Office for National Statistics

Article

# Updated estimates of coronavirus (COVID-19) related deaths by disability status, England: 24 January to 20 November 2020

Estimates of differences in COVID-19 mortality risk by self-reported disability status and diagnosed learning disability status for deaths occurring up to 20 November 2020, using linked data from the 2011 Census, death registrations, and primary care and hospital records.

## Notice

**10 March 2021**

In the article, technical appendix and dataset for this release, we previously stated that clinical variables used in the study were derived from 10 years of patient records, but only five years of records were actually used. This error has now been corrected.

We apologise for any inconvenience caused.

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# 1 . Main points

- Between 24 January and 20 November 2020 in England, the risk of death involving the coronavirus (COVID-19) was 3.1 times greater for more-disabled men and 1.9 times greater for less-disabled men, compared with non-disabled men; among women, the risk of death was 3.5 times greater for more-disabled women and 2.0 times greater for less-disabled women, compared with non-disabled women.

- Disability status was self-reported as collected in the 2011 Census; those who said in the Census that their day-to-day activities were "limited a little" or "limited a lot" are referred to here as "less-disabled" and "more-disabled" respectively, whereas people reporting no limitation to their activities are referred to as "non-disabled".

- After using statistical models to adjust for personal and household characteristics, including residence type, geography, demographic and socio-economic factors, and pre-existing health conditions, a smaller but statistically significantly raised risk of death remained unexplained for more-disabled and less-disabled women (1.4 and 1.2 times respectively) and more-disabled men (1.1 times) but not for less-disabled men.

- This means that no single factor explains the considerably raised risk of death involving COVID-19 among disabled people, and place of residence, socio-economic and geographical circumstances, and pre-existing health conditions all play a part; an important part of the raised risk is because disabled people are disproportionately exposed to a range of generally disadvantageous circumstances compared with non-disabled people.

- Looking at people with a medically diagnosed learning disability, the risk of death involving COVID-19 was 3.7 times greater for both men and women compared with people who did not have a learning disability; after using statistical models to adjust for a range of factors, a raised risk of 1.7 times remained unexplained for both sexes.

- All the socio-economic and geographical circumstances and pre-existing health conditions considered made some difference to the risk for people with learning disabilities, but the largest effect was associated with living in a care home or other communal establishment.

- Patterns in excess COVID-19 mortality risk experienced by disabled people remained largely unchanged between the first and second waves of the pandemic.

In this article, learning disability is based on a clinical diagnosis by a medical practitioner, whereas disability was defined based on responses to a question on the 2011 Census, which will vary according to individuals' own interpretations and experiences. Consequently, it is not possible to make direct comparisons between the estimates of COVID-19 mortality for people with a learning disability and disabled people according to the 2011 Census reported in this article. In addition, rates reported in this release should not be compared with those published elsewhere; our analysis is based on 30- to 100-year-olds and we have not adjusted to allow for comparisons with annual mortality rates.

# 2 . Overview of COVID-19 related deaths by disability status

The Office for National Statistics (ONS) previously published [analysis of deaths involving the coronavirus (COVID-19) by self-reported disability status until 14 July 2020](#). The previous release used linkage of death registrations to the 2011 Census to take account of demographic, socio-economic and geographic characteristics also associated with risk of COVID-19 infection and death. In this article, we extend the analysis to include deaths involving COVID-19 by self-reported disability status (from the 2011 Census) and by learning disability status (from primary care records) for deaths that occurred between 24 January ([the date when the first COVID-19 case was reported in the UK](#)) and 20 November 2020, which were registered by the end of 2020.

The study population consisted of people aged 30 to 100 years in England who were alive on 24 January 2020, who could be linked to the 2011 Census and primary care records for current NHS patients. We excluded people aged younger than 30 years because their living circumstances are likely to have changed since the 2011 Census. People living in both private households and communal establishments (such as care homes) in the 2011 Census were included in the analysis. Care home residence status was updated using the NHS Patient Register 2019 for people who were recorded as living in a private household in the 2011 Census but had subsequently moved into a care home.

We added to the previous findings by using statistical models to investigate the extent to which the raised risk of death involving COVID-19 found in disabled people (relative to non-disabled people) and people with a learning disability (relative to people with no learning disability) is explained by comorbidities (pre-existing health conditions), by linkage to hospital records from April 2017 and primary care records from January 2015. We also compared the risk of death involving COVID-19 by self-reported disability status and learning disability status in the first and second waves of the pandemic, after adjusting for place of residence, geography, socio-economic and demographic factors, and comorbidities. Deaths occurring from 12 September 2020 onwards were considered to be in the second wave.

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# 3 . Age-standardised rates of death involving COVID-19 by self-reported disability status

Disabled people were identified based on their disability status as reported in the 2011 Census, with a distinction between those who reported that their day-to-day activities were "limited a little" and "limited a lot" as a result of a long-term health condition. These two categories are referred to here as "less-disabled" and "more-disabled" respectively, whereas people reporting no limitation to their activities are referred to as "non-disabled". The distinction between less-disabled and more-disabled is based solely on 2011 Census data and not inferred from any other information. Therefore, it only implies a difference based on self-reported activity restrictions.

Disabled people made up 6 in 10 (59.5%) of all deaths involving the coronavirus (COVID-19) for the period to 20 November 2020 (30,296 of 50,888 deaths). For comparison, disabled people made up 17.2% of the study population, therefore suggesting that disabled people have been disproportionately impacted by the COVID-19 pandemic. See the datasets for detailed breakdowns of counts of deaths.

Age-standardised mortality rates (ASMRs) allow populations with different age structures to be compared fairly. Disability is more common in older populations; therefore, it is important to adjust for population age structure in this way.

Age-standardised rates of death involving COVID-19 among both males and females aged between 30 and 100 years, per 100,000 of the population at risk, show that individuals who were disabled in 2011 had a statistically significantly higher rate of death involving COVID-19 in the period to 20 November 2020 than those who were non-disabled (Table 1). Furthermore, more-disabled people had a statistically significantly higher rate of death involving COVID-19 than less-disabled people.

More-disabled males had a mortality rate of 469.6 per 100,000, 3.2 times the rate in non-disabled males, which was 148.5 per 100,000. More-disabled females had a mortality rate of 313.1 per 100,000, 4.1 times the rate in non-disabled females, which was 77.1 per 100,000. For less-disabled people, the mortality rate was 1.8 times that of non-disabled men and 2.0 times that of non-disabled women.

Therefore, although the mortality rate in males was higher than in females for both disabled and non-disabled people, the relative increase in risk of death for disabled females compared with non-disabled females was greater than that for disabled males. This was true for both more- and less-disabled people.

Table 1: Age-standardised mortality rates for deaths involving COVID-19 per 100,000 population with 95% confidence intervals by sex and self-reported disability status, England: 24 January to 20 November 2020

| Disability status | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Rate | Lower 95% confidence limit | Upper 95% confidence limit | Rate | Lower 95% confidence limit | Upper 95% confidence limit |
| **More-disabled (limited a lot)** | 469.6 | 457.9 | 481.4 | 313.1 | 304.2 | 321.9 |
| **Less-disabled (limited a little)** | 270.7 | 263.8 | 277.6 | 152.8 | 148.3 | 157.3 |
| **Non-disabled (not limited)** | 148.5 | 145.7 | 151.2 | 77.1 | 75.3 | 78.8 |

Source: Office for National Statistics – Coronavirus (COVID-19) related deaths by self-reported disability status

Notes

1. Office for National Statistics (ONS) figures based on death registrations up to 31 December 2020 for deaths of people aged 30 to 100 years involving COVID-19 occurring between 24 January and 20 November 2020 that could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic and Planning Research.

2. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10). Deaths involving COVID-19 include those with an underlying cause, or any mention, of ICD-10 codes U07.1 (COVID-19, virus identified) or U07.2 (COVID-19, virus not identified).

3. 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).

# 4 . Risk of death involving COVID-19 by self-reported disability status

We used statistical models (Cox proportional hazards regression) to estimate how differences in the risk of death involving the coronavirus (COVID-19) changed when adjusting for a range of factors affecting both the risk of infection and the risk of death if infected. This approach helps us to understand which factors drive the differences in mortality by disability status.

In Figure 1, we show how the risk of death involving COVID-19 varied by disability status for males and females. We report hazard ratios for each disability status relative to the non-disabled group. The hazard ratio is a measure of how much greater or lesser the rate of death involving COVID-19 was in the two disabled groups compared with non-disabled people. A hazard ratio greater than 1 indicates a greater rate of death involving COVID-19 than the reference group (non-disabled people), while a hazard ratio less than 1 indicates a lower rate of COVID-19 mortality than the reference group.

In our baseline model, we present hazard ratios adjusted for age only.

We then adjust for:

1. Type of residence (private household, care home, or other communal establishments).

2. Geography (local authority district and population density of the Lower layer Super Output Area), demographic and socio-economic factors (ethnicity, deprivation, household characteristics, socio-economic measures and occupational exposure).

3. The number of hospital admissions and the number of days spent in admitted patient care (derived from hospital records since April 2017) and the presence of pre-existing health conditions (derived from primary care records since January 2015); the model also allowed for the effect of all these health-related factors to vary depending on whether or not the individual is aged 70 years or over.

After adjusting for age only, males and females from both disabled groups were at a greater risk of death involving COVID-19 compared with non-disabled individuals (first bar in Figure 1). The rates of death involving COVID-19 for more-disabled and less-disabled males were 3.1 and 1.9 times greater, respectively, than for non-disabled males. The corresponding hazard ratios for females were 3.5 and 2.0, respectively.

These estimates are slightly higher with those reported in our [previous publication](#), which included rates of death involving COVID-19 until 14 July 2020 (though our previous analysis only included people in private households, but over a wider age range of 9 to 110 years, so the results are not strictly comparable with those in the current release).

The second bar in Figure 1 shows relative differences in rates of death involving COVID-19 after further adjusting for residence type. Adjusting for residence type reduced the raised risk of death for those who were more-disabled (hazard ratios were 2.6 for males and 2.9 for females) and to a lesser extent those who were less-disabled (hazard ratios were 1.7 for males and 1.9 for females). However, both males and females in either disabled group remained at a [statistically significantly](#) higher risk of death involving COVID-19 than non-disabled people.

Further adjusting for geography, demographic and socio-economic characteristics substantially reduced the raised risk of death involving COVID-19 for disabled people relative to non-disabled people, but the difference remained statistically significant (third bar in Figure 1). The rate of death was 1.7 and 1.3 times greater for more-disabled and less-disabled males, respectively, compared with non-disabled males. The corresponding hazard ratios for females were 1.9 and 1.4, respectively.

The fourth bar in Figure 1 shows the effect of further adjusting for hospital admissions and pre-existing health conditions on COVID-19 mortality risk for disabled people. The risk of death for more-disabled males was slightly above that for non-disabled males (hazard ratio: 1.1). For less-disabled males, the risk of death was not statistically significantly different to that of non-disabled males. For more-disabled and less-disabled disabled females, rates of COVID-19 mortality were 1.4 and 1.2 times greater, respectively, than that of non-disabled females.

## Figure 1: Excess COVID-19 mortality risk for disabled people was substantially reduced after adjusting for personal and household characteristics, but remained significantly higher than for non-disabled people for most groups

**Hazard ratios for death involving COVID-19 for disabled men and women relative to non-disabled people of the same sex, adjusting for age, residence type, geography, socio-economic and demographic factors, and comorbidities, England: 24 January to 20 November 2020**

## Notes:

1. Cox proportional hazards models adjusting for age, residence type, geography (local authority and population density), socio-economic and demographic factors (ethnicity, area and household deprivation, household composition, socio-economic position, highest qualification held, household tenure, and occupation indicators (including keyworkers, exposure to disease and proximity to others), and health (hospital admissions since April 2017 and pre-existing health conditions identified from primary care records since January 2015).

2. Office for National Statistics (ONS) figures based on death registrations up to 31 December 2020 of people aged 30 to 100 years that occurred between 24 January and 20 November 2020, that could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

3. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10). Deaths involving COVID-19 include those with an underlying cause, or any mention, of ICD-10 codes U07.1 (COVID-19, virus identified) or U07.2 (COVID-19, virus not identified).

4. An error bar not crossing the x-axis at value 1.0 denotes a statistically significantly different rate of death compared with the reference category (non-disabled).

**Download the data**

.xlsx

These findings show that no single factor explains the considerably raised risk of death involving COVID-19 among disabled people. Place of residence, socio-economic and geographical circumstances, and pre-existing health conditions all played a part. All the factors listed when taken together were able to explain the raised risk of death for less-disabled males compared with non-disabled males, but statistically significant unexplained raised risk remained for more-disabled males and all disabled females.

For both sexes and for both more-disabled and less-disabled people, the largest reduction in the hazard ratio was achieved by adding socio-economic and geographical circumstances to the model, suggesting that these factors are somewhat more important than the others considered. This group of factors included region, ethnicity, area deprivation, household composition and occupation, all of which have been shown in other studies to affect the risk of death involving COVID-19. Therefore, it can be inferred that an important part (but not all) of the raised risk is because disabled people are disproportionately exposed to a whole range of generally disadvantageous circumstances compared with non-disabled people. Further estimates of other outcomes for disabled people, such as employment, crime and social participation are forthcoming.

# 5 . Difference between the risk of death involving COVID-19 by self-reported disability status in the first and second waves of the pandemic

To explore whether the relative differences in the risk of coronavirus (COVID-19) mortality between disabled and non-disabled people changed over the course of the pandemic, we divided the study populations between the first and second waves of the pandemic, with the latter commencing on 12 September 2020[1] (see the Technical Appendix for more information).

Figure 2 shows the hazard ratios (adjusted for age, residence type, geography, socio-economic and demographic factors, and health variables) for disabled males and females in the first wave (first bars) and second wave (second bars) of the pandemic. The excess risk of death involving COVID-19 mortality for disabled people, relative to non-disabled people, was consistent across the first and second waves, with little change to the hazard ratios for either men or women.

**Figure 2: Excess COVID-19 mortality risk for disabled people (relative to non-disabled people) was consistent across the first and second waves of the pandemic**

**Hazard ratios for death involving COVID-19 for disabled men and women relative to non-disabled people of the same sex, in the first (24 January to 11 September 2020) and second (12 September to 20 November 2020) waves of the pandemic, adjusting for age, residence type, geography, socio-economic and demographic factors, and comorbidities, England**

**Notes:**

1. Cox proportional hazards models (adjusted for age, residence type, geography, socio-economic and demographic factors, and health variables) allowing for time-dependent disability coefficients, stratified according to the first and second waves of the pandemic (with the second wave starting on 12 September 2020).

2. Office for National Statistics (ONS) figures based on death registrations up to 31 December 2020 of people aged 30 to 100 years that occurred between 24 January and 20 November 2020, that could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

3. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10). Deaths involving COVID-19 include those with an underlying cause, or any mention, of ICD-10 codes U07.1 (COVID-19, virus identified) or U07.2 (COVID-19, virus not identified).

4. An error bar not crossing the x-axis at value 1.0 denotes a statistically significantly different rate of death compared with the reference category (non-disabled).

## Download the data

.xlsx

## Notes for: Difference between the risk of death involving COVID-19 by self-reported disability status in the first and second waves of the pandemic

1. In this analysis, we have used an experimental assessment of defining the waves of the pandemic (see Technical Appendix for further details). As we work with partner bodies, the method used and, consequently, the exact dates used to define the waves may change slightly. However, it is unlikely that a small change in the cut-off dates used will have a significant impact on the outputs.

# 6 . Age-standardised rates of death involving COVID-19 by learning disability status

People with a learning disability made up 6 in 100 (5.8%) of all deaths involving the coronavirus (COVID-19) for the period to 20 November 2020 (2,955 of 50,888 deaths). For comparison, people with a learning disability made up 1.2% of the study population, therefore suggesting that people with a learning disability have been disproportionately impacted by the COVID-19 pandemic. See the datasets for detailed breakdowns of counts of deaths.

The categorisation of learning disability was based on a medical diagnosis identified in primary care records. The groups identified in this analysis as disabled based on the 2011 Census or as having a learning disability overlap; 59.1% of those with a diagnosed learning disability reported themselves as disabled in the Census. The two groups are not directly comparable because of the different approaches to definition.

Age-standardised mortality rates involving COVID-19 among men and women aged 30 to 100 years, per 100,000 of the population at risk, are presented in Table 2. Those with a learning disability had a statistically significantly higher rate of COVID-19 mortality than those who did not have a learning disability in the period to 20 November 2020.

There were large differences in the rate of death, with the rate in males with a learning disability being 690.6 per 100,000 people, 3.5 times the rate of 196.1 in males who did not have a learning disability. The equivalent rates for females were 475.8 and 118.0 per 100,000, respectively, a 4.0 times difference. As in the analysis on all disabled people, for people with a learning disability the rates were higher for males, but the relative difference was greater for females.

Table 2: Age-standardised mortality rates for deaths involving COVID-19 per 100,000 population with 95% confidence intervals by sex and learning disability status, England: 24 January to 20 November 2020

| Learning disability status | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Rate | Lower 95% confidence limit | Upper 95% confidence limit | Rate | Lower 95% confidence limit | Upper 95% confidence limit |
| **Learning disability** | 690.6 | 657.9 | 723.2 | 475.8 | 444.3 | 507.4 |
| **No learning disability** | 196.1 | 193.7 | 198.6 | 118.0 | 116.4 | 119.5 |

Notes

1. Office for National Statistics (ONS) figures based on death registrations up to 31 December 2020 of people aged 30 to 100 years that occurred between 24 January and 20 November 2020that could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

2. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10). Deaths involving COVID-19 include those with an underlying cause, or any mention, of ICD-10 codes U07.1 (COVID-19, virus identified) or U07.2 (COVID-19, virus not identified). ,Learning disability status was retrieved from primary care records, using the General Practice Extraction Service (GPES) Data for Pandemic Planning and Research (GDPPR) to identify people who had contact with primary care for a learning disability (including Down's syndrome) over the past five years.

# 7 . Risk of death involving COVID-19 by learning disability status

In this section, we explore associations between learning disability status and coronavirus (COVID-19) mortality in more detail, using statistical models (described in Section 4) to examine the impact of place of residence, demographic and socio-economic factors, and comorbidities.

After adjusting for age, individuals with a learning disability were at a greater risk of COVID-19 mortality than with those with no learning disability (first bar in Figure 3), with a hazard ratio of 3.7 for both males and females. These estimates are similar to findings of a previous Public Health England study, which reported that the rate of death involving COVID-19 for people with a learning disability between February and June 2020 was 3.6 times greater than in the general population after accounting for under-reporting (although our estimates are not strictly comparable with those produced by Public Health England because of differences in study populations and data sources).

Adjusting for residence type (private household, care home and other communal establishments) substantially reduced the excess risk of death involving COVID-19 for people with a learning disability relative to those with no learning disability, to 2.1 for males and 2.2 for females (second bar in Figure 3).

Further adjustments for geography, demographic and socio-economic factors were associated with a small reduction in the excess risk of death among individuals with a learning disability compared with those without (third bar in Figure 3), though the hazard ratios remained at 1.9 for both males and females.

The fourth bar in Figure 3 shows the effect of further adjusting for hospital admissions and pre-existing health conditions on excess COVID-19 mortality risk for people with a learning disability compared with those without. The hazard ratios remained statistically significant at 1.7 for both males and females.

**Figure 3: Excess COVID-19 mortality risk for people with a learning disability was substantially reduced after adjusting for personal and household characteristics, but mortality rates remained significantly higher than for people with no learning disability**

**Hazard ratios for death involving COVID-19 for men and women with a learning disability relative to people with no learning disability of the same sex, adjusting for age, residence type, geography, socio-economic and demographic factors, and comorbidities, England: 24 January to 20 November 2020**

## Notes:

1. Cox proportional hazards models adjusting for age, residence type, geography (local authority and population density), socio-economic and demographic factors (ethnicity, area and household deprivation, household composition, socio-economic position, highest qualification held, household tenure, and occupation indicators (including keyworkers, exposure to disease and proximity to others), and health (hospital admissions since April 2017 and pre-existing health conditions identified from primary care records since January 2015).

2. Office for National Statistics (ONS) figures based on death registrations up to 31 December 2020 of people aged 30 to 100 years that occurred between 24 January and 20 November 2020, that could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

3. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10). Deaths involving COVID-19 include those with an underlying cause, or any mention, of ICD-10 codes U07.1 (COVID-19, virus identified) or U07.2 (COVID-19, virus not identified).

4. An error bar not crossing the x-axis at value 1.0 denotes a statistically significantly different rate of death compared with the reference category (no learning disability).

**Download the data**

These findings show that for people with a learning disability of both sexes, all the factors considered played some part in their raised risk of death compared with people with no learning disability. Much the largest effect was associated with place of residence, suggesting that living in a care home or other communal establishment was a major factor in the increased exposure of people with learning disabilities to COVID-19. This corroborates a previous ONS publication, which reported that age-specific mortality rates for deaths involving COVID-19 occurring from 2 March to 12 June 2020 were higher for care home residents (irrespective of learning disability status) compared with the non-care home population in England and Wales. However, in this article, a substantial unexplained raised risk remained after taking all the listed factors into account. We cannot say with certainty what is driving the residual differences in risk, and we cannot rule out the possibility of remaining explanatory factors not included within our set of adjustments (for example, differential access to and pathways through the healthcare system between disabled groups).

# 8 . Difference between the risk of death involving COVID-19 by learning disability status in the first and second waves of the pandemic

In this section, we compare the risk of death involving the coronavirus (COVID-19) by learning disability status in the first and second waves of the pandemic, using the approach described in Section 5.

Figure 4 shows the hazard ratios (adjusted for age, residence type, geography, socio-economic and demographic factors, and health variables) for males and females with a learning disability in the first wave (first bars) and second wave (second bars) of the pandemic. The excess risk of death involving COVID-19 for males and females with a learning disability compared with those without reduced slightly between the first and second waves, with hazard ratios falling from 1.7 to 1.4, though this change was not statistically significant. While no definitive conclusion is possible from the data, it is plausible that the lower proportion of deaths in the second wave that were in care homes could be a factor in the apparent difference.

**Figure 4: Excess COVID-19 mortality risk for individuals with a learning disability (relative to those without) was slightly lower during the second wave of the pandemic than the first, but this difference was not statistically significant**

**Hazard ratios for death involving COVID-19 for men and women with a learning disability relative to people with no learning disability of the same sex, in the first (24 January to 11 September 2020) and second (12 September to 20 November 2020) waves of the pandemic, adjusting for age, residence type, geography, socio-economic and demographic factors, and comorbidities, England**

## Notes:

1. Cox proportional hazards models (adjusted for age, residence type, geography, socio-economic and demographic factors, and health variables) allowing for time-dependent disability coefficients, stratified according to the first and second waves of the pandemic (with the second wave starting on 12 September 2020).

2. Office for National Statistics (ONS) figures based on death registrations up to 31 December 2020 of people aged 30 to 100 years that occurred between 24 January and 20 November 2020, that could be linked to the 2011 Census and General Practice Extraction Service Data for Pandemic Planning and Research.

3. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10). Deaths involving COVID-19 include those with an underlying cause, or any mention, of ICD-10 codes U07.1 (COVID-19, virus identified) or U07.2 (COVID-19, virus not identified).

4. An error bar not crossing the x-axis at value 1.0 denotes a statistically significantly different rate of death compared with the reference category (no learning disability).

**Download the data**

# 9 . Coronavirus (COVID-19) related deaths by disability status data

Updated estimates of coronavirus (COVID-19) related deaths by disability status, England
Dataset | Released 11 February 2021
Estimates of differences in COVID-19 mortality risk by self-reported disability status and diagnosed learning disability status for deaths occurring up to 20 November 2020, using linked data from the 2011 Census, death registrations, and primary care and hospital records.

# 10 . Glossary

## Age-standardised mortality rates

Age-standardised mortality rates (ASMRs) are used to allow comparisons between populations that may contain different proportions of people of different ages. The 2013 European Standard Population is used to standardise rates.

## Cox proportional hazards regression model

The Cox proportional hazards regression model is a multiple regression procedure that measures the association between a time-to-event outcome and a characteristic of interest such as disability, while adjusting for other characteristics expected to also be associated with the outcome.

## Hazard ratio

A hazard ratio is a measure of the relative differences in the instantaneous rate of mortality between groups. A hazard ratio greater than 1 indicates the rate of mortality is higher, and likewise, less than 1 lower in the population group under study compared with a reference group.

## Coronavirus (COVID-19) deaths

Coronavirus (COVID-19) deaths are those deaths where COVID-19 was mentioned on the death certificate at registration. A doctor can certify the involvement of COVID-19 based on symptoms and clinical findings – a positive test result is not required.

## Disability

To define disability in this publication, we refer to 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 or yes, limited a little or no). The limited a little and limited a lot categories are referred to in this article as "less-disabled" and "more-disabled" respectively, whereas people reporting no limitation on their activities are referred to as "non-disabled". The distinction between less-disabled and more-disabled is based solely on 2011 Census data and not inferred from any other information. Therefore, it only implies a difference based on self-reported activity restrictions.

This is slightly different to the current Government Statistical Service (GSS) harmonised "core" definition: this identifies as "disabled" a person who self-reports having a physical or mental health condition or illness that has lasted or is expected to last 12 months or more that reduces their ability to carry-out day-to-day activities.

The GSS definition is designed to reflect the definitions that appear in legal terms in the Disability Discrimination Act 1995 and the subsequent Equality Act 2010.

### Learning disability

Learning disability is identified from clinical diagnoses made in primary care, according to the same definition as that used in the QCOVID risk prediction model.

### Statistical significance

The statistical significance of differences noted within the release are determined based on non-overlapping confidence intervals.

# 11 . Data sources and quality

These analyses are based on a unique linked dataset that encompasses Census 2011 records, death registrations, Hospital Episode Statistics (HES) and primary care records retrieved from the General Practice Extraction Service (GPES) Data for Pandemic Planning and Research (GDPPR) with England coverage only. For further details on the data used, including how they were constructed and the diagnostic information used, please refer to the accompanying Technical Appendix.

# 12 . Related links

Updated estimates of coronavirus (COVID-19) related deaths by pandemic wave and disability status, England: 24 January to 28 February 2021
User requested data | Released 26 July 2021
Estimates of differences in COVID-19 mortality risk by self-reported disability status for deaths occurring up to 28 February 2021, using linked data from the 2011 Census, death registrations, and primary care and hospital records across each wave of the pandemic.

Coronavirus (COVID-19) related deaths by disability status, England and Wales: 2 March to 14 July 2020
Article | Released 18 September 2020
Comparison of deaths where the coronavirus (COVID-19) was mentioned on the death certificate by broad age group, sex and disability status, using linked census and mortality records on deaths registered up to 21 July 2020.

Coronavirus (COVID-19) related deaths by disability status, England and Wales: 2 March to 15 May 2020
Article | Released 19 June 2020
Deaths related to the coronavirus (COVID-19) by disability status, including death counts, age-standardised mortality rates, and hazard rate ratios by age, sex and disability status.