

Statistical bulletin

# Coronavirus and vaccination rates in adults by socio-demographic characteristic and occupation, England: December 2020 to March 2023

Coronavirus (COVID-19) vaccination rates among adults , including estimates by socio-demographic characteristic and Standard Occupational Classification (SOC) 2020.

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## Table of contents

1. [Main points](#)
2. [Sociodemographic characteristics](#)
3. [Coronavirus and vaccination rates data](#)
4. [Glossary](#)
5. [Measuring the data](#)
6. [Strengths and limitations](#)
7. [Related links](#)
8. [Cite this statistical bulletin](#)

# 1 . Main points

- Among people aged 18 and over, 75.8% had received at least three coronavirus (COVID-19) vaccinations as of 2 March 2023; of those who had received three doses and were eligible, 77.7% had continued to their fourth vaccination.
- Older people were more likely to continue to their fourth vaccination than younger people, with 94.0% of people aged 80 years and over receiving a fourth dose, compared with 66.4% in people aged 50 to 59.
- After adjusting for differences in age, the ethnic groups with the lowest proportion of people continuing to a fourth vaccination were Pakistani (34.8%), Bangladeshi (36.3%), and Black African (41.8%), compared with the White British group (78.1%); the Pakistani and Black African groups were among the lowest uptake of the third vaccination (40.9% and 42.4%, respectively), and far fewer Bangladeshis had continued to a fourth dose (53.1% receiving three doses).
- Among the eligible population, people identifying as Jewish had the highest proportion of people continuing to a fourth vaccination (80.7%), with those identifying as Muslim having the lowest continuation from third to fourth dose (36.6%).
- People living in the most deprived areas were least likely to continue to a fourth vaccination (63.8%), with vaccination rates increasing as deprivation reduces. Similarly, people in higher managerial occupations had the highest continuation from third to fourth dose (80.7%).
- People reporting fair health (77.8%) were the highest proportion of people continuing from a third to a fourth vaccination; individuals in very good health (71.8%) had the lowest continuation from third to fourth dose, followed by those in very bad health (73.1%).

Vaccination data are produced using linked data from Deaths registrations and Census 2021, National Immunisation Management Service, Hospital Episode Statistics and General Practise Extraction Service data for Pandemic Planning and Research. Data may differ from weekly administrative vaccination data published by NHS England.

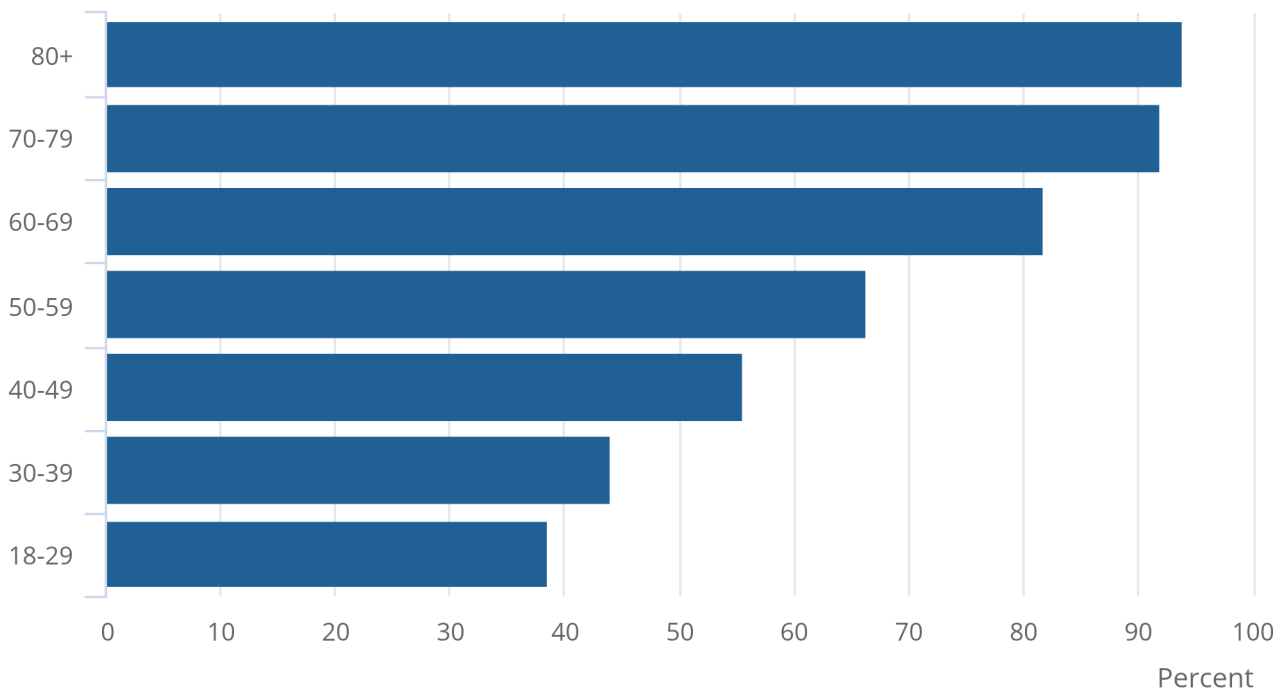
## 2 . Sociodemographic characteristics

**Figure 1: The proportion of eligible individuals with three vaccinations who continue to their fourth vaccination falls with age**

Proportions of eligible people aged 18 years and over continuing to four vaccinations, by age-range, England, 8 December 2020 to 2 March 2023

Figure 1: The proportion of eligible individuals with three vaccinations who continue to their fourth vaccination falls with age

Proportions of eligible people aged 18 years and over continuing to four vaccinations, by age-range, England, 8 December 2020 to 2 March 2023



**Source: Death registrations and Census 2021 from the Office for National Statistics, National Immunisation Management Service, Hospital Episode Statistics and General Practice Extraction Service data for Pandemic Planning and Research**

**Notes:**

1. The population includes people enumerated in Census 2021, resident in England and alive on 2 March 2023.
2. Age group was derived from Census 2021.

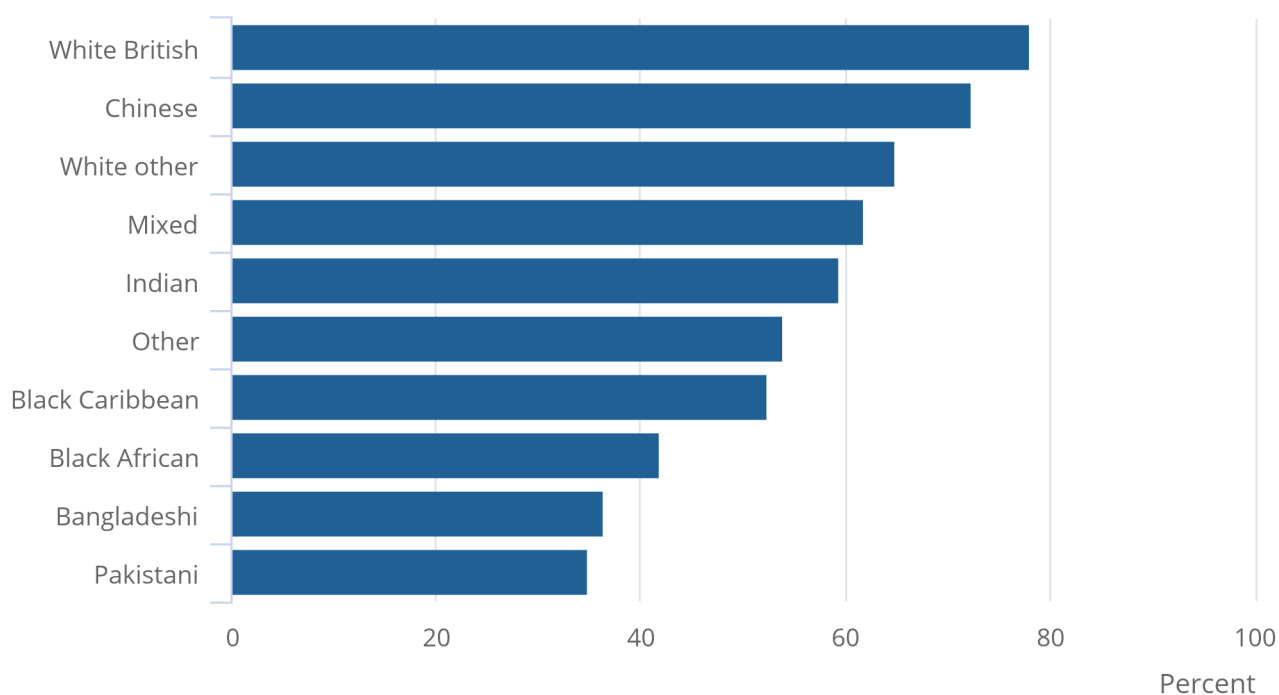
The continuation from third to fourth dose of the coronavirus (COVID-19) vaccine was highest among individuals aged 80 years and above (94.0%) and those between the ages of 70 and 79 years (91.9%). Younger age groups had lower continuation, with less than half of eligible individuals aged 18 to 29 years (38.6%) and 30 to 39 years (44.1%) receiving their fourth dose.

**Figure 2: The White British ethnic group had the highest fourth vaccination coverage, among eligible individuals with three doses**

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations, by ethnic group, England, 8 December 2020 to 2 March 2023

Figure 2: The White British ethnic group had the highest fourth vaccination coverage, among eligible individuals with three doses

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations, by ethnic group, England, 8 December 2020 to 2 March 2023



Source: Death registrations and Census 2021 from the Office for National Statistics, National Immunisation Management Service, Hospital Episode Statistics and General Practice Extraction Service data for Pandemic Planning and Research

Notes:

1. The population includes people enumerated in Census 2021, resident in England and alive on 2 March 2023.
2. The age-standardised proportions presented are annualised directly age-standardised rates per 100 people, represented as a percentage. This is the number of people who have received a vaccination divided by the population for the relevant time period, standardised to the European Standard Population, multiplied by 100.
3. Ethnic group was derived from Census 2021.

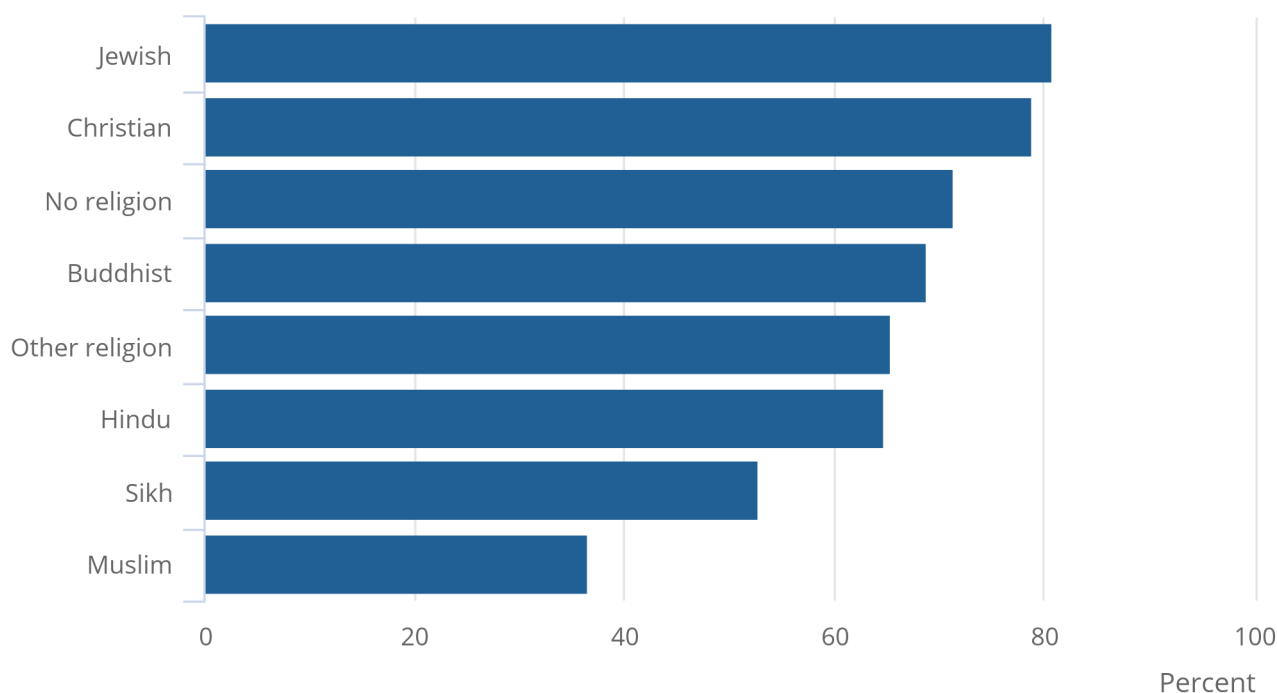
The White British ethnic group had the highest rate of continuation from third to fourth dose of the COVID-19 vaccine (78.1%) among eligible adults. This was followed closely by people identifying as Chinese (72.4%) and White other (65.0%). In contrast, among eligible adults, there was particularly low continuation to the fourth vaccination in the Pakistani (34.8%), Bangladeshi (36.3%), and Black African (41.8%) ethnic groups.

### Figure 3: Fourth vaccination continuation was lowest among those identifying as Muslim

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by religious affiliation, England, 8 December 2020 to 2 March 2023

## Figure 3: Fourth vaccination continuation was lowest among those identifying as Muslim

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by religious affiliation, England, 8 December 2020 to 2 March 2023



Source: Death registrations and Census 2021 from the Office for National Statistics, National Immunisation Management Service, Hospital Episode Statistics and General Practice Extraction Service data for Pandemic Planning and Research

#### Notes:

1. The population includes people enumerated in Census 2021, resident in England and alive on 2 March 2023.
2. The age-standardised proportions presented are annualised directly age-standardised rates per 100 people, represented as a percentage. This is the number of people who have received a vaccination divided by the population for the relevant time period, standardised to the European Standard Population, multiplied by 100.
3. Religious affiliation was derived from Census 2021.

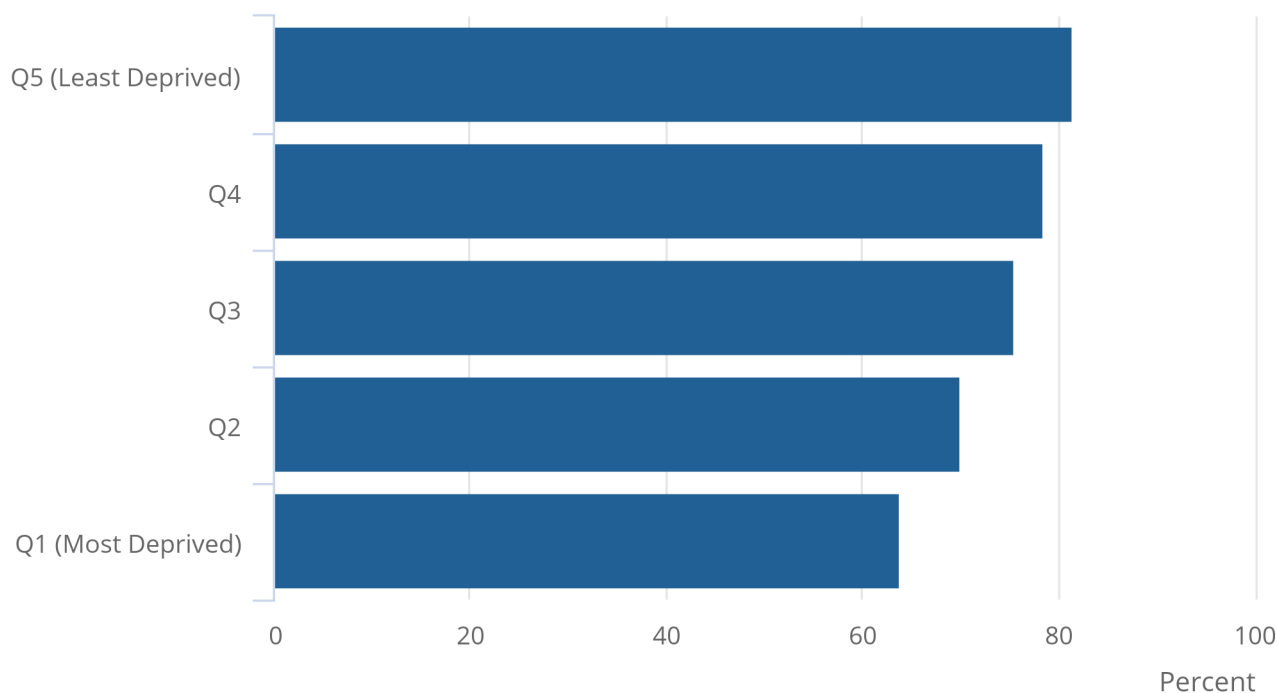
The continuation from third to fourth vaccination was highest among people identifying as Jewish (80.7%), Christian (78.9%), or having no religion (71.4%). However, less than half of the eligible Muslims (36.6%) have continued to a fourth vaccination. People who identify as Sikh (52.8%) also have low continuation. This trend was consistent with the uptake of third vaccinations, where people identifying as Muslim or Sikh also had the lowest uptake.

**Figure 4: The least deprived areas recorded the highest proportion of people continuing to their fourth vaccination among those eligible**

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by index of multiple deprivation quintile, England, 8 December 2020 to 2 March 2023

Figure 4: The least deprived areas recorded the highest proportion of people continuing to their fourth vaccination among those eligible

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by index of multiple deprivation quintile, England, 8 December 2020 to 2 March 2023



Source: Death registrations and Census 2021 from the Office for National Statistics, National Immunisation Management Service, Hospital Episode Statistics and General Practice Extraction Service data for Pandemic Planning and Research

Notes:

1. The population includes people enumerated in Census 2021, resident in England and alive on 2 March 2023.
2. The age-standardised proportions presented are annualised directly age-standardised rates per 100 people, represented as a percentage. This is the number of people who have received a vaccination divided by the population for the relevant time period, standardised to the European Standard Population, multiplied by 100.
3. Index of multiple deprivation quintile was based on the English index of multiple deprivation (IMD), version 2019. It was derived using the individual's resident address in Census 2021.

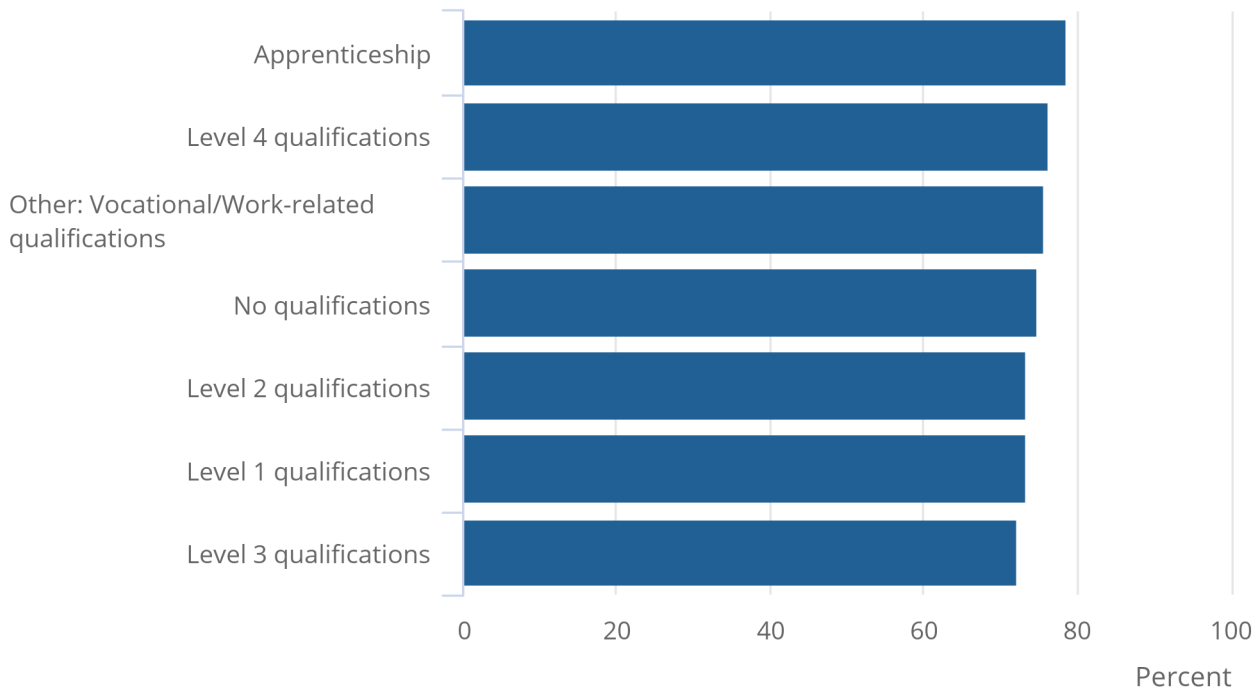
The proportion of eligible individuals who had continued to their fourth vaccination was lowest among the most deprived areas (63.8%), and highest among the least deprived areas (81.5%). Area deprivation was measured according to the [English index of multiple deprivation](#) of an individual's area of residence.

## Figure 5: Individuals with apprenticeships as their highest qualification have the highest continuation to the fourth vaccination

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by highest qualification, England, 8 December 2020 to 2 March 2023

### Figure 5: Individuals with apprenticeships as their highest qualification have the highest continuation to the fourth vaccination

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by highest qualification, England, 8 December 2020 to 2 March 2023



Source: Death registrations and Census 2021 from the Office for National Statistics, National Immunisation Management Service, Hospital Episode Statistics and General Practice Extraction Service data for Pandemic Planning and Research

#### Notes:

1. The population includes people enumerated in Census 2021, resident in England and alive on 2 March 2023.
2. The age-standardised proportions presented are annualised directly age-standardised rates per 100 people, represented as a percentage. This is the number of people who have received a vaccination divided by the population for the relevant time period, standardised to the European Standard Population, multiplied by 100.
3. Highest qualification was derived from Census 2021.

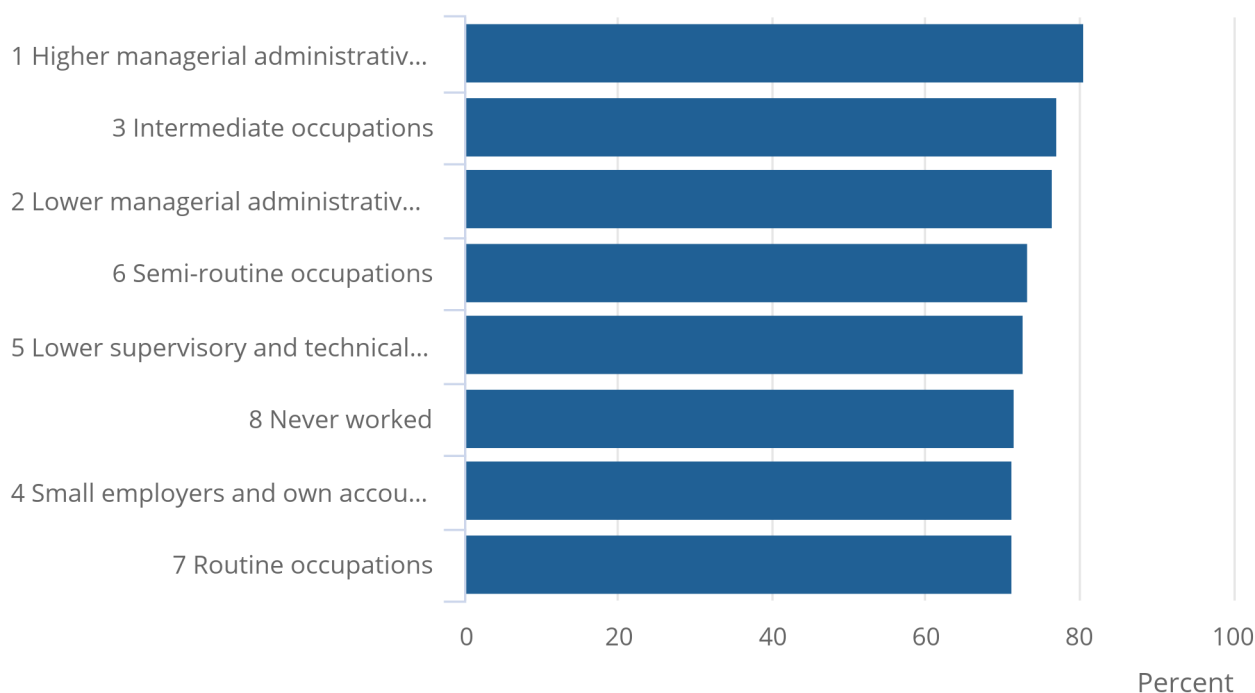
Differences in third to fourth vaccination continuation are small, when measured by highest qualification. Individuals with apprenticeships (78.6%) or Level 4 qualifications (76.2%) have the highest continuation. People with Level 3 qualifications (72.3%) have the lowest continuation. For more information on qualification definitions, see our [Highest level of qualification definitions](#).

## Figure 6: Fourth vaccination continuation rates were lowest for people in routine occupations

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by National Statistics Socio-economic classification (NS-SEC), England, 8 December 2020 to 2 March 2023

### Figure 6: Fourth vaccination continuation rates were lowest for people in routine occupations

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by National Statistics Socio-economic classification (NS-SEC), England, 8 December 2020 to 2 March 2023



Source: Death registrations and Census 2021 from the Office for National Statistics, National Immunisation Management Service, Hospital Episode Statistics and General Practice Extraction Service data for Pandemic Planning and Research

#### Notes:

1. The population includes people enumerated in Census 2021, resident in England and alive on 2 March 2023.
2. The age-standardised proportions presented are annualised directly age-standardised rates per 100 people, represented as a percentage. This is the number of people who have received a vaccination divided by the population for the relevant time period, standardised to the European Standard Population, multiplied by 100.
3. National Statistics Socio-economic classification (NS-SEC) was derived from Census 2021.

The highest proportion of individuals continuing from a third to a fourth vaccination were people in the most advantaged NS-SEC class, in higher managerial, administrative, and professional occupations (80.7%). Those in routine occupations (71.4%) and small employers and own account workers (71.5%) had the lowest continuation to fourth vaccinations. For more information on socio-economic classifications, see our [SOC 2020 Volume 3: the NS-SEC methodology](#).

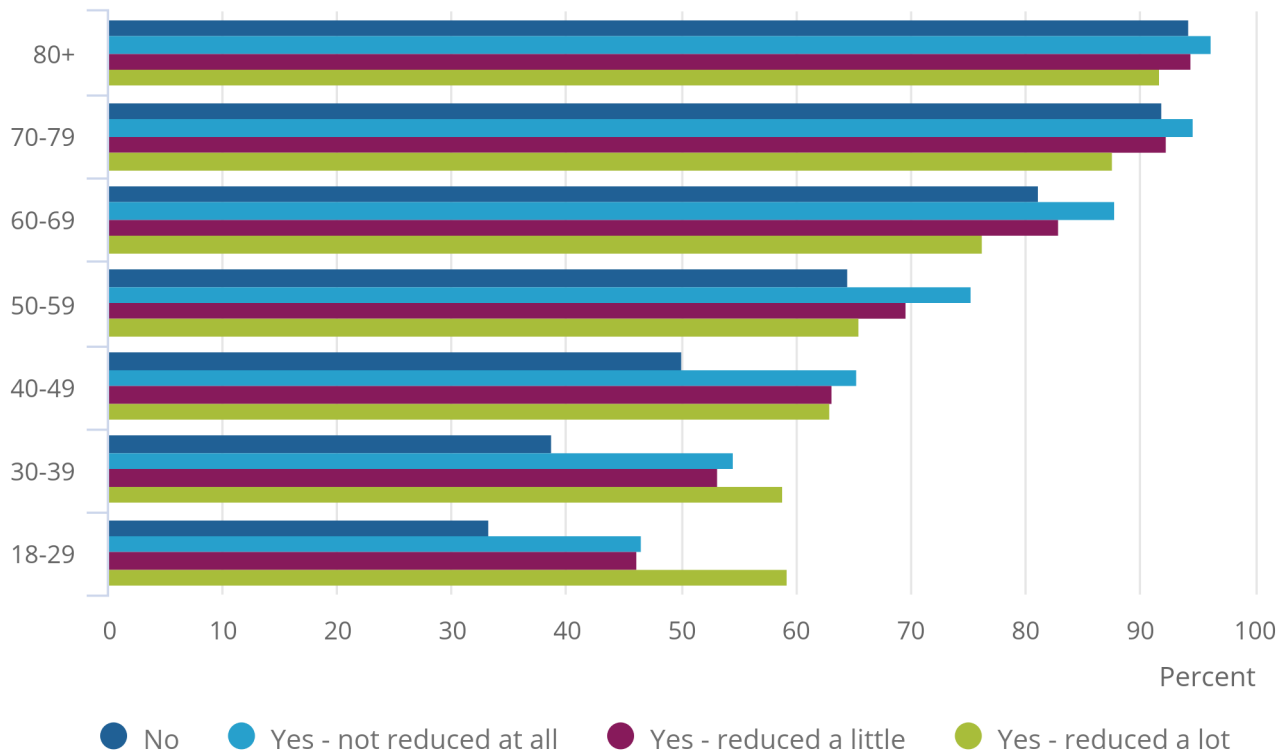


**Figure 7: For all 10-year age bands above 60 years old, individuals reduced a lot in their day-to-day activities had lower continuation to their fourth vaccination than less limited people**

Proportion of eligible people who have continued to their fourth vaccination, by age-range and self-reported disability status, England, 8 December 2020 to 2 March 2023

Figure 7: For all 10-year age bands above 60 years old, individuals reduced a lot in their day-to-day activities had lower continuation to their fourth vaccination than less limited people

Proportion of eligible people who have continued to their fourth vaccination, by age-range and self-reported disability status, England, 8 December 2020 to 2 March 2023



Source: Death registrations and Census 2021 from the Office for National Statistics, National Immunisation Management Service, Hospital Episode Statistics and General Practice Extraction Service data for Pandemic Planning and Research

Notes:

1. The population includes people enumerated in Census 2021, resident in England and alive on 2 March 2023.
2. The age-standardised proportions presented are annualised directly age-standardised rates per 100 people, represented as a percentage. This is the number of people who have received a vaccination divided by the population for the relevant time period, standardised to the European Standard Population, multiplied by 100.
3. Disability status and age group were derived from Census 2021.

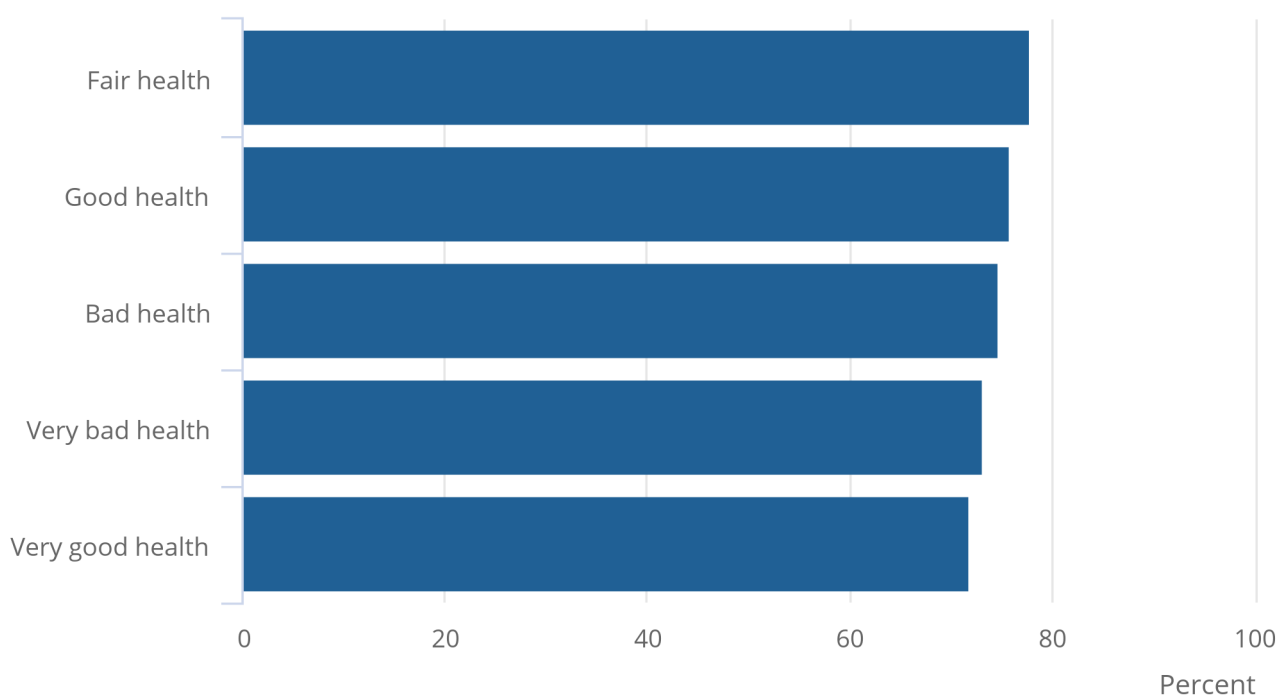
For individuals aged 60 years and above, the continuation from third to fourth vaccination was lowest among those who report they are reduced a lot by their long-term health condition or disability. People who have long-term health issues or a disability but are not reduced at all had the highest continuation for all age groups, from age 40 years and above. Among individuals aged 59 years and younger, continuation to the fourth dose was lowest for those with no self-reported long-term health conditions.

**Figure 8: Fourth vaccination continuation was lowest among eligible individuals with the best self-reported health status**

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by health status, England, 8 December 2020 to 2 March 2023

Figure 8: Fourth vaccination continuation was lowest among eligible individuals with the best self-reported health status

Age-standardised proportion of eligible people aged 18 years and over who continued to four vaccinations by health status, England, 8 December 2020 to 2 March 2023



Source: Death registrations and Census 2021 from the Office for National Statistics, National Immunisation Management Service, Hospital Episode Statistics and General Practice Extraction Service data for Pandemic Planning and Research

Notes:

1. The population includes people enumerated in Census 2021, resident in England and alive on 2 March 2023.
2. The age-standardised proportions presented are annualised directly age-standardised rates per 100 people, represented as a percentage. This is the number of people who have received a vaccination divided by the population for the relevant time period, standardised to the European Standard Population, multiplied by 100.
3. Health status and age group were derived from Census 2021.

Eligible individuals in very good health have the lowest continuation to the fourth vaccination (71.8%), followed by people reporting to be in very bad health (73.1%). Fourth vaccination rates were highest among the eligible population who reported to be in fair health (77.8%).

### 3 . Coronavirus and vaccination rates data

[Coronavirus and vaccination rates in adults by socio-demographic characteristic and occupation, England: December 2020 to March 2023](#)

Dataset | Released 27 March 2023

Coronavirus (COVID-19) vaccination rates among adults who live in England, including estimates by socio-demographic characteristic and Standard Occupational Classification (SOC) 2020

### 4 . Glossary

#### Coronaviruses

The World Health Organization (WHO) defines coronaviruses as "a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS)". Between 2001 and 2018, there were 12 deaths in England and Wales because of a coronavirus infection, with a further 13 deaths mentioning the virus as a contributory factor on the death certificate.

#### Coronavirus (COVID-19)

COVID-19 refers to the "coronavirus disease 2019" and is a disease that can affect the lungs and airways. It is caused by a type of coronavirus. Further information is available from the World Health Organization (WHO).

### 5 . Measuring the data

We used Census 2021 to provide an anonymised person-level dataset on which health, vaccination, and mortality datasets could be linked. The Census 2021 dataset comprised individuals enumerated in Census 2021, who could be linked to an NHS number in the Personal Demographics Register, with a linkage rate of 91.1%.

There were 52 million individuals in this dataset who were usual residents in England, which covered approximately 91.7% of the population of England on Census Day 2021. These individuals were linked to vaccinations data from:

- the National Immunisation Management Service (NIMS)
- a supplementary extract from NHS-Digital point of care
- mortality data from Office for National Statistics (ONS) death registrations
- health data from Hospital Episode Statistics (HES)
- the General Practice Extraction Service (GPES) data for Pandemic Planning and Research version 3 (GDPPR)

There were 1,069 vaccination records from the NHS-Digital point of care extract, covering records up to 29 January 2023, which provided additional vaccination records when linked to our Census 2021-based dataset. The English index of multiple deprivation is linked using the census-reported household output area.

The study consisted of people:

- aged 18 years and over
- alive on 2 March 2023 who were resident in England
- enumerated to Census 2021
- eligible for a fourth vaccination as part of the autumn 2022 booster campaign, or who received three doses as part of their primary course and therefore received a fourth vaccination in the autumn 2021 vaccination campaign

This included:

- all adults aged 50 years and older
- residents and staff in care homes
- frontline health and social care workers
- individuals who are in a clinical risk group
- people who are immunosuppressed or household contacts with immunosuppressed individuals
- carers

The linked NIMS and supplementary extract from NHS-Digital contains flags to determine eligibility for the fourth vaccination.

The age-standardised proportions presented are annualised directly age-standardised rates per 100 people, represented as a percentage. This is the number of people who have received a vaccination divided by the population for the relevant time period, standardised to the European Standard Population, multiplied by 100.

All individual-level socio-demographic characteristics were derived from Census 2021. These characteristics are:

- sex
- ethnic group
- religious affiliation
- disability status
- educational attainment
- health status
- National Statistics Socio-economic Classification (NS-SEC)
- place of residence

Occupation was derived from Census 2021 and was classified according to our [Standard Occupational Classification \(SOC\) 2020](#). Because this occupation information was collected in 2021, it is likely to be misclassified for a proportion of people, as they have left the labour work force or changed occupation since 2011.

The vaccination data covered the period 8 December 2020 to 2 March 2023. However, there may be an additional lag in data reporting such that it is possible we have not captured all vaccinations received by 2 March 2023.

## 6 . Strengths and limitations

### Strengths

The linked dataset combines a rich set of demographic and socio-economic factors from the 2021 Census. This unique dataset allows us to analyse how rates of vaccination differ by socio-demographic group.

We used a population-level dataset for England, which enabled estimates of vaccine effectiveness to be calculated using a population representative of the general population of England.

### Limitations

The dataset only contains information on people who were enumerated in the 2021 Census, and therefore excludes residents who did not take part.

The dataset used differs from that used by NHS England. As a result, the figures published will differ from those published by NHS England.

## 7 . Related links

[COVID-19 vaccine effectiveness estimated using Census 2021 variables, England: 31 March 2021 to 20 March 2022](#)

Bulletin | Released 8 March 2023

Estimates of the risk of hospital admission for coronavirus (COVID-19) and death involving COVID-19 by vaccination status, overall and by age group, using anonymised linked data from Census 2021.

Experimental statistics.

[Deaths involving COVID-19 by vaccination status, England: deaths occurring between 1 April 2021 and 31 December 2022](#)

Bulletin | Released 21 February 2023

Age-standardised mortality rates for deaths involving coronavirus (COVID-19) by vaccination status, broken down by age group. Deaths occurring between 1 April 2021 and 31 December 2022 in England.

[Coronavirus and vaccination rates in people aged 50 years and over by socio-demographic characteristic, England: 8 December 2020 to 12 December 2021](#)

Bulletin | Released 24 December 2021

First, second, third dose and booster COVID-19 vaccination rates among people aged 50 years and older who live in England, including estimates by socio-demographic characteristic.

[Coronavirus and vaccination rates in people aged 40 to 64 years by occupation, England: 8 December 2020 to 12 December 2021](#)

Bulletin | Released 24 December 2021

First, second, third dose and booster COVID-19 vaccination rates, among people aged 40 to 64 years old who live in England, by Standard Occupational Classification 2010 (SOC 2010).

[What the ONS can tell you about the COVID-19 Vaccine programme](#)

Blog | Released 27 April 2021

Builds a picture of the vaccine roll out from statistical, medical and behavioural perspectives.

[Coronavirus and the social impacts on Great Britain: 1 April 2022](#)

Bulletin | Released 1 April 2022

Indicators from the Opinions and Lifestyle Survey (covering 16 to 27 March 2022) of the impact of the coronavirus (COVID-19) pandemic on people, households and communities in Great Britain.

[COVID-19 Health Inequalities Monitoring for England \(CHIME\) tool](#)

Web page | Released 16 March 2023

The CHIME tool brings together data relating to the impacts of COVID-19, for factors such as mortality rates, hospital admissions, confirmed cases, vaccinations and life expectancy.

[COVID-19 vaccinations](#)

Web page | Updated regularly

This section contains information on the total number of COVID-19 vaccinations provided by the NHS in England and information on COVID-19 vaccinations for the current eligible population.

## 8 . Cite this statistical bulletin

Office for National Statistics (ONS), released 27 March 2023, ONS website, statistical bulletin, [Coronavirus and vaccination rates in adults by socio-demographic characteristic and occupation, England: December 2020 to March 2023](#)

