

Analysis of deaths involving coronavirus (COVID-19) in Scotland, by ethnic group

Data up to 14 June 2020

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This report uses linked records from death registrations and Scotland's Census 2011 to look at the likelihood that deaths involved COVID-19, and whether this differs by ethnic group in Scotland.

1. Key Findings

This analysis is based on data for all deaths in Scotland, occurring on or after 12th March 2020 and registered by 14th June 2020, and uses odds ratios to look at whether the likelihood of a death involving COVID-19 differs by ethnic group:

- The data on deaths during this period shows that deaths amongst people in the South Asian¹ ethnic group were almost twice as likely to involve COVID-19 as deaths in the White ethnic group, after accounting for age group, sex, area-level deprivation and urban rural classification.
- We do not have sufficient evidence to say that deaths among people in the Chinese ethnic group were more likely to involve COVID-19.
- Due to the low number of completed records for deaths involving COVID-19 in other minority ethnic groups, it was not possible to carry out valid analysis of the relative likelihood that deaths involved COVID-19.

2. Background

Although the death registration process is statutory, ethnicity information about the deceased person is collected by registrars on a voluntary basis. In May 2020, [NRS published a note](#) on the limitations of the ethnicity information collected through the death registration process. Ethnicity was not recorded for 8.9% of deaths involving COVID-19 registered up to 26th April 2020. This meant that accurate analysis of COVID-19 deaths by ethnicity could not be carried out using death registration data alone.

To make analysis by ethnicity possible, death records were linked to 2011 Census records. This allowed census data on self-reported ethnicity to be used, and reduced the number of records with no ethnicity data substantially – from 8.4% to 1.3% for deaths involving COVID-19 and from 7.0% to 1.4% for other deaths. More details on the linkage process can be found in the [Methodology Note](#) published alongside this report.

¹ Please see Table 2 in Section 3 (Data and definitions used in this report) for a full list of the ethnicity categories included in this group.

3. Data and definitions used in this report

The analysis in this report uses data for deaths in Scotland which occurred on or after 12th March 2020, and were registered by 14th June 2020. Deaths which 'involved COVID-19' are deaths where COVID-19 was mentioned on the death certificate by the doctor who certified the death. This includes cases where the doctor noted that there was suspected or probable coronavirus infection involved in the death. This is the same definition used in the [official statistics on deaths involving COVID-19](#) published by NRS. Table 1 provides a breakdown of deaths by ethnicity.

Table 1 – Deaths by COVID-19 involvement and ethnicity, Scotland, occurring on or after 12 March and registered by 14 June 2020

Ethnicity category	Deaths involving COVID-19	Other deaths	Total
White Scottish	3,606	12,720	16,326
White Other British	267	1,161	1,428
White Irish	54	145	199
White Gypsy / Traveller	0	8	8
White Polish	3	37	40
Other White ethnic group	31	134	165
Mixed or Multiple ethnic groups	6	12	18
Pakistani, Pakistani Scottish or Pakistani British	23	46	69
Indian, Indian Scottish or Indian British	10	22	32
Bangladeshi, Bangladeshi Scottish or Bangladeshi British	1	2	3
Chinese, Chinese Scottish or Chinese British	9	21	30
Other Asian	6	16	22
African, African Scottish or African British	0	10	10
Other African	0	0	0
Caribbean, Caribbean Scottish or Caribbean British	0	8	8
Black, Black Scottish or Black British	0	3	3
Other Caribbean or Black	0	0	0
Arab, Arab Scottish or Arab British	0	5	5
Other ethnic group	1	7	8
Not provided	53	203	256
Total	4,070	14,560	18,630

Source: National Records of Scotland, data on death registrations linked to Scotland's Census 2011

Notes:

1. Self-reported ethnicity from the 2011 Census was used where available, otherwise ethnicity recorded through the death registration process was used.

Table 1 shows that, based on the available data, the number of COVID-19 deaths recorded in many ethnicity categories was zero or close to zero. It was possible to group some ethnicity categories together into broader ethnic groups to allow valid

analysis on the likelihood of deaths involving COVID-19 to be carried out. However, for some categories it was not possible to carry out further analysis.

Table 2 shows the ethnic groups used for further analysis and the ethnicity categories included in each. Decisions on the ethnic groups used were guided by the available data. More information is provided in the accompanying [Methodology Note](#).

Table 2 – Ethnic groups used for further analysis

Ethnic group	Ethnicity categories included
Chinese	Chinese, Chinese Scottish or Chinese British
South Asian	Bangladeshi, Bangladeshi Scottish or Bangladeshi British; Indian, Indian Scottish or Indian British; Pakistani, Pakistani Scottish or Pakistani British
White	White Scottish; White Other British; White Irish; White Gypsy/Traveller; White Polish; Other White ethnic group

Source: National Records of Scotland

4. Analysis of deaths involving COVID-19, adjusting for socio-demographic factors

The analysis in this section uses a binary logistic regression model to look for evidence of differences between ethnic groups in the likelihood that deaths involved COVID-19. The model uses information on age group, sex, area-level deprivation², and whether a person lived in an urban or rural area³. These were all found to be significant explanatory factors in the likelihood that a death involved COVID-19. This is consistent with [NRS figures on COVID-19 mortality rates](#), which show higher mortality rates among older people, males, people who live in deprived areas, and people who live in urban areas. More information on the model is provided in the [Methodology Note](#) published alongside this report.

The results are presented as odds ratios. An odds ratio higher than one for a given ethnic group indicates that deaths were more likely to involve COVID-19, compared to the White ethnic group (the reference group). An odds ratio less than one indicates that deaths were less likely to involve COVID-19.

Table 3 shows the odds ratios for the likelihood that deaths in the South Asian and Chinese ethnic groups involved COVID-19, compared to the White ethnic group. The confidence intervals illustrate the range of values over which we are confident the true value of the odds ratio lies. If the confidence interval includes the value one, then there is not significant evidence to conclude that the likelihood of deaths involving COVID-19 is different to the White ethnic group.

**Table 3 – Relative likelihood that deaths involved COVID-19 by ethnic group, Scotland, deaths occurring on or after 12 March and registered by 14 June 2020
Odds ratios and associated confidence interval**

Ethnic group	Odds ratio	Wald 95% Confidence Interval
South Asian	1.9	[1.3, 2.9]
Chinese	1.7	[0.8, 3.7]

Source: National Records of Scotland, data on death registrations linked to Scotland's Census 2011
Notes:

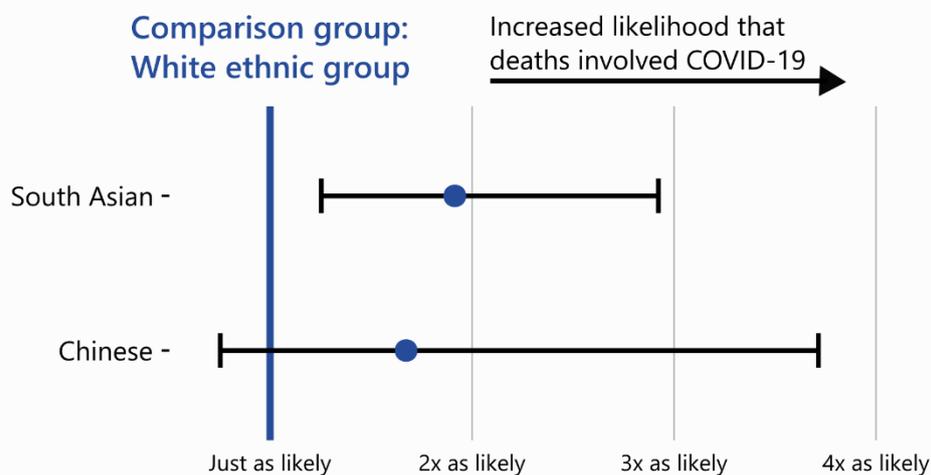
1. Self-reported ethnicity from the 2011 Census was used where available, otherwise ethnicity recorded through the death registration process was used.
2. Odds ratios were obtained by fitting a binary logistic regression model with explanatory variables: Ethnic group, Age group, Sex, Urban rural classification (2-fold), and SIMD 2020 quintile.

² Scottish Index of Multiple Deprivation (SIMD 2020) quintile.

³ Urban rural classification (2-Fold) was used, according to which Data Zones are classified as either 'Urban' or 'Rural'.

Figure 1 provides an illustration of the results. The horizontal lines on either side of each point represent the 95% confidence interval around the odds ratio estimate.

Figure 1 – Relative likelihood that deaths involved COVID-19 by ethnic group, Scotland, deaths occurring on or after 12 March and registered by 14 June 2020



likelihood that deaths involved Covid-19 compared to White ethnic group

Source: National Records of Scotland, data on death registrations linked to Scotland's Census 2011
Notes:

1. Self-reported ethnicity from the 2011 Census was used where available, otherwise ethnicity recorded through the death registration process was used.
2. Odds ratios were obtained by fitting a binary logistic regression model with explanatory variables: Ethnic group, Age group, Sex, Urban rural classification (2-fold), and SIMD 2020 quintile.
3. Horizontal lines represent 95% confidence intervals.

Deaths in the South Asian ethnic group

The odds ratio of 1.9 for the South Asian ethnic group shows that, after accounting for age group, sex, area deprivation and urban rural classification, deaths in the South Asian ethnic group were more likely to involve COVID-19 than deaths in the White ethnic group.

Because the model used to produce this estimate includes information on age, sex, area deprivation and urban rural classification, the difference observed between the South Asian and White ethnic groups cannot be explained by those factors. It may be explained by other factors not included in the model, however, such as health factors or occupation. Further information on the model and the data used is provided in the Strengths and Limitations section and the [Methodology Note](#).

Deaths in the Chinese ethnic group

Although the model also produced an odds ratio higher than one for the Chinese ethnic group, suggesting that deaths were more likely to involve COVID-19, there was more uncertainty around the estimate for this group. This is illustrated in Figure 1 by the horizontal lines: the 95% confidence interval for the Chinese ethnic group is wider than for the South Asian ethnic group. The fact that an odds ratio of one (indicating no

difference) is within the 95% confidence interval for the Chinese ethnic group means we do not have sufficient evidence to say that that deaths were more likely to involve COVID-19.

Deaths in other ethnic groups

It was not possible to carry out analysis on the relative likelihood that deaths in any other minority ethnic group involved COVID-19, due to the number of completed records for deaths involving COVID-19 in these groups.

Conclusions

The results show that, over the course of the pandemic to date, COVID-19 was a relatively more common cause of death for people in the South Asian ethnic group, compared to people in the White ethnic group.

It is important to note that this analysis does not say that relatively more people across Scotland in the South Asian ethnic group have died from COVID-19, but rather that, if a person in the South Asian ethnic group died during the pandemic, it is more likely to be COVID-19 related than is the case for those in the White ethnic group.

The underlying death rate across the population may differ between ethnic groups and it has not been possible to account for this in the analysis. Further information is provided in the Strengths and Limitations, and Other Evidence on Ethnicity and COVID-19 sections of this report.

5. Other Evidence on Ethnicity and COVID-19

Ethnicity and COVID-19

[Analysis released by the Office for National Statistics \(ONS\) in May](#) used linked census and death records to look at differences in the relative risk of dying from COVID-19 by ethnicity in England and Wales. The ONS found that, after accounting for age, people in the Black ethnic group were over 4 times more likely to die from COVID-19 than people in the White ethnic group. There were also higher risks for people in the South Asian and Mixed ethnic groups. Once socio-demographic and health factors were accounted for, the relative risk for these population groups dropped to 1.6 – 1.9 times the risk for the White ethnic group, suggesting that socio-demographic and health factors explained some but not all of the difference in risk.

The NRS analysis is broadly similar in nature but is not directly comparable. The definition of deaths involving COVID-19 is the same, and both analyses were based on a dataset created by linking death registration records and census information. The key difference, however, is that due to the smaller ethnic minority population in Scotland it was not possible to use population-based measures or apply adjustment factors. The NRS analysis measures COVID-19 deaths relative to deaths from other causes in each ethnic group, rather than relative to the underlying population in each ethnic group. More information is provided in the Strengths and Limitations section.

[Public Health England \(PHE\) published analysis in June](#) which showed death rates from COVID-19 were highest among people in the Black and Asian ethnic groups. An analysis of survival among confirmed COVID-19 cases showed that after accounting for the effect of sex, age, deprivation and region, people of Bangladeshi ethnicity had around twice the risk of death of people of White British ethnicity. People of Chinese, Indian, Pakistani, Other Asian, Caribbean and Other Black ethnicity had between 10% and 50% higher risk of death when compared to people of White British ethnicity.

[A study published by the International Severe Acute Respiratory and emerging Infections Consortium \(ISARIC\)](#) in June looked at data from hospital patients in Scotland, England and Wales. People in minority ethnic groups in hospital with COVID-19 were more likely to be admitted to critical care and receive invasive mechanical ventilation than people in the White ethnic group, despite similar disease severity on admission, similar duration of symptoms, and being younger with fewer comorbidities. People in the South Asian ethnic group were found to be at greater risk of dying, due at least in part to a higher prevalence of pre-existing diabetes.

[Public Health Scotland \(PHS\) published analysis in May](#) which looked at whether there was an association between ethnicity and outcomes for confirmed COVID-19 cases in Scotland. PHS acknowledged that the data available for analysis was incomplete, with around half of confirmed COVID-19 cases excluded due to a lack of ethnicity data. The conclusion, based on the available data, was that there was not sufficient evidence to suggest that the relative risk of hospitalisation, ICU admission or death was higher for minority ethnic groups.

The key difference between the PHS analysis and the NRS findings presented in this report is the data source used. The NRS analysis uses data from death records and

the 2011 Census. This means the scope of the analysis is limited to deaths but the completeness of the ethnicity information was high (98%). The PHS analysis used hospital data which allowed a range of health outcomes to be considered, however, the completeness of the ethnicity information was lower (around 50%).

Other differences include the time period covered by the analysis and how cases involving COVID-19 were identified. NRS used death registration records to identify deaths where COVID-19 was involved. PHS focussed on individuals with a confirmed positive test result for COVID-19.

Ethnicity and inequalities

The Scottish Government has published analysis of [inequalities by ethnicity in the context of COVID-19](#), including data on deprivation, poverty, housing and health.

Ethnicity, death rates and life expectancy

A [study comparing death rates of people in Scotland during 2001-2013](#) found that both males and females in most minority ethnic groups had relatively lower death rates than the White Scottish population, even when age differences were accounted for. The difference was greater for people from minority ethnic groups who were born overseas than for those born in the UK.

A [study of life expectancy of different ethnic groups in Scotland](#) found that males and females in most of the larger minority ethnic groups have longer life expectancies than the White Scottish population.

6. Strengths and Limitations

Strengths

Combining data from two sources meant that the ethnicity information on the linked dataset was relatively complete (98.6% of records). The success rate for the linkage of death records to the 2011 Census was high and self-reported ethnicity information was used in the majority of cases (82.0% of records). Ethnicity information collected through the death registration process was used if a death record could not be linked to the census (16.6% of records). In a small number of cases, no ethnicity information was available from either source (1.4% of records). Where no ethnicity information was available, the record was excluded from further analysis.

Limitations

Minority ethnic groups account for a relatively small percentage of the population in Scotland. Analysis of the Scottish Surveys Core Questions dataset shows that at least 4.6% of the adult population of Scotland were from minority ethnic groups in 2018 (this percentage does not include minority ethnicity categories from within the White ethnic group). This limits the analysis of COVID-19 deaths in this report in several ways:

Level of detail - For many ethnicity categories, the number of COVID-19 deaths recorded in the available data does not allow valid statistical analysis to be carried out.

Uncertainty - Even where it is possible to carry out statistical analysis, a relatively low number of deaths in an ethnic group will result in relatively wide confidence intervals around the odds ratio estimate, which may then include the value one. This means we might not be able to detect significant differences in the likelihood of a given death involving COVID-19, making it difficult to draw robust conclusions.

Population-based mortality measures - We were unable to calculate underlying death rates or the relative risk of dying from COVID-19 for each ethnic group. These measures require robust, up-to-date population estimates for each ethnic group, by age and sex. The 2011 Census provides suitably robust and detailed breakdowns but these are now around nine years old. In 2011, at least 3.6% of the adult population were from minority ethnic groups. The Scottish Surveys Core Questions dataset shows that this percentage had increased to at least 4.6% in 2018. The Scottish Surveys Core Questions dataset cannot, however, provide sufficiently robust estimates for the population in each ethnic group when broken down by age and sex.

Adjustment factors for migration - We were unable to create age-specific adjustment factors for migration by ethnic group. We explored using the International Passenger Survey (IPS) but robust breakdowns by ethnicity and age group are not available for Scotland. We also explored using the National Health Service Central Register (NHSCR) to capture unobserved migration through de-registration of patients but found that the results at broad ethnic group level were inconsistent with the Scottish Surveys Core Questions dataset estimates.

In the absence of suitable data to calculate population-based mortality measures and adjustment factors for ethnic groups, we restricted our analysis to people who had died

during the pandemic and looked at the relative likelihood that deaths involved COVID-19 by ethnic group. We also limited the variables considered for inclusion in our model to those available on death registration records to avoid biases which might be introduced by including census variables where we had no information for people who entered the country after 2011. The only exception was ethnic group, which could be included in the model because the majority of the missing information could be provided from death registration records.

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