

Statistical bulletin

# Coronavirus (COVID-19) case rates by socio-demographic characteristics, England: 1 September 2020 to 25 July 2021

Analysis of age-standardised case rates for coronavirus (COVID-19) in England by various socio-demographic characteristics including estimates of case rates by ethnic group, religion, country of birth, socio-economic status, and disability.

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# 1 . Main points

- Age-standardised coronavirus (COVID-19) case rates were highest among the Pakistani and Bangladeshi ethnic groups during the second wave (1 September 2020 to 22 May 2021), whereas in the first part of the third wave (23 May 2021 to 25 July 2021) the White British ethnic group had the highest case rate.
- Case rates were higher among people born outside of the UK in the second wave, whereas in the third wave case rates were higher among people born in the UK.
- Case rates also differed by religious affiliation, with people identifying as Muslim or Sikh having the highest rates in the second wave, whereas the Christian group had the highest rates in the third wave.
- Throughout the pandemic, COVID-19 case rates were highest among people living in the most deprived areas and in urban areas.
- In the second wave, case rates were higher in households from lower socio-economic backgrounds than in more affluent ones; in the third wave there was little difference between socio-economic groups other than that those who had never worked or were long-term unemployed had the lowest rates.
- Overall, case rates were lower among disabled people than non-disabled people.
- Further work is needed to understand better the inequalities in case rates

## 2 . Overview of data and methods

Linking NHS Test and Trace data to the ONS Public Health Data Asset (PHDA) dataset, we estimated age-standardised case rates by various socio-demographic characteristics, from 1 September 2020 to 25 July 2021. For more information on the data used in this release see [Section 8: Measuring the data](#). A case is defined as a person who had at least one positive COVID-19 test in a given time period. We primarily focused on socio-demographic characteristics which are not available in traditional health records but can be retrieved from the 2011 Census. We produced weekly rates and rates for the second and third waves of the pandemic (robust NHS Test and Trace data are not available for the first wave). Following definitions outlined in the ONS [COVID-19 Insights tool](#), we classified tests up to and including 22 May 2021 as having occurred in the second wave, with tests from 23 May 2021 to 25 July 2021 (latest data available) classified as the first part of the third wave.

The risk of infection is complex and involves a range of interrelated factors. Therefore, it is likely that higher COVID-19 case rates in some groups may be partly explained by co-occurring differences in other characteristics, such as living in an area where infection rates are higher or working in an occupation where the risk of becoming infected is greater. Easing of lockdown restrictions, such as working from home and limits on social contacts, and the vaccine rollout programme may also have played a part in the changing patterns of COVID-19 case rates by socio-demographic characteristics over the course of the pandemic.

This bulletin highlights differences in case rates between groups, after accounting for age. We are planning on conducting additional analyses to further understand these differences.

The estimates presented in this release are experimental statistics and should be interpreted with caution. COVID-19 case rates were produced by linking NHS Test and Trace data with the Public Health Data Asset dataset and cover a subset of the population. Therefore, they may differ from the [Public Health England](#) COVID-19 case rate administrative data and our infection estimates in the [Coronavirus Infection Survey](#).

## 3 . Identity and cultural factors

## Ethnic group

Overall, age-standardised coronavirus (COVID-19) case rates were highest for the Bangladeshi and Pakistani ethnic groups and lowest for the Chinese ethnic group (Figure 1). The differences between these groups were most pronounced during the second wave (1 September 2020 to 22 May 2021), with rates of 390.6 and 378.1 per 100,000 person-weeks for the Bangladeshi and Pakistani ethnic groups respectively, compared with 93.0 for the Chinese ethnic group. These figures are consistent with the [differences in COVID-19 mortality](#) observed over the second wave of the pandemic, and with results from [research](#) carried out by our academic partners at Oxford University based on the Coronavirus Infection Survey. However, the differences in case rates between ethnic groups varied over time.

### **Figure 1: Age-standardised case rates were highest among the Pakistani and Bangladeshi ethnic groups in the second wave, whereas the White British ethnic group had the highest case rate in the third wave**

#### **Age-standardised COVID-19 case rates by ethnic group, 1 September 2020 to 25 July 2021, England**

##### **Notes:**

1. Figures based on positive tests from NHS Test and Trace data between 1 September 2020 and 25 July 2021, where individuals could be linked to the ONS Public Health Data Asset; these figures are provisional.
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. Figures for the final weekly period are based on incomplete data (20 July to 25 July 2021) as NHS Test and Trace data were only available until 25 July 2021.

##### **Download the data**

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It was not possible to calculate case rates for the first wave as mass testing was not available. Estimates for the third wave should be considered provisional as it goes beyond 25 July 2021.

In the first part of the second wave (September 2020 to early December 2020) case rates were higher in people from South Asian backgrounds, especially among the Pakistani ethnic group. The pattern changed in late December 2020/early January 2021, when the case rate increased sharply in people from the Bangladeshi ethnic group, peaking at 1,876.5 cases per 100,000 person-weeks. It also increased in people from the Black African and Black Caribbean ethnic groups who had higher case rates than those from the White British ethnic group in the second half of the second wave. The case rate remained consistently higher in people from the Pakistani ethnic group than any other ethnic group in the period following the peak (February 2021 to May 2021). During the third wave, case rates were highest in the White British ethnic group, at 234.7 cases per 100,000 person-weeks. Some of these differences may be explained by regional variation in infection rate over time, as some regions, such as London or the West Midlands, are more [ethnically diverse](#) than others.

## Religion

During the second wave of the pandemic, age-standardised COVID-19 case rates per 100,000 person-weeks were highest for people who identified as Muslim (339.3) and Sikh (325.3) (Figure 2). Rates were lowest for people in the 'Other Religion' group (143.5) and the Buddhist population (145.4). However, the differences between religious groups varied over time. During the third wave, those who identified as Christian had the highest rates at 235.1 cases per 100,000 person-weeks, whereas the lowest rates were found in the Buddhist and Hindu groups at 135.8 and 135.9 cases per 100,000 person-weeks, respectively. These differences are broadly consistent with the differences in [COVID-19 mortality observed over the second wave](#), although for most groups they tend to be less pronounced for cases than for deaths; the exception is the Sikh group.

## Figure 2: People identifying as Muslim or Sikh had the highest COVID-19 case rates during the second wave of the pandemic, whereas the Christian group had the highest case rates in the third wave

Age-standardised COVID-19 case rates by religious group, 1 September 2020 to 25 July 2021, England

### Notes:

1. Figures based on positive tests from NHS Test and Trace data between 1 September 2020 and 25 July 2021, where individuals could be linked to the ONS Public Health Data Asset; these figures are provisional.
2. Self-reported religious affiliation is derived from the 2011 Census.
3. Figures for the final weekly period are based on incomplete data (20 July to 25 July 2021) as NHS Test and Trace data were only available until 25 July 2021.

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## Country of birth

Overall, during the second wave, case rates were higher for people born outside of the UK than those born in the UK, at 205.2 cases per 100,000 person-weeks compared with 172.6 cases (Figure 3). However, during the first part of the second wave (September 2020 to early December 2020), those born in the UK had higher case rates than those born outside of the UK. Later in the second wave, particularly from December 2020 through to February 2021, rates were higher among those born outside of the UK. During the third wave, rates were higher among those born in the UK (UK born: 225.0, non-UK born: 146.1).

## Figure 3: Case rates were higher among people born outside of the UK in the second wave, whereas in the third wave case rates were higher among people born in the UK

Age-standardised COVID-19 case rates by country of birth, 1 September 2020 to 25 July 2021, England

### Notes:

1. Figures based on positive tests from NHS Test and Trace data between 1 September 2020 and 25 July 2021, where individuals could be linked to the ONS Public Health Data Asset; these figures are provisional.
2. Country of birth is derived from the 2011 Census.
3. Figures for the final weekly period are based on incomplete data (20 July to 25 July 2021) as NHS Test and Trace data were only available until 25 July 2021.

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## 4 . Socio-economic factors

## National Statistics Socio-economic Status

During the second wave, coronavirus (COVID-19) case rates were highest among people living in households where the household reference person was in a semi-routine or routine occupation, at 200.4 and 195.7 cases per 100,000 person-weeks, respectively. In comparison, case rates were lowest among people where the household reference person was in a higher managerial occupation (142.6 cases per 100,000 person-weeks) (Figure 5). During the third wave, however, rates were highest among people where the household reference person was in a lower managerial, administrative or professional occupation (228.5 cases per 100,000 person-weeks) or intermediate occupation (228.1 cases per 100,000 person-weeks). Rates were lowest among people where the household reference person had never worked or were long-term unemployed (178.4 cases per 100,000 person-weeks). During the second and third waves, COVID-19 case rates were highest in the most deprived areas, as measured by the Index of Multiple Deprivation ([see reference Table 5](#)). This was consistent with other [data sources](#).

### Figure 4: In the second wave, case rates were higher in households from lower socio-economic backgrounds than in more affluent ones

Age-standardised COVID-19 case rates by NS-SEC of the household reference person, 1 September 2020 to 25 July 2021, England

#### Notes:

1. Figures based on positive tests from NHS Test and Trace data between 1 September 2020 and 25 July 2021, where individuals could be linked to the ONS Public Health Data Asset; these figures are provisional.
2. NS-SEC of the household reference person was derived from the 2011 Census.
3. Figures for the final weekly period are based on incomplete data (20 July to 25 July 2021) as NHS Test and Trace data were only available until 25 July 2021.

#### Download the data

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## Rural Urban Classification

Throughout the analysis period, urban areas had consistently higher COVID-19 case rates than rural areas. During the second wave, rates were highest in major and minor conurbations at 217.6 and 205.9 cases per 100,000 person-weeks, respectively, whereas rates were lowest in villages, hamlets and isolated dwellings at 119.3 cases (Figure 6). During the third wave, rates were highest in minor conurbations at 273.0 cases per 100,000 person-weeks, while the lowest rates were in villages, hamlets and isolated dwellings, at 177.2 cases. [Recent research](#) based on the Coronavirus (COVID-19) Infection Survey (CIS) data found that Rural Urban Classification was consistently associated with the risk of infection in the second and third wave. In line with Public Health England, we found substantial variation in case rates across regions, especially in the third wave ([see reference Table 9](#)).

### Figure 5: Throughout the second and third waves of the pandemic, cases rates were higher in urban areas than in rural areas

Age-standardised COVID-19 case rates by Rural Urban Classification, 1 September 2020 to 25 July 2021, England

#### Notes:

1. Figures based on positive tests from NHS Test and Trace data between 1 September 2020 and 25 July 2021, where individuals could be linked to the ONS Public Health Data Asset; these figures are provisional.
2. Rural Urban Classification was derived from postcodes held in GP records.
3. Figures for the final weekly period are based on incomplete data (20 July to 25 July 2021) as NHS Test and Trace data were only available until 25 July 2021.

#### Download the data

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## 5 . Disability

Over the whole analysis period and across the second and third waves of the pandemic, coronavirus (COVID-19) case rates were highest among non-disabled people and lowest for disabled people who reported that they were “limited a lot” in their day-to-day activities (Figure 7). During the second wave, rates per 100,000 person-weeks for the non-disabled, disabled and “limited a little”, and disabled and “limited a lot” groups were 175.1, 163.9, and 160.5, respectively. During the third wave, differences between the groups were much larger, with rates being 220.7, 159.5, and 116.2, respectively. Several factors may contribute to these differences. First, as disabled people have a greater risk of death involving [COVID-19](#) than non-disabled people, they may have been more likely to shield and follow social distancing guidance. Secondly, disabled people have been vaccinated [more rapidly](#) than non-disabled people, which could explain the lower case rates in the third wave.

**Figure 6: Across the second and third waves of the pandemic, COVID-19 case rates were lower among disabled people than non-disabled people**

**Age-standardised COVID-19 case rates by disability status, 1 September 2020 to 25 July 2021, England**

#### Notes:

1. Figures based on positive tests from NHS Test and Trace data between 1 September 2020 and 25 July 2021, where individuals could be linked to the ONS Public Health Data Asset; these figures are provisional.
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).
3. Figures for the final weekly period are based on incomplete data (20 July to 25 July 2021) as NHS Test and Trace data were only available until 25 July 2021.

#### Download the data

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## 6 . COVID-19 case rates by socio-demographic characteristics data

[Coronavirus \(COVID-19\) case rates by socio-demographic characteristics, England](#) Dataset | Released 20 September 2021 Analysis of age-standardised case rates for coronavirus (COVID-19) in England by socio-demographic characteristics.

## 7 . Glossary

### Age-standardised COVID-19 case rates

Age-standardised coronavirus (COVID-19) case rates were calculated as the number of positive cases per 100,000 person-weeks at-risk. A case was defined as a person who had at least one positive COVID-19 test in a given time period. Age-standardised rates allow comparisons between populations that may contain proportions of different ages. The age distribution within each group was standardised to the 2013 European Standard Population.

### Positive test

This is defined as receiving a positive PCR or lateral flow device (LFD) test result for COVID-19 in NHS Test and Trace data. We excluded positive tests from the same individual occurring within 120 days of an initial positive test as these may have been part of the same infection episode.

### 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](#).

## 8 . Measuring the data

We linked NHS Test and Trace data (pillar 1 and pillar 2) to the Office for National Statistics (ONS) Public Health Data Asset (PHDA) using NHS number. The ONS PHDA is a linked dataset combining the 2011 Census, mortality records, the General Practice Extraction Service (GPES) data for pandemic planning and research and Hospital Episode Statistics (HES).

The study population consists of all people aged 10 years or over in 2020, living in England and registered with a general practitioner on 1 November 2019, who were enumerated at the 2011 Census, and alive on 1 September 2020. This amounts to 39,003,251 individuals, which is 78.4% of the mid-year 2020 population estimate of people aged 10 years and over in England.

The Test and Trace data contain test results for up to 25 July 2021, with 3,178,842 individuals with a positive test. Out of all test results, 83.0% were linked to the ONS PHDA.

All individual level socio-demographic characteristics (for example, ethnic group, religious affiliation, disability status) come from the 2011 Census. Geographic variables (region, Rural Urban Classification, and area-based deprivation) were derived based on data from postcodes held in GP records.

## 9 . Strengths and limitations

### Strengths

The primary strength of the study is using nationwide linked population-level data that combines a rich set of demographic and socio-economic factors from the 2011 Census with timely data from NHS Test and Trace. Another strength is the size of the dataset; it contains data on 78.4% of people aged 10 years and over living in England in 2020. Therefore, we can provide precise estimates of weekly case rates broken down by detailed characteristics.

## Limitations

The Public Health Data Asset only contains information on people who were enumerated at the 2011 Census. It therefore excludes people living in England in 2011 but not taking part in the 2011 Census (estimated to be about 5%); respondents who could not be linked to the 2011 to 2013 NHS Patient Registers (5.4% of Census respondents); people who have immigrated since 2011; and children younger than 10-years-old in 2020.

Another limitation is that many of the socio-demographic variables were derived from the 2011 Census. Some of these characteristics (for example disability status and National Statistics socio-economic classification) might have changed since the 2011 Census and may not accurately reflect individuals' circumstances during the pandemic.

The figures presented in this release may not be generalisable to all positive coronavirus (COVID-19) infections in the population because the NHS Test and Trace data does not provide a representative measure of positive infections. People are more likely to get a test for COVID-19 if they have symptoms and around half of people who test positive in the [Coronavirus Infection Survey](#) do not develop symptoms within 35 days of testing positive. Therefore, these figures are likely to under-represent the number of asymptomatic cases. In addition, people in certain occupations and school children are required to undergo regular testing, so may be more likely to test positive for COVID-19 as a result of higher testing rates.

## 10 . Related links

[Coronavirus \(COVID-19\) Infection Survey, characteristics of people testing positive for COVID-19](#) Bulletin | Released 25 August 2021 Characteristics of people testing positive for COVID-19 from the Coronavirus (COVID-19) Infection Survey.

[Coronavirus \(COVID-19\) latest insights](#) Interactive tool | Updated regularly A roundup of the latest data and trends about the coronavirus (COVID-19) pandemic from the ONS and other sources.

[COVID-19 Health Inequalities Monitoring for England](#) Tool | Updated regularly Brings together data relating to the impacts of COVID-19, for factors such as mortality rates, hospital admissions, confirmed cases, vaccinations and life expectancy.