At national level, the growth rates for this sub-setting appeared implausibly high. Therefore, we decided to exclude High Cost drugs from the overall setting growth rates, both for the raw and cost-weighted growth rates. The setting specific growth rates were calculated excluding High Cost Drugs activity also in 2022/23 and in 2019/20.

Diagnostic Tests and Radiology

Direct Access Diagnostic and Pathology Services were comparable between 2022/23 and 2023/24 at both currency and service codes levels. A small number of Direct Access Diagnostic Services currencies were introduced in 2023/24, we kept them in and relied on the imputation method to obtain a valid unit costs using the NHS Cost Pay and Price Cost Inflation index. Finally, we noted that the currency code DAPFI in the 2022/23 NCC data was recoded as PF in the 2023/24 NCC data. The currency code for 2022/23 was changed to enable comparability with 2023/24.

As for Direct Access Pathology Services, currencies were recorded in 2023/24 changing from DAPS (01-09) in 2022/23 to PATH (01-09) in 2023/24. This change was considered in the analysis. To compare with 2019/20, we follow Arabadzhyan et al. (2025) and aggregate the data to the currency level for use in output growth calculations.

Radiological services for 2023/24 were reported in the same worksheets as in 2022/23: Nuclear Medicine (NM), Diagnostic Imaging (IMAG) and Directly Accessed Diagnostic Services (DADS) worksheets. In this year, we considered only currencies from NM and IMAG under the Radiology setting, while RD* and RN* currencies were no longer moved from DADs to Radiology. Instead, they were retained within DADs to ensure comparability between 2022/23 and 2023/24. Additionally, the currency code RD97Z was moved from APC to Radiology in 2023/24 and is imputed for 2022/23. The service code SI_Imag_OP under IMAG and NM was recoded to SI to enable comparison with 2022/23. In the same vein, we treated the service description “Supplementary Information” under service code SI in 2022/23 as comparable to “Outpatient Imaging” under service code “SI_Imag_OP” in 2023/24. This treatment reflects the structure of the NCC data, where identical currency codes (e.g., RD*) can appear across both DADS and IMAG worksheets. The currency code captures the clinical activity itself (e.g., MRI, CT, or ultrasound), while the worksheet reflects the referral pathway. Specifically, DADS records imaging requested directly by primary or community care (e.g., GP referrals), where the scan represents a standalone activity. In contrast, IMAG captures imaging requested within secondary care, where the scan forms part of a broader patient pathway (e.g., outpatient, inpatient, or A&E activity). Separating these activities is essential for accurate costing. For DADS, the imaging represents the full cost of care, whereas in IMAG, imaging costs are unbundled from the overall episode of care to avoid double counting within hospital activity.

For the purpose of calculating the output growth rate between 2019/20 and 2023/24, we follow the approach suggested in Arabadzhyan et al. (2025) and move the activity under currency codes RD* and RN* from the DADS worksheet back to the Radiology setting and assign it the ‘Direct Access’ (DA) service code to make it comparable.

Specialist Services (Cancer Multidisciplinary Teams Meetings, Critical Care, Specialist Palliative Care)

Cancer Multidisciplinary Teams Meetings (CMDT) healthcare services were reported with a split by service code and currency code in the NCC data for both 2022/23 and 2023/24. Therefore, these are directly comparable. However, aggregation to currency code is still applied to compare these healthcare services with 2019/20. Additionally, several Trusts reported implausibly high activity volumes in either 2022/23 (Gloucestershire Hospitals NHS Foundation Trust (RTE), Northern Lincolnshire and Goole NHS Foundation Trust (RJL), and Gateshead Health NHS Foundation Trust (RR7)) or 2023/24 (East Lancashire Hospitals NHS

Trust (RXR)) When calculating the growth rates corrected for the number of Trusts, we excluded all four of the above providers from the 2022/23-2023/24 growth rates, and East Lancashire Hospitals NHS Trust (RXR) only for the 2019/20-2023/24 link. Critical care transport currencies do not present issues between 2022/23 and 2023/24. However, we still need to aggregate to currency level when comparing with 2019/20.

Specialist Palliative Care activity which is normally included in the Specialist Services setting was excluded from all years included in this update as they are no longer available in the NCC dataset.

Renal Dialysis

In the 2023/24 NCC data, as in 2022/23, renal dialysis activity was submitted at the patient level, following NHS England's mandate to move this activity to PLICS. Renal dialysis currencies can still be found in the APC worksheet. However, in 2022/23, these currencies were disaggregated across service codes EL, NEL, NES, DC, and RP, whereas in 2023/24 they were reported under the service code Renal. To ensure comparability between 2023/24 and 2022/23 and 2019/20, we aggregated the activity to the currency level. In addition, two new currencies, LD03B and LD04B, appeared in 2023/24. We keep these two new currencies and apply the imputation method proposed by Castelli et al. (2011) to obtain the unit costs.

Rehabilitation

Starting from 2022/23, rehabilitation was recorded in both unbundled HRGs and against the core HRGs for admitted patient care rehabilitation. When calculating growth rates for the 2022/23-2023/24 and 2019/20-2023/24 links, we aggregated activity up to the currency level.

Although 2022/23 and 2023/24 were comparable in terms of both currency and service codes, we retained the approach from the previous year. Specifically, in 2023/24, 623 currencies (about 73% of all currencies in rehabilitation in 2023/24) matched those observed in 2022/23 within the same setting. Of these, 600 appeared in HES Admitted Patient Care (APC), while the remaining 23 consisted exclusively of VC* currencies, which have historically been recorded within the separate Rehabilitation setting. A further 229 currencies appeared newly in the Rehabilitation setting in 2023/24 and were also present in HES APC in the same year. The majority of these new currencies, consistent with 2022/23, were recorded under the Rehabilitation Medicine service (service code 314). This service code used to be present in the APC worksheet, but this was no longer the case since 2022/23. This implied that the activity recorded as service code 314 in the inpatient setting, similar to 2022/23 was reported in the rehabilitation setting in the NCC publication. We checked whether the 2023/24 HES APC dataset included activity for the specialty 314, and we found this to be the case. We also checked whether the volumes in 2023/24 were similar to those in 2022/23 and found this to be the case too. This led us to conclude that some of the rehabilitation activity was already included as hospital inpatient care in the HES APC dataset in 2023/24 and in previous years. To avoid double-counting this part of rehabilitation services, we need to exclude them either from the Rehabilitation setting as measured by the NCC data, or from the Inpatient setting, which is measured by the HES APC data. We opted for dropping these currencies from the NCC-measured rehabilitation activity because in HES APC we were unable to distinguish between activity delivered as inpatient care from the rehabilitation-specific activity for a few other relevant specialties of the Rehabilitation setting (323, 344, and 345).⁴³ Therefore, we

⁴³ The reason we are able to easily make this distinction in the National Cost Collection data is that these currencies are recorded in separate worksheets (APC and REHAB).

derived the Rehabilitation output growth rate, which then feeds into the total NHS output growth rate, including only VC* codes. However, when discussing growth rates for each setting, we also included a growth rate measure calculated using all the currencies in the Rehabilitation sheet, which was a fairer representation of the actual growth of the setting.

Other NHS activity

In 2023/24 we were again able to compare both Day Care (DC) facilities and audiological services. Unlike previous NCC data, where comparability required aggregation to the currency level, we did not need to aggregate these for the financial years 2022/23 and 2023/24. Nevertheless, to ensure comparability with the 2019/20 financial year, we aggregated these activities up to the currency level.

The number of service codes for DC facilities in 2023/24 is approximately twice as large as in 2022/23, while the set of currencies remains broadly comparable. Given the increase in the number of service codes, we decided not to aggregate the data to the currency level and instead apply an imputation method.

Mental Health

We compared mental health activity between 2022/23 and 2023/24. In both years, the activity was reported under three different settings: mental health provider spells (MHPS), mental health care contacts (MHCC), and NHS talking therapies care contacts (NHS TT). MHPS was not directly comparable between 2022/23 and 2023/24, as the service codes differ across years. Therefore, we aggregated to the currency level, which is common to both years. MHCC had stable currency codes but different, yet comparable, service codes. Specifically, four additional new service codes appear in 2023/24. Hence, to compare with 2022/23, we applied the imputation method for the MHCC activity that only appears in 2023/24. NHS TT activity was fully comparable between 2022/23 and 2023/24, with aligned currency codes and matching service codes. However, the comparison between 2019/20 and 2023/24 is not possible for all settings due to the lack of matching currency codes.

In the remainder of this section, we present the results of our internal data quality checks (section 6.4.1) and report detailed overviews of activity and unit costs trends, and output growth for each NHS setting (section 6.4.2). Activity and unit costs trends are calculated using the national-level NCC data, i.e. they are not corrected for the number of Trusts.

6.4.1. Quality checks

Following our own validation process (Bojke et al., 2014), we identify large changes in either volume or unit costs of activity for all non-acute services. In particular, our quality assurance process consists of four steps:

- **Step 1:** We check whether a large change in either the total volume (>500,000 units) or the total value (>£25,000,000) of NHS activity/HRG codes, as reported in the NCC data, is observed. The check compares volumes of activity, unit costs, and total costs of the last two financial years in the national productivity series.
- **Step 2:** We check whether cases of NHS activity/HRG codes, meeting at least one of the criteria in Step 1, do not appear to be genuine. This step may lead to the identification of a subset of HRG/service codes related to NHS activity requiring

further investigation. Limited to the HRG/service codes flagged up as requiring further investigation, we implement two further steps.

- **Step 3:** This step normally included a cross-check of flagged up HRC codes against the codes listed in the HRG4+ Reference Costs Grouper Roots file. However, since 2019/20 NHS England has not been publishing an updated HRG4+ Reference Costs Grouper Roots file, and therefore, all checks were carried out via web searches and careful reading of the NCC costing guidance publication.⁴⁴
- **Step 4:** If flagged HRG/service codes have not changed in terms of labelling, definition, or categorisation, we analyse the data in greater detail to identify the possible source of any potential large changes in either volume or value of activity.

We followed this validation process for the financial years 2022/23 and 2023/24, and for the 2019/20-2023/24 link.

We found that the 2023/24 data were again characterised by a substantial number of categories flagged as large changes in either value, measured as total cost, and/or volume, measured as units of activity. Compared with 2022/23, the total number of NCC categories increased from 9,497 to 9,821. This net increase masks considerable movement in the underlying currency structure: 1,736 categories were newly observed in 2023/24 and 1,412 categories present in 2022/23 were no longer observed.

Some of these changes may be explained by continuing changes in the NCC data structure, the move to PLICS in several areas of care, and the aggregation required to make 2022/23 and 2023/24 data comparable. These adjustments can make currencies more likely to exhibit large absolute changes in volume and/or value.

Below we describe which settings and individual service categories within these settings were flagged up as having a large value and/or volume change, and the likely reasons behind them.

A&E and Ambulance

A&E Services recorded an increase in the number of categories, from 49 in 2022/23 to 68 in 2023/24. This is fully explained by 19 new categories, mainly associated with new emergency medicine and unknown categories.

Large value changes were observed for ambulance “see and treat or refer” and “see and convey” currencies, ASS01 and ASS02, and for several emergency medicine currencies, including VB03Z, VB07Z, VB08Z and VB09Z. In the unit-cost/value comparison, VB04Z was also flagged. These changes appear to be driven by a combination of activity and unit-cost changes rather than by a clear change in currency definition.

Chemotherapy, Radiotherapy, High Cost Drugs and Devices

The number of categories in Chemo/Radiotherapy and High Cost Drugs fell from 809 in 2022/23 to 793 in 2023/24. However, this net reduction masks substantial churn, with 102 new categories and 118 dropped categories. We also identified a large value change for the high cost device currency DEV14, ICD: Implantable Cardioverter-Defibrillator.

⁴⁴ [NCC 2021 costing guidance](#) (last accessed 11/11/2023).

Community Care

Community Care increased from 1,189 categories in 2022/23 to 1,248 categories in 2023/24, with 321 new categories and 262 dropped categories. A substantial number of large value and volume changes were concentrated in maternity, community nursing, school-based children's health services, and intermediate care.

The largest repeated flags included N02AF: District Nurse, Adult, Face to face, which was flagged across value, unit-cost/value and volume comparisons. Other flagged currencies included N0500: School Based Children's Health Other Services, One to One; N12: Nursing Services for Children; N29AF: Other Specialist Nursing, Adult, Face to face; N02AN: District Nurse, Adult, Non face to face; IC01: Intermediate Care, Crisis Response and Early Discharge Services; IC03: Intermediate Care Home Based Services; A13C1: Speech and Language Therapist, Child, One to One; VACN: School Based Children's Health Other Services, Vaccinations; and 560: Community Midwife, Ante Natal Visit.

These patterns are consistent with continuing recording changes in community services, including the effects of more granular service-code reporting and the earlier soft move to PLICS for some community activities.

Outpatient

We observed a substantial increase in both the volume and value of appointments for midwifery (TFC 560), which was concurrent to large negative changes in the volume and value observed in community maternity care activity. This might indicate a shift of the point of delivery from community to outpatient, and a consequent shift of its records.

Specialist Services

Large value changes between 2022/23 and 2023/24 were mainly detected in the Critical Care sub-setting, driven by concurrent increases in both volumes and unit costs. In addition, Cancer Multidisciplinary Teams Meetings currencies were flagged due to both large volume and value changes. This was due to several Trusts submitting implausibly high activity volumes. Note we can only correct for this when deriving growth rates based on Trust-level data. Activity volumes and unit costs for the Cancer Multidisciplinary Teams Meetings sub-setting were reported using national level data, without exclusions.

Diagnostic tests

Similar to the previous update (Arabadzhyan et al., 2024), large changes in diagnostic services were detected for volume only, while their unit costs remained stable. We believe this may be explained by rolling out Community Diagnostic Centres, where diagnostic services were also provided.⁴⁵

Rehabilitation

A few VC* codes in the Rehabilitation setting saw large negative value changes. This is in line with the general trend for the VC* currencies we have been observing for the last few years. We believe the drop in those currencies does not reflect a decline in service provision, but rather a change in recording practice, as described in the beginning of this section.

⁴⁵ For more information on Community Diagnostic Centres see [here](#) (last accessed 24/06/2026).

Finally, similarly to the previous NHS productivity updates, we provide the estimates of the growth rates corrected for the number of Trusts included in the core NCC schedule. Both uncorrected and corrected growth rates are reported in Table 23.

National Screening Programmes

These were first reported in the National Cost Collection dataset in 2022/23. As we now have two years' worth of data, we are able to introduce them in the measure of NHS output growth.

This setting is comprised of four separate screening programmes: (1) the NHS abdominal aortic aneurysm screening programme, (2) the NHS breast screening programme, (3) the NHS cervical screening programme and (4) the NHS bowel cancer screening programme.

6.4.2. Growth in NHS activity captured in the National Cost Collection data

In this section, we present the results for the three most recent financial years of NHS activity captured by the NCC data. Tables reporting the full time series for both activity and average costs can be found in the Online Appendix.

Table 22 provides an overview of the activity volumes and average unit costs for the last three years, as measured by the original NCC data. This year the Community Mental Health setting and the National Screening Programme were included in the analysis.⁴⁶ Moreover, we separately present wheelchair and maternity services under the Community Care setting.

And Table 23 presents raw volume growth rates, Laspeyres volume growth rates derived from the NCC data as is, and Laspeyres volume growth rates adjusted for the number of Trusts present in the two financial years, for both the links 2022/23-2023/24 and 2019/20-2023/24.

As appears from Table 22, activity volumes between 2022/23 and 2023/24 were fairly stable, with some settings seeing an increase (Chemo-/Radiotherapy and High Cost Devices, Diagnostic Tests, A&E and Ambulance, Mental Health, Community Care) and others declining (Radiology, Rehabilitation, Renal Dialysis, Specialist Services, Other NHS activity). A similar picture arises when comparing activity volumes as measured by the national level NCC data between 2019/20 and 2023/24. This may reflect that some trends in service provision induced by the pandemic remained until 2023/24. Table 22 represents growth rates for the A&E and Ambulance including same day emergency care. Table 23 shows growth rates for the whole Rehabilitation setting.

⁴⁶ For historic trends in community mental health activity see Table A14 in the Online Appendix.

Table 22: Activity volumes and average unit costs for the settings measured by NCC

NHS setting	2021/22		2022/23		2023/24	
	Volume of activity	Average cost (£)	Volume of activity	Average cost (£)	Volume of activity	Average cost (£)
Outpatient*	84,986,789	170	84,438,743	176	88,003,646	181
Community Care*						
Maternity	-	-	38,845,110	69	40,997,014	73
Wheelchair	-	-	281,543	180	299,097	184
Total	73,310,146	79	64,689,786	80	68,775,010	86
Directly Accessed Diagnostic Services*	6,318,767	41	11,528,851	62	12,319,952	63
Directly Accessed Pathology Services*	385,602,765	2	410,137,655	2	456,170,841	2
Radiology*	10,020,705	131	10,522,635	144	9,546,102	131
Rehabilitation	1,223,867	516	1,225,179	511	1,579,394	629
Renal dialysis	4,506,408	152	4,017,010	185	4,005,866	193
National Screening Programmes	-	-	5,151,924	68	6,751,862	55
A&E and Ambulance						
Emergency Departments	15,601,148	281	15,989,113	312	16,176,143	330
Other A&E services	4,490,255	108	5,022,481	104	5,827,987**	114
Hear and treat/refer	1,238,673	63	1,014,301	78	1,147,817	66
Ambulance Services						
See and treat/refer	2,652,954	268	2,597,637	308	2,659,366	327
See and treat & convey	4,929,780	390	4,547,244	462	4,858,582	459
Other	3,341,620	50	4,448,734	22	4,425,204	22
Chemotherapy, Radiotherapy, High Cost Drugs and Devices						
Chemotherapy	2,932,618	657	1,500,077	426	1,569,815	434
Radiotherapy	1,623,628	339	1,578,416	360	1,570,981	379
High Cost Drugs	3,492,206	774	6,813,360	606	-	-
High Cost Devices	365,412	1,503	310,160	1,954	349,715	1,972
Specialist Services						
Critical Care	2,362,589	1,753	2,404,161	1,831	2,355,216	1,917
Specialist Palliative Care	823,770	219	-	-	-	-
Cystic Fibrosis	50,103	1,212	44,759	1,409	-	-
Cancer Multi-Disciplinary Team Meetings	2,034,490	139	6,411,493	48	4,051,694	78
Mental Health						
Mental health care contacts	-	-	17,907,760	287	20,324,922	302
Mental health provider spells	-	-	6,240,940	687	7,463,508	651
NHS talking therapies	-	-	4,562,463	159	4,807,986	163
Other NHS activity						
Regular Day & Night Attenders	267,445	403	305,967	409	293,880	415
Audiological Services	2,615,431	90	1,797,966	100	2,313,039	93
Day Care Facilities	70,000	276	46,537	167	91,368	180

Notes: * Settings obtaining different activity volumes or average costs in 2022/23 compared with those reported in Arabadzhyan et al. (2025). DADs and Radiology volumes and unit costs for 2022/23 differ from those reported by Arabadzhyan et al. (2025), as we no longer move RD* and RN* codes out of DADs in 2023/24. ** This figure includes same day emergency care within Other A&E services in 2023/24.

Table 23 reports raw volume growth rates and the Laspeyres growth rates derived using the national NCC data and those obtained when corrected for the number of NHS Trusts. Between 2022/23 and 2023/24, NHS settings showed significant variation in growth rates. The working/total days adjusted Laspeyres output growth for NHS activity corrected for the number of providers was 7.65% including the outpatient setting, and 9.25% otherwise. The largest increases were recorded for Radiology and Other NHS activity (43.37% and 17.47% respectively, when corrected for the number of providers).

The majority of NHS settings recorded positive Laspeyres growth rates, except for Renal Dialysis and Specialist Services, whose growth rate was -0.09% and -3.13%, respectively.

Between 2019/20 and 2023/24, the Laspeyres growth rates showed a positive growth for settings: Outpatient, Community Care, Diagnostic Tests, A&E and Ambulance, Radiology, and Chemo-/Radiotherapy and High Cost Drugs and Devices. The latter only include activity for Radiotherapy and High Cost Devices. The working/total days adjusted Laspeyres growth rate of activity corrected for the number of Trusts was -2.18%, and -1.01% when the outpatient setting was excluded. This is an improvement compared to last financial year, suggesting that the NHS is on a steady path to recovery from the pandemic downturn, pre-pandemic levels of activity have not been reached yet. If we exclude the NHS settings that have moved to PLICS since 2022/23, we find that the working day adjusted Laspeyres output growth rate was 2.14%.

In the remainder of this section, we describe in more detail the setting-specific activity and unit costs, providing, where appropriate, further information.

Table 23: Raw volume and Laspeyres growth rates for the settings measured by NCC

NHS setting	2022/23-2023/24			2019/20-2023/24		
	Raw volume growth rate	Laspeyres growth rate	Laspeyres growth rate corrected for # of Trusts	Raw volume growth rate	Laspeyres growth rate	Laspeyres growth rate corrected for # of Trusts
Outpatient	3.22%	4.30%	3.84%	2.13%	0.96%	-4.03%
Community Care	6.32%	11.46%	9.70%	13.04%	5.72%	1.46%
<i>Maternity</i>	5.54%	9.65%	8.42%	-	-	-
<i>Wheelchair</i>	6.23%	12.60%	12.75%	-	-	-
Diagnostic Tests	11.10%	11.42%	14.61%	16.06%	16.12%	12.17%
<i>Directly Accessed Diagnostic Services</i>	6.86%	8.77%	13.63%	11.53%	14.57%	5.72%
<i>Directly Accessed Pathology Services</i>	11.22%	13.30%	14.93%	16.14%	16.60%	14.18%
Radiology	-10.09%	14.08%	43.37%	21.41%	31.73%	26.57%
Rehabilitation	-3.74%	0.36%	0.48%	-57.29%	-56.20%	-56.83%
Renal dialysis	-0.28%	-0.06%	-0.09%	-5.53%	-4.02%	-7.92%
National Screening Programmes	31.06%	35.27%	35.27%			
A&E and Ambulance	3.55%	3.54%	3.13%	13.04%	4.47%	1.54%
<i>Emergency Departments</i>	1.17%	2.31%	1.49%	4.58%	4.16%	-0.48%
<i>Other A&E services</i>	10.44%	12.02%	12.89%	22.39%	25.57%	19.37%
<i>Ambulance Services</i>	3.83%	6.04%	6.04%	21.25%	1.64%	1.64%
Chemotherapy, Radiotherapy and High Cost Devices	3.01%	10.15%	11.23%	-17.31%	8.41%	3.95%
<i>Chemotherapy</i>	4.65%	5.05%	6.54%	-39.76%	-66.72%	-69.69%
<i>Radiotherapy</i>	-0.47%	2.31%	5.58%	-15.34%	-11.88%	-14.67%
<i>High Cost Devices</i>	12.75%	22.87%	21.16%	-25.14%	28.93%	22.11%
Specialist Services	-27.32%	-2.09%	-3.13%	46.46%	5.95%	-4.18%
<i>Critical Care</i>	-2.04%	-2.64%	-3.25%	-5.18%	-1.58%	-5.01%
<i>Cancer Multi-Disciplinary Team Meetings</i>	-36.81%	5.79%	-1.27%	114.31%	118.42%	8.50%
Mental Health	13.53%	16.43%	13.76%	-	-	-
<i>Mental health care contacts</i>	13.50%	14.87%	12.18%	-	-	-
<i>Mental health provider spells</i>	19.59%	20.07%	17.00%	-	-	-
<i>NHS talking therapies</i>	5.38%	5.90%	5.57%	-	-	-
Other NHS activity	25.47%	20.66%	17.47%	-22.63%	-18.26%	-19.49%
<i>Regular Day & Night Attenders</i>	-3.95%	-5.56%	-5.51%	-11.26%	-9.97%	-8.01%
<i>Audiological Services</i>	28.65%	35.48%	30.70%	-24.48%	-23.54%	-26.56%
<i>Day Care Facilities</i>	96.33%	102.00%	80.50%	-2.49%	-7.82%	-7.80%
Total NHS output measured by NCC		8.38%	7.65%		2.88%	-2.18%
<i>excluding Outpatient</i>		9.13%	9.25%		3.98%	-1.01%
<i>excluding Outpatient, Rehabilitation, Renal Dialysis, and Chemo-/ Radiotherapy and High Cost Devices*</i>					20.83%	2.14%

Notes: * Fully or partially mandated for PLICS collection in 2022/23. Laspeyres growth rates are adjusted for working/total days. High cost drugs data are no longer published in the NCC, hence were removed from all growth rate estimates. Large negative Chemotherapy growth rates for the 2019/20-2023/24 link are due to moving part of its activity to the High Cost Drugs sub-setting from 2022/23 onwards. Since High Cost Drugs data are no longer available, we excluded Chemotherapy from the growth rates calculation of Chemotherapy, Radiotherapy and High Cost Devices setting for the 2019/20-2023/24 link to avoid downward bias. Large positive Cancer Multidisciplinary Teams Meetings growth rate using national level data for 2019/20-2023/24 link is due to a data quality issue in one Trust, which was excluded in the growth rates corrected for the number of Trusts. Growth for the Rehabilitation setting is based on VC* currencies only.

Outpatient activity

Outpatient activity, as measured in the NCC database, is classified into three major groups: consultant-led activity, non-consultant-led activity, and procedures. Consultant- and non-consultant-led activity represent broadly the same set of outpatient specific HRG-style codes (currency codes beginning with WF). Outpatient procedure codes represent procedure-related HRGs which may appear in other hospital settings. The shares of outpatient activity by the three major groups described above did not change in 2023/24 compared to 2022/23 with consultant-led activity representing 57%, non-consultant-led activity representing 26% and outpatient procedures' representing 17% of overall outpatient activity.

For the 2022/23-2023/24 link, the adjusted Laspeyres growth rate corrected for the number of providers was 3.84%.

When comparing outpatient activity to its pre-pandemic levels, i.e. with financial year 2019/20, the working day adjusted Laspeyres growth rate was negative at -4.03%, with raw volume growth at -4.64%. This is an indication that the negative growth occurred more in activity with a lower cost weight.

A&E and ambulance services

A&E services are provided in both Emergency Departments (EDs) and 'Other A&E' departments.⁴⁷ Up to 2020/21, attendances at A&E departments were classified into three groups: those where patients are subsequently admitted (AD) to an inpatient ward, those where patients are not admitted (NAD), and those with an unknown outcome (Unknown). However, in 2021/22 this classification was removed, and only the total number of activities within each department type was recorded. From 2022/23, A&E activity was grouped as consultant-led 24-hour emergency department services (E01), other consultant-led mono-specialty A&E services (E02), other A&E/minor injury units (E03), and NHS walk-in centres (E04). In 2023/24, a separate category was introduced for Same Day Emergency Care activity (E05).

A&E and ambulance services showed very similar raw volume and Laspeyres growth rates adjusted for the number of Trusts, between 2022/23 and 2023/24, at 3.55% and 3.13%, respectively. Including Same Day Emergency care increases these to 4.39% and 4.29%, respectively.

Considering sub-categories of A&E services, we observed an increase in the raw volume growth of 'Other A&E services' (10.44%) between 2022/23 and 2023/24, with a resulting 12.89% Laspeyres growth rate when adjusting for the number of trusts. Similarly, as noted above, including same day emergency care would further increase the growth rates to 16.04% and 24.50%, respectively (see Table 24). Between 2022/23 and 2023/24, the raw volume of

⁴⁷ Emergency departments offer a consultant-led 24 hour service with full resuscitation facilities and designated accommodation for the reception of A&E patients, whilst other A&E departments can be either of the following: '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'. For a definition see the spreadsheet "10. Attendance Location" of the file "ECDS Enhanced Technical Output Specification (ETOS) v3.1.1." available at NHS Digital website "[ECDS guidance and documents](#)" (last accessed 27/02/2025).

emergency department attendances increased by 1.17%, whilst the Laspeyres volume growth was 1.49% after adjusting for trust coverage over the same period.

As regards ambulance services, an increase in activity volume (3.83%) was captured for the 'Hear and treat/refer' category between 2022/23 and 2023/24, while growth in the remaining activity categories was less pronounced. The 'Other' category recorded a slight decline by -0.53%. For this period, overall ambulance services grew by 3.83% in raw volumes and 6.04% when cost-adjusted growth is considered.

Table 24: Growth rates for the A&E and Ambulance including same day emergency care, 2022/23 – 2023/24

Settings	Raw volume growth rate	Laspeyres growth rate	Laspeyres growth rate corrected for # of Trusts
A&E and Ambulance	4.39%	4.29%	3.89%
Other A&E services	16.04%	24.50%	17.44%

Compared to 2019/20, we found an overall increase in A&E and Ambulances raw volume of activity of 9.85%. The total day adjusted Laspeyres output growth rate was, however, much lower at 1.54%, an indication that activity grew faster in services with lower unit cost weights.

Chemotherapy, Radiotherapy and High Cost Devices

It should be noted that we excluded High Cost Drugs from the calculation of the overall growth rates, both in raw activity volumes and the Laspeyres measure, because this activity is no longer reported both at the national and organisational level within the NCC data., because it has been classified as commercially sensitive information. Therefore, between 2022/23 and 2023/24, the growth figures include only activity for Chemotherapy, Radiotherapy and High Cost Devices. Further, in 2022/23, a large amount of Chemotherapy activity was moved to the High Cost Drugs worksheet of the NCC dataset (both national and organisational), as a consequence, we had to exclude not only High Cost Drugs, but also all Chemotherapy activity in the comparison between 2019/20 and 2023/24 to avoid a downward bias.

Overall, Chemotherapy, Radiotherapy and High Cost Devices increased by 3.01% between 2022/23 and 2023/24, while the Laspeyres growth rate was strongly positive at 11.23% adjusted for the number of Trusts.

When comparing NHS setting in 2023/24 with 2019/20, and unlike last year, we found negative growth of -17.31% when considering raw volumes. This increases to 8.41% when we calculated the Laspeyres growth rate using the national level NCC data and to 3.95% when adjusting for the number of providers.

Community care

Community care includes a very diverse array of activities carried out in the community by Allied Health Professionals, Community Rehabilitation Teams, and by Health Visiting and Midwifery personnel, as well as Intermediate Care (incl. crisis responses, care home based services, etc), Medical and Dental care (e.g. community, emergency, and general dental services), Nursing (ranging from school-based children's healthcare service to specialist nursing for various diseases) and wheelchair services for both adults and children.

Between 2022/23 and 2023/24, community care activity, as captured by the NCC data, grew by 6.23%, with the Laspeyres output growth rate equal to 9.70% adjusted for the number of trusts, indicating a higher growth in more costly community care services. This year, we were able to estimate growth rates for the maternity and wheelchair sub-settings within

Community Care. Between 2022/23 and 2023/24, maternity activity recorded a raw volume growth rate of 5.54% and a Laspeyres growth rate of 8.42% on a trust-adjusted basis, while wheelchair activity recorded corresponding growth and Laspeyres rates of 6.23% and 12.75% respectively. These estimates excluded the wheelchair currencies “WCC” and maternity currencies that appeared for the first time in 2023/24 within either outpatient care (OP) and/or outpatient procedures (OPROC).

Compared to 2019/20, community care activity in 2023/24 increased by 13.04% in terms of raw volume, and when correcting for the number of Trusts the Laspeyres cost-weighted growth was 1.46%.

Diagnostic tests, pathology, and radiology

Continuing the post-pandemic recovery trend, diagnostic and screening activities increased significantly both in terms of raw volumes with a Laspeyres volume growth rate of 11.42% for diagnostic and pathology services and 14.08% for radiological services between 2022/23 and 2023/24. We believe that some of this increase may be due to the roll out of Community Diagnostic Centres, where diagnostic services were also provided.

When comparing output in 2023/24 with that in 2019/20, the volume of activity of Diagnostic Tests (including pathology services) still exceeded its pre-pandemic levels, having recorded a 16.06% growth in raw volumes. The Laspeyres growth was still positive but lower at 12.17% when correcting for the number of Trusts, due to higher volumes of less expensive activity in 2023/24 compared to 2019/20.

For the Radiology setting, we found for the first time positive growth in both the raw volume of activity of 21.21% and a Laspeyres growth rate of -26.57%, when correcting for the number of providers, finally showing post-pandemic recovery.

Rehabilitation and Renal Dialysis

Renal dialysis and rehabilitation services were also among the settings which were mandated for PLICS collection in 2022/23. Renal Dialysis continued to record a milder, but still negative growth equal to -0.28% in raw volume, and -0.09% in Laspeyres terms on a trust-adjusted basis. Similarly, for the 2019/20-2023/24 link, both the raw and the cost-adjusted growth rates were also negative, at -5.53% and -7.92% respectively (corrected for the number of providers). This is still a substantial negative change, which we found difficult to reconcile given that this is life-saving care. We therefore suggest that these results should be interpreted with caution.

Rehabilitation services, as measured by the VC* currencies, continued to show negative raw volume growth rate, but milder, only -3.74%. The Laspeyres volume growth rate was 0.48% adjusted for trusts between 2022/23 and 2023/24, and -56.83% between 2019/20 and 2023/24. Analysing all the currencies would yield a better understanding of the actual growth of rehabilitation activity. Table 26 presents the growth rates for the Rehabilitation setting when all currencies are included. This resulted in 28.91% raw volume growth rate for the 2022/23-2023/24 link, and 38.70% in cost-weighted growth rate. When correcting for the number of Trusts, the Laspeyres growth rate was 37.98%. Including all rehabilitation currencies led to a substantially higher than the 0.48% growth, adjusted for trusts, obtained when only VC* codes are included.

Table 25: Growth rates for the whole Rehabilitation setting

Years	Raw volume growth rate	Laspeyres growth rate	Laspeyres growth rate corrected for # of Trusts
2022/23 – 2023/24	28.91%	38.70%	37.98%
2019/20 – 2023/24	-29.82%	-20.55%	-20.77%

Notes: Laspeyres growth rates are adjusted for working days.

The difference between 2019/20 and 2023/24, however, remains quite large and negative, for all the growth rate measures constructed.

Specialist services

The setting Specialist Services, as defined in this report, comprises the following services: critical care⁴⁸ and cancer multi-disciplinary team meetings. Up to 2018/19, cystic fibrosis services were reported in the NCC data as a separate activity and included in the Specialist Services setting. In the 2019/20 NCC schedule, this activity was recorded under different NHS settings, and the volumes were no longer comparable. In the 2020/21 NCC dataset cystic fibrosis activity was reported in a new format, in a separate schedule. In both the 2021/22 and 2022/23 collections, it was reported in the supplementary materials, rather than in the core schedule, indicating potential data issues. In 2023/24 this setting was no longer reported, and we therefore excluded it from the calculations of the Laspeyres output growth rate for the Specialist Services setting. Finally, up to 2021/22, we also included specialist palliative care activity in the Specialist Services setting, but we are no longer able to do so due to the move of this activity to the inpatient setting in the PLICS reporting format and the disappearance of the previously existing currencies.

The Laspeyres growth rate for critical care services was negative at -3.25% when correcting for the number of trusts between 2022/23 and 2023/24, and very similar to the -2.04% fall in its raw volume. By comparing 2019/20 and 2023/24, we observed a negative Laspeyres growth rate of -5.01% adjusted for trusts, suggesting that critical care activity has not yet reached pre-pandemic levels.

The raw volume growth rate for cancer multi-disciplinary team meetings was negative between 2022/23 and 2023/24 at -36.81%, reducing to a -1.27% Laspeyres output growth rate adjusted for the number of Trusts, and indication that decreased more in services with lower unit cost weights. When compared to the pre-pandemic year 2019/20, we found a substantial positive growth in the raw volumes of activity of 114.31%. This is, however, affected by data quality issues in one Trust, which was excluded in the growth rates corrected for the number of Trusts, showing a more reasonable Laspeyres growth rate of 8.50%.

National Screening Programmes

National Screening Programmes have been reported as a separate NCC setting from 2022/23 onwards. Therefore, growth is only evaluated between 2022/23 and 2023/24, with no comparison made to the pre-pandemic year of 2019/20.

As previously noted, we have activity data for four different national screening programmes, with the highest activity concentrated in bowel cancer testing. This is not surprising, given that in 2023/24, this programme expanded down its routine home-testing kit invitations to

⁴⁸ Up to 2017/18, CHE NHS productivity updates referred to Critical Care under the 'Adult critical care' label.

include 54-year-olds, whereas in 2022/23, these were only extended down to 58-year-olds. In particular, the NHS bowel cancer screening programme recorded the highest increase, with raw volume growing by 85.1% and Laspeyres growth reaching 85.82%. The NHS abdominal aortic aneurysm screening programme followed with a 16.62% increase in raw volume, and a 17.09% growth in the Laspeyres measure. The NHS breast screening programme had a raw volume growth of 6.34%, whilst its Laspeyres growth rate was 6.77%. Finally, the NHS cervical screening programme recorded the lowest increase, with a 3.23% growth in its raw volume, equivalent to 3.64% growth in Laspeyres terms.

Overall, the National Screening Programmes showed strong growth between 2022/23 and 2023/24, with total raw volume increasing by 31.06%, and the overall Laspeyres growth rate reaching 35.27%. The Trust-adjusted growth rate was almost identical to the national-level growth rate, suggesting that the observed increase was not driven by changes in provider coverage. Furthermore, as the number of healthcare currencies remained unchanged during this period, the growth likely reflects a genuine rise in recorded activity within existing programmes, with the exception of the bowel cancer screening programme. Nevertheless, because this represents a new setting in the NCC data, these initial results should still be interpreted with caution.

Mental Health activity

We were finally able to re-introduce mental health activity in our baseline measure of NHS output growth. Mental health care activity is reported in the National Cost Collection data in three separate worksheets: mental health provider spells (MHPS), mental health care contacts (MHCC), and NHS Talking Therapies. The MHPS worksheet includes all inpatient mental health spells; the MHCC worksheet includes all non-admitted mental health care contacts; and the NHS Talking Therapies worksheet includes all attended therapy appointments in the year (excluding long-term care and integrated-pilot services).

Between 2022/23 and 2023/24, overall Mental Health activity showed positive growth, with raw volume increasing by 13.53% and the Laspeyres output growth measure showing 13.76% growth, adjusted for the number of trusts. Growth was observed across all mental health settings. Mental health provider spells recorded the highest increase, with raw volume rising by 19.59% and Laspeyres growth increasing by 14.47% after adjusting for trust coverage. Mental health care contacts also increased by 13.50% in raw volume and by 12.18% in Laspeyres terms. Finally, NHS Talking Therapies showed more moderate growth, with raw volume increasing by 5.38% and Laspeyres growth of 5.57% using trust-adjusted estimates.

Other NHS activity

Other NHS activity settings include day care (DC) facilities, audiological services and regular day and night attenders. Between 2022/23 and 2023/24, the raw volume of the 'Other NHS activity' setting increased by 25.47%. Growth was mainly driven by audiological services, which increased by 28.65%. Although Day care facilities experienced a substantially higher growth rate of 96.33%, its contribution to growth of the whole other NHS activity is the smallest due to the low value in terms of unit costs of this NHS service compared to the other NHS services included in this setting. As regards regular day and night attenders, we found that the Laspeyres cost-weighted growth rate decreased by 5.51% correcting for the number of Trusts between 2022/23 and 2023/24. Overall, the Laspeyres growth rate, corrected for the number of trusts, for this setting was 17.47% for the 2022/23-2023/24. (2019/20-2023/24) link.

In terms of recovery compared to 2019/20, the overall setting and its sub-settings still show substantial negative growth, respectively equal to -22.63% in terms of raw volume growth and -19.49% in its Laspeyres measure, when adjusted for the number of Trusts.

6.5. Dentistry and ophthalmology

- **Between 2022/23 and 2023/24, the cost-weighted and working days adjusted Laspeyres output growth measure for Ophthalmology and Dentistry combined was -0.70%.^{49, 50}**
- **The cost-weighted and working days adjusted Laspeyres output growth measure for Dentistry was -0.88%.**

Information about dentistry⁵¹ (activity and costs), previously published by NHS England, is now published by the NHS Business Services Authority (NHS BSA). Since 2022/23, the categories for dental services have changed, with Band 2 type dental activity now disaggregated into four distinct categories, the addition of two new categories, 'free' and 'Regulation 11 Replacement Appliance', and the retirement of the category 'Other'. No information is provided by NHS BSA on this change affects/is related to previous and current dental service categories.

The sources of information for Ophthalmology⁵² activity have changed over times. Up to 2019/20, this was provided by NHS England (previously NHS Digital). From 2020/21 to 2022/23, we received this information directly from NHS England. In 2022/23, the NHS Business Services Authority took over this role. However, no data for 2023/24 have been published because of known data quality issues that are under investigation by NHS England. Unit cost data for ophthalmological services were provided by the Association of Optometrists up until 2019/20, and since 2020/21 by the NHS BSA.⁵³

Table 26 shows the volume of activity and average costs for both types of outputs, with dental activity differentiated into dental bands for the last three financial years.

In the absence of activity data for ophthalmic services for 2023/24, we decided to make the conservative assumption of no volume change in ophthalmic activity between 2022/23 and 2023/24. This is equivalent to assuming zero growth between these two financial years. This is probably an underestimate as in most other NHS settings, output is growing (except for dentistry). The comparison to the pre-pandemic year 2019/20 is equal to the one recorded in 2022/23, i.e., -4.23%, this reduces to -2.70% when adjusted for the number of working days.

Dental services raw volume of activity increased in 2023/24 by 4.32%, a much more modest growth compared to the one recorded in 2022/23 of 23.2% in 2022/23. This shows a

⁴⁹ Please note that the NHSBSA has not released the activity volumes for ophthalmology for 2023/24 due to data quality issues which, at the time of this report's publication, were still under investigation. We have therefore assumed that the volume of activity for ophthalmology in 2023/24 is equal to the volume of activity in 2022/23. This implies zero growth in the Laspeyres Output growth rate for ophthalmology.

⁵⁰ Between 2019/20 and 2023/24, the cost-weighted and working days adjusted Laspeyres output growth for Ophthalmology was -3.08% (assuming activity volume in 2023/24 is equal to that of 2022/23. See footnote 46 for details), for Dentistry was -12.66%, and for the two activities combined was -11.23%.

⁵¹ [NHS Dental Statistics](#) (last accessed 15/01/2026).

⁵² [Ophthalmic services activity](#) (last accessed 15/01/2026).

⁵³ [NHS Business Services Authority Cost of NHS Treatment](#) (last accessed 15/01/2026).

continued increase which started in 2021/22. When comparing activity volumes with 2019/20, dental activity has still not fully recovered to pre-pandemic levels, with total volumes in 2023/24 being 11.11% lower than in 2019/20. However, this growth rate should be considered with caution because of the re-categorisation of dental services in 2023/24.

Table 26: Ophthalmology and Dentistry

Output	2021/22		2022/23		2022/23		2023/24	
	Volume of activity	Average cost (£)	Volume of activity	Average cost (£)	Volume of activity	Average cost (£)	Volume of activity	Average cost (£)
Ophthalmology	12,719,843	22	12,790,385	22	12,790,385	22	12,790,385	23
Dentistry								
Band 1	13,774,346	24	18,062,643	26	18,148,117	26	19,999,550	27
Band 2	7,328,280	65	9,013,277	71	6,112,051	71	36,131	74
Band 2a	-	-	-	-	2,215,713	71	6,625,186	74
Band 2b	-	-	-	-	692,718	71	2,161,611	74
Band 2c	-	-	-	-	33,674	71	112,219	74
Band 3	1,391,912	283	1,567,481	307	1,572,686	307	1,385,355	319
Urgent	3,782,854	24	3,750,452	26	3,785,953	26	3,674,731	27
Other	85,368	24	83,842	26	-	-	-	-
Free	-	-	-	-	133,432	26	112,047	27
Reg11 Rep. App	-	-	-	-	9,934	96	9,430	96
Total	26,362,760	49	32,477,694	52	32,704,278	52	34,116,260	51

6.6. Primary care activity

- **Between 2022/23 and 2023/24, the cost-weighted, quality (waiting time only) and working days adjusted Laspeyres output growth of primary care activity was 2.56%.⁵⁴**

Since 2018/19, NHS England (formerly NHS Digital) has been releasing the General Practice (GP) appointments dataset, which is used to calculate the output growth of primary care activity (Arabadzhyan et al., 2021).^{55,56} NHS England releases three separate datasets: (1) a monthly summary of GP appointments data at the national level, (2) a monthly dataset at the CCG level with NHS geographies up to regional local office included, and (3) a CCG-level dataset reporting daily appointment counts in general practices. The monthly and daily appointment datasets at CCG level allow for the grouping of GP appointment modes by appointment status and waiting time.

Each monthly data release covers the most recent 30 months, with updated information on the current month and the previous 17 months (18 months in total). The data include activity recorded within the appointment systems for the great majority of General Practices across England, with average patient coverage of about 99.8% during 2023/24.⁵⁷ For the purpose of our NHS productivity calculations, we use the monthly CCG-level dataset to obtain monthly appointment data, with a breakdown by appointment status and waiting time within each appointment mode. We use the national-level dataset for the monthly estimates of patient coverage. Since December 2020, data on COVID-19 vaccinations carried out by GP practices and Primary Care Networks have also been recorded and are included in our analysis.⁵⁸

In this report, we calculate primary care output growth, with and without quality and working day adjustment, following the methodology outlined in the 2020/21 productivity update (Arabadzhyan et al., 2023). In addition to our analysis of activity and its growth between the latest two financial years, i.e. 2022/23 and 2023/24, we also provide an overview of how GP appointments compare with pre-pandemic volumes by calculating growth rates between 2019/20 and 2023/24. Note that COVID-19 vaccinations are not adjusted for waiting times since we do not have information on how long patients had to wait for their vaccination appointments.

In the remainder of this section: we outline the continued impact of the COVID-19 pandemic on the delivery of primary care services and the quality of the data recorded; provide information on assigning the unit costs to different appointment modes; report the cost-weighted, quality- and working days adjusted output growth rates of the primary care setting for the 2022/23-2023/24 and 2019/20-2023/24 links. Finally, we perform two sensitivity analyses. The first sensitivity check is the same as the one included in previous NHS productivity growth updates (Arabadzhyan et al., 2022, 2023, 2024). In it we use different unit

⁵⁴ Between 2019/20 and 2023/24, the cost-weighted, quality (waiting time only) and working days adjusted Laspeyres output growth of primary care activity was 14.98%.

⁵⁵ Up to 2017/18, the output growth measure of the primary care setting was calculated using GP Patient Survey data (Castelli et al., 2020, Castelli et al., 2019).

⁵⁶ [NHS England GP appointments data](#) (last accessed 30/07/2025). For the analysis presented in this section, we used the January 2025 publication.

⁵⁷ Calculated based on the January 2024 Appointments in General Practice publication.

⁵⁸ These data are published separately from the main GP appointments data, in the [National Immunisation Management Service](#) (NIMS) dataset. NIMS is the System of Record for the NHS COVID-19 vaccination programme in England.

cost weights for remote appointments. This exercise sheds light on the impact of using alternative value weights on the overall growth of primary care activity. The second sensitivity check reintroduces the Quality and Outcomes Framework (QOF) based quality adjustment. NHS England suggests that QOF achievement indicators for 2021/22 were payment protected, while in 2022/23 payment protection was removed.

However, for 2023/24, the indicators were again payment protected. As a result, the QOF indicators are not directly comparable across years. For this reason, we keep this additional analysis as a sensitivity check rather than incorporating it into the baseline figures.

6.6.1. GP services and the COVID-19 pandemic

The COVID-19 pandemic led to substantial changes in the way primary care services were provided. While patients avoided using primary care services either out of fear of contracting the virus or putting pressure on the NHS,⁵⁹ GP practices were faced with the task of reorganising service provision to contain virus spread. A higher proportion of appointments were offered as either telephone or video/online consultations. Importantly, these changes were implemented with the reassurance that GP practices would continue to receive the same income as they would have in the business-as-usual scenario.

As England started moving out of the pandemic, and a substantial fraction of the population was immunised, GP practices were advised to adapt their mode of operation accordingly, by ensuring that face-to-face appointments were re-offered to patients, and that patients' preferences for face-to-face consultations were respected.⁶⁰ Primary care services re-organisation was also supported by additional funding to increase practice capacity.⁶¹

Another important aspect which modified primary care provision was the COVID-19 vaccination programme. Since 2020/21, we continue to include vaccination appointments provided by GP practices in the primary care output measure.

The pandemic has also affected the GP appointments data collection and data quality. As noted in the GP appointments data publication,⁶² differences in appointment management systems among practices were exacerbated during the pandemic, negatively affecting the quality of the data recorded.

6.6.2. Assigning unit costs to primary care consultations

Unit costs for primary care consultations are taken from the 'Unit Costs of Health and Social Care' manuals (Curtis and Burns, 2020, Jones and Burns, 2021, Jones et al., 2023, Jones et al., 2024). In order to calculate the primary care cost-weighted output growth measures, we need to use appropriate unit costs for the different types of primary care activity.

We use the cost of patient contact per minute of GP's time (excluding travel) as our primary unit.⁶³ The per-minute cost of a GP contact reported for both 2019/20 and 2020/21 was £4.30,

⁵⁹ [Fear of contacting GPs during Covid outbreak 'fuelling missed diagnoses' – The Guardian](#) (last accessed 08/05/2024).

⁶⁰ See [updated guidance](#) for practices from 13/05/2021 (last accessed 08/05/2024).

⁶¹ See [GP access improvement plan](#) from 14/10/2021 (last accessed 08/05/2024).

⁶² [Appointments in general practice: supporting information - NHS Digital](#) (last accessed 08/05/2024).

⁶³ A fuller explanation for this decision can be found in Arabadzhyan et al. (2021).

while that for 2021/22 rose to £4.41.⁶⁴ In 2022/23 the cost increased further to £4.93, followed by a slight decrease to £4.46 in 2023/24.⁶⁵

Finally, in order to calculate the unit costs for different types of appointments, we need to know the average duration of each consultation type. It should be noted that changes in the way primary care services were delivered during the pandemic could have affected the total duration of a consultation. The GP appointments data collection started recording consultation duration from December 2021. However, these data are not available by mode of appointment. Also, data quality remains a concern, with about a quarter of observations having unknown consultation duration. In the absence of more recent empirical evidence, we are using the baseline estimates of consultation duration for each consultation type reported in the 2018/19 NHS productivity update (Arabadzhyan et al., 2021) and the cost per-minute of GP time as reported in the ‘Unit Costs of Health and Social Care’ manual, to obtain the unit costs for each appointment mode reported Table 27.

Table 27: Unit costs (£) of GP appointment modes

Appointment mode	2019/20 and 2020/21	2021/22	2022/23	2023/24
Face-to-Face	39.65	40.62	49.25	44.59
Home Visit	121.68	123.48	138.02	124.99
Telephone	39.65	40.62	49.25	44.59
Video/Online	39.65	40.62	49.25	44.59
COVID-19 vaccinations	39.65	40.62	49.25	44.59

As mentioned earlier in this section, the COVID-19 pandemic profoundly impacted the way primary care services were delivered, with some of the changes in work practices becoming the “new normal”. Therefore, we continue to treat face-to-face, telephone and remote appointments as being of the same value to patients, assigning the unit cost of a GP face-to-face appointment also to the other two types of GP appointments (see Arabadzhyan et al. (2023) for a detailed analysis of the pandemic-driven changes to both demand for and supply of primary care activity).

⁶⁴ This year, we derive the per-minute cost of a GP’s home visit using the same methodology as in Arabadzhyan et al. (2025).

⁶⁵ The per-minute cost of a GP contact for 2022/23 differs from that reported in Arabadzhyan et al. (2025), as it is based on the updated annual cost excluding travel time for 2022/23 provided in Jones et al. (2024). Until 2020/21 inclusive, the per-minute unit cost of a GP contact was taken from the PSSRU ‘Unit Costs of Health and Social Care’ reports (Curtis and Burns, 2018; Curtis and Burns, 2019; Curtis and Burns, 2020; Jones and Burns, 2021). From 2021/22 onwards, however, the per-minute unit cost of a GP contact reported by PSSRU has been derived from the annual cost including travel time. To ensure consistency, from 2021/22 we derive the per-minute cost of patient contact ourselves, as follows. For example, for 2023/24, we use the annual cost excluding travel reported in Jones et al. (2025), equal to £331,355. This is divided by the number of hours worked per year (2064; see Jones et al., 2022, for details). Since GPs spend a proportion of their working time on activities other than direct patient contact, this value must be adjusted accordingly. Jones et al. (2022, p.69) report that, based on the 11th National GP Worklife Survey, direct patient care (e.g. surgeries, clinics, and home visits) accounts for 60% of a GP’s time. Thus, the per-hour cost should be corrected by the factor of $100/60 = 5/3$. Finally, to derive the per-minute patient-facing cost, the adjusted value is divided by 60. Altogether, this calculation yields:
 $\text{£}331,355 / 2,064 * 5/3 / 60 = \text{£}4.46$.

In Table 28, we report the total volume of GP appointments by mode of appointment for the years 2019/20 to 2023/24, and their respective unit costs in Table 27 with the same unit costs for face-to-face, telephone and video/online consultations.

Table 28: Volume of GP activity

Appointment mode	2019/20	2020/21	2021/22	2022/23	2023/24
Face-to-Face	244,918,881	143,040,299	184,508,264	219,195,814	231,720,359
Home Visit	2,868,106	1,612,794	1,990,396	2,549,152	3,632,183
Telephone	46 678,238	118,225,447	117,123,929	96,140,568	91,406,084
Video/Online	1,914,916	1,092,986	1,574,982	1,960,759	8,838,274
COVID-19 vaccinations	-	19,846,183	41,375,339	10,376,741	6,500,165
Total GP appointments	296,380,141	283,817,710	346,572,910	330,223,034	342,097,065

Overall, between 2022/23 and 2023/24 primary care output increased by 3.6%, when measured in terms of raw volume growth. This is mainly due to a substantial increase in the number of video and online consultations by 351%. COVID-19 vaccination appointments and telephone appointments decreased, while face-to-face consultations and home visits recorded an increase, by 5.7% and 42.5% respectively. In comparison with the pre-pandemic year 2019/20, the total number of consultations in 2023/24 was 15.43% higher. The positive growth was primarily driven by telephone appointments. Face-to-face consultations (excluding vaccinations) did not return to the pre-pandemic level, whereas home visits exceeded the 2019/20 baseline by 26.6%, and video/online consultations also showed a remarkable growth.

Primary care output is measured using recorded appointments, with only a broad distinction between appointment modes, such as face-to-face, home, telephone, and video or online consultations. The data do not identify what patients are seen for and therefore do not capture differences in the complexity of care provided. The increased use of pre-appointment triage may mean that the case mix of patients receiving appointments has become more complex over time. However, such changes in patient case mix are not captured by the current output measure. Accounting for these shifts in complexity would likely yield higher estimates for both primary care output and productivity growth.

Based on feedback received from NHS England, there are several potential factors contributing to the observed increase in video and online consultations. Between 2022/23 and 2023/24, one possible explanation is the decline in telephone appointments, their number fell by 4,734,484 (from 96,140,568 to 91,406,084). This reduction was 4.43 times smaller than the drop observed between 2021/22 and 2022/23, which amounted to 20,983,361. However, there was no corresponding rise in video or online appointments during 2021/22 to 2022/23. The increase in this period was only 385,777, representing just 5.6 percent of the growth recorded between 2022/23 and 2023/24. This suggests that while reduced telephone use may have contributed to the trend, it is unlikely to have been the primary driver.

Another explanation for the marked growth in video/online appointments may be an increase in online chat consultations. The video/online appointments also encompass non-video consultations, such as live chats or Voice over Internet Protocol (VoIP).⁶⁶ Patients may favour these modes of communication over conventional telephone or video consultations due to their convenience.⁶⁷ This trend can be linked to the ambitions set out in the ‘Delivery plan for recovering access to primary care’, published by NHS England in May 2023.⁶⁸ Among its priorities was the need to address the “8 am rush”, reducing the number of patients struggling to contact their practice, and ensuring that patients know on the day they make contact how their request will be managed. To support these priorities, a target was set to increase the proportion of registered patients using the NHS App from 20% to 90% by March 2024 (NHS England, 2023, p. 13).⁶⁹ As a result, the wider use of the NHS App has likely contributed to the rise in message-based appointments, supporting policy efforts to expand digital access to healthcare services.

The core element of the delivery plan was the development of the Modern General Practice (MGP) approach, designed to improve patient access by embedding digital and online consultation options into routine primary care. This includes measures such as expanding online consultations and enhancing digital telephony. The MGP model is intended to benefit both patients and practices: it enabled a wider range of services to be provided through digital platforms, facilitated the delegation of certain patient requests to nursing and pharmacy staff, and thereby released additional capacity for general practitioners.⁷⁰ In parallel, capacity was further augmented through the expansion of multidisciplinary teams, the recruitment of new doctors, and the retention and return of experienced GPs. As a result, not only did the proportion of registered patients increase, but there was also a marked growth in the number of practices adopting online consultation systems. The ‘Delivery plan for recovering access to primary care: update and actions for 2024/25’ claims that 94.3% of practices were offering patients the ability to book or cancel appointments online by April 2024.⁷¹

⁶⁶ For more information on the categorisation of appointment modes, see ‘[Appointments in general practice: supporting information](#)’ (last accessed 09/09/2025).

⁶⁷ See ‘[Network contract directed enhanced service: standardised GP appointment categories](#)’ for limitations on how appointments for certain patient purposes should be recorded. For example, clinical triage, an appointment slot primarily intended for the assessment of a patient, can be managed through a relatively simple intervention, such as issuing a prescription via live chat, while still involving a clinician or healthcare professional. However, triage performed by an administrative member of staff would fall under the category “Not an appointment”. By contrast, when clinical triage is undertaken by a healthcare professional as a routine encounter to assess, diagnose, and treat, it can’t be conducted via a live chat appointment and must instead be processed through other appointment modes, such as face-to-face (last accessed 10/09/2025).

⁶⁸ ‘[Delivery plan for recovering access to primary care](#)’ was developed in parallel with ‘[Delivery plan for recovering urgent and emergency care services](#)’, and ‘[Delivery plan for tackling the COVID-19 backlog of elective care](#)’. The plan seeks to restore core NHS services after the pandemic, with particular emphasis on primary care, within which general practice represents a central component. This is planned to be achieved through focusing on four areas described in this plan, empowering patients, implementing Modern General Practice Access, building capacity and cutting bureaucracy (last accessed 10/09/2025).

⁶⁹ According to the ‘Submissions via online consultations systems in general practice’ dataset, the number of registered patients at practices using online consultations increased by 14.2% between April 2023 and March 2024, reaching 86.7% of all registered patients by March 2024.

⁷⁰ For more details on MGPs follow ‘[Modern general practice model](#)’ (last accessed 10/09/2025).

⁷¹ See ‘[Delivery plan for recovering access to primary care: update and actions for 2024/25](#)’ (last accessed 10/09/2025). According to the ‘[Submissions via online consultations systems in general practice](#)’ dataset, the number of practices known to have an online consultation system increased by 10.9% between April 2023 and March 2024, reaching 85.8% of all open active practices by March 2024.

A further potential reason for the peak in video and online consultations is the update to TPP (SystmOne), one of the GP system suppliers, which from April/May 2023 has allowed users to select the appointment mode manually for each slot type. This change likely improved recording accuracy and resulted in more consultations being classified as video/online. Before this update, message-based consultations were not recorded as appointments in SystmOne unless they led to a booked slot.⁷²

6.6.3. Quality adjustments

We normally include two quality adjustments for primary care activity: improvement in disease management (blood pressure management) for coronary heart disease, history of transient ischaemic attack or stroke, and hypertension;⁷³ and waiting times.

Since 2019/20 the Quality and Outcomes Framework (QOF) indicators have been subject to either changes in their definitions (QOF 2019/20) and/or policy changes around their funding (QOF 2020/21 – 2023/24). The policy changes affected the income protection that was introduced during the pandemic to ensure practices received further funding independently from their performance.^{74, 75, 76} The income protection was briefly lifted in 2022/23, and reintroduced in 2023/24. For these reasons, we are unable to reintroduce the quality adjustment based on QOF to the baseline cost-weighted and quality adjusted Laspeyres output growth measure for primary care. We do, however, include a sensitivity check, following the approach of Arabadzhyan et al. (2025), and reintroduce the QOF adjustment to assess its impact on the baseline results.

6.6.3.1. *Waiting times quality adjustment*

Information on the time between the date an appointment is booked and the date of the actual appointment- waiting time (WT) - continued to be collected. In particular, the GP appointment dataset includes information on the number of appointments by time intervals for each appointment mode.⁷⁷

Similarly to hospital inpatient and outpatient activity, we use the 80th percentile waiting time as our quality indicator. Further details can be found in Arabadzhyan et al. (2022).

Table 29 presents the 80th percentile waiting times for each appointment mode for the financial years 2019/20 to 2023/24. It is worth noting that the waiting times distribution is positively skewed: in 2023/24, about 45.4% of face-to-face appointments;⁷⁸ 70.5% of home visits; 65.8% of telephone consultations; and 83.5% of video/online appointments took place on the same day and within 1 day from the booking date. Compared to 2022/23, waiting times for all appointment types, except video/online, increased, which could be due to higher demand in 2023/24. The 80th percentile waiting time for telephone consultations increased in 2023/24, although the volumes of telephone appointments were lower than those

⁷² For other classifications of GP system suppliers see '[Appointments in general practice: supporting information](#)' (last accessed 10/09/2025).

⁷³ See Arabadzhyan et al. (2023) for further details on this quality adjustment.

⁷⁴ [COVID-19: toolkit for GPs and GP practices - BMA](#) (last accessed 17/06/2024).

⁷⁵ Further details on Quality and Outcomes indicators, 2021, are available on the [NHS Digital website](#) (last accessed 17/06/2024).

⁷⁶ See [QOF 2022/23 results](#) (last accessed 17/06/2024).

⁷⁷ The list of time intervals is as follows: same day, 1 day, 2 to 7 days, 8 to 14 days, 15 to 21 days, 22 to 28 days, more than 28 days, unknown ([Appointments in General Practice](#), last accessed 21/03/2025).

⁷⁸ Note that vaccinations appointments do not have information on waiting times, so they do not contribute to the calculation of the 80th percentile waits for face-to-face appointments.

recorded in 2022/23. These changes might be explained by shifts in workforce capacity. It is plausible that some of the staff previously engaged in remote consultations were moved to providing face-to-face care. Video and online consultations reached their lowest level of waiting times at just 1.67 days, the lowest in the post-pandemic period. This occurred due to the reasons mentioned in section 6.6.2.

We also note that in 2023/24, waiting times for all types of GP consultations were quite different from those observed in 2019/20. All consultations, except video/online, were higher.

Table 29: Waiting times (days) for GP appointments, 2019/20 – 2023/24

Appointment mode	80 th percentile waiting time (days)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Face-to-Face	14.00	10.95	12.05	13.21	15.47
Home Visit	1	4.46	4.31	4.37	4.75
Telephone	3.36	3.74	5.71	6.07	6.51
Video/Online	17.61	10.57	11.08	13.56	1.67

6.6.4. Primary Care output growth

The cost-weighted Laspeyres output growth rates for the primary care setting, when adjusting for waiting time alone and correcting for the total number of working days (WD) for the last two links, are reported in Table 30. In the same table, we also report growth rates in primary care activity between 2023/24 and the pre-pandemic year 2019/20.

Focusing first on growth between 2022/23 and 2023/24, we find that the total number of appointments delivered increased by 3.6%, with a 4.13% increase in the cost-weighted Laspeyres growth rate. This observed improvement in the Laspeyres growth rate, compared to the raw growth measure, is due to substantial growth of home visits, which have the highest unit cost and therefore assigned higher relative weight while contributing to the growth rate. However, if we look at the type of primary care appointments that contribute the most to the Laspeyres measure, this is still face-to-face appointments. Adjusting for waiting times decreases the cost-weighted Laspeyres growth rate to 2.15. These results can be explained by the substantial increase in waiting times for face-to-face, home visits, and telephone appointments, which is slightly mitigated by the improvement in waiting times recorded for online/video consultations. The working days adjustment improves the Laspeyres index yielding an overall 2.56% growth rate.

Comparing 2023/24 with 2019/20 yields a large positive growth rate. The cost-weighted growth measure is 15.65%, whilst adjusting for waiting times decreases measured growth to 13.17%. The main drivers of this decrease in the growth rate are telephone appointments and face-to-face appointments, with their lower contribution to the growth rate due to an increase in waiting times for both appointment modes.

Finally, correcting for the total number of working days increases the growth rate, yields a 14.98% Laspeyres growth between 2019/20 and 2023/24.

Table 30: Growth rates comparison

Years	Raw consultations	Laspeyres Cost-weighted (CW)	Laspeyres CW and WT-adjusted	Laspeyres CW, WT and WD-adjusted ⁷⁹
2019/20 – 2020/21	-4.24%	-5.02%	-3.06%	-2.68%
2020/21 – 2021/22	22.11%	22.13%	19.89%	19.89%
2021/22 – 2022/23	-4.72%	-4.34%	-5.59%	-4.84%
2022/23 – 2023/24	3.60%	4.13%	2.15%	2.56%

Recovery				
Years	Raw consultations	Laspeyres Cost-weighted (CW)	Laspeyres CW and WT-adjusted	Laspeyres CW, WT and WD-adjusted
2019/20 – 2021/22	16.94%	16.00%	16.43%	16.895
2019/20 – 2022/23	11.42%	10.98%	10.48%	11.81%
2019/20 – 2023/24	15.43%	15.65%	13.17%	14.98%

6.6.5. Sensitivity analysis

In this sub-section, we perform two sensitivity analyses to examine the impact of using appointment type specific unit costs and re-introducing the QOF quality adjustment for effective blood pressure management.

6.6.5.1. Sensitivity to different unit costs of GP appointment types

Similarly to Arabadzhyan et al. (2024), the first sensitivity analysis tests different unit costs for different types of primary care appointments. For the 2022/23-2023/24 link this yields unit costs of £24.63 for telephone and video/online consultations, £49.25 for face-to-face appointments and £138.02 for home visits. For the 2019/20-2023/24 link, this yields £39.65 for a face-to-face appointment, £121.68 for a home visit, and £21.5 for both telephone and video/online consultations. As we use a Laspeyres index, only the unit costs in the base year of each link are reported. Table 31 presents the results of this analysis for the 2022/23-2023/24 and 2019/20-2023/24 links, as well as the 2019/20-2020/21, 2020/21-2021/22 and 2021/22-2022/23 links for comparison.

We find that assigning lower unit costs for telephone and video/online consultations increases the cost-weighted Laspeyres growth rate of primary care output to 4.46% between 2022/23 and 2023/24 but reduces the cost-weighted Laspeyres growth rate to 1.94% when adjusted for waiting times, and to 2.35% when adjusted for both waiting times combined with working days. The lower cost-weighted and waiting time adjusted Laspeyres growth rate is due to relatively longer waiting times recorded for face-to-face, home visits and to a smaller extent telephone consultations in 2023/24. Adjusting for working days improves the growth rate because there were fewer working days in 2023/24 compared to 2022/23.

⁷⁹ The number of working days was 254 in 2019/20, 253 in 2020/21 and 2021/22, 251 in 2022/23, and 250 in 2023/24.

Table 31: Primary care output growth measures: sensitivity to the choice of unit costs

	2019/20- 2020/21	2020/21- 2021/22	2021/22- 2022/23	2022/23- 2023/24	2019/20- 2023/24
Laspeyres Cost-weighted (CW)	-16.97%	27.44%	-1.95%	4.46%	8.45%
Laspeyres CW and WT-adjusted	-14.77%	25.35%	-3.34%	1.94%	6.08%
Laspeyres CW, WT and WD-adjusted	-14.44%	25.35%	-2.57%	2.35%	7.77%

When using 2019/20 as the baseline year, assigning lower unit costs to remote appointments yields substantially lower growth rates. The cost-weighted Laspeyres measure equals 8.45%, around 7 percentage points lower than when using the same unit costs for telephone and video/online consultations. This difference in growth rates is due to the relatively lower weights assigned to telephone consultations and video/online consultations.

6.6.5.2. *Sensitivity to QOF quality adjustment*

We reintroduce QOF quality adjustment to our baseline estimates as a sensitivity check, due to QOF achievement indicators not being directly comparable between 2022/23 and 2023/24. Specific changes are detailed in section 6.6.3. QOF adjustment is introduced prior to waiting times adjustment (see Arabadzhyan et al. (2022) for more details). Table 32 below provides the baseline growth rates in the first column, and the growth rates when QOF adjustment is applied. As expected, QOF adjustment increases the resulting growth rates, since for all the three indicators used their achievement rates were higher in 2023/24 compared to 2022/23, when they were still income protected. The impact of the QOF adjustment is non-negligible and brings the growth rates up by about 1 percentage point.

Table 32: Primary care output growth measures: reintroducing QOF adjustment

	2022/23- 2023/24	2022/23- 2023/24 QOF-adj
Raw consultations	3.60%	3.84%
Laspeyres Cost-weighted (CW)	4.20%	4.37%
Laspeyres CW and WT-adjusted	2.23%	2.38%
Laspeyres CW, WT and WD-adjusted	2.63%	2.79%

6.7. Community prescribing

- **The Laspeyres cost-weighted and total days adjusted output growth measure for Community Prescribing was 6.25% between 2022/23 and 2023/24.**

Since 2020, we use the NHS Business Services Authority (BSA) Prescription Cost Analysis (PCA) publication as our source of Community Prescribing data. The publication includes information about the Drug code (PropGenLinkCode), Net Ingredient Cost (NIC), Quantity of Drug Dispensed, and Number of Prescription Items, which are published on a monthly basis. The data are complete, and prices are available for all items and years.

6.7.1. Methods

The community prescribing dataset includes information on total expenditure and total volume for each drug prescribed (PropGenLinkCode). We calculate drug unit costs as the ratio of expenditure and volume. A drug can retain the same PropGenLinkCode over time but be

reported in different units. This change can occur in the middle of a financial year (most often from January). This change impacts the calculated unit cost and critically prevents a like-for-like comparison. It is also possible for data entry error to lead to an artificial large change in volume or expenditure over time which might impact overall results. To minimise both possibilities in a transparent and automated way, we employ two outlier detection methods. In this way we exclude outliers which are unlikely to be comparable with similar data either within or between years, while retaining as much information as possible.

Table 33 presents information about the number of drug-months and drugs as part of respectively the within year and between year outlier methods. Each pair of years was considered in turn. Drug-months and drugs were dropped for both years for a given comparison, even if an outlier was only identified in one of these two years. The table indicates 85 drug-months, and 49 drugs were dropped when comparing 2022/23 with 2023/24. The drugs dropped due to being outliers between years is the more critical element, as all months are dropped in these cases. This is equivalent to dropping 588 (49×12) drug-months.

Table 33: Observations dropped as outliers for Community Prescribing

Years	Observations	
	Drug-months dropped (within year outlier)	Drugs dropped (between year outlier)
2020/21 – 2021/22	47	26
2021/22 – 2022/23	71	45
2022/23 – 2023/24	85	49

6.7.2. Activity and growth rates

Table 34 reports summary statistics for Community Prescribing. In 2023/24, 7,834 distinct drugs were observed. The total number of prescriptions made out increased by more than 37 million (3.2%), a similar increase to the one observed between 2021/22 and 2022/23. The total number of items and expenditure on community prescribing also both increased, by 3.4% and 5.2% respectively, continuing generally upward trends. The unit cost of items remained constant at £0.11.

When compared with equivalent information reported by the NHS Business Service Authority⁸⁰ which reported 1,212,798,906 prescriptions at a cost of around £10.93 billion, the total number of prescriptions and expenditure in 2023/24 was similar but lower. This aligns with excluding some drugs and drug-months to ensure a like-for-like comparison in calculating change over time.

⁸⁰ See [NHS Business Services Authority publication](#), document “National Summary tables – financial year”, worksheet “National” (last accessed 18/06/2025).

Table 34: Community Prescribing, summary data 2020/21 – 2023/24

Year	Unique Drug Codes Observed	Total Prescriptions	Total Items Prescribed	Total Spend	Activity-weighted Prescription Unit Cost £	Activity-weighted Prescribed Item Unit Cost £
2020/21	7,137	1,106,274,762	89,217,616,708	£9,403,485,867	8.50	0.11
2021/22	7,175	1,139,254,272	92,514,172,928	£9,687,036,928	8.50	0.10
2022/23	7,784	1,175,244,672	95,852,462,080	£10,376,587,264	8.83	0.11
2023/24	7,834	1,212,280,576	99,098,804,224	10,915,017,728	9.00	0.11

In 2023/24, 666 new drugs were observed, amounting to a total expenditure of £25.6 million in 2023/24 prices. 611 drugs prescribed in 2022/23 were not observed in 2023/24, representing £29.8 million of expenditure in 2022/23 prices. We explored the number of new drugs and dropped drugs to ensure there are no concerns regarding the observed numbers. More information about this is available in Appendix 9.1. No data items appeared incorrect, we therefore took the data at face value.

Volume and price indices for community prescribing are reported in Table 35. Between 2022/23 and 2023/24, the Paasche Price ratio indicated a decrease in price by 0.94%, reverting the increase between 2021/22 and 2022/23. The Laspeyres volume index was positive, 6.54%, between 2022/23 and 2023/24, equal to 6.25% when adjusted for total days. When comparing 2019/20 with 2023/24, the Laspeyres volume growth was 13.97%.⁸¹

Table 35: Community Prescribing: price and volume indices 2019/20 – 2023/24

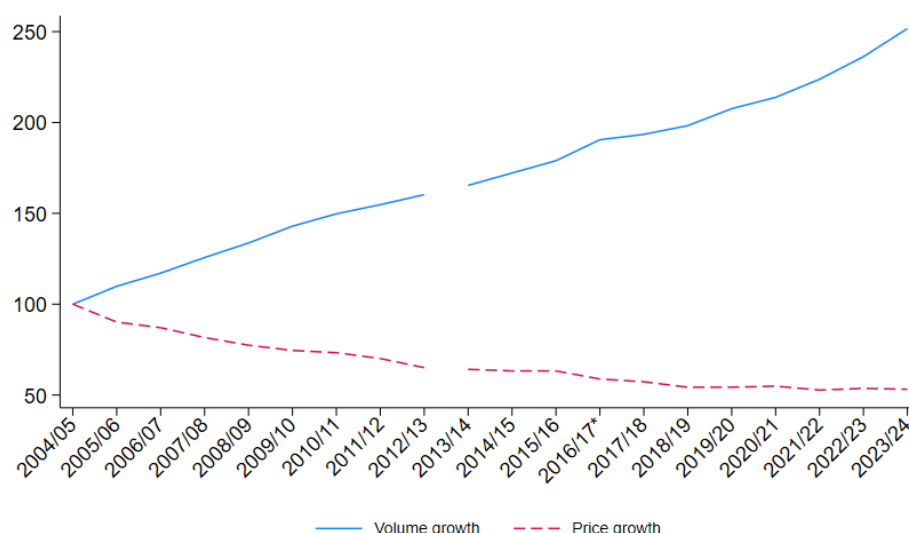
Years	Paasche Price Ratio	Laspeyres Volume Ratio
2021/22 – 2022/23	1.0178	1.0556
2022/23 – 2023/24	0.9906	1.0654

Recovery		
Years	Paasche Price Ratio	Laspeyres Volume Ratio
2019/20 – 2021/22	1.0016	1.1159
2019/20 – 2022/23	1.0016	1.1159
2019/20 – 2023/24	1.0436	1.1397

From the base year of 2004/05, trends in the volume and prices of items prescribed are shown in Figure 5. This figure highlights that growth in the Laspeyres volume index had a continued upward trend in most recent years, with the index in 2023/24 continuing to exceed the previous peak registered in 2016/17. On the other hand, the cumulative Paasche prices index follows a decreasing trend, well below the base year, 2004/05, level, although in more recent years, it fluctuated between successive small positive and negative growth.

Figure 5: Price and volume changes for community prescribed pharmaceuticals

⁸¹ The total number of days in 2019/20 and 2023/24 is the same, so adjusting for the total number of days will not impact the Laspeyres volume growth rate.



7. Growth in input categories

7.1. Direct labour growth measure

- **Between 2022/23 and 2023/24, the cost (salary)-weighted Laspeyres volume growth for NHS staff was 4.67%.**

Since 2007/08, Electronic Staff Record (ESR) data, provided by NHS England, have been used to calculate direct labour growth.^{82,83,84} This dataset contains monthly provider level Full Time Equivalent (FTE) counts for over 500 categories of labour (occupation codes) and covers all staff employed by the NHS excluding agency and bank staff. Due to small number suppression, the aggregate figures we obtain will not match precisely with those published by NHS England using the same ESR data.^{85,86}

National average staff earnings data, also provided by NHS England, cover the same staff groups and organisations as counts of staff at the occupation code or a more disaggregated level. Basic pay is reported per head and per FTE, whilst non-basic pay is reported per head only. We construct total pay per FTE as the sum of basic pay per FTE and non-basic pay per head times the ratio 'basic pay per FTE/basic pay per head', as per recent reports (Arabadzhyan et al., 2021). This method of imputation relies on the assumption that for each occupation code, the ratio of 'basic pay per FTE/basic pay per head' is a good proxy for the ratio of 'non-basic pay per FTE/non-basic pay per head'.

From 2016, separate information has been provided for FTE count and earnings of staff working at 'core' and 'wider' services.⁸⁷ We take an FTE weighted average of wages of staff working in 'core' and 'wider' services and apply this calculated wage to all staff within the

⁸² Before 2007/08, the number of staff was extracted from the Workforce Census.

⁸³ More precisely, NHS England shares the ESR and NHS combined Payroll data with us, but these can be accessed from the [NHS View database](#) (last accessed 28/02/2026), which is constructed from the ESR and NHS combined Payroll and Human Resources System.

⁸⁴ In March 2016, the data collection method for ESR was updated, leading to improved quality. These changes are discussed in more detail in Castelli et al. (2019).

⁸⁵ If a provider-staff group cell contains fewer than 5 staff, the provider reports 0 or 5 at random.

⁸⁶ [NHS workforce statistics](#) (last accessed 28/02/2026).

⁸⁷ Core services are made up of hospital Trusts and commissioning bodies. Wider services are made up of central support services such as NHS England and NHS Improvement.

occupation code. In this way, a value by type of work is identified, rather than one also influenced by the type of provider worked for. If wage information is missing for either 'core' or 'wider' service providers for a specific occupation code, we assume the observed wage also reflects the average for equivalent staff in the other organisation group.

From the year 2021/22, FTE and salary information has been reported at a more disaggregated level than occupation code for a small number of occupation codes. For example, FTEs are reported for the same occupation code but a different care setting within the same provider. Equivalently to how 'core' and 'wider' providers are dealt with, an FTE weighted average of salaries of staff within the same occupation code is calculated and used as the wage for all staff in that occupation code. If wage information is missing for some instances of an occupation code but not others, the FTE weighted mean of observed salaries is taken as the proxy of wages for all staff within that occupation code.

Also starting for growth between 2020/21 and 2021/22, direct labour growth is calculated using the software STATA 18, instead of SAS 9.2. As part of this change, analyses are performed using only the specific base and current year being considered. As a result, imputation of wages draws on information only from these two years, instead of all previous years, as was the case previously. This approach brings methodology in line with output care settings.

Table 36 shows the number of organisations reporting FTE counts information by organisation type.⁸⁸ Due to mergers, both Clinical Commissioning Groups (CCGs) and Trusts' figures have broadly decreased over time. On the 1st of July 2022, CCGs were formally abolished and Integrated Care Boards (ICBs) established. As a result, ICBs are observed from 2022/23, while CCGs are not observed anymore in 2023/24. The number of Commissioning Support Units (CSUs) remains the same between 2022/23 and 2023/24.

Table 36 also reports total expenditure on staff by organisation type. Expenditure is calculated as the summed products of FTE staff employed in each occupation code in the provider type and the national average total earnings for that occupation code. Proportional increases in expenditure between 2022/23 and 2023/24 are generally similar to those observed between 2021/22 and 2022/23. The exception to this is NHS England staff, where proportional growth in expenditure between 2022/23 and 2023/24 is greater than between 2021/22 and 2022/23. The total expenditure for CCGs vanishes due to their abolition in 2022. Comparing expenditure on ICBs in 2023/24 with combined expenditure on CCGs and ICBs in 2022/23 indicates a similar proportional increase in expenditure between these two financial years, and similar to that observed between 2021/22 and 2022/23 for CCGs alone, and CCGs and ICBs combined. This finding aligns with a general shift of a similar level of resource from one form of commissioning to another. The increase in expenditure among Trusts from 2022/23 to 2023/24 (14.9%) is double in comparison to the one between 2021/22 and 2022/23. See Table A26 in the Online Appendix for historic trends in expenditure by provider type from 2010/11 to 2023/24.

Table 36: Number of reporting organisations and expenditure by type 2019/20 – 2023/24

	2021/22	2022/23	2023/24
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⁸⁸ For conciseness, this table includes only the main organisation types, which account for about 97% of organisations and 98% of total expenditure. The main analysis includes all categories. A time series of equivalent information from 2010/11 is presented in Table A26 in the Online Appendix.

Organisation type	Orgs	Exp (£m)	Orgs	Exp (£m)	Orgs	Exp (£m)
CCGs	94	1,018	92	182	n/a	n/a
ICBs	n/a	n/a	42	902	42	1233
CSUs	4	224	4	263	4	298
NHS England	1	451	1	547	1	808
Non-geographical staff	1	111	1	119	1	120
NHS Trusts	215	48,899	212	52,362	211	60,178

Table 37 reports the number of FTE staff employed by NHS Trusts and other NHS organisations (hereafter non-Trusts) by broad categories for each year from 2021/22 to 2023/24. These figures show that the majority of staff are employed by hospital Trusts and the largest employee group is that of 'Nursing, midwifery and health visiting staff and learners'.⁸⁹ FTE staff in Trusts has grown from last year for all categories. In contrast, the FTEs for staff categories in non-Trusts do not follow a common trend.

Table 37: Count of FTE staff employed by category

NHS Staff type	2021/22		2022/23		2023/24	
	Trust	Non-Trust	Trust	Non-Trust	Trust	Non-Trust
Medical staff	126,212	1,662	130,723	1,708	137,343	1,389
Ambulance staff	36,983	5	38,008	6	40,119	9
Administration and estates staff	257,331	48,870	257,331	52,181	278,012	48,733
Health care assistants and other support staff	150,882	444	153,098	425	163,297	416
Nursing, midwifery and health visiting staff and learners	403,301	4,937	414,556	5,075	435,724	5,280
Scientific, therapeutic and technical staff and health care scientists	212,477	5,536	221,628	5,338	235,460	3,780
Unknown and non-funded staff	662	108	510	96	523	39
Total	1,150,443	56,016	1,187,848	61,562	1,224,618	64,828

Notes: Data are taken from organisational returns of Electronic Staff Records. When there are 5 or fewer people employed in an occupational group, organisations report either 5 or 0 at random; these totals therefore will differ from those derived from national level data.

Figure 6 and Figure 7 present growth in FTE by staff category among staff employed by Trusts and by other organisations respectively. First, that all specified categories of staff employed by Trusts have increased between both 2021/22-2022/23 and 2022/23-2023/24. Staff employed by Trusts in the 'unknown category' fell substantially between 2021/22-2022/23 but increased once more between 2022/23-2023/24. Among staff employed at other organisations, the fall in FTEs was even more pronounced among some staff groups where the decline began in 2021/22-2022/23, namely 'Scientific, therapeutic and technical' and 'Unknown' staff. In contrast, the fall became smaller among 'Health care assistants and support' staff in 2022/23-2023/24 compared with 2021/22-2022/23. Additionally, in 2022/23-2023/24, a decline was also observed in other staff groups, including 'Medical' and

⁸⁹ A time series of equivalent information from 2010/11 is presented in Table A28 in the Online Appendix.

'Admin and estates'. The impact of these proportional changes is limited given the small number of FTEs in non-Trusts and the specific categories.

Figure 6: Growth in Trust FTE staff by group 2020/21 to 2023/24

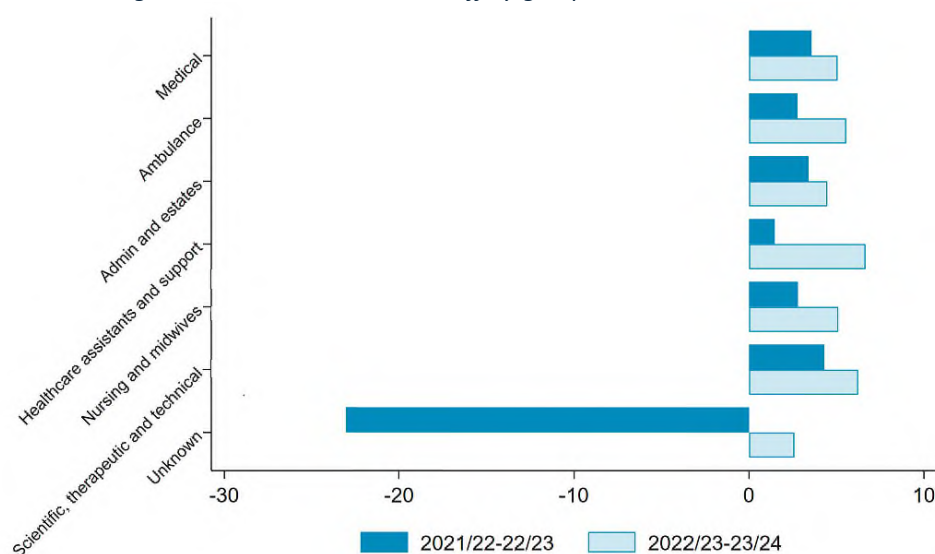


Figure 7: Growth in Non-Trust FTE staff 2020/21 to 2023/24

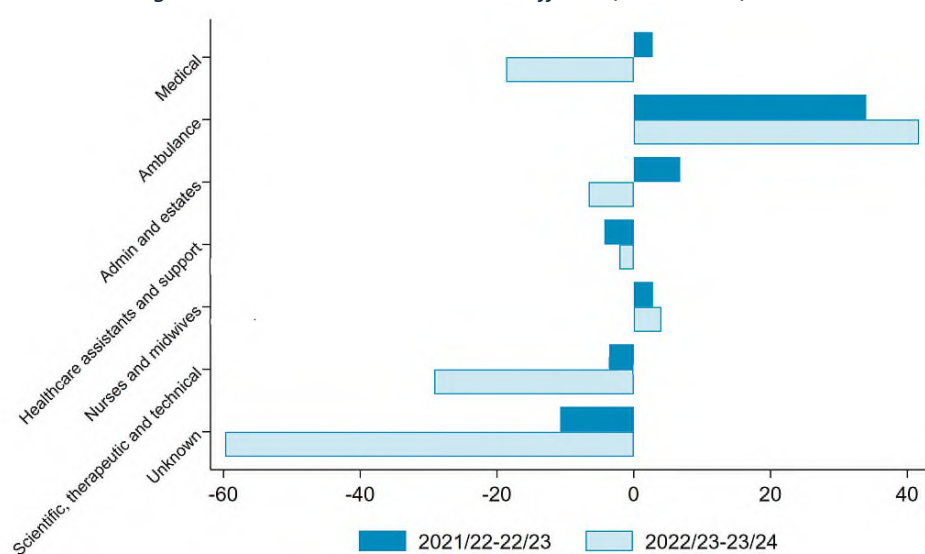


Table 38 presents nominal expenditure growth and Laspeyres volume growth in labour for the NHS overall and for Trusts alone from 2019/20 to 2023/24.⁹⁰

Laspeyres volume indices indicate growth of 4.67% overall and 5.37% for the group of Trusts between 2022/23 and 2023/24. These growth rates are larger than those recorded between 2021/22 and 2022/23. The results imply the increase in growth is concentrated in Trusts. As has been seen historically, nominal expenditure growth is substantially larger than Laspeyres volume growth in both Trusts and non-Trusts. This indicates part of nominal growth reflects inflation and a shift in the distribution of staff employed to those commanding higher salaries.

⁹⁰ See Table A29 in the Online Appendix for the equivalent series from 2007/08 to 2023/24.

Thus, nominal growth of all NHS organisations and growth in Trusts between 2022/23 and 2023/24 are 13.84% and 14.6%.

Table 38 also presents equivalent information when comparing the year 2019/20 with 2023/24. This comparison provides information about staff employed in the most recent year compared to just before the COVID-19 pandemic. Compared to 2019/20, and following recent increases in staff wages, we observe an increase in both nominal expenditure growth and in the Laspeyres input growth. These increases are in line with expectations.

Table 38: Growth in direct labour 2019/20 – 2023/24

Years	Nominal expenditure growth		Laspeyres volume growth	
	All*	Trusts	All*	Trusts
2020/21 – 2021/22	7.38%	7.05%	3.82%	3.47%
2021/22 – 2022/23	7.16%	7.12%	3.33%	3.29%
2022/23 – 2023/24	13.84%	14.60%	4.67%	5.37%

Recovery				
Years	Nominal expenditure growth		Laspeyres volume growth	
	All*	Trusts	All*	Trusts
2019/20 – 2021/22	16.53%	16.28%	8.79%	8.57%
2019/20 – 2022/23	24.82%	24.51%	12.38%	12.10%
2019/20 – 2023/24	42.48%	43.10%	17.61%	18.11%

* All NHS organisations.

7.2. Indirect NHS input growth measures

- **Between 2022/23 and 2023/24, the indirect growth rate for NHS inputs was 1.49% and the mixed NHS input growth rate was 1.33%.⁹¹**

7.2.1. Expenditure data sources

Expenditure on inputs by the NHS England Group⁹² and NHS Trusts are taken from published financial accounts. Items of expenditure from each account are aggregated to the broad categories of Labour, Materials, and Capital. Labour covers expenditure on staff wages and other payments for work. Materials consist of assets which are expected to be consumed within the financial year they are purchased. Capital consists of expenditure on assets which are expected to be retained and used in multiple years. By using these broad categories, we can generate comparable figures over time and across organisations, despite differences in the precise reporting requirements of different organisations and changes in these requirements over time. Expenditure of the NHS England Group is reported in the annual reports and accounts of the Department of Health and Social Care (DHSC).⁹³

Similarly to Arabadzhyan et al. (2025), we included the expenditure for “Supplies and services – clinical” and “Supplies and services – general” of the ‘Other Group’ to the ‘NHS England Group’ for the calculations of the indirect input growth measure between 2022/23 and 2023/24.⁹⁴

The items of expenditure used to calculate Labour, Materials, and Capital in the 2022/23 – 2023/24 accounts are presented in Table 39.

We also use Trust level accounts for all NHS Trusts (non-FT) and Foundation Trusts (FT). Each FT and Non-FT publishes accounts annually, with a specified set of items of expenditure in the Trust Accounts Consolidation (TACs) data. Table 40 reports the sources of expenditure data used. Similarly to previous years, in 2022/23 NHS Trust and Foundation Trust accounts included extra items of expenditure related explicitly to COVID-19. Specifically, two expenditure items under Materials and one under Capital (see Table 39). However, these represented a very small fraction of total expenditures on either Materials or Capital (0.17% and 0.01% respectively). It is not possible to fully disentangle the COVID-19 response resources in other items. Therefore, the true impact of COVID-19 on input expenditure cannot be evaluated.

In this report, we adjusted the NHS Trusts' labour expenditure figures to account for the one-off payment of approximately £2.7 billion awarded to NHS staff (Department of Health and Social Care, 2023, Office for National Statistics, 2023) at the direction of the Department of Health and Social Care. This adjustment was necessary because this non-consolidated, central government payment was captured in the Trusts' financial accounts but not reflected in the salaries recorded within the Electronic Staff Record (ESR) data used to calculate the direct labour growth measure (see Section 7.1).

⁹¹ Comparing NHS inputs in 2022/23 to 2019/20, we find that growth is equal to 13.91% for the mixed approach and 14.63% for the indirect approach.

⁹² NHS England Group includes CCGs and NHS England and NHS Improvement.

⁹³ See [DHSC annual reports and accounts 2022-2023](#) (last accessed 25/03/2025).

⁹⁴ NHS England advised us that from October 2021 NHS Supply Chain Co-Ordination Limited (SCCL) moved from being reported in the ‘Other Groups’ category in the DHSC Annual Reports and Accounts (ARA) to the ‘NHS England Group’ category.

Table 39: Categorisation of operating expenditure items

Organisation	Labour	Materials	Capital
NHS Foundation Trusts and Non-Foundation Trusts Source: TAC	- Staff and executive directors' costs - Non-executive directors	- Purchase of services - Supplies and services – clinical - Supplies and services – clinical: utilisation of consumables donated from DHSC group bodies for COVID response - Supplies and services – general - Supplies and services – general: notional cost of equipment donated from DHSC for COVID response below capitalisation threshold - Drugs costs - Consultancy - Establishment - Transport - Audit services and other remuneration - Clinical negligence costs - Research and development - Education and training - Redundancy costs - Legal fees - Insurance - Early retirement costs - Car parking and security - Hospitality - Other losses and special payments - Other	- Premises - Depreciation - Amortisation - Impairments - Operating lease expenditure - Changes to operating expenditure for on-Sop and off-SoFP IFRIC 12 schemes - Inventories written down (not including drugs) - Inventories written down (consumables donated from DHSC group bodies for COVID response) - Provisions arising/released in year
NHS England Group Source: DHSC Annual Report and Accounts	Staff costs	- Consultancy services - Clinical negligence costs - Establishment - Education, training & conferences - Supplies and services – general - Supplies and services – clinical - Inventories consumed - Research & development expenditure - Other	- Premises - Net impairments (excluding COVID-19 inventory impairment) * - Rentals under operating leases - Depreciation - Amortisation - Impairments & reversals - Interest charges

Note: Items of expenditure for Foundation Trusts and Non-Foundation Trusts are taken from accounts of 2023/24. The items used in previous years can be found in Table A30 in the Online Appendix. * Capital expenditure item 'Impairments & reversals' changed its name to 'Net impairments (excluding COVID-19 inventory impairment)'.

Finally, we obtain expenditure on agency and bank staff directly from the DHSC.

Table 40: Sources of expenditure information 2013/14 – 2023/24

Years	Foundation Trusts	Non-Foundation Trusts	NHS England Group
2013/14 – 2016/17	Consolidated NHS Financial Trusts Accounts	Financial monitoring and accounts	DHSC Annual Reports and Accounts
2017/18 – 2022/23	Trust accounts consolidation		

7.2.2. Expenditure on inputs

This section describes nominal expenditure on inputs, which is converted to real terms using appropriate deflators. We use the NHS Cost Inflation Index for Labour (ESR deflator), Materials and Capital. For further details on the deflators used see section 9.5 in Appendix.

Table 41 presents current expenditure on Labour, Materials, and Capital of the NHS England Group from 2019/20 to 2023/24. Nominal expenditure for all three input categories increased from 2022/23 to 2023/24. Labour expenditure increased by 11.64% meanwhile expenditure on materials increased by 16.43%. The largest increase seen was in nominal capital expenditure, which increased by 21.10%.

Table 41: Current expenditure by NHS England Group (£000)

Year	Labour	Materials*	Capital*
2020/21	2,270,582	3,296,681	621,361
2021/22	2,549,296	3,273,357	572,190
2021/22**	-	4,639,030	-
2022/23**	3,255,557	4,999,739	533,202
2023/24**	3,634,446	5,820,998	645,718

* Interest payments are moved from Material to Capital expenditure, to align with the practice followed with NHS Trusts. ** Expenditure for "Supplies and services – clinical" and "Supplies and services – general" of the 'Other Group' included in the 'NHS England Group' expenditure.

Nominal expenditure on Labour, Materials, and Capital among NHS Foundation and non-Foundation Trusts is reported in Table 42. Expenditure continued to rise across all categories, with labour expenditure increasing by 3.52% compared to 2022/23. Expenditure on materials increased by 5.96%, meanwhile capital expenditure again saw the biggest increase, by 16.80%.

Table 42: Current expenditure by NHS Trusts (£000)

Year	Labour	Materials	Capital
2020/21	67,106,390	28,504,921	11,078,757
2021/22 ^{95*}	71,134,250	31,846,873*	10,569,042*
2022/23**	76,355,235	33,781,003	11,182,682
2023/24	81,841,826	35,795,593	13,061,205

* Expenditure figures incurred by NHS Trusts for both Materials and Capital for 2021/12 were corrected as a coding issue was detected. Expenditure for Materials is calculated as a residual from total operating expenditure once we deduct both expenditure for both Labour and Capital. Erroneously in the 2021/22 update, part of the Capital expenditure was attributed to Materials. ** The value of the 2022/23 NHS Trusts labour expenditure was corrected to account for a reporting error in the 2022/23 update, and to take into account the one-off pay award.

Overall NHS (nominal) expenditure on all input items from 2019/20 to 2023/24 is summarised in Table 43. The table includes the sum of Labour (NHS Staff and Bank staff), Materials and Capital across NHS Trusts and NHS England Group. Expenditure on Primary Care and Community Prescribing (Prescribing) are also included. Details about the source of information of Community Prescribing are given in section 6.7. Expenditure on NHS staff remained the largest proportion of total input expenditure at 49.54%, followed by materials

⁹⁵ The expenditure figures for Materials and Capital for NHS Trusts reported in Arabadzhyan et al (2024) were respectively equal to £33,850,830 and £8,565,085.

at 25.01%, primary care expenditure at 11.04%, capital expenditure at 7.85% and prescribing at 6.56% of total nominal expenditure.

Nominal expenditure on overall NHS staff grew by 8.28% in 2023/24 compared to 2022/23. Materials expenditure grew by 7.31%, whilst capital expenditure grew by 11.48%. Finally, nominal expenditure on primary care grew by 6.89%.

Table 43: Total NHS current expenditure 2019/20 – 2023/24 (£000)

Year	NHS Staff	Material	Capital	Prescribing	Primary Care
2019/20	59,348,146	27,051,717	9,333,550	9,281,577	14,751,852
2019/20	-	29,375,354 [^]	9,310,403	8,907,754 [§]	-
2020/21	66,935,079	31,801,635	11,700,085	9,403,486	16,176,029
2021/22 ^{*96}	70,723,546	36,485,903 ^{*^}	11,141,232 [*]	9,687,037	17,367,209
2022/23	76,147,992	38,780,742 [^]	11,715,884	10,376,587	17,191,969
2023/24	82,452,172	41,616,591	13,061,205	10,915,018	18,376,079

*Expenditure figures for both Materials and Capital for 2021/22 were corrected as a coding issue was detected. Expenditure for Materials is calculated as a residual from total operating expenditure once we deduct both expenditure for both Labour and Capital. Erroneously in the 2021/22 update, part of the Capital expenditure was attributed to Materials. This correction has no overall effect on Total expenditure and on the indirect and mixed input growth rates, and NHS productivity growth rates

[^] Expenditure for “Supplies and services – clinical” and “Supplies and services – general” of the ‘Other Group’ included in the ‘NHS England Group’ expenditure. [§] Updated as part of the recovery calculations between 2019/20 and 2023/24.

Finally, comparing nominal NHS expenditure for each input type between 2019/20 and 2023/24, we found that nominal expenditure on overall NHS staff grew by 38.93% expenditure on materials increased by 41.67%, whilst capital nominal expenditure increased by 40.29%. Finally, nominal expenditure on primary care increased by 24.57% between 2019/20 and 2022/23. In real terms, NHS expenditure between 2019/20 and 2023/24 on NHS staff grew by 17.90%, expenditure on materials increased by 25.27%, expenditure on capital grew by 24.05% and expenditure on primary care grew by 2.52%.

Table 44 presents the nominal growth rate of NHS expenditure across five key input categories from 2019/20 to 2023/24. Overall, nominal spending grew year-on-year across almost all categories and time periods. The only exceptions to this upward trend were Capital expenditure, which contracted by -4.78% in 2020/21 and 2021/22, and Primary Care, which fell slightly by 1.01% in 2021/22 – 2022/23.

We note that the onset of the COVID-19 pandemic triggered the largest single-year budget increases. This is most visible in Capital expenditure, which spiked by 25.67%, and NHS Staff costs, which grew by 12.78% as emergency capacity was built and staffed. Unlike Staff and Capital, which saw their highest growth in the first year of the pandemic, Material expenditure peaked in the second year (2020/21 – 2021/22) at 14.73%, likely reflecting ongoing supply acquisitions (such as PPE and medical equipment) and prolonged logistics adjustments. Finally, throughout the entire four-year timeline, spending on NHS Staff, Materials, and Prescribing remained consistently positive. Prescribing was the most stable and predictable cost category, maintaining moderate and steady annual growth fluctuating tightly between

⁹⁶ The expenditure figures for Materials and Capital for the NHS as a whole, reported in Arabadzhyan et al (2024) were respectively equal to £37,124,187 and £9,137,275.

3.02% and 7.12%. As regards primary care, after the small contraction of -1.01% in 2021/22 – 2022/23, funding for Primary Care rebounded robustly in 2022/23 – 2023/24, growing by 6.89%.

Table 44: Total NHS current expenditure growth, 2019/20 – 2020/21 to 2022/23 – 2023/24

Years	NHS Staff	Material	Capital	Prescribing	Primary Care
2019/20 – 2020/21	12.78%	8.26%	25.67%	5.57%	9.65%
2020/21 – 2021/22	5.66%	14.73%	-4.78%	3.02%	7.36%
2021/22 – 2022/23	7.67%	6.29%	5.16%	7.12%	-1.01%
2022/23 – 2023/24	8.28%	7.31%	11.48%	5.19%	6.89%

8. Concluding remarks

Overall NHS output, adjusted for quality, increased by 7.87% between 2022/23 and 2023/24. An indication of a sustained increase in healthcare services delivery, which was one of the policy focuses of NHS England's elective recovery plans in both 2021 and 2022. Improvements in the quality of care are primarily due to improvements in life expectancy. Further adjusting NHS outputs to account for avoidable emergency readmissions and hospital-acquired infections (HAIs) resulted in a slightly higher NHS output growth rate of 7.86%. This slight negative effect was solely due to a slight increase in avoidable emergency readmissions in 2023/24. NHS inputs grew by 4.48% when measured using the mixed approach (our preferred measure), over the same period, leading to productivity growth of 3.25%.⁹⁷

Similarly to Arabadzhyan et al. (2023, 2024), test and trace services were not included in our output measure due to a lack of comprehensive data. To the extent these services were delivered by NHS staff within their NHS roles, their costs would have been captured in our input measure but not in our output measure.

Further, we compared productivity in 2023/24 with the pre-pandemic year of 2019/20, to directly investigate the extent of NHS recovery. We found that compared to the pre-pandemic year of 2019/20, both the NHS cost-weighted and the quality-adjusted output grew by 6.62% and 7.23% respectively. NHS inputs were also higher in 2023/24 compared to 2019/20, with a growth rate of 14.45% for the mixed measure and 15.17% for the indirect measure. This is in line with expectations, as NHS England has consistently provided additional financial resources to support the elective recovery programme.

Due to sustained growth in inputs, NHS productivity in 2023/24 remains lower compared to 2019/20, showing a decrease of between -6.89% and -6.30%, depending on the method used. NHS productivity has steadily recovered since the 2020 COVID-19 pandemic, with this most recent period showing further significant year-on-year improvement, with increases of 3.84% (indirect method) and 3.86% (mixed method) compared to 2022/23. Despite these gains, a significant productivity gap as compared to the pre-pandemic period still remains in 2023/24.

We compare total factor productivity growth in the NHS to the broader UK economy, as measured by the Gross Value Added per Hour (labour productivity, LP) and the Market Sector MFP indices. We find that in the post-pandemic period, all measures except for Market Sector (MFP), have shown a rising trend, with the Overall Economy index LP index surpassing its pre-pandemic level. NHS productivity, while still substantively lower than its pre-pandemic level, shows steady growth, indicating the system is on the path of recovery, and of the three measures shows the fastest growth, also surpassing the growth in the economy as measured by the Market Sector (MFP) index.

Finally, taking a longer-term view from 2004/05 to 2023/24, we calculated the average annual growth rate for NHS outputs, inputs, and productivity. It's important to note that, until 2018/19-2019/20, the mixed approach was used to calculate both NHS inputs and productivity growth rates, whilst the indirect approach was used for the 2019/20-2020/21

⁹⁷ Our preferred measure for the 2023/24 NHS productivity update is based on the mixed approach, as it was in 2022/23. This follows two years of using the indirect approach in measuring growth in NHS inputs as the Department of Health and Social Care noted delays in updating the staff and pay-roll systems by NHS Trusts during the pandemic, while financial accounts correctly reflected the expenditure on NHS staff.

and 2020/21-2021/22 links.⁹⁸ Over this period, we find that growth in NHS quality-adjusted outputs averaged 3.30% per annum, while NHS inputs grew by an average of 3.01% annually, resulting in annual NHS productivity growth averaging at 0.47%.

These figures remain below the average annual growth rates achieved by the NHS before the pandemic (up to 2018/19). During that earlier period, NHS quality-adjusted output growth averaged 3.76% annually, input growth averaged 2.64%, and productivity growth averaged 1.11% per annum.

⁹⁸ Please note that for 2022/23 we reverted back to using the mixed NHS productivity growth measure.

9. Appendix

9.1. New costing method (equivalisation of cost weights) for procedures performed in either an elective inpatient setting, as day cases or in outpatient clinics

In section 9.1.1, we summarise the new equivalisation of cost weights method, referred here as the 'new costing method', which we apply to procedures that are performed either as elective, day cases or in outpatient clinics. Section 9.1.2 briefly explains the costing method for elective, day case and emergency activity not affected by the equalisation of cost weights. In section 9.1.3, we summarise the costing approach for both outpatient procedures and appointments up until and including the 2022/23 NHS productivity update (Arabadzhyan et al, 2025). Importantly, this method is still applied when costing both first and follow-up outpatient appointments.

9.1.1. New costing method – equalisation of cost weights

National health care policy has increasingly shifted elective care to less intensive settings by “[...] mov(ing) procedures down the ‘intensity gradient’ from inpatient to day case settings, and from day case theatres to outpatient clinics” (Wall et al., 2022). This shift has been proposed as a core mechanism for achieving the elective recovery, reducing waiting times, and ultimately increasing the efficiency of the health system. Therefore, we have implemented a new costing method for outpatient procedures, to correctly reflect the value of activity provided in the different settings. This is also known as ‘weight equalisation’.

We calculate activity weighted average unit costs across the three modes of delivering care (elective inpatient, day cases and outpatient procedures) for a select set of procedures that we observe as being delivered in any of the above modes of delivery. This is performed at the HRG and year level and calculated using information from the NCC dataset. In some cases, the NCC dataset has information suppressed due to low (activity) numbers in line with NHS England policy, and we follow (Arabadzhyan et al., 2022) and impute the missing activity value and set it equal to 4.

In particular, we use information provided in the worksheet “Total HRGs” for the years 2019/20 and 2022/23, and in the Excel file “Summary HRG” for the year 2023/24 of the NCC dataset for total activity and total cost for each of the three modes of delivery to calculate the activity weighted average unit cost as per formula (1)

$$\bar{c}_{j,t} = \frac{\sum_m TC_{j,t}^m}{\sum_m TA_{j,t}^m} \quad (1)$$

where j denotes the currency code (Healthcare Resource Group), t indicates the financial year, and m corresponds to the mode of care delivery: elective inpatient, day cases, and outpatient procedures. Therefore, $TA_{j,t}^m$ is the total activity for mode of delivery m , HRG j and year t and $TC_{j,t}^m$ is the total cost for mode of delivery m , HRG j and year t .

The unit cost, $\bar{c}_{j,t}$, thus calculated is assigned to outpatient procedures within the HES OP dataset.

An illustrative example of all possible combinations of activity and cost information that can be found in the NCC dataset is presented in Table A1; whereas in Table A2, we present for each of the possible combinations, actual examples taken from the 2023/24 NCC dataset.

Table A1: New costing of Outpatient Procedures as the average cost across the modes of care elective, day cases, and outpatient procedures

Example	Currency Code (HRG) (<i>j</i>)	Mode of delivery (<i>m</i>)		
		Elective inpatient	Day Cases	Outpatient Procedure
A	HRG ₁	X	X	X
B	HRG ₂	X		X
C	HRG ₃		X	X
D	HRG ₄			X

Table A2: New costing of Outpatient Procedures - An example per valid case from the NCC data 2023/24

Currency Code (HRG) (<i>j</i>)	Mode of delivery (<i>m</i>)						Total Activity ($\sum_m TA_{j,t}^m$)	Total Cost ($\sum_m TC_{j,t}^m$)	Activity weighted average Unit cost (£) ($\bar{c}_{j,t}$)
	Elective Inpatient		Day Cases		Outpatient Procedure				
	Activity	Total Cost	Activity	Total Cost	Activity	Total Cost			
XD38Z	14	679.37	11	761.23	12	487.51	37	1,928.11	52.11
NZ40C	19	61,288.82	-	-	52	31,395.12	71	92,683.95	1,305.41
MC10Z	-	-	66	124,607.61	165	172,077.77	231	296,685.38	1284.35
SC43Z	-	-	-	-	43	85,052.92	43	85,052.92	1,977.97

9.1.2. Old costing method for both physical and mental elective, day cases, and emergency activity

First, it is important to discuss our approach of measuring the inpatient activity and then explain our costing approach. Specifically, the differing types of NHS activity performed in an inpatient setting are identified through HRGs. Output within an HRG is the count of Continuous Inpatient Spells (CIPS) allocated to that HRG. A CIPS can contain multiple FCEs. This occurs if a patient is transferred to the care of a different hospital consultant within the same Trust or a different Trust as part of their care. We construct CIPS following our own algorithm (Arabadzhyan et al., 2021)⁹⁹, which is similar to the official algorithm published by NHS England.¹⁰⁰

The cost of each CIPS is the highest cost reported for an individual FCE within the CIPS (Bojke et al., 2017). Costs are reported in the National Cost Collection (NCC) dataset. The NCC dataset reports a separate unit cost for day case, elective care, and non-elective care activity for each HRG. As we use unit costs as a proxy for the relative health value of different activities, we acknowledge the significance of appropriate day case care by assigning it equal value as elective care (Bojke et al., 2016).¹⁰¹ Having assigned a cost to each CIPS, we then calculate the national average cost per CIPS in each HRG.

It can be that some HRGs do not have associated costs in consecutive years, due to new HRGs being introduced (old HRGs being retired). This can also arise if there was no activity in a given HRG for a specific year. Additionally, the unit costs for some HRGs have a negative cost. In such cases we deflate (inflate) costs from the year where a cost was observed, using the imputation method as described in (Castelli et al., 2011). For any remaining missing costs, we assign the activity weighted cost at the activity and year level.

Finally, it is important to note that the new equalisation of cost weights method does not affect non-elective (emergency) care. Therefore, costs assigned for non-elective care follow the usual method described here.

9.1.3. Old costing method for outpatient procedures and outpatient specialist appointments

Outpatient activity encompasses both procedures and specialists' visits, either first or follow-up appointments.

Information on unit costs is taken from the National Cost Collection (NCC) data, which reports activity and unit costs for both outpatient appointments and outpatient procedures. The unit costs for outpatient specialists' appointments are provided separately for first and follow-up appointments, whether consultant-led or not consultant-led, and whether these are provided by a multi-professional team or not, for different service types, which correspond to different treatment specialties. Unit costs for outpatient procedures are provided by Healthcare Resource Group (HRG) and service type (treatment specialty), i.e. the same HRG can appear multiple times in different specialties.

⁹⁹ A note detailing the differences between the CHE and the NHS Digital algorithms to construct CIPS is available as [supplementary material](#) published alongside the NHS productivity update for 2018/19 (Arabadzhyan et al., 2021).

¹⁰⁰ [NHS Digital CIPS and Spells methodology](#) (last accessed 20/04/2026).

¹⁰¹ This equal weighting ensures that the output index is not biased downwards if delivery of treatment moves from overnight to day case settings over time.

The activity data in the HES outpatient (OP) dataset are not reported in the same way as in the NCC datasets. A key difference is that the HES OP dataset does not classify activity as either consultant-led or non-consultant-led, which is the standard division for non-procedural outpatient activity in the NCC dataset. Because the necessary consultant codes are considered sensitive and were not available to our team, a successful match was not possible. A further difference between the HES OP dataset and NCC dataset is that HES OP includes activity from organisations other than just Trusts, and it records both attended and non-attended appointments. For our analysis, we only included attended appointments, which account for approximately 80% of the recorded data. Non-attended appointments are divided roughly equally between patient cancellations, provider cancellations, and failure to attend without notice.

To reconcile the activity definitions between the NCC and the HES OP datasets, we calculated activity weighted average costs specific to currency codes (e.g., WF01A) and service codes (e.g., 100, corresponding to General Surgery Service). We then matched these averages to the HES OP activity. Our initial matching required a complete correspondence between the NCC service code/currency code combination and the HES treatment specialty/SUS HRG code per year. For the remaining unmatched activity, we calculated the activity weighted average cost based on the currency code per year. We continued and calculated the activity weighted average cost based on the service code per year. The remaining unmatched records were then assigned an overall average cost.

* * *

In sections 9.2 and 9.3 we present and discuss the results of the hospital physical and mental health inpatient and outpatient growth when we assign unit costs based only on the old costing methodology. Similarly to the main analysis, we identified and excluded private patients who use NHS facilities to receive either inpatient or outpatient care.

For inpatient care, we also excluded the South West Yorkshire Partnership NHS Foundation Trust (RXG) from our sample in 2022/23, because it did not report any activity to the HES APC dataset in 2023/24. Finally, we excluded from the analysis the Frimley Health NHS Foundation Trust (RDU) data, as they experienced technical issues in 2022/23. For details on the datasets and methods used please refer to section 6.1 in the main text and to sections 9.1.2 and 9.1.3 in the Appendix.

Finally, and only for outpatient care, we included outpatient activity delivered to NHS funded patients by all organisations providing outpatient care included in the HES OP dataset. These include NHS trusts, both Foundation (FT) and non-Foundation trusts, independent sector providers, clinical commissioning groups, and “other provider organisations”. In previous years the sample of analysis included only outpatient activity delivered by both FT and non-FT NHS trusts.

9.2. Inpatient Care – old costing approach

Section 9.2.1 presents the overall results for the hospital overall inpatient activity. Within this, Sub-sections 9.2.1.1 and 9.2.1.2 detail the descriptive results and growth rates for physical care volumes of activity and related quality indicators, respectively. Sub-section 9.2.1.3 summarises the incremental impact of introducing quality indicators—and combinations

thereof—on the Laspeyres output growth rate for overall inpatient care, as well as separately for physical and mental health care. In sub-section 9.2.1.3, we compare NHS inpatient activity in 2023/24 with 2019/20 to calculate and assess recovery trends. Finally, Sections 9.2.2 and 9.2.3 include tables reporting information on private patients treated in the NHS and alongside descriptive statistics for the data used in this analysis.

9.2.1. Hospital physical and mental health inpatient growth following the old costing methodology

- **Overall cost-weighted and working days adjusted Laspeyres output growth for hospital inpatient activity was 5.95% between 2022/23 and 2023/24.**
- **Measures of quality improved over this period, leading to a growth rate of 7.91% after the quality-adjustment is applied.**

9.2.1.1. *Physical elective, day case, and non-elective activity*

- **Cost-weighted and working days adjusted Laspeyres output growth for elective and day case physical care was 7.46% between 2022/23 and 2023/24. Non-elective physical care Laspeyres output growth was 4.12% over the same period. Overall, the Laspeyres output growth rate (adjusted for working days) for NHS inpatient physical care was 5.96%**
- **Measures of quality indicated an increase of nearly 1.5 percentage points between 2022/23 and 2023/24 for elective and day case care in physical health, resulting in growth of 8.92%. For non-elective physical care activity, the effect of adding quality indicators was also positive, and this increase was around 2.6 percentage points leading to a growth rate 6.70%. The overall quality adjusted Laspeyres output growth for physical health care was equal to 7.92%.**

Table A3 presents the information regarding the volume of activity and the corresponding activity-weighted average unit costs for both elective and day cases, and emergency activity. Activity-weighted average unit cost for elective care decreased between 2022/23 and 2023/24: from £2,758 to £2,654 (a decrease of just under 4%), whilst that for non-elective care increased from £2,522 to £2,553 (equivalent to around 1% increase). Activity-weighted average unit costs in 2023/24 were well above those observed in 2019/20, especially for emergency health care activity (increase of just under 38%). A potential reason for the small differences observed in average unit costs may be the more modest changes in the inflation rate observed between 2022/23 and 2023/24 compared to previous financial years. In fact, the mean Consumer Price Inflation, including housing costs (CPIH), from 2022/23 with 2023/24 was only 3.3% (ONS 2024), whilst it was more than double this amount (6.8%) between 2021/22 and 2022/23.¹⁰² Activity weighted average unit costs may also differ across years because of treating a different case-mix of patients. These are not usually detectable when reporting at the level of aggregation used here.

Results do not differ at all when including private patients. See Table A7, in section 9.2.3, for the summary information on volume and activity-weighted average unit costs.

¹⁰² See [CPIH annual rate](#) (last accessed 24/03/2026).

Table A3: Number of CIPS and average cost for electives and non-electives

Year	Elective and day case activity		Non-elective activity	
	# CIPS	Average cost (£)	# CIPS	Average cost (£)
2019/20	10,322,560	1,900	8,044,921	1,852
2019/20 ^{*, ^}	8,725,893	2,133	8,031,972	1,851
2020/21	6,830,556	2,542	6,901,554	2,627
2020/21 [*]	6,828,395	2,601	6,907,709	2,641
2021/22 [*]	9,258,555	2,275	7,739,036	2,307
2021/22 [§]	7,811,654	2,584	7,649,308	2,307
2022/23 [§]	8,509,067	2,765	7,557,654	2,523
2022/23 ^{§, ^}	8,437,941	2,758	7,541,496	2,522
2023/24 ^{§, ^}	8,958,819	2,654	8,011,221	2,553

Notes: ^{*} Measures calculated using corrected ordering of FCEs within CIPS. [§] Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the 2022/23 financial year. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded from 2022/23 as it did not report any inpatient activity in 2023/24 to the HES APC dataset. Also, excluded are private patients who use NHS facilities to receive inpatient care.

The cost-weighted and working days adjusted Laspeyres output growth for elective and day-case physical care was 7.46% between 2022/23 and 2023/24. Non-elective output grew by 4.12% over the same period, leading to an overall NHS cost-weighted and working days adjusted Laspeyres output growth of 5.96 %.¹⁰³

Including private patients slightly increased these figures. Elective and day case physical care growth was 7.50%, and non-elective growth was 4.13%, resulting in an overall inpatient physical care Laspeyres output growth of 5.99%.

9.2.1.2. *Physical elective, day case, and non-elective activity: quality adjustment*

The methodology for adjusting the Laspeyres output growth measure for quality indicators is discussed in section 6.2.3 We do not revisit the descriptive statistics here, as they are not affected by the costing approach.

However, it is important to note the impact of the quality indicators on the NHS inpatient output growth measure. We find that the inclusion of quality indicators, specifically for in-hospital survival rates, life expectancy, PROMs, and waiting times, has a positive impact on the NHS inpatient output growth measure. Between 2022/23 and 2023/24, the quality-adjusted Laspeyres output growth rates were 8.92% for physical elective and day case care and 6.70% for non-elective physical care respectively. Overall, accounting for these quality improvements increases the Laspeyres output growth for physical inpatient health care by almost two percentage points to 7.92%.

Finally, including private patients treated in the NHS does increase these figures slightly. Elective and day case physical care growth was 8.97% and non-elective physical care was 6.72%, resulting in an overall inpatient physical care quality-adjusted Laspeyres output growth of 7.96%.

¹⁰³ The total number of working days was 251 and 250 in 2022/23 and 2023/24, respectively.

9.2.1.3. *Breakdown of quality measures for inpatient care*

In sub-sections 6.2.3 and 6.2.5 we presented descriptive statistics for quality adjustment measures for inpatient physical care, along with the overall impact of these quality adjustments on Laspeyres growth. Importantly these are not affected by the costing approach adopted. In this section we examine the incremental impact of introducing these quality indicators and their various combinations. A detailed breakdown of the quality adjustments is presented in Table A4.

Adjusting for survival alone increases overall inpatient output growth by 0.37 percentage points. The most impacted activities were non-elective physical health care and mental health overall activity. Specifically, output growth for non-elective physical health care increased by 0.58 percentage points, whilst for mental health activity (across elective and day cases, and non-elective settings) increased by 0.36 percentage points. A further improvement in output growth is observed when including the PROMs adjustment (representing health gain). Due to data unavailability for the 2023/24 financial year, PROMs values for hip and knee replacement are held constant by design. They are now set at 0.8 for elective and day case activity, in line with all other inpatient healthcare activity. However, this adjustment still magnifies the impact of survival, particularly in elective care.

Applying the life expectancy adjustment had a large, positive impact, increasing overall inpatient output growth by more than one percentage point. This effect was consistent across all types of physical health care activity, with the greatest improvement seen in non-elective cases (almost 1.4 percentage points). For overall mental healthcare activity, the increase was more modest at roughly 0.6 percentage points. When adjusting for both waiting times and life expectancy together, the overall output growth measure increased by approximately 1.2 percentage points. Under this combined adjustment, the highest positive impact was observed in non-elective physical healthcare (a 1.4 percentage points increase), whilst mental health output growth improved by just over 0.6 percentage points.

Overall, Table A4 indicates a general improvement in the quality of care provided by the NHS in the hospital inpatient setting. The combined impact of changes in survival, pre- and post-treatment health status, life expectancy and waiting time was substantial, adding almost 2 percentage points to the Laspeyres cost-weighted output growth rate. The largest improvement was seen in non-elective physical healthcare activity, where these quality measures added nearly 2.6 percentage points to the cost-weighted output growth measure.

Table A4: Quality adjustment breakdown with working day/total day adjustment 2022/23 – 2023/24

	Cost-adjusted	Quality-adjusted (Survival, PROMs, LE & WT)	QA only Survival	QA only Survival & PROMS	QA only survival & PROMS & LE	QA only LE	QA only WT & LE
Physical + Mental Health Inpatient (all)	5.95%	7.91%	6.31%	6.67%	7.88%	7.15%	7.17%
Physical Inpatient (all)	5.96 %	7.92%	6.32%	6.68%	7.90%	7.16%	7.18%
Physical Inpatient (Elective)	7.46%	8.92%	7.65%	7.83%	8.88%	8.51%	8.55%
Physical Inpatient (Non-Elective)	4.12%	6.70%	4.70%	5.27%	6.70%	5.51%	5.51%
Mental Health Inpatient (all)	4.13%	5.44%	4.49%	4.79%	5.42%	4.75%	4.77%

Further, we added additional quality indicators into the quality-adjusted Laspeyres output growth measure: avoidable emergency readmissions and Hospital Acquired Infections (HAIs), specifically MRSA and C-Diff.

Adjusting solely for avoidable emergency readmissions, decreased the overall NHS output by 0.08 percentage point to 7.82%. The impact on the physical elective and day case activity quality-adjusted output growth measure was small (a 0.02 percentage point reduction); however, the effect on the output growth measure for physical non-elective activity was more pronounced, dropping 0.19 percentage points to 6.50%. When including this additional adjustment to mental health activity, the growth measure decreased to 5.08%, 0.36 percentage point decline across elective and day case and non-elective activity settings.

Finally, we accounted for the deadweight-loss associated with HAIs. Because the impact of this quality indicator cannot be disentangled between elective and day case and non-elective activity, for both physical and mental health care, we report only the overall effect. The Laspeyres inpatient output growth measure became 7.80%, which is a 0.02 percentage points lower than when adjusting for avoidable emergency readmissions alone.

9.2.1.4. Comparison between 2019/20 and 2023/24

Comparing NHS inpatient output in 2023/24 to the pre-pandemic year of 2019/20 shows a 5.83% increase in the cost-weighted and working day adjusted Laspeyres output growth rate. This represents a significant improvement over previous year, indicating a strong recovery from the pandemic related decline. After adjusting for changes in quality, inpatient growth increased by nearly 2.5 percentage points, reaching 8.31%.¹⁰⁴

Adjusting for survival alone leads to a higher overall inpatient output growth by 0.45 percentage points. The most significantly impacted activities were non-elective physical healthcare activity and elective and day case physical healthcare activity, which saw growth increases of 0.6 and 0.34 percentage points, respectively. In contrast, the output growth for mental health care deteriorated further upon adjusting for the survival rate, decreasing from -16.92% to -17.02%.

¹⁰⁴ In the sample where NHS private patients are included the cost and working day adjusted inpatient activity was 5.75% and it increased to 8.17% after for quality indicators.

Introducing the PROMs adjustment magnifies also in this instance the impact of survival on overall inpatient growth. This effect was consistent across all types of physical health care activity, with the greatest improvement seen in non-elective cases. The exception is mental healthcare activity (both elective and day cases and non-elective), where the PROMs adjustment decreases the output growth ever further to -17.08%.

Applying the life expectancy adjustment on its own drove overall output growth up by almost 2 percentage points. The most substantial effect was observed in non-elective physical health activity, which increased by 3.2 percentage points. This adjustment likewise exerted a positive influence on mental health activity, yielding a 0.03 percentage point increase. Finally, adjusting for both life expectancy and waiting times dampens the positive effect of the former; but growth rates for the overall inpatient output are still positively affected.

All results are presented in Table A5.

Table A5: Quality adjustment breakdown with working day/total day adjustment 2019/20 – 2023/24

	Cost-adjusted	Quality-adjusted (Survival, PROMs, LE & WT)	QA only Survival	QA only Survival + PROMS	QA only survival + PROMS + LE	QA only LE	QA only WT & LE
Physical + Mental Health Inpatient (all)	5.83%	8.31%	6.27%	6.65%	8.65%	7.69%	7.36%
Physical Inpatient (all)	5.98%	8.49%	6.43%	6.82%	8.82%	7.86%	7.52%
Physical Inpatient (Elective)	6.03%	6.97%	6.36%	6.64%	7.57%	6.86%	6.24%
Physical Inpatient (Non-Elective)	5.93%	10.39%	6.52%	7.04%	10.39%	9.12%	9.12%
Mental Health Inpatient (all)	-16.92%	-17.08%	-17.02%	-17.08%	-17.05%	-16.89%	-16.92%

Further, when we added the quality indicator avoidable emergency readmissions to the quality adjusted Laspeyres output growth measure we found that overall output growth improved by 0.17 percentage points bringing it to 8.48%. The impact of this quality indicator was more pronounced for physical non-elective activity than for elective physical care. Similarly, the growth of mental health activity improved when including avoidable readmissions. More specifically, the overall mental health growth improved to -16.75%, equivalent to a 0.33 of a percentage point increase. Finally, accounting also for the deadweight-loss associated with HAIs the overall Laspeyres inpatient output growth decreases to 8.43%.

9.2.2. Proportion of private patients in the HES Admitted Patient Care dataset

Table A6 reports the proportion of inpatient services delivered to private patients, for the years 2019/20 – 2023/24. This was less than 0.5% in financial years, 2019/20, 2022/23 and 2023/24. Note that the proportion of private patients is calculated before we drop any providers with data issues (e.g. Excludes Frimley Health NHS Foundation Trust (RDU) with data submission issues during the financial year 2022/23).

Table A6: Proportion of private patients treated for outpatient care in NHS Trusts and other organisations, 2019/20 – 2023/24

Year	Proportion of private patients over time
2019/20	0.48%
2020/21	0.29%
2021/22	0.43%
2022/23	0.48%
2023/24	0.45%

9.2.3. Descriptive statistics including private patients

Table A7: Number of CIPS and average cost for electives and non-electives physical health when private patients are included

Year	Elective and day case activity		Non-elective activity	
	# CIPS	Average cost (£)	# CIPS	Average cost (£)
		Old Costing New Costing Method		
2019/20 ^{*,^}	8,798,355	2,142 1,636	8,052,252	1,852
2022/23 ^{§,^}	8,509,059	2,765 2,135	7,557,406	2,523
2023/24 ^{§,^}	9,023,767	2,666 2,113	8,030,008	2,553

Notes: ^{*} Measures calculated using corrected ordering of FCEs within CIPS. [§] Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the 2022/23 financial year. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded from 2022/23 as it did not report any inpatient activity in 2023/24 to the HES APC dataset.

Table A8: Number of CIPS and average cost for electives and non-electives mental health when private patients are included

Year	Elective and day case activity		Non-elective activity	
	# CIPS	Average cost (£)	# CIPS	Average cost (£)
2019/20 ^{*,^}	16,637	1,494	136,662	1,516
2022/23 ^{§,^}	12,491	1,641	108,510	1,665
2023/24 ^{§,^}	12,239	1,690	113,983	1,715

Notes: ^{*} Measures calculated using corrected ordering of FCEs within CIPS. [§] Excludes Frimley Health NHS Foundation Trust (RDU). Provider excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). Provider excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data.

Table A9: Quality adjustment for elective and day case and for non-elective activity including private patients and when we implement the new costing approach

Year	Elective and day case activity			Non-elective activity	
	In-hospital survival rate	Mean life expectancy	80 th percentile waiting times	In-hospital survival rate	Mean life expectancy
2019/20	99.96%	22.1	85	98.36%	31.8
2019/20 ^{*, ^}	99.94%	22.8	88	97.51%	31.7
2020/21 [*]	99.93%	21.7	104	96.63%	30.7
2021/22 [*]	99.95%	21.5	104	97.38%	31.5
2021/22 [§]	99.94%	22.1	104	97.38%	31.5
2022/23 [§]	99.94%	22.1	108	97.17%	31.7
2022/23 ^{§, ^}	99.94%	22.1	108	97.17%	31.7
2023/24 ^{§, ^}	99.94%	22.2	110	97.52%	31.4

* Measures calculated using corrected ordering of FCEs within CIPS and updated life tables used for 2020/21 and 2021/22. [§] Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data.

Table A10: Quality adjustments for mental health activity including private patients

Year	Elective and day case activity			Non-elective activity	
	In-hospital survival rate	Mean life expectancy	80 th percentile waiting times	In-hospital survival rate	Mean life expectancy
2019/20	99.63%	30.8	43	99.10%	24.4
2019/20 ^{*, ^}	99.43%	30.9	31	98.21%	24.4
2020/21	99.25%	30.8	52	97.97%	23.8
2021/22	99.48%	31.1	50	97.90%	23.1
2021/22 [*]	99.48%	31.2	49	97.90%	23.1
2022/23 [*]	99.49%	31.1	73	97.35%	22.4
2022/23 ^{*, ^}	99.49%	31.1	73	97.33%	22.3
2023/24 ^{*, ^}	99.55%	31.2	82	97.66%	22.2

* Excludes Frimley Health NHS Foundation Trust (RDU). This provider was excluded due to data submission issues during the financial year 2022/23. Also excluded are regular day and night attenders. [^] Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2022/23, but not in 2023/24 in the HES APC data.

9.3. Outpatient Care – old costing approach

Section 9.3.1 presents the results of the analysis when we apply the 'old costing method'. In section 9.3.1.1, we present the volume of activity and activity weighted unit costs for NHS Trusts only. Finally, section 9.3.3 presents the proportion of private patients in the HES Outpatient data over time.

9.3.1. Hospital outpatient growth following the old costing methodology

- The cost-weighted and working days adjusted Laspeyres output growth measure for outpatient activity was 9.41% between 2022/23 and 2023/24.

- **After adjusting for waiting times, the Laspeyres output growth measure was 9.37%.**

In this section we present and discuss the results of the outpatient analysis when we assign unit costs based on the old costing methodology. Similarly to the main analysis, we implemented two further changes. First, we identified and excluded private patients who use NHS facilities to receive outpatient care. Second, we included outpatient activity delivered to NHS funded patients by all organisations providing outpatient care included in the HES OP dataset. These include NHS trusts, both Foundation (FT) and non-Foundation trusts, independent sector providers, clinical commissioning groups, and “other provider organisations”. In previous years the sample of analysis included only outpatient activity delivered by both FT and non-FT NHS trusts.

Table A11 presents the volume of outpatient activity, provided by all organisations, and the average cost when we implement the old costing methodology. Between 2022/23 and 2023/24, average unit costs increased by 6.97% when excluding private patients, and by 6.94% when including them.

Equivalent results for outpatient activity delivered only by NHS Trusts are presented in Table A12. Between 2022/23 and 2023/24, average cost increased by 7.12% when excluding private patients and by 7.09% when including them.

Table A11: HES outpatient activity provided by all organisation and average cost over time

Year	Hospital Outpatient Activity			
	All providers, excl. private patients		All providers, incl. private patients	
	Volume	Activity weighted average Cost (£)	Volume	Activity weighted average Cost (£)
2019/20*	95,946,191	135.72	96,348,256	135.99
2022/23**	95,352,488	168.51	95,731,628	168.55
2023/24**	102,715,330	180.26	103,142,591	180.25

* Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2019/24, but not in 2023/24 in the HES OP data. The year 2022/23 is not impacted as the provider did not reported activity in 2022/23 as well. ** Volume and average unit cost figures are calculated excluding Frimley Health NHS Foundation Trust¹⁰⁵

Between 2022/23 and 2023/24, the cost-weighted and working-day adjusted Laspeyres growth for total outpatient activity, excluding private patients, was equal to 9.41% between 2022/23 and 2023/24. The working-day adjustment had a significant impact; without it, the growth rate was 8.98%. Further, excluding private patients did not significantly affect outpatient growth given the small proportion of private patients treated in NHS trusts in this setting. Including private patients yielded a cost-weighted Laspeyres growth rate of 9.42%.¹⁰⁶

Finally, as a sense check, we calculated the Laspeyres growth rate restricted to NHS trusts consistent with previous reports. We ran this analysis both excluding and including private patients. The results were nearly identical: the cost-weighted, working day adjusted

¹⁰⁵ This was due to technical issues with data submission experienced by the NHS Trust from June 2022 - March 2023. Details of the technical issue are reported by NHS England on the [Data Quality section](#) of their supporting information for HES Outpatient activity.

¹⁰⁶ The cost-weighted Laspeyres growth rate without adjusting for the total number of working days was: 8.98%.

Laspeyres output growth rate was 9.18% when excluding private patients, and 9.19% when including them.¹⁰⁷

Overall, it is important to highlight that, as expected, comparing the above results to the ones obtained with the new costing methodology, reported in section 1.2 (Main Outpatient Section), the growth is lower. This is due to the fact that the new unit costs, calculated as the activity weighted average unit cost across elective, day cases and outpatient procedures, are higher than the average unit costs for outpatient procedures alone, as reported by NHS trusts.

9.3.1.1. HES outpatient: quality adjustment

When adjusting for waiting times of all first appointments, using our main sample, with the old costing method, we found that the cost-weighted and working day-adjusted Laspeyres growth was equal to 9.37%, a mere 0.04 of a percentage point lower compared to the non-quality adjusted growth. When adjusting for the waiting times of only face-to-face first appointments, the growth rate dropped to 9.36%¹⁰⁸, or a 0.05 of a percentage point lower compared to the cost-weighted growth rate. This is to be expected given their higher 80th percentile waiting time (see Table 3, Main Outpatient Section, Section 1.3)).

Given the low proportion of private patients, their removal from the sample had no material effect on the resulting outpatient quality and working day adjusted cost-weighted Laspeyres growth. The growth was not much different, and it corresponded to around 9.37%¹⁰⁸ in both cases of quality adjustments (all first appointments, only face-to-face first appointments).

To serve as a sense check, we calculated the quality and working-day adjusted cost-weighted Laspeyres growth for outpatient activity delivered by NHS trusts only, consistent with previous reports. Excluding private patients from the sample, the resulting growth rate was 9.14% and 9.13%, respectively when including waiting times for all first appointments and for face-to-face first appointments. Including private patients did not impact the calculated quality and working day adjusted cost-weighted Laspeyres growth rate, which was equal to 9.14% (adjusting for all first appointments and for only face-to-face first appointments).¹⁰⁸

9.3.1.2. Comparison between 2019/20 with 2023/24

In this sub-section, we compare activity average cost in the year 2019/20 with that in 2023/24 using the old costing methodology. Table A11 shows that the unit cost of activity in 2023/24 was 32.47% (32.20%) higher than in 2019/20 when excluding (including) NHS private patients, when considering NHS outpatient activity delivered by all organisations. Cost weighted and working day adjusted Laspeyres volume growth rate between 2019/20 and 2023/24 was 6.03%¹⁰⁹ and 6.02%¹⁰⁹ without and with private patients, respectively. The positive value suggests recovery of outpatient activity in 2023/24 compared to the pre-COVID-19 pandemic period (2019/20). Moreover, our results remained largely unchanged when private patients were included in the sample.

¹⁰⁷ The cost-weighted Laspeyres growth rate without adjusting for the total number of working days was: 8.75% irrespective of whether private patients were excluded or included.

¹⁰⁸ The cost-weighted Laspeyres growth rate without adjusting for the total number of working days was between 8.93% - 8.94% when adjusting for waiting time of all first appointments when we excluded/included private patients. The growth was approximately 8.7% in the sample of outpatient activity provided only by NHS Trusts independently of the quality adjustments and whether we excluded/included private patients.

¹⁰⁹ The cost-weighted Laspeyres growth rate without adjusting for the total number of working days was: 4.36% (4.35%) without (with) private patients.

Table 21 (see Section 6.3.3) indicates that between 2019/20 and 2023/24 both the mean and the 80th percentile waiting time worsened. Cost weighted, quality and working day adjusted output growth was around 5.88%. This figure remained consistent whether using all first appointments or only face-to-face first appointments within the sample of outpatient activity delivered by all organisations (excluding private patients). Applying the quality adjustment to outpatient output resulted in a reduction of approximately 0.14 of a percentage points. This reduction was greater in magnitude than the impact of the quality adjustment seen between 2022/23 and 2023/24, which is consistent with the overall deterioration of the waiting time quality indicator from 2019/20 to 2023/24.

Due to the negligible volume of private patients, our findings remain mainly unchanged. Hence, the cost weighted, quality and working day adjusted outpatient growth was 5.87% when adjusted for all first appointments and 5.88% when adjusted for only face-to-face first appointments.

Furthermore, we conducted a similar analysis for the outpatient activity delivered by NHS trusts only in the year 2019/20 and 2023/24, consistent with previous reports. Table A12 shows that, compared with 2019/20, the unit cost in 2023/24 was 32.55% higher when including private patients, and 32.26% higher when excluding. Cost weighted and working day adjusted Laspeyres volume growth between 2019/20 and 2023/24 was 5.76% (5.75%)¹¹⁰ excluding (including) private patients. The cost weighted, quality and working day adjusted outpatient growth decreased only to around 5.62% (5.61%), when using both all first appointments and face-to-face first appointments, and when excluding (including) private patients, respectively.

9.3.2. HES Outpatient volume of activity and activity weighted unit costs for NHS Trusts

Table A12 reports HES outpatient volume of activity provided by NHS Trusts only and the corresponding average cost, for both the 'new costing' and 'old costing' approaches, for the financial years 2019/20, 2022/23, and 2023/24. The information provided here is used both in the main section of the Outpatient analysis and in Section 9.3.1.

Table A12: HES outpatient volume provided by NHS Trusts and cost overtime

Year	Hospital Outpatient Activity*			
	NHS Trusts, excl. private patients		NHS Trusts, incl. private patients	
	Volume	Activity weighted average Cost (£)	Volume	Activity weighted average Cost (£)
		Old Costing New Costing Method		Old Costing New Costing Method
2019/20*	90,528,420	136.89 144.06	90,930,310	137.17 144.07
2022/23**	89,936,170	169.86 178.39	90,315,310	169.90 178.44
2023/24**	96,546,260	181.96 191.26	96,973,510	181.94 191.24

* Excludes South West Yorkshire Partnership NHS Foundation Trust (RXG). This provider was excluded as it reported activity in 2019/24, but not in 2023/24 in the HES OP data. The year 2022/23 is not impacted as the provider did not reported activity in 2022/23 as well. ** Volume and average unit cost figures are calculated excluding Frimley Health NHS Foundation Trust¹¹¹

¹¹⁰ The cost-weighted Laspeyres growth rate without adjusting for the total number of working days was: 4.10% (4.08%) excluding (including) private patients.

¹¹¹ This was due to technical issues with data submission experienced by the NHS Trust from June 2022 - March 2023. Details of the technical issue are reported by NHS England on the [Data Quality section](#) of their supporting information for HES Outpatient activity.

9.3.3. Proportion of private patients in the HES Outpatient dataset over time

Table A13 reports the proportion of outpatient services delivered to private patients, for the years 2019/20 – 2023/24. This was around 0.4% in the financial years 2019/20, 2022/23 and 2023/24.

Table A13: Proportion of private patients treated for outpatient care in NHS Trusts and other organisations, 2019/20 – 2023/24

Year	Proportion of private patients over time
2019/20	0.42%
2020/21	0.32%
2021/22	0.37%
2022/23	0.40%
2023/24	0.41%

9.4. Community Prescribing

The Community Prescribing section of the 2023/24 National Productivity Update reported **611** drugs which were prescribed in 2022/23 but not observed in 2023/24, and **666** drugs which were prescribed in 2023/24 which were not prescribed in 2022/23.

We refer to these as ***dropped drugs*** (611), and ***new drugs*** (666) in this appendix.

Within a given link, the likely reason for drugs to be dropped, and new ones to surface are rebranding, or patented drugs being switched to generic. The number of dropped drugs and new drugs are often similar.

In the current productivity update, in line with the expectation, the number of new drugs prescribed in 2023/24 which were not prescribed in 2022/23 is similar to the number of the dropped drugs that appeared in 2022/23 but are no longer prescribed in 2023/24. We conduct confirmation checks to ensure that the observed numbers are correct.

Independently from the process used to produce the report, we matched the community prescribing record of 2022/23 with 2023/24 and found 665 new drugs and 609 dropped drugs. The difference of 1 and 2 drugs in this statistic result from the outlier exclusion process applied for the main report.

We then looked at the PropGenLinkCode, which utilises a top-down hierarchical coding system to separate drugs by disease categories and medical conditions. We look at three layers of PropGenLinkCode in our comparison for new and dropped drugs.

Table A14 summarises the number of new and dropped drugs by tier-1¹¹² of PropGenLinkCode in the latest link. The number for dropped and new drugs are more or less the same for each of the tier-1 categories. We highlight that the categories “04”, “06”, and “09” have the highest difference of new and dropped drugs.

¹¹² We consider the first 2 characters within the PropGenLinkCode as tier-1, the first 4 characters as tier-2, and the first 6 characters as tier-3. As PropGenLinkCode follows a top-down hierarchical coding system, this means any conditions under tier 3 would be nested under its corresponding condition in tier-2, and similarly tier-2, tier-1. An example would be metabolic disorders for tier-1, amino acid metabolism disorders for tier-2, and phenylketonuria (PKU) for tier-3.

Table A14: Tier-1 of PropGenLinkCode for New and Dropped Drugs between 2022/23 and 2023/24

PropGenLinkCode	Number of new drugs	Number of dropped drugs
01	32	31
02	52	26
03	17	15
04	118	80
05	37	40
06	59	29
07	9	7
08	33	30
09	153	195
10	21	25
11	22	15
12	11	6
13	59	57
14	9	8
15	12	3
19	4	12
20	2	0
21	1	2
22	5	10
23	9	18

Based on this result, we looked at the tier-2 of PropGenLinkCode nested under categories “02” “04”, “06” and “09” of tier-1, and found 11, 7, and 14 tier-2 categories under them respectively.

Again, most of these categories report numbers of new and dropped drugs in the single digit, that are consistent between the number of new drugs and the number of dropped drugs, with the exception of the categories reported in Table A15.

Table A15: Tier-2 of PropGenLinkCode for New and Dropped Drugs between 2022/23 and 2023/24, Irregular Categories

PropGenLinkCode	Number of New Drugs	Number of Dropped Drugs
0205	14	4
0408	29	11
0601	18	5
0901	19	5
0904	2	132
0913	76	6

We then looked at the conditions under these tier-2 categories and identified four tier-3 categories with the highest level of difference of the number of new drugs and dropped drugs.

Tier-3 Category 040801

There were **26** new drugs and **9** dropped drugs under this category in the most recent link. This category includes drugs used to control epilepsy.

Tier-3 Category 060102

There were 14 new drugs and only **1** dropped drug under this category in the most recent link. This category includes antidiabetic drugs.

Tier-3 Category 090401

There was **1** new drug and **76** dropped under this category in the most recent link. All the drugs in this category are food for special diets.

Tier-3 Category 090402

There was **1** new drug and **57** dropped under this category in the most recent link. All the drugs in this category are for enteral nutrition.

Tier-3 Category 091346

There were **13** new drugs and **2** dropped under this category in the most recent link. All the drugs in this category are 'specific food products prescribed for patients with coeliac disease or dermatitis'.

9.5. Deflators

In order to construct a Laspeyres volume growth measure for NHS inputs, expenditure reported in the most recent year needs to be deflated (see section 2.2 for methodological details). This is to purge any changes in expenditure due to changes in prices. Because inflation rates can vary for different sources of expenditure, we use the most appropriate and disaggregated measures available.

We employed specific deflators for four categories of expenditure (Materials and Capital are considered as a homogenous category) until 2015/16. From 2016/17 and limited to Community Prescribing, we use the direct Laspeyres output growth, instead of deflating its expenditure.¹¹³ In 2018/19 we incorporated a specific deflator for agency staff. The various categories of expenditure and deflators used from 2013/14 onwards are summarised in Table A16.

Table A16: Sources of deflator data

Years	Labour	Materials & Capital	Primary Care	Prescribing
2013/14 – 2014/15	ESR deflator	Hospital and Community Health Services (HCHS) deflator	Pay and Price deflator $0.1 + 0.4 \times \text{ESR deflator} + 0.4 \times \text{HCHS deflator}$	PCA / NHS BSA
2014/15 – 2015/16				
2015/16 – 2016/17				
2016/17 – 2017/18	ESR deflator and Agency deflator (from NHSCII)	NHS Cost Inflation Index: Provider Non-Pay Index (NHSCII-PNPI)	NHS Cost Inflation Index: General Practice Index (NHSCII-GPI)	
2017/18 – 2023/24				

The deflators applied to Labour and Prescribing expenditure are constructed using the ESR dataset and Prescribing data (PCA, NHS BSA) respectively and imply calculating the Paasche price index for these two NHS inputs.

The Hospital and Community Health Services deflator and Pay and Price deflator were provided by DHSC. In 2016/17, the Pay and Price deflator was discontinued and we replaced it with a combination of ESR and HCHS deflators. In 2017/18, the DHSC created a set of new deflators – known as the NHS Cost Inflation Index¹¹⁴ – from which we use specific deflators for Materials and Capital, and Primary Care. We use the Provider Non-Pay Index to deflate expenditure on Materials and Capital, and the General Practice Index to deflate expenditure on primary care. The Provider Non-Pay index (PNPI) is calculated by weighting several sub-components – various expenditure categories in the providers accounts. Each of them is deflated using the most appropriate available deflator: components of Producer Price Index (PPI), Services Producer Price Index (SPPI),¹¹⁵ Consumer Price Index (CPI), etc. and their combinations are used to construct item-specific deflators. As regards the General Practice Index, it is computed as a weighted average of the staff and non-staff subcomponents. The former is calculated using GP and other staff earnings data provided by NHS England, whereas

¹¹³ This approach yields a more precise real input growth rate of the sector. However, we still calculate and report the deflator for Prescribing to give an idea of the price dynamics in this expenditure category in recent years.

¹¹⁴ Details on the methodology behind the index can be found in [NHS Cost Inflation Index](#) (last accessed 11/04/2025). For a comparison of HCSC and NHSCII see p.154 [Unit Costs of Health and Social Care 2019](#) (last accessed 11/04/2025).

¹¹⁵ ONS have introduced some changes to the construction of the PPI and SPPI indices, because of these some of the components of the indices used for the NHSCII are not produced anymore. As a consequence, alternative indices were used and the NHSCII back series were updated accordingly. This change does not affect our productivity series.

intermediate consumption is deflated using the Consumer Price Index, including the owner occupiers' housing costs (CPIH) published by ONS.

In addition, starting from 2018/19, a separate deflator for agency staff was produced within the NHSCI index. For the financial years 2020/21 and 2021/22 the agency deflator is calculated using data from the Crown Commercial Services/London procurement partnership. This data does not provide full coverage of Agency Expenditure, it is only data on agency supply through the NHS Workforce Alliance framework agreements, and they estimate that this accounts for around 40% of the total market. In previous years, the agency deflator was calculated using data collected by NHS England and NHS Improvement from all NHS Trusts, cover NHS Trusts' agency staff spending and the number of shifts worked, which allowed one to calculate the change in the cost of an agency staff shift, based on the assumption that the length of an agency staff shift was constant, which was deemed to be a reasonable assumption.¹¹⁶ As agency expenditure normally accounts for a large share of expenditure, it is important to understand more closely how agency staff costs vary over time and reflect this back into our measures of NHS input and NHS productivity growth. This is particularly important when agency staff costs have different growth rates compared to NHS provider staff costs, as shown in Table A17.

In 2022/23, the ESR deflator (Labour) was adjusted to take account of the NHS Pay Award that was paid out only in 2023/24 but was effective from 2022/23.¹¹⁷

Table A17 shows deflation figures for each category of expenditure from 2019/20 – 2020/21 to 2022/23 – 2023/24. These figures indicate that between 2020/21 and 2021/22 all input categories were subject to an increase in costs, with the exception of prescribing and agency expenditures.

Table A17: Deflator values 2019/20 – 2023/24

Years	Labour	Materials and Capital	Primary Care	Prescribing
2019/20 – 2020/21	3.49%	0.78%	6.04%	1.06%
2020/21 – 2021/22	3.43%	1.70%	4.48%	-3.90%
2021/22 – 2022/23	7.52%	7.15%	3.60%	1.78%
2022/23 – 2023/24	2.39%	2.98%	5.86%	-0.94%

Note: agency deflator in brackets; the agency deflator for financial years 2019/20 to 2022/23 has been suppressed as it is based on management information from NHSEI.

¹¹⁶ As highlighted by [ONS](#) (last accessed 15/03/2026), discussions with the NHS experts suggest agency staff shift lengths have been stable in recent years.

¹¹⁷ Further information on the Pay Award can be found on the [NHS Employers website](#) (last accessed 15/03/2026).

9.6. NHS Trust-only productivity measures

While the main body of our research concerns the calculation of productivity growth for the whole NHS, we also produce an NHS Trusts-only productivity growth measure.

Table A18 reports NHS output, input and productivity growth rates for NHS Trusts only. Their output growth measure for the 2022/23 – 2023/24 link, adjusted for both quality and working and total days, where appropriate (see section 2.4 for further details on working and total days adjustment) continued to grow at 8.86%. Trust-only NHS output growth between 2019/20 with 2023/24 was 5.49%.

Trust specific input growth was similar to that of the NHS as a whole: 5.03% using the mixed method and 4.68% using the indirect method between 2022/23 and 2023/24. When comparing growth in NHS inputs between 2019/20 and 2023/24, we still find sustained growth in inputs.

Between 2022/23 and 2023/24 Trust-only productivity growth was 0.39 percentage points higher than that of the NHS as a whole for the mixed productivity measure and 0.89 percentage points higher than that of the NHS as a whole for the indirect measure.

Finally, comparing 2023/24 with the pre-pandemic year 2019/20, Trust-specific productivity growth was more negative than the overall NHS (see Table A18 for full details), due to both a more sustained growth in inputs and a slower growth in outputs.

Table A18: Input, output and productivity growth, Trusts only

Years	Quality and working days adjusted Output growth	Input growth		Productivity growth rate	
		Mixed	Indirect	Mixed	Indirect
2020/21 – 2021/22	20.09%	4.84%	3.72%	14.55%	15.79%
2021/22 – 2022/23	2.88%	1.41%	1.34%	1.45%	1.52%
2022/23 – 2023/24	8.86%	5.03%	4.68%	3.64%	3.99%

Years	Quality and working days adjusted Output growth	Recovery Input growth		Productivity growth rate	
		Mixed	Indirect	Mixed	Indirect
2019/20 – 2021/22	-3.17%	14.71%	15.52%	-15.85%	-16.18%
2019/20 – 2022/23	-0.32%	16.27%*	17.06%	-14.26%*	-14.85%
2019/20 – 2023/24	5.49%	22.06%	20.06%	-13.57%	-12.13%

* Correction made to both mixed input and mixed productivity growth rates, previous growth rates reported were 9.07% and -8.61% respectively.

9.7. Working and Total Days

Total days and working days for the last three financial years are reported in Table A19.

Table A19: Total days and working days in the last three financial years

Year	Total days	Working days
2020/21	365	253
2021/22	365	253
2022/23	365	251
2023/24	366	250

10. References

- ARABADZHYAN, A., CASTELLI, A., CHALKLEY, M. J., GAUGHAN, J. M. & MATIAS, M. A. 2021. Productivity of the English National Health Service: 2018/19 update. York: Centre for Health Economics Research Paper 182, University of York.
- ARABADZHYAN, A., CASTELLI, A., CHALKLEY, M. J., GAUGHAN, J. M. & MATIAS, M. A. 2022. *Productivity of the English National Health Service: 2019/20 update*.
- ARABADZHYAN, A., CASTELLI, A., GAUGHAN, J. & CHALKLEY, M. 2024. *Productivity of the English National Health Service: 2021/22 update*.
- ARABADZHYAN, A., CASTELLI, A., GAUGHAN, J., NAZERAI, A. & SONG, W. 2025. *Productivity of the English National Health Service: 2022/23 update*.
- ARABADZHYAN, A., CASTELLI, A., GAUGHAN, J. M., ANAYA MONTES, M. & CHALKLEY, M. J. 2023. *Productivity of the English National Health Service: 2020/21 update*.
- ATKINSON, T. 2005. *Atkinson Review: Final Report. Measurement of Government Output and Productivity for the National Accounts*, Basingstoke, Palgrave Macmillan.
- ATKINSON, T. 2010. *Measuring Health Output, Productivity and Equity*, London, Office of Health Economics.
- BLUNT, I., BARDSLEY, M., GROVE, A. & CLARKE, A. 2015. Classifying emergency 30-day readmissions in England using routine hospital data 2004–2010: what is the scope for reduction? *Emergency Medicine Journal*, 32, 44-50.
- BOJKE, C., CASTELLI, A., GRAŠIČ, K., HOWDON, D. & STREET, A. 2016. *Productivity of the English NHS: 2013/14 update*, York, Centre for Health Economics Research Paper 126, University of York.
- BOJKE, C., CASTELLI, A., GRAŠIČ, K., HOWDON, D. & STREET, A. 2017. Productivity growth in the English National Health Service from 1998/99 to 2013/14. *Health Economics*, 26, 547-565.
- BOJKE, C., CASTELLI, A., GRAŠIČ, K. & STREET, A. 2014. *Productivity of the English National Health Service from 2004/5: updated to 2011/12*, York, Centre for Health Economics Research Paper 94, University of York.
- CASTELLI, A., CHALKLEY, M. J., GAUGHAN, J. M., PACE, M. L. & RODRIGUEZ SANTANA, I. 2019. *Productivity of the English National Health Service: 2016/17 update*, York, Centre for Health Economics Research Paper 163, University of York.
- CASTELLI, A., DAWSON, D., GRAVELLE, H., JACOBS, R., KIND, P., LOVERIDGE, P., MARTIN, S., O'MAHONY, M., STEVENS, P., STOKES, L., STREET, A. & WEALE, M. 2007. A new approach to measuring health system output and productivity. *National Institute Economic Review*, 200, 105-117.
- CASTELLI, A., LAUDICELLA, M., STREET, A. & WARD, P. 2011. Getting out what we put in: productivity of the English National Health Service. *Health Economics, Policy and Law*, 6, 313-335.
- CHALKLEY, M. & MALCOMSON, J. M. 1998. Contracting for health services with unmonitored quality. *The Economic Journal*, 108, 1093-1110.
- CURTIS, L. & BURNS, A. 2020. *Unit Costs of Health and Social Care*, Personal Social Services Research Unit, University of Kent, Canterbury.
- DAWSON, D., GRAVELLE, H., O'MAHONY, M., STREET, A., WEALE, M., CASTELLI, A., JACOBS, R., KIND, P., LOVERIDGE, P., MARTIN, S., STEVENS, P. & STOKES, L. 2005. *Developing new approaches to measuring NHS outputs and productivity, Final Report*, York, Centre for Health Economics Research Paper 6, University of York.

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Department of Health and Social Care.

DIEWERT, W. E., BALK, B. M., FIXLER, D., FOX, K. J. & NAKAMURA, A. O. 2010. *Price and Productivity Measurement: Volume 6 - Index Number Theory*, Trafford Press.

EUROSTAT 2001. *Handbook on price and volume measures in national accounts*, Luxembourg: Office for Official Publications of the European Communities.

JONES, K. C. & BURNS, A. 2021. Unit Costs of Health and Social Care 2021.

JONES, K. C., WEATHERLY, H., BIRCH, S., CASTELLI, A., CHALKLEY, M., DARGAN, A., FORDER, J. E., GAO, M., HINDE, S. & MARKHAM, S. 2023. Unit costs of health and social care 2022 manual.

JONES, K. C., WEATHERLY, H., BIRCH, S., CASTELLI, A., CHALKLEY, M., DARGAN, A., FORDER, J. E., GAO, M., HINDE, S. & MARKHAM, S. 2024. Unit Costs of Health and Social Care 2023 Manual.

OECD 2001. *OECD Productivity Manual: a guide to the measurement of industry-level and aggregate productivity growth*, Paris: Organisation for Economic Cooperation and Development.

OFFICE FOR NATIONAL STATISTICS 2023. Recent and upcoming changes to public sector finance Statistics. 9.

WALL, J., RAY, S. & BRIGGS, T. W. 2022. Delivery of elective care in the future. *Future Healthcare Journal*, 9, 144-9.

