Office for National Statistics

Statistical bulletin

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

First dose COVID-19 vaccination rates among people aged 50 years and older who live in England, both in private households and communal establishments. Includes estimates for ethnic minorities, religious groups, those identified as disabled and by other socio-demographic factors.

Contact:
Vahé Nafilyan, Ted Dolby and Jasper Morgan
Health.Data@ons.gov.uk
+44 (0)1633 455865

Release date:
6 May 2021

Next release:
To be announced

## Table of contents

# 1 . Main points

- Vaccination rates for the first dose of a coronavirus (COVID-19) vaccine were lower among all ethnic minority groups compared with the White British population; the lowest vaccination rates were among people identifying as Black Caribbean and Black African (66.8% and 71.2% respectively), followed by people from Pakistani (78.4%) backgrounds.

- Vaccination rates also differed by religious affiliation, with the lowest rates being among those who identified as Muslim (78.8%) and Buddhist (83.3%); after adjusting for geography, socio-demographic factors and underlying health conditions, those identifying as Sikh and Hindu had a higher probability of being vaccinated than those in the Christian group.

- There was a relationship between proficiency in English language, as recorded in the 2011 Census, and vaccination rates; the lowest vaccination rates were for those who do not speak English at all (75.3%) and those who do not speak English well (75.9%), compared with 92.7% for those whose main language is English.

- There were lower vaccination rates among those in less advantaged socio-economic groups; people living in more deprived areas, those who have never worked or are long-term unemployed, those with no qualifications and those who do not own their own home all had lower vaccination rates than their more advantaged socio-economic class counterparts.

- Disabled people who reported being “limited a lot” in their day-to-day activities had lower rates of vaccination (89.3%) compared with those who were non-disabled (92.3%); this disparity between disabled and non-disabled groups was greater within those aged 50 to 69 years than those aged 70 years and over.

- Statistical modelling shows that the lower rates of vaccination in ethnic minorities, certain religious groups, disabled people and less advantaged socio-economic groups are not fully explained by differences in other geographical and socio-demographic factors or underlying health conditions.

The vaccination data presented in this release are produced using the linked National Immunisation Management System (NIMS) and Office for National Statistics (ONS) Public Health Data Asset (PHDA) dataset and cover a subset of the population. Therefore, the data may differ from the administrative data on vaccinations published by NHS England weekly, which cover all vaccinations given to individuals who have an NHS number and are currently alive in the resident population.

## Statistician's comment

“Vaccination rates in the over 50s in England are lower in all ethnic minority groups compared with their White British counterparts, with the lowest rates in those who identify as Black Caribbean and Black African. Lower vaccination rates were also observed in those who identify as Muslim, disabled people, and those living in more deprived areas.

“This is broadly similar to the groups who express vaccine hesitancy. However, the reasons for lower uptake are likely to be complex, including for example being unable to travel to a vaccination centre.”

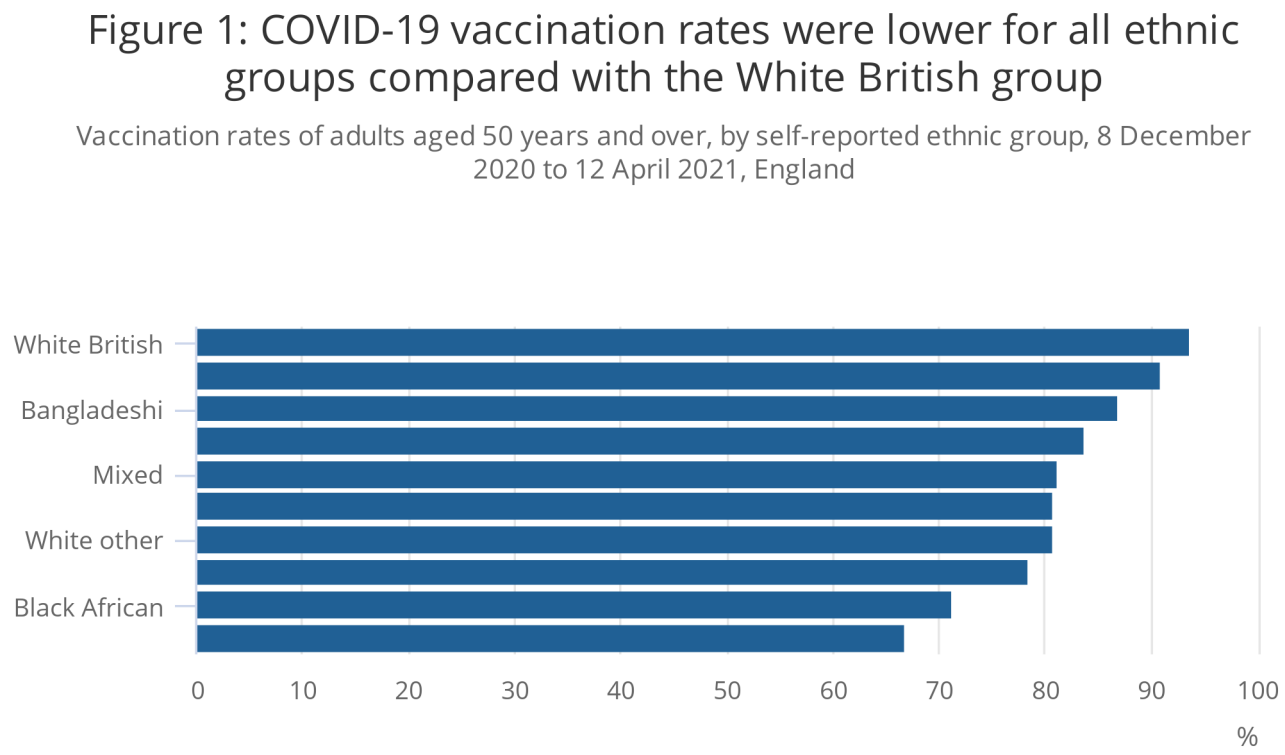
Hugh Stickland, Strategy and Engagement, Office for National Statistics

# 2 . Identity and cultural factors

## Ethnic group

**Figure 1: COVID-19 vaccination rates were lower for all ethnic groups compared with the White British group**

**Vaccination rates of adults aged 50 years and over, by self-reported ethnic group, 8 December 2020 to 12 April 2021, England**




**Source: Office for National Statistics - Public Health Data Asset, National Immunisation Management Service**

**Notes:**

1. Figures based on first dose of a vaccine administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. Self-reported ethnic group is derived from the 2011 Census. Other ethnic group encompasses Asian other, Black other, Arab and Other ethnic group categories in the classification.

Among people aged 50 years and over, vaccination rates for the first dose of a coronavirus (COVID-19) vaccine were lower for all ethnic minority groups (self-reported ethnicity in the 2011 Census), when compared with those identifying as White British.

This analysis covers only people aged 50 years and over, as it can be assumed that a substantial proportion of this age group had been offered the vaccine during the time period presented – this is not applicable for younger age groups.

Vaccination rates were lowest for those identifying as Black Caribbean (66.8%), Black African (71.2%) and Pakistani (78.4%). Although lower than that of the White British group (93.7%), the vaccination rates among people identifying as Indian (90.9%) and Bangladeshi (86.9%) remained high.

The difference in vaccination rates between those identifying as White Other and White British was noticeably greater within the 50 to 69 years age group than among those aged 70 years and over. While there was great disparity in vaccination rates between Black Caribbean and White British groups for all ages, this disparity was starker within those aged 50 to 69 years. Conversely, the gap in vaccination rates for those identifying as Bangladeshi and Black African, relative to the White British group, was much smaller within the 50 to 69 years age group, compared with those aged 70 years and over.

## Figure 2: People from ethnic minority groups were less likely to have received a COVID-19 vaccine compared with the White British group

**Odds ratios of not having received the first dose of a vaccination for COVID-19, by self-reported ethnic group, compared with White British, 8 December 2020 to 12 April 2021, England**

**Notes:**

1. Figures based on first dose of a vaccine administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. Self-reported ethnic group is derived from the 2011 Census. Other ethnic group encompasses Asian other, Black other, Arab and Other ethnic group categories in the classification.

3. The fully adjusted logistic regression model includes age, sex, region, care home residency, urban or rural area, Index of Multiple Deprivation quintiles (area deprivation), educational attainment, household tenure, BMI categories and a range of underlying health conditions.

4. An error bar not crossing the x-axis at value 1.0 denotes a statistically significantly different odds of not being vaccinated compared with the reference category (White British).

**Download the data**

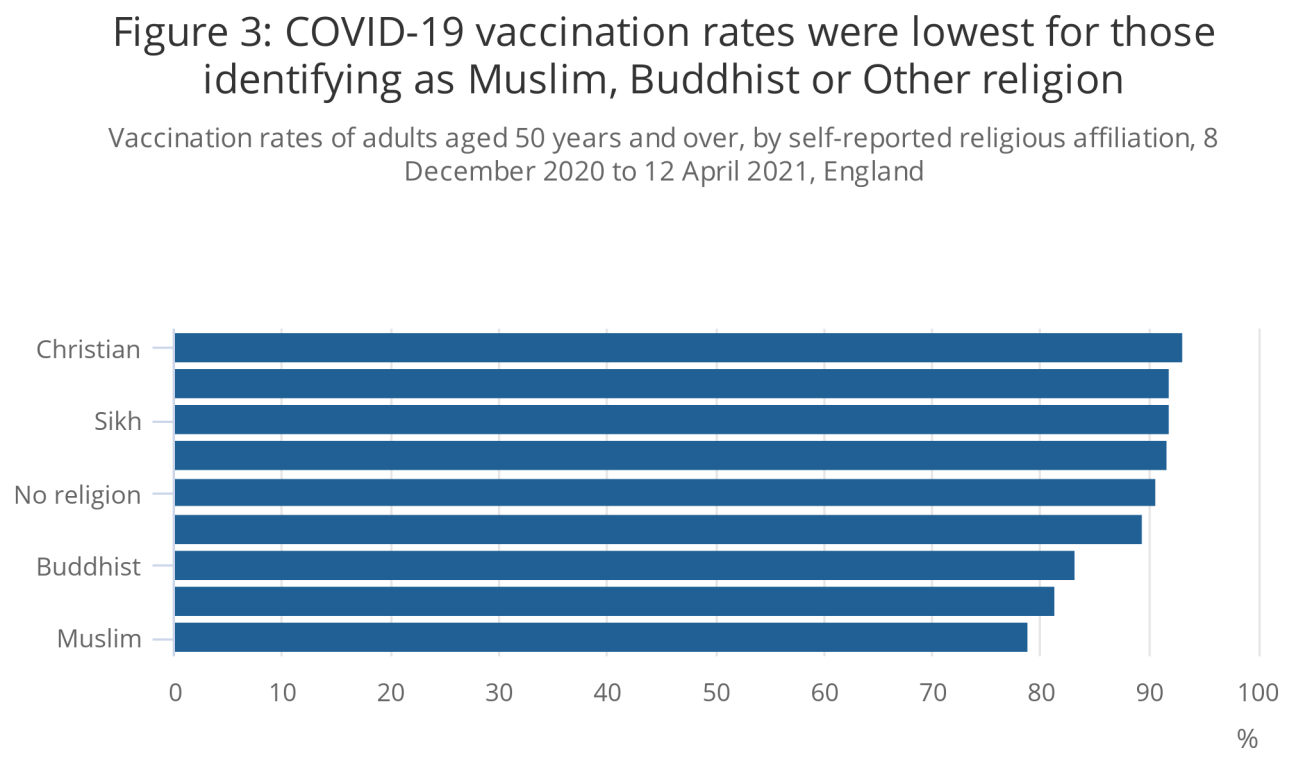
.xlsx

Statistical modelling shows that accounting for differences in geography, socio-demographic factors and underlying health conditions does not fully explain the lower vaccination rates among ethnic minority groups. Figure 2 shows the odds ratio of not being vaccinated remains higher than one for all ethnic groups once adjusted for these characteristics. The odds ratio is a measure of how likely an outcome is given a particular characteristic. A value greater than one indicates that people in an ethnic group are less likely to be vaccinated than those in the White British group.

## Religion

### Figure 3: COVID-19 vaccination rates were lowest for those identifying as Muslim, Buddhist or Other religion

**Vaccination rates of adults aged 50 years and over, by self-reported religious affiliation, 8 December 2020 to 12 April 2021, England**




**Source: Office for National Statistics - Public Health Data Asset, National Immunisation Management Service**

**Notes:**

1. Figures based on first dose vaccination administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. Self-reported religious affiliation is derived from the 2011 Census.

Among adults aged 50 years and over, the vaccination rate was highest for those who identified as Christian (93.2%). The lowest vaccination rates were seen for those identifying as Muslim (78.8%), Buddhist (83.3%) or Other religion (81.4%).

### Figure 4: People identifying as Muslim, Buddhist or Other religion were less likely to have received a COVID-19 vaccine compared with the Christian group

**Odds ratios of not having received the first dose of a vaccination for COVID-19, by self-reported religious affiliation, compared with Christian, 8 December 2020 to 12 April 2021, England**

**Notes:**

1. Figures based on first dose of a vaccine administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. Self-reported religious affiliation is derived from the 2011 Census.

3. The fully adjusted logistic regression model includes age, sex, region, care home residency, urban or rural area, Index of Multiple Deprivation quintiles (area deprivation), educational attainment, household tenure, BMI categories and a range of underlying health conditions.

4. An error bar not crossing the x-axis at value 1.0 denotes a statistically significantly different odds of not being vaccinated compared with the reference category (Christian).

**Download the data**

.xlsx

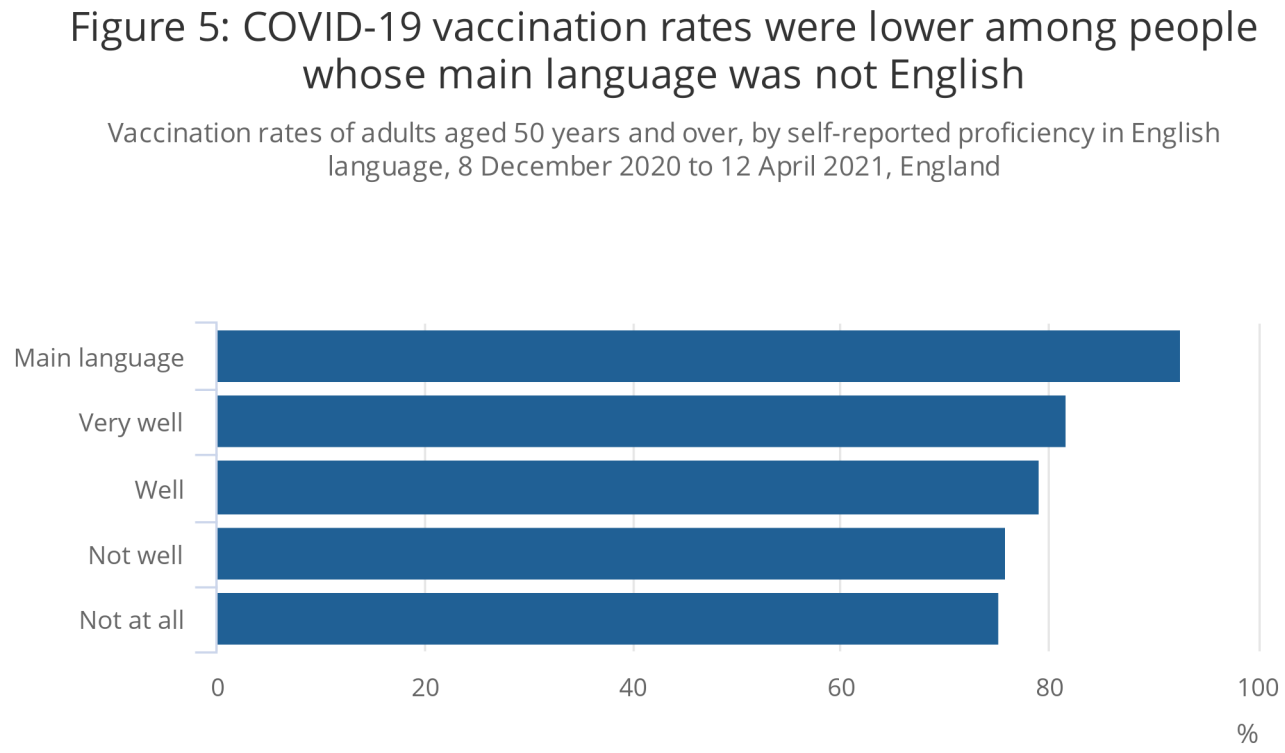
Geographical, socio-demographic factors and underlying health conditions only partly explained these lower vaccination rates among those identifying as Muslim, Buddhist or Other religion, as the odds ratios of not being vaccinated remained well above one. Furthermore, when controlling for these factors, there was greater disparity in the probability of not being vaccinated for Muslim and Buddhist groups within the elderly (aged 70 years and over), compared with the 50 to 69 years age group.

After accounting for differences in geography, socio-demographic factors and underlying health conditions, the odds ratios of not being vaccinated for people who identified as Hindu or Sikh were lower than one, suggesting a greater probability of being vaccinated than those in the Christian group. This was driven by relatively high vaccination rates among those aged 50 to 69 years in these two groups.

## Proficiency in English language

**Figure 5: COVID-19 vaccination rates were lower among people whose main language was not English**

**Vaccination rates of adults aged 50 years and over, by self-reported proficiency in English language, 8 December 2020 to 12 April 2021, England**




**Source: Office for National Statistics - Public Health Data Asset, National Immunisation Management Service**

**Notes:**

1. Figures based on first dose vaccination administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. Self-reported proficiency in English language is derived from the 2011 Census.

Lower English proficiency was associated with lower vaccination rates. The lowest vaccination rates were for those who do not speak English at all (75.3%) and those who do not speak English well (75.9%), compared with 92.7% for those whose main language is English.

Geographical, socio-demographic factors and underlying health conditions did not fully explain these differences in vaccination rates. After controlling for these factors, there was greater disparity in the odds of not being vaccinated across English proficiency levels within the elderly (aged 70 years and over), compared with the 50 to 69 years age group.

English language proficiency is derived from the 2011 Census. People's proficiency may have improved since this was measured, so this analysis should be treated with caution.

### Country of birth

Vaccination rates were also lower for those born outside of the UK (82.5%), when compared with those born in the UK (93.3%). Geographical, socio-demographic factors and underlying health conditions did not explain a substantial proportion of this difference. Country of birth is derived from the 2011 Census.

**More about coronavirus**

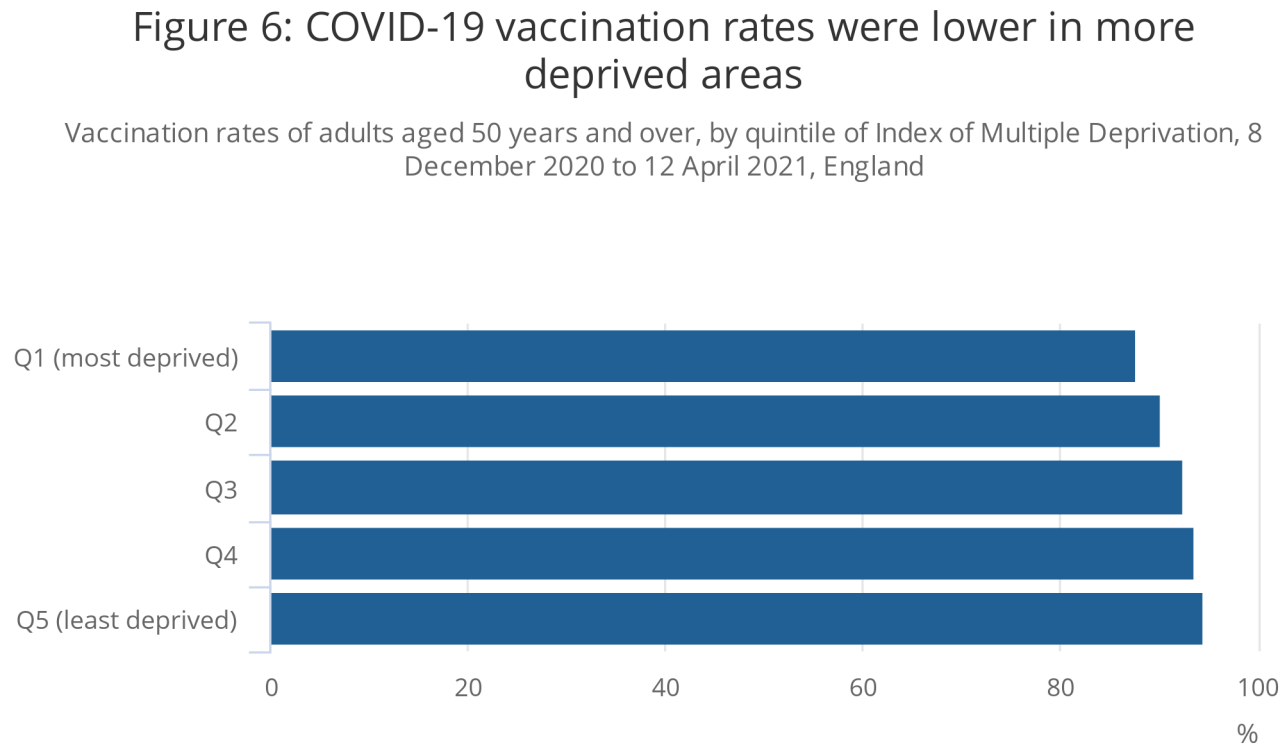
- Find the latest on coronavirus (COVID-19) in the UK.
- Explore the latest coronavirus data from the ONS and other sources.
- All ONS analysis, summarised in our coronavirus roundup.
- View all coronavirus data.
- Find out how we are working safely in our studies and surveys.

## 3 . Socio-economic factors

## Area deprivation

**Figure 6: COVID-19 vaccination rates were lower in more deprived areas**

**Vaccination rates of adults aged 50 years and over, by quintile of Index of Multiple Deprivation, 8 December 2020 to 12 April 2021, England**




**Source: Office for National Statistics - Public Health Data Asset, National Immunisation Management Service**

**Notes:**

1. Figures based on first dose vaccination administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

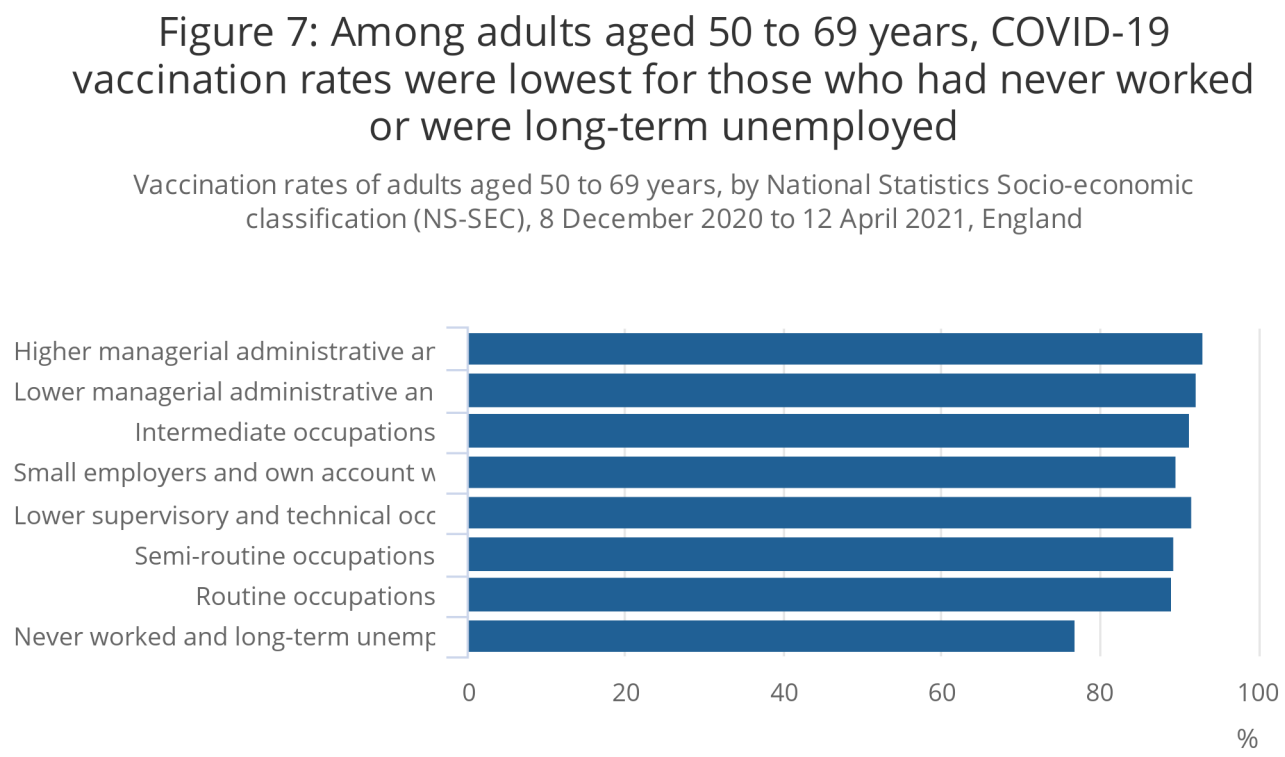
2. Deprivation Quintiles are based on the English Index of Multiple Deprivation (IMD), version 2019.

Lower vaccination rates were in more deprived areas; at 87.8% in the most deprived areas, compared with 94.5% in the least deprived areas. Area deprivation is measured according to the English Index of Multiple Deprivation of an individual's area of residence.

## National Statistics Socio-economic classification (NS-SEC)

**Figure 7: Among adults aged 50 to 69 years, COVID-19 vaccination rates were lowest for those who had never worked or were long-term unemployed**

**Vaccination rates of adults aged 50 to 69 years, by National Statistics Socio-economic classification (NS-SEC), 8 December 2020 to 12 April 2021, England**




**Source: Office for National Statistics - Public Health Data Asset, National Immunisation Management Service**

**Notes:**

1. Figures based on first dose vaccination administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. National Statistics Socio-economic classification (NS-SEC) class is derived from self-reported occupation from the 2011 Census.

For those aged 50 to 69 years, the National Statistics Socio-economic classification (NS-SEC) is used to demonstrate individual-level socio-economic status. This measure is less applicable for those of non-working age as it refers to an individual's occupation.

Among 50- to 69-year-olds, those in the least advantaged NS-SEC class, individuals who have never worked or are long-term unemployed, have a much lower vaccination rate (77.1%) when compared with people working in routine occupations (89.2%).

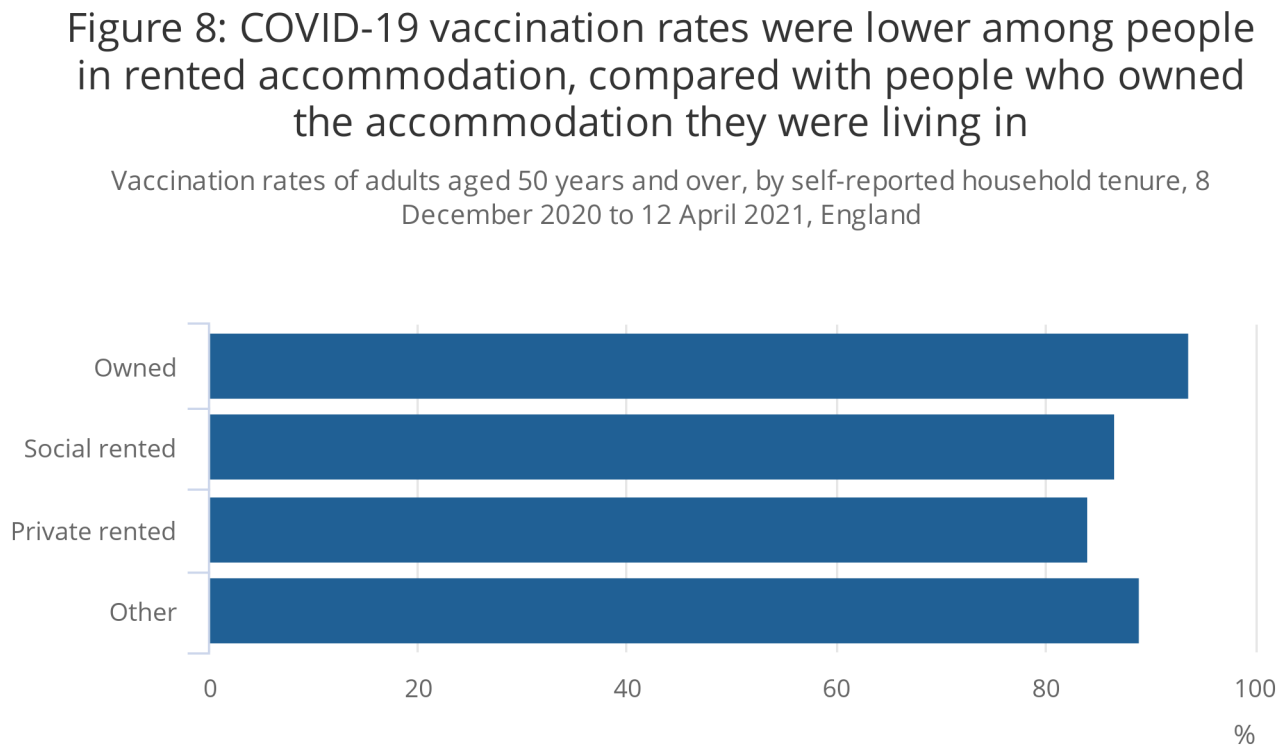
## Educational attainment

Similarly, after adjusting for geography, socio-demographic factors and underlying health conditions, those aged 50 to 69 years with no qualifications were less likely to be vaccinated than those with a formal qualification. Data on individual's qualifications are derived from the 2011 Census.

## Household tenure

**Figure 8: COVID-19 vaccination rates were lower among people in rented accommodation, compared with people who owned the accommodation they were living in**

**Vaccination rates of adults aged 50 years and over, by self-reported household tenure, 8 December 2020 to 12 April 2021, England**




**Source: Office for National Statistics - Public Health Data Asset, National Immunisation Management Service**

**Notes:**

1. Figures based on first dose vaccination administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. Self-reported household tenure is derived from the 2011 Census.

Household tenure (home ownership) is a useful measure of socio-economic status amongst the elderly. Vaccination rates were higher among those who owned the accommodation that they were living in (93.7%), compared with those in social rented (86.6%) and private rented (84.2%) accommodation.

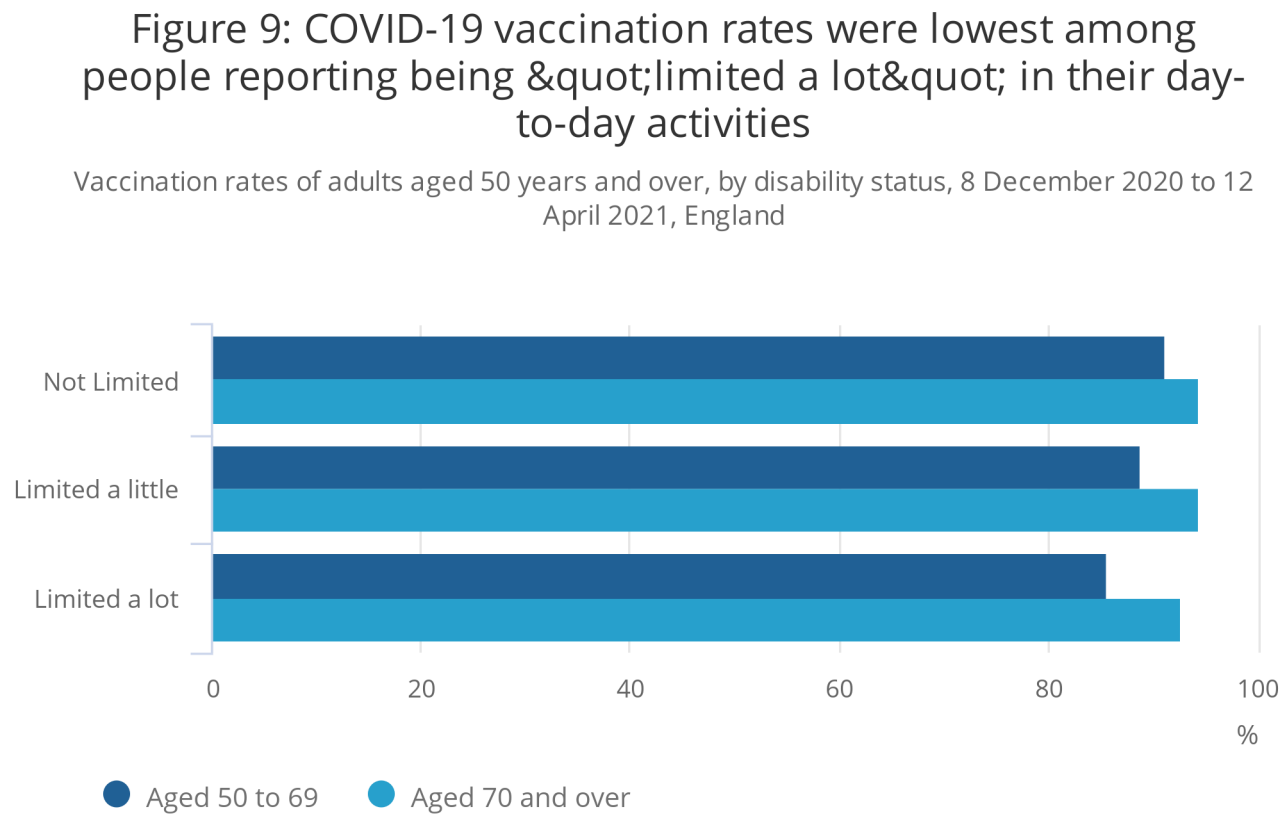
For all four of these socio-economic measures – deprivation, NS-SEC, education and household tenure – there was a greater disparity in vaccination rates among people aged 50 to 69 years than those aged 70 years and over.

Adjusting for geographical factors, socio-demographic factors and underlying health conditions did not substantially account for the lower vaccination rates seen for those in less advantaged socio-economic groups.

# 4 . Disability

**Figure 9: COVID-19 vaccination rates were lowest among people reporting being "limited a lot" in their day-to-day activities**

**Vaccination rates of adults aged 50 years and over, by disability status, 8 December 2020 to 12 April 2021, England**




**Source: Office for National Statistics - Public Health Data Asset, National Immunisation Management Service**

**Notes:**

1. Figures based on first dose vaccination administered between 8 December 2020 and 12 April 2021 for residents in England who could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. Disability status was defined using the self-reported answers to the 2011 Census question; “Are your day-to-day activities limited because of a health problem or disability which has lasted, or is expected to last, at least 12 months? - Include problems related to old age” (Yes, limited a lot; Yes, limited a little; and No).

Vaccination rates were lower for those who reported being disabled at the time of the 2011 Census, compared with those who did not. Those disabled people who reported being “limited a lot” in their day-to-day activities had a vaccination rate of 89.3%, compared with 92.3% of non-disabled people.

This disparity was more prominent among those aged 50 to 69 years, compared with those aged 70 years and over.

# 5 . Coronavirus and vaccination rates data

COVID-19 vaccination rates and odds ratios by socio-demographic group
Dataset | Released 6 May 2021
Vaccination rates and odds ratios by socio-demographic group among people aged 70 years and older and 50 years and older who live in England.

# 6 . Glossary

## COVID-19 vaccination

Vaccinations against the coronavirus (COVID-19) were initially introduced for the people most at risk of COVID-19, including those who are aged 70 years and over. The vaccine is given as an injection and requires two doses; the second dose is given between 3 and 12 weeks after the initial injection.

Approved vaccines in the UK are Pfizer/BioNTech, AstraZeneca (also known as the Oxford vaccine) and Moderna vaccine. For more information on vaccines see NHS information about the coronavirus (COVID-19) vaccine.

## Confidence interval

A confidence interval gives an indication of the degree of uncertainty of an estimate, showing the precision of a sample estimate. The 95% confidence intervals are calculated so that if we repeated the study many times, 95% of the time the true unknown value would lie between the lower and upper confidence limits. A wider interval indicates more uncertainty in the estimate. Overlapping confidence intervals indicate that there may not be a true difference between two estimates.

For more information, see our methodology page on statistical uncertainty.

## Odds ratio

An odds ratio is a measure of how likely an outcome is given a particular characteristic. In a coronavirus context, they can be used to determine whether a characteristic (for example, age) is a risk factor for testing positive for the disease. The odds ratio measures can also be compared with each other to compare the different levels of risk associated with different characteristics (for example, age groups).

# 7 . Measuring the data

We linked vaccination data from the National Immunisation Management System (NIMS) to the Office for National Statistics (ONS) Public Health Data Asset (PHDA) based on NHS number. The ONS PHDA is a unique linked dataset combining the 2011 Census, the General Practice Extraction Service (GPES) data for pandemic planning and research and the Hospital Episode Statistics (HES).

The study population consisted of people aged 50 years and over, alive on 12 April 2021 who were resident in England, registered with a general practitioner, and were enumerated at the 2011 Census. This analysis covers only people aged 50 years and over, as it can be assumed that a substantial proportion of this age group had been offered the vaccine during the time period presented – this is not applicable for younger age groups.

Of people aged 50 years and over who received at least one dose of a vaccine, 86.1% were linked to the ONS PHDA.

All individual level socio-demographic characteristics (ethnic group, religious affiliation, disability status, educational attainment) come from the 2011 Census. Place of residence (region, care home) and area-based deprivation were derived based on data from the 2019 Patient Register.

Body Mass Index (BMI) and comorbidities were derived based on the primary care and hospitalisation data. For BMI, we used the following categories: underweight (less than 18.5); ideal (18.5 to 25), overweight (25 to 30), obese (30 or more); Missing BMI. Comorbidities were defined as in the QCOVID risk prediction model. For each exposure, we modelled the odds of not having received a first dose of a COVID-19 vaccine using three logistic regression models:

- an unadjusted model
- a model adjusted for age and sex
- a model adjusted for age, sex, place of residence (region, care home), area-based deprivation, ethnicity, education, household tenure, and pre-existing conditions

# 8 . Strengths and limitations

## Strengths

One of the main strengths of the linked NIMS – PHDA is that it combines a rich set of demographic and socio-economic factors from the 2011 Census and 2019 Patient Register with pre-existing conditions based on clinical records. This unique dataset allows us to analyse how rates of vaccination differ by socio-demographic group, and examine the extent to which these differences are driven by other factors.

Another strength is the size of the dataset: it contains data on 86.1% of people aged 50 years and over who received the first dose of a COVID-19 vaccination. The average age of linked and unlinked individuals was similar (65.9 years compared with 65.7 years).

Lower vaccination rates among people from ethnic minority groups are consistent with the higher vaccination hesitancy among ethnic minorities reported in Coronavirus and vaccine hesitancy, Great Britain.

The vaccination rates by ethnicity and IMD quintiles are generally consistent with findings based on the OpenSAFELY analytics platform, which uses data from 40% of general practices that use the Phoenix Partnership (TPP) electronic health record software.

### Limitations

The dataset only contains information on people who were enumerated in the 2011 Census, and therefore excludes residents who did not take part in that census, and people who have immigrated since 2011. As a result, we excluded 13.9% of people aged 50 years and over who received the first dose of a COVID-19 vaccination.

The NIMS data covered the period 8 December 2020 to 12 April 2021, however, there may be some additional lag in reporting the data so it is possible that we have not captured everyone aged 50 years and over who had a dose of a COVID-19 vaccine by 12 April 2021.

## 9 . Related links

What the ONS can tell you about the COVID-19 Vaccine programme
Blog | Released 27 April 2021
Explanation of the different sources for our coronavirus (COVID-19) analysis.

Coronavirus and vaccine hesitancy, Great Britain: 31 March to 25 April 2021
Bulletin | Released 6 May 2021
Hesitancy towards the coronavirus (COVID-19) vaccine, based on the Opinions and Lifestyle Survey.

Coronavirus (COVID-19) Infection Survey, UK
Bulletin | Weekly
Estimates for England, Wales, Northern Ireland and Scotland. This survey is being delivered in partnership with University of Oxford, University of Manchester, Public Health England and Wellcome Trust.

Coronavirus (COVID-19) latest insights
An interactive tool to explore the latest data and trends about the coronavirus (COVID-19) pandemic from the ONS and other sources.

Coronavirus (COVID-19) roundup
Latest data and analysis related to the coronavirus (COVID-19) pandemic and its impact on our economy and society.

NHS England Coronavirus (COVID-19) Vaccinations
Administrative data on vaccinations published by NHS England weekly, covering all vaccinations given to individuals who have an NHS number and are currently alive in the resident population.