

Statistical bulletin

Public service productivity, quarterly, UK: April to June 2023

Experimental estimates for UK total public service productivity, inputs and output to provide a short-term, timely indicator of the future path of the annual productivity estimates.

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Table of contents

1. [Main points](#)
2. [About these estimates](#)
3. [Quarterly productivity estimates](#)
4. [Quarter-on-previous-year productivity estimates](#)
5. [Revisions to public service productivity estimates](#)
6. [Public service productivity: quarterly, UK, April to June 2023 data](#)
7. [Glossary](#)
8. [Measuring the data](#)
9. [Related links](#)
10. [Cite this bulletin](#)

1 . Main points

- Public service productivity has remained relatively stable since Quarter 2 (Apr to June) 2021.
- Public service productivity fell by 0.6% in Quarter 2 2023 compared with Quarter 1 (Jan to Mar) 2023, following an increase of 0.3%.
- Public service productivity fell by 1.1% in Quarter 2 2023 compared with the same quarter a year ago.
- Experimental annual estimates suggest that public service productivity rose by 3.2% in 2022 following an increase of 9.1% in 2021, representing a "bounce-back" from the coronavirus (COVID-19) pandemic; however, this did not return UK public service productivity to its pre-pandemic peak.

The estimates are not a measure of the productivity of an individual worker within the public sector but reflect the volume of services delivered to end users relative to the volume of total inputs required to deliver these services. The measure is dominated by health and education services because of their relative size.

Caution should be used when comparing the latest estimates with pre-coronavirus (COVID-19) pandemic years, as the structure of inputs and output changed in response to the pandemic.

2 . About these estimates

This release presents [experimental estimates](#) for total public service productivity, inputs and output. This provides a short-term, timely indicator of the future path for the annual [National Statistics estimates](#) of [total public service productivity](#), which apply quality adjustments to output data and are produced with a two-year lag. See our [Public service productivity article](#) for more information.

This release contains data that are consistent with our [Quarterly national accounts bulletin](#). Therefore, in line with the [National Account Revisions Policy](#), this release now includes revisions to 2022 and 2023 as a result of Blue Book 2023 methodological changes, improved source data and additional updated data.

The public service productivity estimates show revisions in the following service areas:

- social protection: improved measurement of adult social care included in our [Improvements to non-market adult social care output methodology](#)
- healthcare: our [Improvements to healthcare volume output in the quarterly national accounts methodology](#) now includes community, mental health and ambulance services, and an update to the annual healthcare benchmark which uses more detailed and comprehensive data
- education: estimates of pupil absence from Quarter 2 (Apr to June) 2020 have been revised down, leading to higher volume estimates of final consumption expenditure since this quarter; following [National Account revisions policy](#), figures have been updated from Quarter 1 (Jan to Mar) 2022 onwards, while estimates for Quarter 2 2020 to Quarter 4 (Oct to Dec) 2021 will be updated at the earliest opportunity

This bulletin is the first publication on public service productivity since the beginning of the National Statistician's [Public services productivity review](#). The [review](#) is being undertaken following a commission from the Chancellor of the Exchequer asking the National Statistician to review and improve how public service productivity is measured.

We are now working [to improve both our data sources and our methods](#), to ensure we capture changes in productivity across the public sector in a better and more consistent way. Our first findings will be prepared for the autumn statement, with the project expected to run over two years.

Details on data and methods are described in [Section 8: Measuring the data](#).

In reading the following statistics, please consider that unless stated otherwise, all growth rates reported in this article are indexed to the base year 1997.

3 . Quarterly productivity estimates

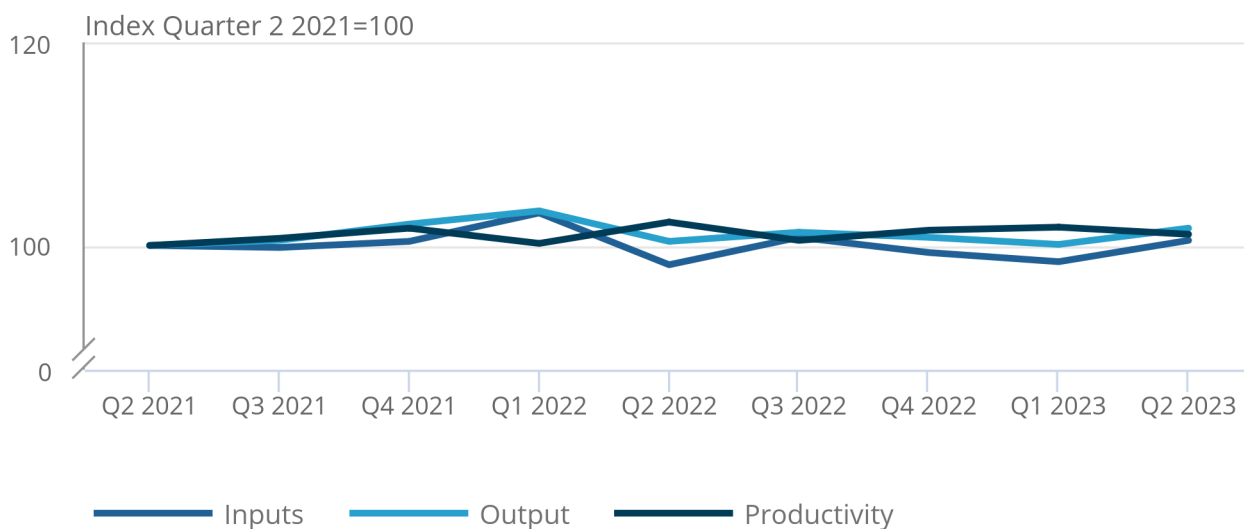
As seen in our previous [Public service productivity bulletin](#), public service productivity has remained relatively stable since Quarter 2 (Apr to June) 2021. Inputs have grown 0.5% over this period, while output has grown 1.7%, and productivity has increased by 1.1%.

Figure 1: Public service productivity has remained fairly stable since Quarter 2 2021

Index of public service output, inputs and productivity, UK, Quarter 2 2021 to Quarter 2 2023

Figure 1: Public service productivity has remained fairly stable since Quarter 2 2021

Index of public service output, inputs and productivity, UK, Quarter 2 2021 to Quarter 2 2023



Source: Office for National Statistics

Notes:

1. Experimental quarterly estimates of productivity are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output.

This, however, masks a degree of short-term volatility. For example, productivity fell by 0.6% in Quarter 2 2023 compared with the previous quarter. This is because of inputs increasing by a proportionately larger amount than output (2.2%, compared with 1.6%).

Both inputs and output increased for:

- healthcare
- social protection
- military defence
- central government
- justice and fire (output flat 0.0%)

Education saw a fall in inputs and a growth in output, while local government saw a fall in both inputs and output.

Military defence, central and local government service areas all adopt an "output-equals-inputs" convention. For more information, see our [Sources and methods for public service productivity estimates methodology](#). The "output-equals-inputs" convention states that output volume is assumed to be equal to the volume of inputs used to create them. This is applied where direct observation of output is not possible. In this case, productivity is constant.

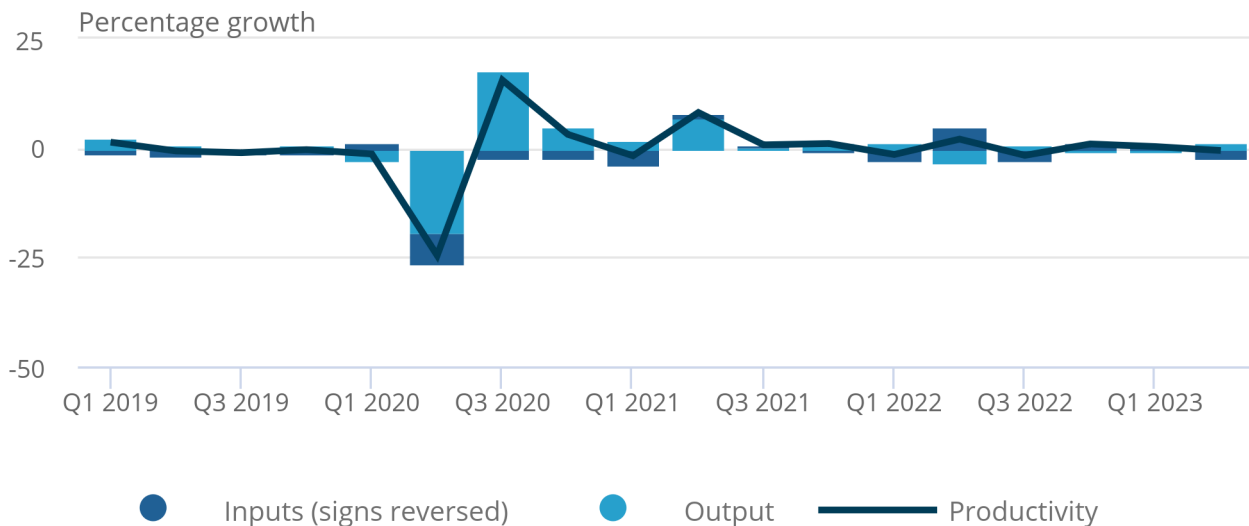
Quarterly estimates should be interpreted with caution because of the volatile nature of quarterly inputs estimation.

Figure 2: Public service productivity decreased by 0.6% in Quarter 2 2023, caused by inputs growing faster than output

Quarterly growth rates in public service output, inputs and productivity, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 2 (Apr to June) 2023

Figure 2: Public service productivity decreased by 0.6% in Quarter 2 2023, caused by inputs growing faster than output

Quarterly growth rates in public service output, inputs and productivity, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 2 (Apr to June) 2023



Source: Office for National Statistics

Notes:

1. Experimental quarterly estimates of productivity are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output.
2. This chart inverts the growth rates of inputs.

4 . Quarter-on-previous-year productivity estimates

Productivity for total public services was 1.1% lower in Quarter 2 (Apr to June) 2023 compared with the same quarter a year ago. Over this period, inputs increased by 2.4% while output increased by 1.3%.

The main services causing the increase in this quarter's inputs were:

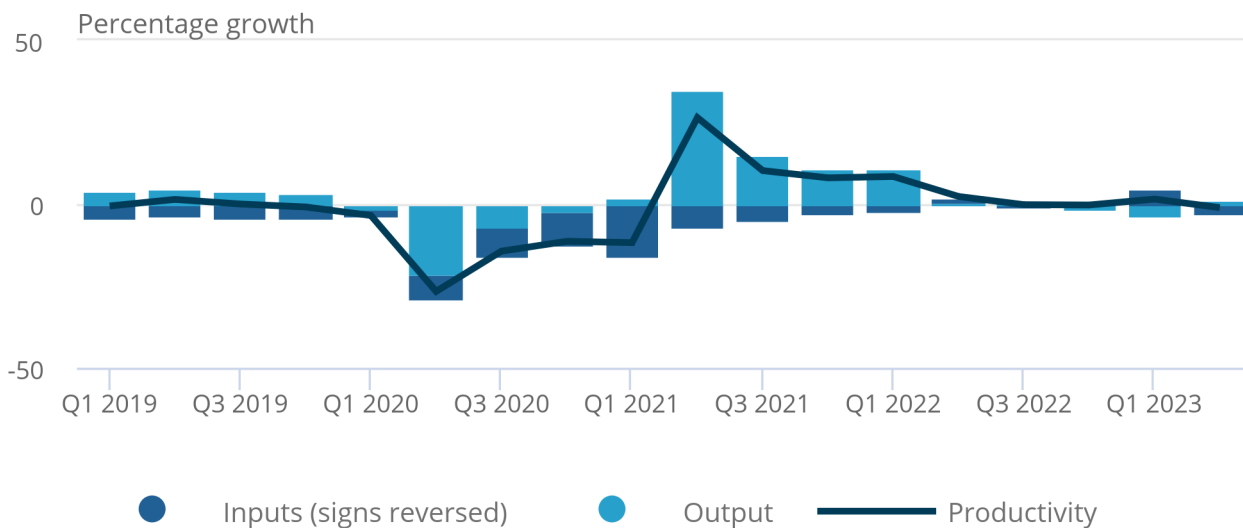
- healthcare
- social protection
- military defence
- central government

Figure 3: Public service productivity fell in Quarter 2 2023 compared with the same quarter a year ago

Quarter-on-same-quarter a year ago growth rates in public service output, inputs and productivity, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 2 (Apr to June) 2023

Figure 3: Public service productivity fell in Quarter 2 2023 compared with the same quarter a year ago

Quarter-on-same-quarter a year ago growth rates in public service output, inputs and productivity, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 2 (Apr to June) 2023



Source: Office for National Statistics

Notes:

1. Experimental quarterly estimates of productivity are indirectly seasonally adjusted, calculated using seasonally adjusted inputs and seasonally adjusted output.
2. This chart inverts the growth rates of inputs.

Please note that our [Public service productivity estimates](#) are subject to revisions because of improvements to source data and methodology.

In general, because changes in productivity represent long-term structural trends, we advise looking at changes over a longer time period. This helps to smooth any short-term fluctuations. Comparing quarters with the same quarters a year ago provides a rolling annual estimate of productivity and is, therefore, a good indication of the future path of the [National Statistics annual estimates](#). These estimates include additional data sources that are less timely than those used for quarterly estimates.

Figure 4 places the inputs, output, and productivity in an annual context over a longer time series, combining our annual estimates from our [Public service productivity article](#) between 1997 to 2020 with experimental data from 2021 onwards.

Experimental estimates suggest that annual total public service productivity rose by 3.2% in 2022, reflected by an increase of output by 2.8% compared with a decrease in inputs of 0.4%. This followed an increase of 9.1% in 2021.

The coronavirus (COVID-19) pandemic had a strong impact on public services. In 2020, inputs rose, reflecting the extra resources provided to public services to deal with the pandemic. Conversely, output fell in 2020, as many services were delivered in a different way than in 2019, with additional costs and mandatory restrictions present for certain services.

It is worth noting that the pandemic caused widespread cost pressures and disruption to public service outputs, including:

- new safety measures
- urgent healthcare treatments taking priority
- remote consultations
- remote learning within education
- support for care homes
- restrictions to courts and tribunals

In 2021 and 2022, output grew faster than inputs, as fewer restrictions were present and new services such as test, trace and vaccinations were introduced.

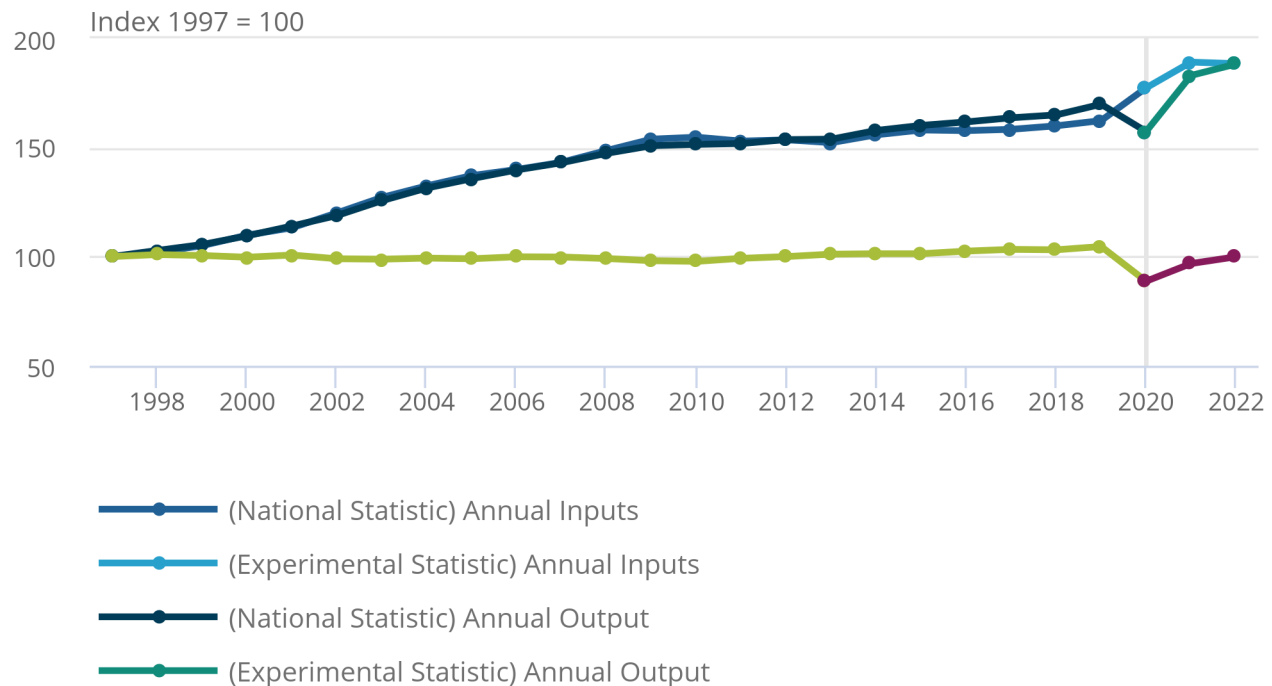
Therefore, comparing pre- and post-pandemic productivity is difficult and estimates of this nature should be treated with caution.

Figure 4: Public service productivity is estimated to have risen by 3.2% in 2022

Total public service productivity, UK, index 1997=100, 1997 to 2022

Figure 4: Public service productivity is estimated to have risen by 3.2% in 2022

Total public service productivity, UK, index 1997=100, 1997 to 2022



Source: Office for National Statistics

Notes:

1. Estimates for 2021 and 2022 are experimental statistics.
2. Estimates from 1997 to 2020 are National Statistics.

Output estimates use data on changes in the quantity of various services delivered, but do not include data on changes in the relative quality of these services. Data including quality adjustment for 2021 will be published with a two-year lag, as many of these quality factors require data collected with a lag.

These experimental estimates for 2021 and 2022 should be treated with caution until our [total public service productivity annual estimates](#) are available for these years.

5 . Revisions to public service productivity estimates

In line with the [National Accounts revisions policy](#), all time periods in the dataset are open for revision.

Figure 5 shows the estimates published in the [previous bulletin](#), and the revised estimates on Public service productivity, following the changes mentioned in [Section 2. About these estimates](#).

Figure 5: Public service productivity quarter-on-quarter revisions

Total public service productivity revisions, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 1 2023

Figure 5: Public service productivity quarter-on-quarter revisions

Total public service productivity revisions, UK, Quarter 1 (Jan to Mar) 2019 to Quarter 1 2023



Source: Office for National Statistics

For more detailed information on revisions to inputs, output and productivity for quarter-on-quarter and quarter-on-same-quarter a year ago growth rates, please see Table 4 in our [accompanying dataset](#).

6 . Public service productivity: quarterly, UK, April to June 2023 data

[Public service productivity: quarterly, UK, April to June 2023](#)

Dataset | Released 13 October 2023

Experimental statistics on UK public service productivity. Includes estimates of inputs, output, productivity, and revisions compared with estimates from the previous quarter.

7 . Glossary

Public services

These are services delivered by or paid for by government (central or local). If paid for by the government, they may be delivered by a private body – for example, the provision of nursery places by the private sector, where these places were funded by the government.

Direct output measurement

Using a cost-weighted activity index to estimate the non-quality adjusted output of a service provided, such as the number of students in state schools, adjusted for attendance to produce an estimate of total hours of schooling delivered each year. Differs from indirect output measurement, where output is assumed equal to inputs.

Quality adjustment

A statistical estimate of the change in the quality of a public service, using an appropriate metric, such as safety in prisons as part of the public order and safety adjustment.

Classification of the functions of government

The [Classification of the functions of government \(COFOG\)](#) is the structure used to classify government activities. It is defined by the United Nations Statistics Division.

Service area

The way we refer to the breakdown of public services into nine areas, closely following COFOG.

Intermediate inputs

Also referred to as "goods and services", or "intermediate consumption" (the UK National Accounts term). Intermediate inputs include goods and services used up in the provision of a public service, such as utilities, energy, professional services and medical supplies, among others.

Deflator

A price index used to remove inflation effects from current price estimates of expenditure to provide a volume estimate.

8 . Measuring the data

Data sources

Different sources and methods are used to produce the experimental quarterly statistics and the National Statistics.

This release uses expenditure data from quarterly UK National Accounts, split into seven categories:

- health
- education
- social protection
- justice and fire
- military defence
- central government services
- local government services

Data sources and methods differ from the annual publication, depending on data availability and appropriateness on a quarterly or annual basis. For example, some inputs measures that are available on an annual basis as direct measures are not available on a quarterly basis. These missing quarterly direct input measures may only be obtainable using indirect measures (deflated expenditure).

The National Statistic also uses different deflators to those used in this release to estimate those volumes of inputs. As such, estimates are not directly comparable between the quarterly and annual publications.

This release does not provide adjustments for the quality in public service output whereas the National Statistic does for some public output.

Estimates of productivity, inputs and output up to 2020, are reported on an annual basis and use data from our [Public service productivity, total, UK, 2020 article](#). Further information about the annual National Statistics release can be found in our [Public service productivity: total, UK Quality and Methodology Information \(QMI\)](#).

Experimental estimates differ from the annual estimates, as described in Section 9 of our [Sources and methods for public service productivity estimates methodology](#). Importantly, experimental estimates do not apply quality adjustments.

Revisions

In line with the National Account revisions policy, this release now includes revisions to 2022 and 2023, as a result of Blue Book 2023 methodological changes, improved source data and additional updated data. [Section 2: About these estimates](#) describes these changes.

Measuring public service productivity

Productivity is calculated by dividing output by the respective inputs used to produce it. Therefore, productivity will increase when more output is being produced for each unit of inputs used. Estimates of inputs, output and productivity are given both as growth rates between consecutive periods and as indices, showing the cumulative trend over time.

Experimental quarterly estimates of productivity are seasonally adjusted. In official statistics, it is common for the time series to have regular, repeating, predictable variation (for example, the increase in retail sales in December). To help users interpret the series, national statistical institutes use a statistical method called seasonal adjustment to remove these effects. We use the X11 algorithm in the X-13ARIMA-SEATS software to perform seasonal adjustment. Time series experts in the Office for National Statistics (ONS) review the seasonal adjustment each year. This includes checking for the impact of outliers. For the public sector productivity series, the coronavirus (COVID-19) pandemic period has been closely analysed for such outliers. The outliers are only included if they are judged by a time series expert to improve the seasonal adjustment. This judgement will include consideration of the charts, statistical tests, and diagnostics. For the pandemic period, some series have additive outliers used to take account of the impact, while others have used level shifts. The annual seasonal adjustment reviews are conducted by time series experts, and all work is independently quality assured by another time series expert before leaving the team.

For total UK public services, estimates of output and inputs are made up of aggregated series for individual public services, weighted together by their relative share of total expenditure on public services (expenditure weight). Inputs are composed of labour, goods and services, and consumption of fixed capital.

Expenditure data, used to estimate most inputs growth, are taken from our [Gross domestic product\(GDP\) quarterly national accounts. UK: April to June 2023 bulletin](#). The quarterly national accounts also provide estimates of government output, based on direct measures where they are available and indirect measures where they are not.

Public service productivity is measured differently to labour productivity and multi-factor productivity and is not directly comparable. It reflects the volume of services delivered to end users relative to the volume of total inputs (which comprise of labour, intermediate consumption, and capital). The measure is dominated by health and education services because of their relative size.

The estimates are not a measure of the productivity or efficiency of an individual worker within the public sector. For instance, while children within school received fewer hours of education at the start of the pandemic, a teacher may still have had to undertake additional work to modify lesson plans for remote learning.

Similarly, the resource required to deliver some services within the NHS may have increased because of additional restrictions, such as the use of personal protective equipment (PPE), but the overall volume of NHS services may still have declined.

Public service productivity within this statistic only focusses on the education received by end users, or the healthcare services received by end users, rather than the productivity of an individual teacher or an individual nurse to deliver a discrete task.

These estimates should be considered a first estimate on public service productivity. The Office for National Statistics (ONS), together with [HM Treasury and other government departments](#) will continue to develop and improve its methods, which may lead to revisions of these preliminary estimates.

9 . Related links

[GDP quarterly national accounts, UK: April to June 2023](#)

Bulletin | Released 29 September 2023

Revised quarterly estimate of gross domestic product (GDP) for the UK. Uses additional data to provide a more precise indication of economic growth than the first estimate.

[Improvements to healthcare volume output in the quarterly national accounts](#)

Methodology | Revised 25 September 2023

An overview of the improvements made to the coverage and cost-weights for quarterly government healthcare volume output for the UK.

[Improvements to non-market adult social care output in the National Accounts](#)

Methodology | Revised 1 September 2023

Information on the updated methodology for measuring the output of non-market adult social care services.

[Productivity overview, UK: January to March 2023](#)

Article | Released 7 July 2023

The main findings from official statistics and analysis of UK productivity, presenting a summary of recent developments.

[Public service productivity: total, UK, 2020](#)

Article | Released 28 April 2023

Updated measures of output, inputs and productivity for UK public services between 1997 and 2020: service area breakdown, quality adjustment, latest revisions.

[Public service productivity, healthcare, England: financial year ending 2021](#)

Article | Released 29 March 2023

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

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

Methodology | Released 25 July 2022

Quality and Methodology Information (QMI) report for the Public service productivity: total, UK: 2019 release, detailing the strengths and limitations of the data, methods used and data uses and users.

[Public service productivity, adult social care, England: financial year ending 2021](#)

Article | Released 25 July 2022

Trends in publicly funded adult social care inputs, quantity and quality of output, and productivity in England, between financial year ending 1997 and financial year ending 2021.

[Sources and methods for public service productivity estimates](#)

Methodology | Revised 11 May 2022

Sources and methods information for the public service productivity: total, UK publication, detailing the main concepts, output and inputs measures by service area.

[International comparisons of the measurement of non-market output during the coronavirus \(COVID-19\) pandemic](#)

Methodology | Revised 21 February 2022

A joint Office for National Statistics – Organisation for Economic Co-operation and Development exploration of international differences in the methodologies used to measure non-market output and analysis of the implications for international comparisons of gross domestic product during the coronavirus (COVID-19) pandemic.

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

Methodology | Revised 20 January 2022

Explaining methodological improvements to education quality adjustment, children's social care, and healthcare output, used in the upcoming public service productivity article.

[Public service productivity: quarterly, UK, October to December 2019](#)

Article | Released 7 April 2020

Experimental estimates for UK total public service productivity, inputs and output to provide a short-term, timely indicator of the future path of the annual productivity estimates.

10 . Cite this bulletin

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