Office for National Statistics

Article

# Coronavirus (COVID-19) infections in the community in England: July 2020

Characteristics of people testing positive for the coronavirus (COVID-19) in England from the COVID-19 Infection Survey.

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# 1 . Main points

- In this article, we refer to the number of coronavirus (COVID-19) infections within the community population in England; community in this instance refers to private residential households, and it excludes those in hospitals, care homes or other institutional settings.
- Infections refer to those identified from a positive test for coronavirus (COVID-19) from a swab taken from someone's nose and throat; this means there was evidence that they had the coronavirus when the swab was taken.
- Individuals working outside the home show higher rates of positive swab tests than those who work from home.
- Over the study period, infection rates are higher for those working in patient-facing healthcare or resident-facing social care roles than for people not working in these roles.
- There is some evidence to suggest that infection rates are lower in one- and two-person households than in larger households.
- While those who have symptoms are more likely to test positive than those without symptoms, out of those within our study who have ever tested positive for COVID-19, 33% reported any evidence of symptoms around the time of their positive swab test.
- There is evidence to suggest that infection rates are higher among people who have reported coming into recent contact with a known case of the coronavirus than those who have had no reported contact with potential cases.
- It is too early to say whether COVID-19 infection rates differ between ethnic groups because the number of people testing positive in groups other than the White ethnic group are very small, although antibody test results provide an indication that individuals identifying as White are less likely to have had COVID-19 in the past than non-white ethnic groups.

# 2 . What this analysis covers

This article presents analysis on the characteristics of those testing positive for SARS-CoV-2 – the coronavirus causing the COVID-19 disease – from a nose and throat swab[1], based on findings from the COVID-19 Infection Survey. This is a test for current infection at the time the swab was taken. In this article we use COVID-19 to mean testing positive for SARS-CoV-2, with or without having symptoms.

The analysis primarily looks at the potential risk factors associated with those who have ever tested positive for COVID-19 from a nose and throat swab at any point in the study (26 April to 27 June 2020), even if they now test negative. We have conducted statistical testing to indicate whether there is any evidence of differences in infection rates during for each of the characteristics provided, or whether any variation we see is compatible with chance. Including all those who ever tested positive or never tested positive on nose and throat swabs gives a larger dataset enabling more accurate analysis of risk factors.

The analysis in this article is conducted on individual risk factors and not adjusted to account for other factors meaning estimates are susceptible to confounding. Forthcoming analysis to be published by the study's academic partners will focus on multivariate analysis that will control for other factors. Results presented in a multivariate analysis may differ from those presented in this article.

Over the whole study period, an estimated 0.32% (95% confidence interval: 0.26% to 0.38%) of the 36,061 people providing swab test results have ever tested positive for COVID-19. This estimate is unweighted and therefore not necessarily representative of the wider community population in England. As an unweighted estimate over a different time period, this cannot be compared against the estimates of the number of people who have had COVID-19 in England over time, as presented in our latest bulletin.

The estimates in this article include everyone who has ever tested positive (including many who have now recovered) and this will always be higher than the proportion testing positive in the last 14 days of the study. It is also important to consider that there may be differences in the number of times different population groups are tested. For example, if one group is likely to have fewer follow-up tests than another, they would have a lower probability of ever having a positive on a nose and throat swab test just because they had been tested less often.

### Notes for: What this analysis covers

1. We also present blood test results for infection rates by ethnic groups to give a clearer picture of infection rates for non-White ethnic groups. Further analysis of antibody tests will follow in future articles.

# 3 . Infection rates by age, sex and ethnicity over the study period

There is no evidence of differences in the proportions of males or females testing positive for the coronavirus (COVID-19), based on swab results from those who have ever tested positive over the study period. It is also not possible to say with confidence that there are any differences in infection rates across age groups, while there is currently only limited evidence of differences in the percentage of individuals ever testing positive between people of different ethnic groups, based on the data collected so far from the study.

Figure 1 presents unadjusted estimates of infection rates and confidence intervals for sex, different age bands and different ethnic groups.

### Figure 1: There is no evidence of differences in COVID-19 infection rates over the study period by sex and age bands, and only limited evidence of differences by ethnic groups

Estimated percentage testing positive for the coronavirus (COVID-19) on a swab test, by sex, age bands and ethnic groups, England, 26 April to 27 June 2020

### Notes:

1. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes or other institutional settings.

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## No evidence of differences in infection rates among males and females, or different age bands over the study period

While it may appear from the estimate in Figure 1 that the share of females infected with COVID-19 is slightly higher, statistical testing indicates that there is, in fact, no evidence of differences in the infection rates for males and females over the study and the differences we observe are compatible with chance.

Statistical testing also indicates that there is not enough evidence to say with confidence that community infection rates over the study period differ between age groups. However, when analysing the different infection rates by age, it is important to recognise that community settings do not include people in institutional settings, such as care homes. This is particularly important in understanding the infection rate provided for those aged 70 years or over.

The first results from the Vivaldi study, which covers 9,081 care homes in England providing dementia care and care for older people, suggests that over half of these care homes reported at least one confirmed case of COVID-19 in residents and staff, since the start of the pandemic. Across those care homes where managers reported at least one case of coronavirus, we estimate that 20% of residents in those care homes have tested positive for COVID-19, while 7% of staff tested positive, as reported by care home managers, during the same period.

The latest analysis of COVID-19 related deaths shows that for the year-to-date, for most age groups, there have been more deaths involving COVID-19 in males than in females, although this does not necessarily mean that infection rates will be higher among males. COVID-19 related deaths are more common among older age groups than within younger age groups. Deaths involving COVID-19 are highest among people aged between 80 and 89 years as a percentage of all deaths among people of those ages. It is important to remember that this will include deaths of those residing in settings outside the community, such as care homes and hospitals.

## It is too early to say whether there are differences in infection rates among different ethnic groups over the study period

Our study was established in late April 2020, by which time the pandemic had peaked in England. Other analysis from the ONS, of mortality rates, showed that the impact of the pandemic was more geographically spread in May than in April, when it was highly concentrated in London and other urban areas. It also showed a narrowing of differences between white and other ethnic groups in May compared with the period during March and April. This means that, given the low current overall infection rate in England, sample sizes within individual ethnic groups are low and a rounded picture can be better provided by also looking at results from tests for antibodies on blood samples and the already published information on mortality.

Based on initial data from our study on positive swab tests, it is too early to say whether there are differences in infection rates over the study period between ethnic groups because the number of people testing positive in this survey in groups other than the White ethnic group are very small.

Our initial findings appear to show limited evidence suggesting higher infection rates for those identifying under the “Other ethnic group” category[1] than for those belonging to the White ethnic group, but the confidence intervals are very wide. For the remaining ethnic groups, the limited number of positive cases reported in our study so far means that it is difficult to make conclusions about differences between ethnic groups. As the study progresses and expands, sample sizes will increase and we expect to be able to provide more commentary on the differences in infection rates across ethnic groups.

We have also conducted antibody tests on blood samples taken from a subsample of the COVID-19 Infection Survey respondents. While the swab tests give an indication of COVID-19 infection rates over the course of the study period, the antibody test provides an indication of the overall percentage of the population who have had COVID-19 since the pandemic began.

Initial findings show that those identifying as White are less likely to test positive for antibodies than non-White ethnic groups. When looking as specific ethnic groups, there is some evidence that those identifying as Asian or Asian British are more likely to test positive for antibodies than individuals identifying as White. For the remaining ethnic groups, the limited number of individuals who have evidence of antibodies in our study so far means that it is difficult to make conclusions about differences between ethnic groups, as with the swab test analysis.

Note that we have included the antibody analysis for ethnic groups in this article to give a clearer picture of the patterns of infection for different ethnic groups. Breakdowns of positive antibody tests for other attributes will follow in future articles as more data become available.

Recent analysis of COVID-19 related deaths shows that the mortality rate for those of White ethnic background was generally lower than for other ethnic groups. In particular, the rate of deaths involving COVID-19 for Black males was 3.3 times greater than that for White males of the same age, while the rate for Black females was 2.4 times greater than for White females.

**More about coronavirus**

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

### Notes for: Infection rates by age, sex and ethnicity

1. The “Other ethnic group” category includes those who reported being from the Arab ethnic group.

# 4 . Infection rates among workers over the study period

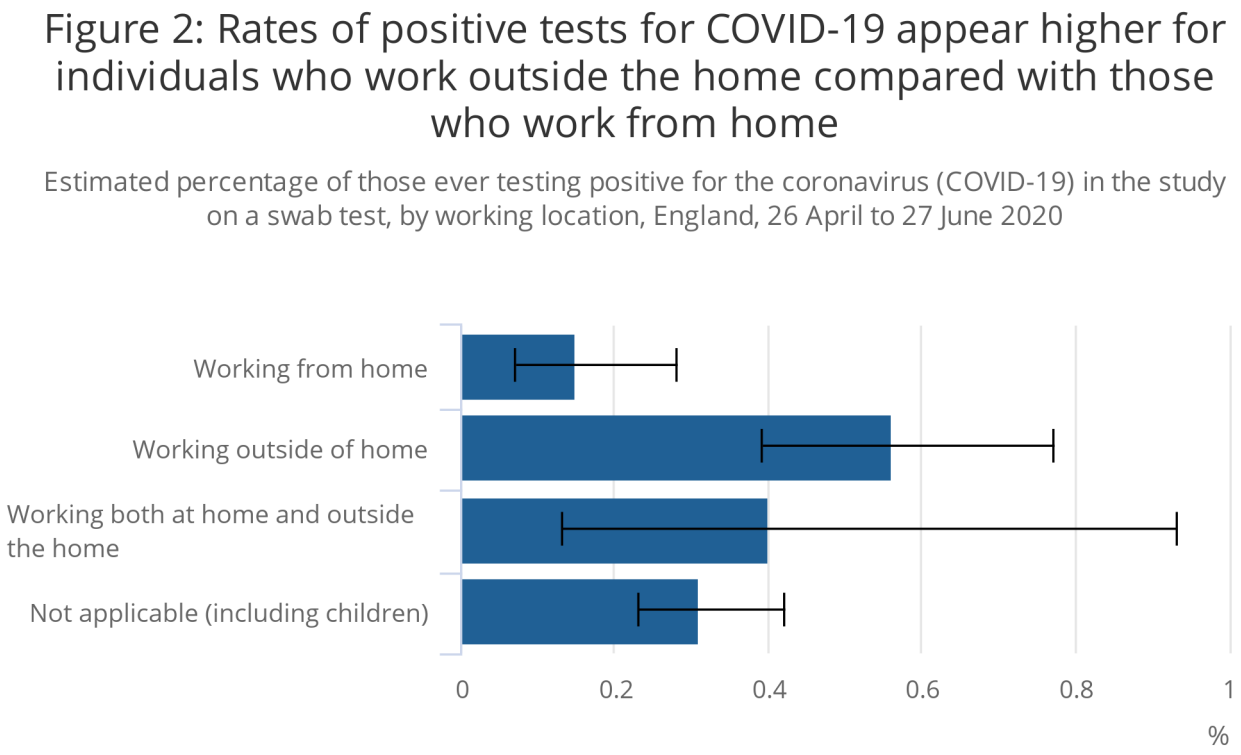
## Infection rates over the study period are lower for home workers than for those working outside of the home

Participants were asked as part of the study to state their working status. They were asked to report whether they were employed or self-employed, furloughed, not working, or were currently a student. In this analysis we compare the working status at the first positive swab test for anyone testing positive in the study and the last negative swab test for anyone who never had a positive test. There is currently no evidence of differences in the percentage of individuals of working age (those aged between 16 and 74 years) testing positive for the coronavirus (COVID-19) based on their working status.

Of those who were in employment, rates of infection for COVID-19 over the study period appear higher for people who reported working outside the home compared with those who were working from home. An estimated 0.56% (95% confidence interval: 0.39% to 0.77%) of individuals who reported working outside of the home tested positive for COVID-19, which was higher than the 0.15% (95% confidence interval: 0.07% to 0.28%) of individuals who reported working at home.

**Figure 2: Rates of positive tests for COVID-19 appear higher for individuals who work outside the home compared with those who work from home**

**Estimated percentage of those ever testing positive for the coronavirus (COVID-19) in the study on a swab test, by working location, England, 26 April to 27 June 2020**




**Source: Office for National Statistics - COVID-19 Infection Survey**

**Notes:**

1. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes or other institutional settings.

2. The ‘not applicable’ category applied to over half the respondents, and includes children, as well as some people who are retired, furloughed, or not working for another reason.

Within our study, a small number of people reported working both in the home and outside the home. Given the low number of positive cases among this category, the uncertainty of the estimated infection rate over the study period for these workers is high. Individuals of working age, who were furloughed, not working students, or not working for another reason were reported as “not applicable”.

Analysis of home working shows that around 5.1% of people (1.7 million) in the UK reported working mainly from home in 2019. This is expected to be substantially higher for 2020, following the onset of the COVID-19 pandemic. In general, those in higher-skilled occupations tended to be most likely to work from home.

Nearly 80% of those who worked from home were working as managers, directors and senior officials, in professional occupations or in associate professional and technical occupations, yet these groups constitute less than 50% of total employment. The latest analysis from the Opinions and Lifestyle Survey shows that almost 3 in 10 working adults interviewed between 25 June and 28 June 2020 said they had worked exclusively at home in the past seven days. This figure has fallen in recent weeks, and there has been an increase in the number of people travelling to work.

A separate analysis shows that 14% of those identified as key workers, based on definitions from UK government guidance, said they worked from home at least one full day in the week in 2019. In comparison, 20% of non-key workers reported working from home. This may suggest that key workers are less able to work from home, although more key workers than this may have been able to work from home if necessary.

## Infection rates are higher among patient- and resident-facing health and social care roles than other occupations over the study period

Our study shows that those working in patient-facing healthcare or resident-facing social care roles[1] are more likely to be infected by COVID-19 over the study period than those not working in these roles. This includes NHS professionals, such as nurses and doctors, as well as social care workers, such as nursing home or home care workers, and social workers. These roles fall across several occupation categories, but are mostly associated with professional occupations and occupations in care, leisure and services.

Of those in our study who reported working in patient-facing healthcare or resident-facing social care roles, 1.58% tested positive for COVID-19 on a swab test during the study period (95% confidence interval: 0.99% to 2.38%). By comparison, the percentage of people reporting not working in these types of roles testing positive for COVID-19 on a swab test was lower at 0.27% (95% confidence interval: 0.21% to 0.34%).

Health and social care roles are one of a number of occupations classed as key workers. The latest analysis shows that nearly one in every three key workers are employed in a health or social care role, making this the most common key worker group, although not all of these roles will be patient- or resident-facing.

### Figure 3: No evidence of differences in infection rates over the study period across occupation groups, but higher infection rates among patient- and resident-facing roles in health and social care than in other roles

Estimated percentage of those ever testing positive for coronavirus (COVID-19) in the study on a swab test, by working status, Standard Occupational Classification and healthcare and social care workers and other individuals, England, 26 April to 27 June 2020

### Notes:

1. We asked individuals to self-report whether they worked in patient-facing healthcare or resident-facing social care; where that information was missing or uncertain, we used the other information they gave us about their occupation.

Download the data

While we can say infection rates are higher among those working in patient- or resident-facing health and social care roles, initial investigations into differences in infection rates across major occupation groups show no evidence of difference between groups. The limited number of positive cases reported for some occupation groups in our study so far means that it is difficult to make conclusions about differences between occupations. These estimates only include the working age population (those aged between 16 and 74 years old).

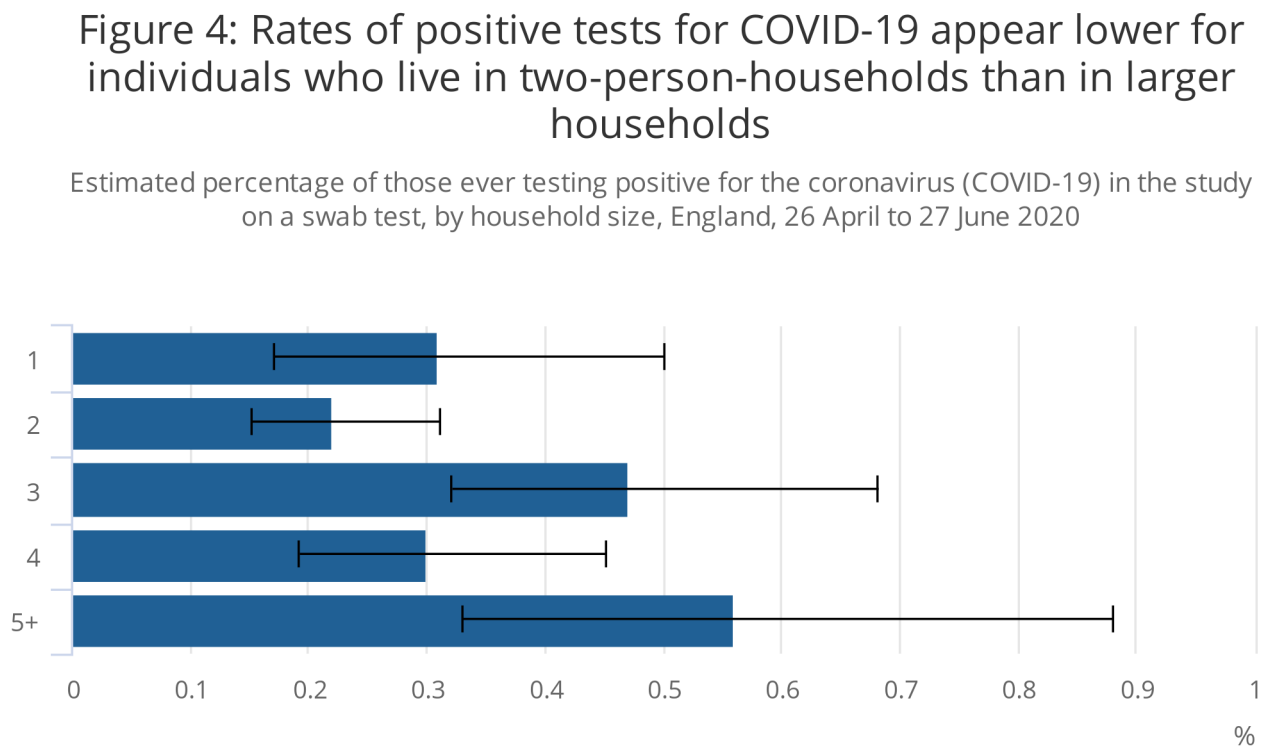
# 5 . Infection rates by household size over the study period

## Some evidence to suggest that infection rates are lower for those living in households of fewer people

There is some evidence to suggest that household size affects the proportion of individuals testing positive for the coronavirus (COVID-19) on swab test. There is evidence to suggest that infection rates over the study period among those living in two-person households are lower than infection rates among those living in larger households.

**Figure 4: Rates of positive tests for COVID-19 appear lower for individuals who live in two-person-households than in larger households**

**Estimated percentage of those ever testing positive for the coronavirus (COVID-19) in the study on a swab test, by household size, England, 26 April to 27 June 2020**




**Source: Office for National Statistics - COVID-19 Infection Survey**

**Notes:**

1. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes or other institutional settings.

There are many factors that could drive differences in the number of people ever testing positive for COVID-19 on a swab test by household size, including secondary transmission of infection within households, different household structures and households having different contact patterns with people outside of the household.

# 6 . Infection rates by symptoms of COVID-19 over the study period

## Infection rates are higher for those reporting evidence of symptoms of COVID-19

Individuals taking part in the Coronavirus (COVID-19) Infection Survey were asked whether they had experienced a range of possible symptoms[1] on the day that they were tested[2] and also separately whether they felt that they had symptoms compatible with COVID-19 infection. In this analysis we compare these factors at the first positive swab test for anyone testing positive in the study and the last negative swab test for anyone who never had a positive test.

Of those reporting any evidence of symptoms of COVID-19 from either question, 4.32% (95% confidence interval: 2.87% to 6.22%) were tested positive on a swab test. By comparison, the infection rate for those not reporting any symptoms was much lower at 0.25% (95% confidence interval: 0.20% to 0.31%).

When narrowing down to those reporting specifically having a cough or fever, or loss of taste or smell on the day of testing, 10.13% (95% confidence interval: 5.90% to 15.92%) tested positive for COVID-19. This compares with an estimate of 0.28% of those who did not report having these specific symptoms on the day of their positive test (95% confidence interval: 0.22% to 0.34%).

### Figure 5: Rates of positive tests appear higher for people exhibiting one or more symptoms of COVID-19 at the time of the swab test compared with those reporting no symptoms

Estimated percentage of those ever testing positive for the coronavirus (COVID-19) in the study on a swab test, by symptoms reported, England, 26 April to 27 June 2020

**Notes:**

1. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes or other institutional settings.

Download the data

## Only around one-third of individuals testing positive for COVID-19 on a swab test reported having symptoms

The analysis of those reporting evidence of symptoms appears to show that those reporting symptoms are much more likely to have contracted the virus. However, additional analysis shows that, of those who tested positive, only 33% (95% confidence interval: 25% to 43%) reported any evidence of symptoms at the time of their swab test or at either the preceding or subsequent swab test. The share fell to 22% of those testing positive when accounting for those who reported evidence of symptoms only at the time of their swab test.

The remaining 67% of positive cases either did not report having any of the specific or general symptoms on the day of their positive swab test, preceding swab test or subsequent swab test, or did not answer both questions. While this suggests there is a potentially large number of asymptomatic cases, it is important to note that symptoms were self-reported rather than professionally diagnosed, and those without any evidence of symptoms will include instances where the questions relating to symptoms were not answered.

This analysis is based on 115 individuals in the sample who tested positive for COVID-19. This is a very small denominator, meaning the confidence intervals are wide. Additionally, with such a small number of cases included in this analysis, if any of these are false positives this would have a large effect on the results.

### Notes for: Infection rates by symptoms of COVID-19

1. The symptoms respondents were asked to report are: fever, muscle ache (myalgia), fatigue (weakness or tiredness), sore throat, cough, shortness of breath, headache, nausea/vomiting, abdominal pain, diarrhoea, loss of taste or loss of smell.

2. Here we compare symptoms from the first time a person tested positive, or from their most recent test if they have never tested positive in the study.

# 7 . Infection rates over the study period among those who had contact with others

## Individuals coming into recent contact with people suspected of having COVID-19 are much more likely to test positive for COVID-19 than those with no contact with suspected cases

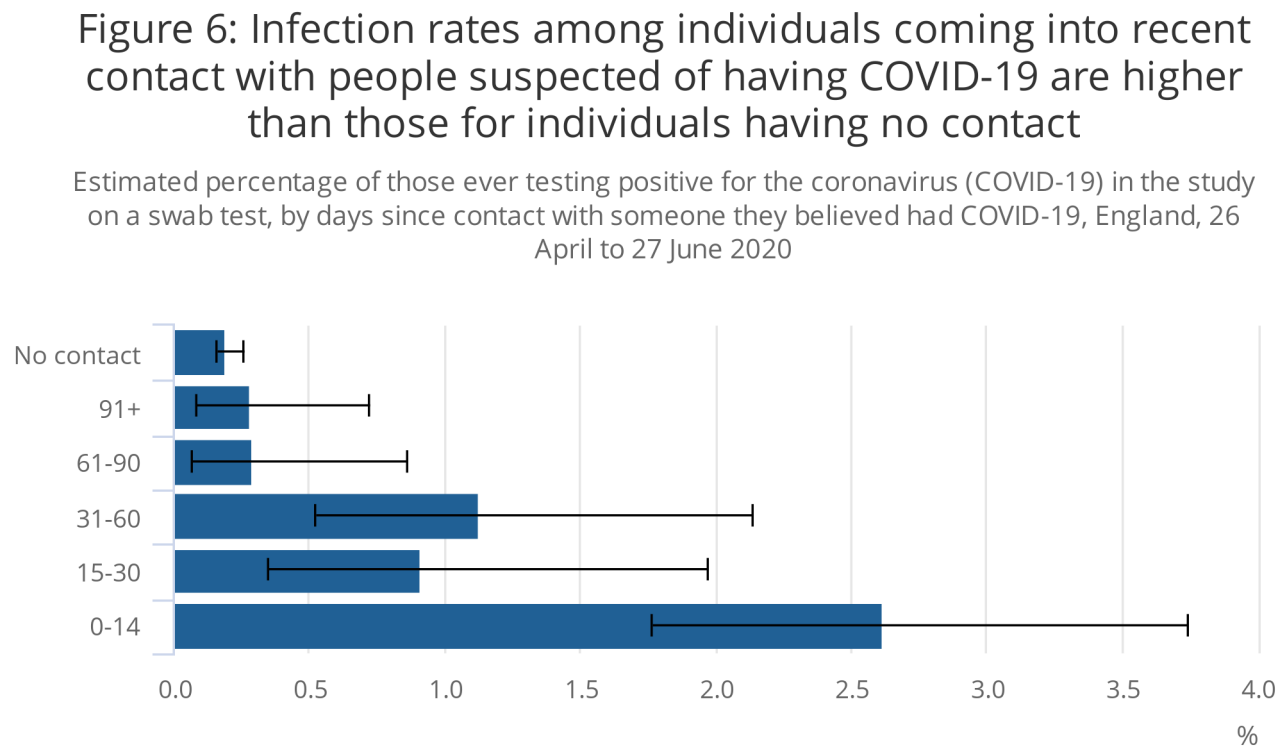
Individuals within our study were asked to report if they have had any contact with either a known or suspected case of COVID-19 and when this was. Individuals who have come into recent contact with a known or suspected case (contact within the last 14 days) are more likely to have a positive swab test than those who reported not ever coming into contact with a known or suspected case.

Those who have reported contact with a known or suspected case in the last 15 to 60 days also appear to have a higher likelihood of testing positive than those who reported not ever coming into contact, although to a lesser extent than those coming into recent contact.

An estimated 2.62% (95% confidence interval: 1.76% to 3.74%) of individuals who have reported coming into contact with a known or suspected case of COVID-19 were positive themselves on a swab test. By comparison, only 0.19% (95% confidence interval: 0.15% to 0.25%) of those who had no reported contact at all with a known or suspected case of COVID-19 were positive themselves on a swab test.

**Figure 6: Infection rates among individuals coming into recent contact with people suspected of having COVID-19 are higher than those for individuals having no contact**

**Estimated percentage of those ever testing positive for the coronavirus (COVID-19) in the study on a swab test, by days since contact with someone they believed had COVID-19, England, 26 April to 27 June 2020**




**Source: Office for National Statistics - COVID-19 Infection Survey**

**Notes:**

1. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes or other institutional settings.

People are more likely to come into contact with others when leaving the home. The latest analysis from the Opinions and Lifestyle Survey (OPN) shows that of those asked between 25 June and 28 June 2020, around 4 in 10 adults in Great Britain either stayed at home or only left home for work, exercise, essential shopping or medical needs in the previous seven days. This was down from more than 7 in 10 adults around one month earlier, between 21 May and 24 May 2020. The latest OPN analysis also shows that over one-quarter of people who had left their home in the most recent week did so to meet with people in a personal place, such as visiting family and friends at home.

# 8 . Coronavirus (COVID-19) infections in the community in England data

COVID-19 infections in the community in England Dataset | Released 7 July 2020 Characteristics of people testing positive for COVID-19 taken from the COVID-19 Infection Survey.

# 9 . COVID-19 Infection Survey methodology Collaboration

## Collaboration

The Coronavirus (COVID-19) Infection Survey analysis was produced by the Office for National Statistics (ONS) in partnership with the University of Oxford, the University of Manchester, Public Health England and Wellcome Trust.

## Data collection and analysis

Our methodology article provides further information around the survey design, how we process data, and how data are analysed. The study protocol (PDF, 1.14MB) specifies the research for the study.

Pairwise statistical testing was conducted to determine whether there was a significant difference in infection rates between pairs of groups for each characteristic. For instance, to identify any evidence of differences in infection rates between those aged 2 to 11 years and those aged 12 to 19 years. Fisher's exact test was used to determine whether the differences were compatible with chance given the numbers sampled. More information on the statistical testing we conducted is available in our methodology article.

Users may conduct post-hoc adjustment of these unadjusted p-values, found in the datasets accompanying this article, using a method of their choice, based on whichever family of tests is relevant to their analysis. Throughout this release, p-values less than 0.001, 0.01 and 0.05 are considered to provide relatively strong, moderate, and weak evidence of difference between the groups being compared. Comparisons may also have been commented on with higher p-values if the analysis is of known interest to users.

# 10 . Related links

Coronavirus (COVID-19) Infection Survey pilot
Statistical bulletin | Updated weekly
Initial data from the COVID-19 Infection Survey. This survey is being delivered in partnership with IQVIA, Oxford University and UK Biocentre.

Coronavirus (COVID-19) latest data and analysis
Methods article | Updated 6 July 2020
Information on the methods used to collect the data, process it, and calculate the statistics produced from the COVID-19 Infection Survey (pilot).

COVID-19 Infection Survey (CIS)
Article | Updated 14 May 2020
Whether you have been invited to take part, or are just curious, find out more about our COVID-19 Infection Survey and what is involved.

Coronavirus (COVID-19) roundup
Blog | Updated as and when data become available
Catch up on the latest data and analysis related to the COVID-19 pandemic and its impact on our economy and society.