

Article

# Public service productivity, healthcare, England: financial year ending 2021

Estimates of output, inputs and productivity for public service healthcare in England.



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Release date:  
29 March 2023

Next release:  
To be announced

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# 1 . Main points

- Quality-adjusted public service healthcare productivity saw a fall of 25.6% in the financial year ending (FYE) 2021 (running from April 2020 to March 2021) because of the effect of the coronavirus (COVID-19) pandemic, after small declines in the previous two financial years.
- Goods and services provided to support healthcare services in England through the coronavirus pandemic (such as additional personal protective equipment and NHS Test and Trace) was the main driver of the 24.2% growth in inputs in FYE 2021.
- The coronavirus pandemic caused a delay or a cancellation of several activities in the healthcare sector, leading to a 7.6% decline in healthcare public service output in FYE 2021.

These estimates show the relationship between inputs and outputs in the healthcare service, the structure of which changed in response to the coronavirus (COVID-19) pandemic. The pandemic caused widespread pressure and disruption, including new safety measures, urgent treatments taking priority, remote consultations, and delayed diagnosis. Productivity estimates have reacted accordingly, but comparisons over time are complex as it is difficult to consider how the present model would appear if the coronavirus pandemic had not occurred. Caution should be used when comparing the latest estimates with pre-pandemic years.

## 2 . The impact of the coronavirus (COVID-19) pandemic on public service healthcare productivity

This article focuses on the inputs, output and productivity of public service healthcare for England to the financial year April 2020 to March 2021 (FYE 2021). Updated figures for public service healthcare productivity for the UK will be published in our [Public service productivity: total, UK, 2020 article](#).

The findings presented in this report were affected by the coronavirus (COVID-19) pandemic, which means that:

- there were fundamental changes in the delivery of services in light of the impact of COVID-19 during this period
- there was a lack of data availability, such as an absence of fully updated mortality tables for this period
- there were methodological challenges, such as the absence of data in FYE 2021 which are comparable with data used in the previous years

Our analyses suggest the coronavirus pandemic may have caused a re-alignment of the relationship between inputs and outputs, requiring more inputs to continue safely to deliver healthcare outputs, given the presence of the disease. This can therefore be seen as a change in the fundamental technology (similar to a discontinuity in the series), rather than an incremental marginal productivity change.

The Office for National Statistics (ONS) will continue to develop and improve its methods for estimating healthcare output, which may lead to revisions of these preliminary estimates. More details for each component of productivity are presented in [Section 9: Data sources and quality](#).

These estimates should be considered a first estimate and subject to revisions as more data become available. For more details on the methodological changes, see our [Public service productivity estimates: healthcare QMI \(Quality and Methodology Information\)](#).

Note that, in this article, we refer to "quality" and "non-quality" measures. We refer to "output" and "productivity" when these are adjusted by quality, otherwise we specify that these are non-quality adjusted.

### 3 . Healthcare inputs

Total inputs for healthcare grew by 24.2% in England in the financial year ending (FYE) 2021. This compares with a compound annual growth rate (CAGR) of 3.6% from FYE 1996 to FYE 2020.

We use [appropriate deflators](#) to obtain an estimate of input volume growth. Since FYE 2019, a specific deflator for agency staff expenditure has been produced by the Department of Health and Social Care within the [NHS Cost Inflation Index](#).

Inputs growth in FYE 2021 was mainly driven by a 46.6% increase in real spending on healthcare goods and services. This was the biggest growth observed over the time series and it is because of the expenditure of the additional operational procurement in response to the coronavirus (COVID-19) pandemic. This includes additional personal protective equipment and goods and services associated with the operation of the NHS Test and Trace.

Labour inputs, which are mainly measured by full-time equivalent staff numbers weighted by their cost (CWAI), grew by 5.0% in FYE 2021; a faster pace than in previous years.

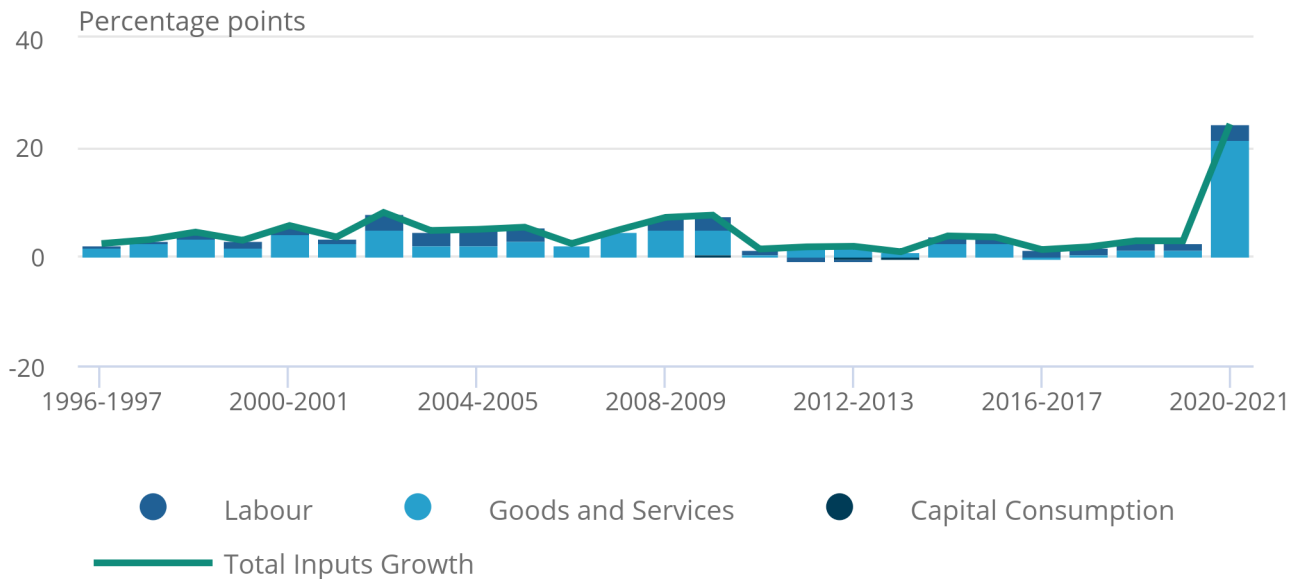
Capital inputs increased by 1.5% in FYE 2021. The growth of capital over the series has been quite volatile and the average growth of the last five years was equal to 0.4%.

## Figure 1: Healthcare inputs saw the highest ever recorded growth in FYE 2021

Contributions to annual change in public service healthcare input volumes by component, England, financial year ending (FYE) 1997 to FYE 2021

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Contributions to annual change in public service healthcare input volumes by component, England, financial year ending (FYE) 1997 to FYE 2021



Source: Public service productivity from the Office for National Statistics

#### Notes:

1. Figure 1 shows the inputs growth by component after weighting by their share of total expenditure.
2. Contributions to growth may not sum to overall growth because of rounding.
3. These estimates do not explicitly measure overtime.

## 4 . Healthcare output

Hospital and community output services (HCHS), the largest component of public service healthcare output, fell by 19.9% in the financial year ending (FYE) 2021. This was the first fall recorded in our time series, following small growth (0.2%) in FYE 2020. The slowdown in growth between FYE 2019 and FYE 2020 reflected a decline in follow-up outpatient attendance and slower growth in other HCHS activities (including hospital outpatient first attendances). However, the decrease in FYE 2021 output relative to FYE 2020 was driven by delayed or cancelled hospital services because of the coronavirus (COVID-19) pandemic.

Publicly funded healthcare output from non-NHS providers, which is the second biggest component based on the expenditure shares, grew by 19.1% in FYE 2021. This may be partly because of increased [purchases of care capacity from the independent sector](#), but may also be related to the difference in methodology from HCHS, as this is measured indirectly.

The smallest two components of output (community prescribing, and primary care services) showed different trends. Community prescribing grew by 2.6% in FYE 2021, although this was still below its average annual growth rate of 6.7% since FYE 1996. However, primary care services output fell by 27.5% in FYE 2021. There were several contributing factors to this, including the provision of dental and ophthalmic services being affected by lockdowns. In general practice, there was a considerable fall in the total number of consultations in FYE 2021 and a shift in the mode of consultation away from face-to-face appointments towards phone consultations.

Combining these four healthcare components, non-quality adjusted healthcare output fell by 14.3% in FYE 2021. The [introduction of NHS Test and Trace](#) and vaccination services in FYE 2021 slowed the overall fall in volumes of existing healthcare services.

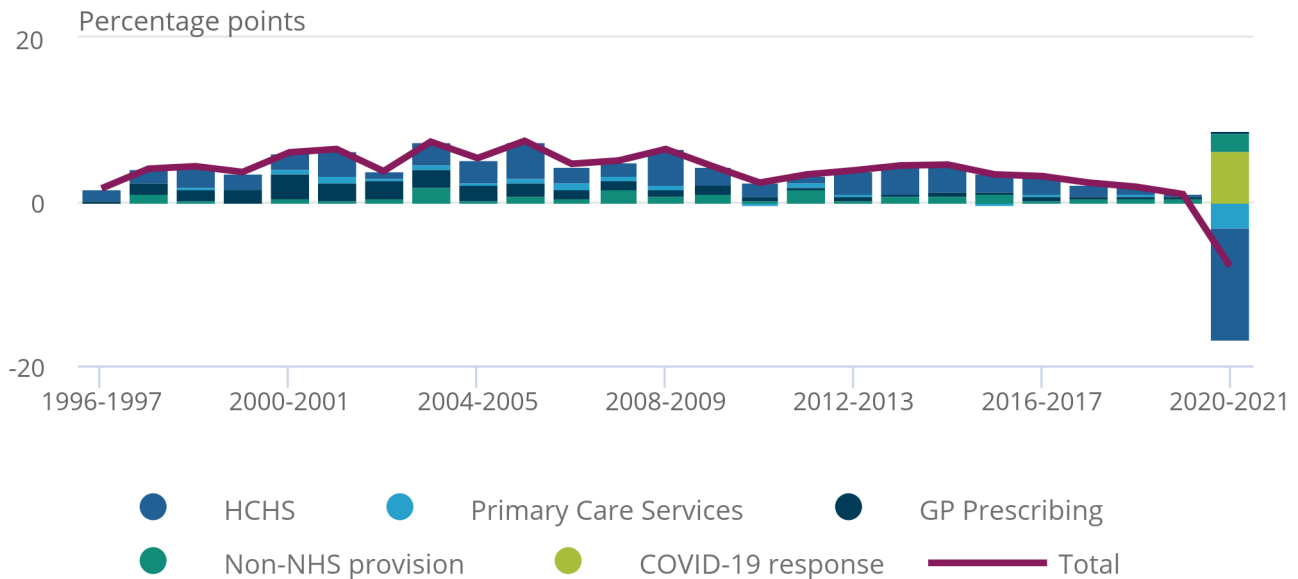
After these new services are accounted for, non-quality adjusted healthcare output fell by 7.9% in England in FYE 2021.

## Figure 2: Total healthcare outputs posted a large fall in FYE 2021

Contributions to annual change in public service healthcare output volumes by component, England, financial year ending (FYE) 1997 to FYE 2021

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Contributions to annual change in public service healthcare output volumes by component, England, financial year ending (FYE) 1997 to FYE 2021



Source: Public service productivity from the Office for National Statistics

#### Notes:

1. HCHS refers to Hospital and Community Health Services.
2. Primary Care Services was called Family Health Services until the publication in 2019.
3. COVID-19 response refers to testing, tracing and vaccination services.
4. The sum of components of quantity output may not equal total output because of rounding.
5. The contribution to growth for each component depends on both its growth rate and its weight in total output.
6. Excludes quality adjustment.

## 5 . Healthcare output quality

Quality adjustment added only a small amount to healthcare output growth (0.3%) in the financial year ending (FYE) 2021. This was mainly driven by post-operative mortality, in combination with the treatment of a younger cohort of patients in FYE 2021 compared with FYE 2020. The quality adjustment may be an overestimate of quality improvement as these data use the 2018 to 2020 life tables for FYE 2021, and our average life expectancy statistics for 2020 show a fall in life expectancy because of the coronavirus (COVID-19) pandemic.

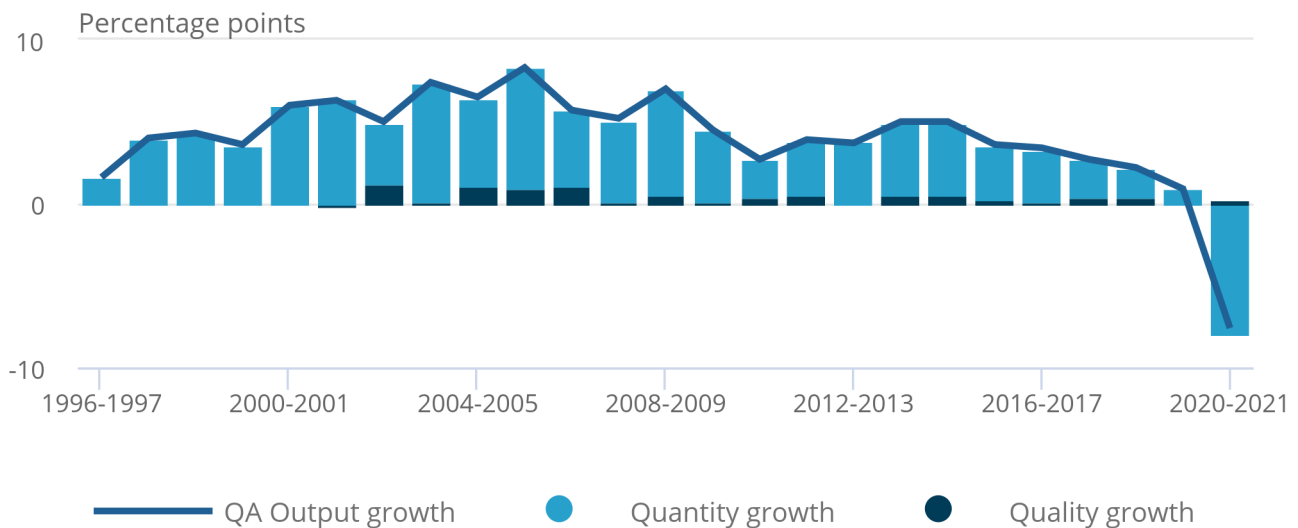
After adjusting for quality, healthcare output declined by 7.6% in FYE 2021, which is the highest fall recorded in our time series (which began in FYE 1996).

**Figure 3: Quality adjustment has a slightly positive impact on the output in FYE 2021**

Public service healthcare quantity and quality adjusted output growth rates, England, financial year ending (FYE) 1997 to FYE 2021

Figure 3: Quality adjustment has a slightly positive impact on the output in FYE 2021

Public service healthcare quantity and quality adjusted output growth rates, England, financial year ending (FYE) 1997 to FYE 2021



Source: Public service productivity from the Office for National Statistics

Notes:

1. Healthcare quantity output is quality adjusted (QA) from FYE 2002 onwards.
2. Quality growth may not match the difference in QA and quantity output growth because of rounding.

## 6 . Healthcare productivity

Public service healthcare productivity is estimated by comparing growth in the total quantity of healthcare output provided (adjusted for quality where possible) with growth in the total quantity of inputs used, using inflation-adjusted volume measures. If output growth exceeds input growth, productivity increases, meaning that more output is being produced for each unit of input. Conversely, if input growth exceeds output growth, then productivity will fall.

Overall public service healthcare productivity fell by an estimated 25.6% in England in the financial year ending (FYE) 2021, the largest annual fall since our time series began in FYE 1996. This large decline in productivity continues a negative trend set in recent years, with public service healthcare productivity decreasing by 0.6% in FYE 2019 and by 1.8% in FYE 2020.

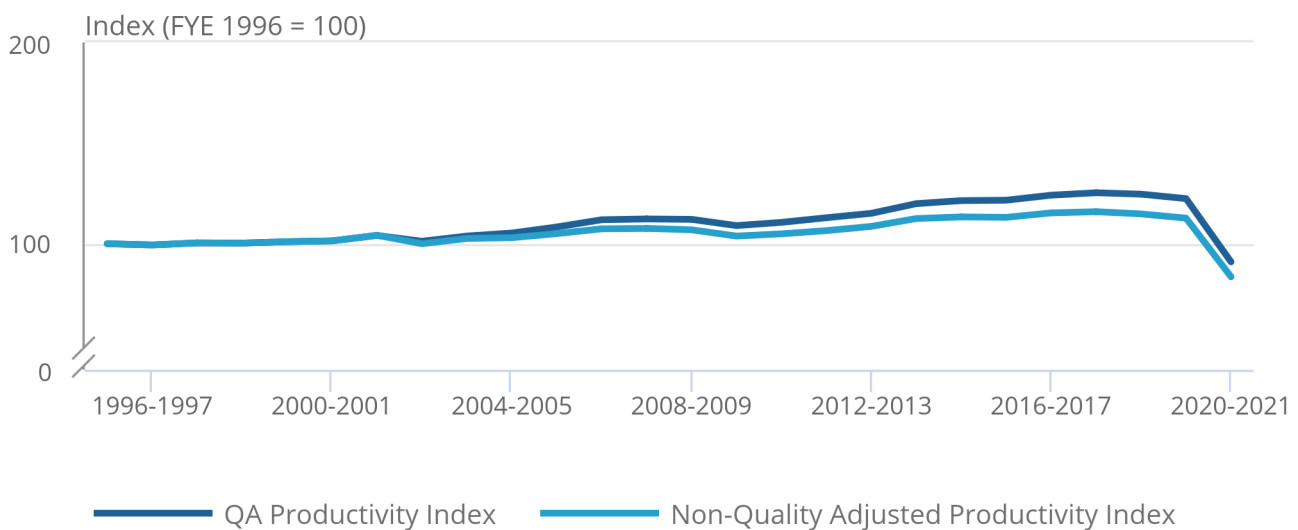
Non-quality adjusted healthcare productivity decreased by a slightly larger 25.9% in FYE 2021.

**Figure 4: Public service healthcare quality and non-quality adjusted productivity strongly decreased, respectively, by 25.6% and 25.9% in FYE 2021**

Public service healthcare quality and quantity productivity indices, England, financial year ending (FYE) 1996 to FYE 2021

Figure 4: Public service healthcare quality and non-quality adjusted productivity strongly decreased, respectively, by 25.6% and 25.9% in FYE 2021

Public service healthcare quality and quantity productivity indices, England, financial year ending (FYE) 1996 to FYE 2021



Source: Public service productivity from the Office for National Statistics

Notes:

1. Healthcare quantity output is quality adjusted (QA) from FYE 2002 onwards.
2. Quality growth may not match the difference in QA and quantity output growth because of rounding.

The fall in healthcare non-quality-adjusted productivity in FYE 2021 was because of inputs growth of 24.2% and a fall in non-quality-adjusted output by 7.9%



Despite inputs having always recorded positive growth, the increase in FYE 2021 is the highest recorded since the beginning of the series in FYE 1996. This reflects the extra resources provided to the healthcare system to deal with the coronavirus (COVID-19) pandemic, as discussed in the previous sections.

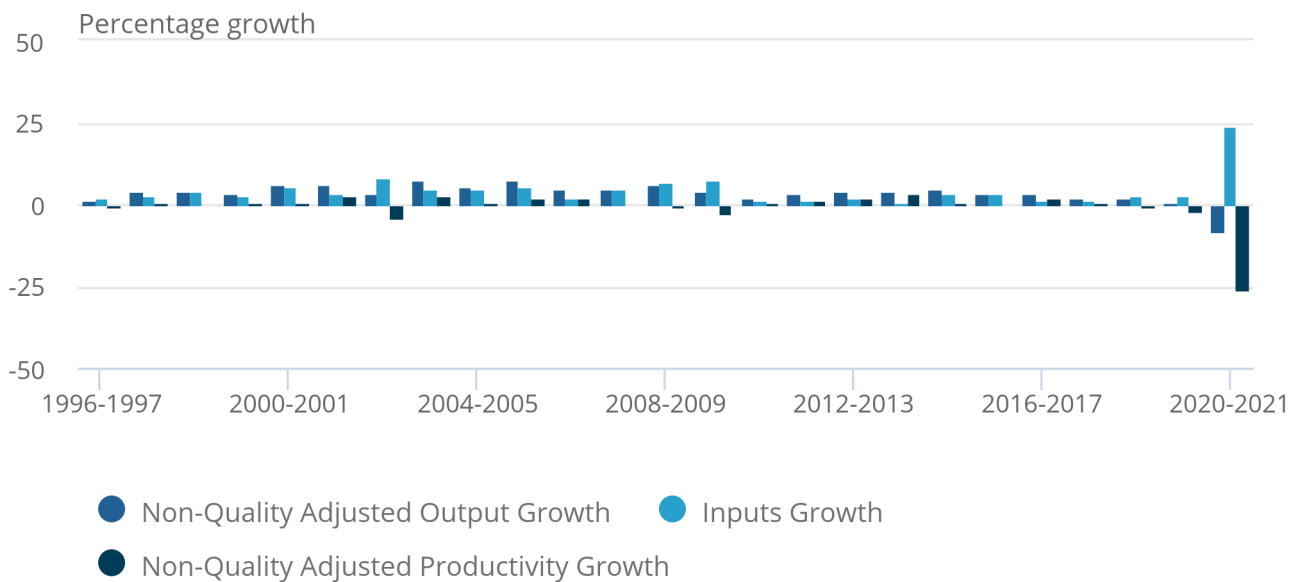
By contrast, non-quality adjusted output declined for the first time since the beginning of the series. The large differences between the growth in inputs and output is to be expected and has also been observed in other reports on healthcare productivity such as [Productivity of the English National Health Service: Update 2021 to 2022 \(PDF, 4.0MB\)](#). The pandemic led the healthcare sector to face extreme challenges and widespread postponement of elective activity.

**Figure 5: The non-quality adjusted healthcare productivity fall in FYE 2021 was because of a large increase in inputs and lower outputs**

Annual change in public service healthcare non-quality adjusted output, inputs and non-quality adjusted productivity growth, England, financial year ending (FYE) 1997 to FYE 2021

Figure 5: The non-quality adjusted healthcare productivity fall in FYE 2021 was because of a large increase in inputs and lower outputs

Annual change in public service healthcare non-quality adjusted output, inputs and non-quality adjusted productivity growth, England, financial year ending (FYE) 1997 to FYE 2021



Source: Public service productivity from the Office for National Statistics

Notes:

1. Growth of components may not sum to overall growth because of rounding.

## 7 . Public service productivity, healthcare, England data

[Public service productivity estimates: healthcare, England](#)

Dataset | Released 29 March 2023

Public service healthcare growth rates and indices for inputs, quality and non-quality adjusted output and productivity, totals and components. England, financial years ending 1996 to 2021.

## 8 . Glossary

### Inputs

Inputs are resources used to produce healthcare services. Inputs are different from expenditure and instead are expressed in volume terms. This means that an increase in staff pay will not increase inputs, but an increase in staff numbers will. Inputs can be measured directly, such as by cost-weighted staff numbers or indirectly, using appropriately deflated expenditure.

### Public service healthcare productivity

Productivity is a measure of the amount of service provided (which can be either quality-adjusted or non-quality-adjusted output) for the quantity of inputs used. "Public service" relates to the fact that all healthcare services paid by the public sector are included in this measure.

### Quality adjustment

In line with the [recommendations of the Atkinson Review](#) (PDF, 1.05MB), a quality adjustment is applied to the estimate of healthcare quantity output to control for the success of the service in meeting selected outcomes. For more information, see our report, [Quality adjustment of public service health output: current method \(PDF 153KB\)](#).

### Quantity output

The quantity of output is the amount of healthcare services provided and is mostly measured using the number of healthcare activities performed, weighted by the cost of each activity.

### Weighting

Weighting refers to the relative importance of changes in individual inputs or output components to changes in the overall inputs or output index. The weight assigned is usually based on cost and so an increase of one hip replacement will have a greater effect on output growth than one outpatient consultation.

## 9 . Data sources and quality

### Quality and methodology

Each component of productivity used in this article are outlined below.

### Inputs:

- goods and services inputs for FYE 2021 include, alongside [the procurement of typical goods and services](#), measures for additional operational procurement in response to the coronavirus (COVID-19) pandemic, such as additional personal protective equipment, and goods and services associated with the operation of NHS Test and Trace
- similarly, higher expenditure has seen [capital inputs](#) in FYE 2021 reflect the response to the pandemic
- labour inputs consider full-time equivalent staff numbers, including [NHS bank staff](#); agency staff are included in goods and services as they are not employees of the health service
- labour inputs estimates do not explicitly measure overtime; while changes in the number of staff between FYE 2020 and FYE 2021 are considered in our estimates, any changes to average hours worked are not reflected in this publication

## Output:

- for output we have included, alongside the measures used in the previous years, the [NHS Test and Trace and the COVID-19 vaccination](#), applying the same methods established for the UK national accounts; these were new health services established to manage and mitigate the impact of COVID-19, and represent a sizeable contribution to public service healthcare output in FYE 2021
- we have used alternative data sources to estimate output growth for some hospital and community health services where this was not possible using our regular data sources, as we did with FYE 2020; more information can be found in our [Improved methods for total public service productivity: total, UK, 2019 methodology](#)

## Quality adjustment:

- as in previous estimates, a [quality adjustment \(PDF, 152KB\)](#) is applied to the quantity output index where a positive (negative) quality adjustment indicates that the quality of healthcare services provided has improved (diminished), as defined by the selection of indicators used in the quality adjustment
- however, for FYE 2021, [patient experience](#) and the aggregate data on clinical measures recorded on General Practitioner (GP) practice computers (based on the [quality and outcome framework](#)) were excluded since these data are not available
- our estimates used the 2018 to 2020 life tables for FYE 2021, as the life tables from the period 2019 to 2021 were not yet released; as life expectancy in England is likely to have been lower in FYE 2021 than in previous years, our quality adjustment will likely be revised when updated life tables become available

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in our [Public service productivity: total, UK QMI \(Quality and Methodology Information\)](#). The last methodological changes are explained in our [Improved methods for total public service productivity: total, UK, 2019](#).

## Acknowledgements

With particular thanks to James Lewis, James Cooper, Thomas Prendergast and Dominic Thomas for their significant contribution to this work.

The authors would like also to thank Adriana Castelli, James Gaughan and Anastasia Arabadzhyan from the University of York for the provision of quality adjustment data and comments, and colleagues from the Department of Health and Social Care, NHS England and NHS Improvement, NHS Wales, Northern Ireland Executive, Scottish Government and Welsh Government.

## 10 . Related links

[Measuring the economic output of COVID-19 testing, tracing and vaccinations: April 2020 to June 2021](#)

Methodology | Last revised 30 September 2021

An overview of our approach to measuring coronavirus (COVID-19) testing, tracing and vaccination services in government output.

[Improved methods for total public service productivity: total, UK, 2019](#)

Methodology | Last revised 20 January 2022

Describes recent developments to public service healthcare productivity.

[Methodological developments to public service productivity: healthcare](#) (PDF, 611 KB)

Methodology | Released 16 December 2019

Describes recent developments to public service healthcare productivity.

[Methodological developments to public service productivity, healthcare: 2021 update](#)

Methodology | Last revised 18 January 2021

Describes recent developments to public service healthcare productivity.

[Public service productivity: healthcare: QMI](#)

Methodology | Last revised 2 February 2021

Quality and methodology information on public service healthcare productivity

[Sources and methods public service productivity estimates: healthcare](#) (PDF, 329KB)

Methodology | Released July 2013

Provides a guide to how estimates of productivity in publicly funded healthcare are calculated.

[Quality adjustment of public service health output: current method](#) (PDF, 153KB)

Methodology | Released April 2012

Describes the methodology used for quality adjusting healthcare output.

[Public service productivity: total, UK, 2019](#)

Article | Released 22 February 2019

Regular publication providing information and analysis of productivity across all public services in the UK.

## 11 . Citation

Office for National Statistics (ONS), released 29 March 2023, ONS website, [Public service productivity, healthcare, England: financial year ending 2021](#)