Office for National Statistics

Article

Estimates of coronavirus (COVID-19) related deaths by hearing and vision impairment status, England: 24 January 2020 to 20 July 2022

Estimates of the risk of death involving coronavirus (COVID-19) for people with and without a hearing or vision impairment identified via hospital records for deaths occurring between 24 January 2022 and 20 July 2022, using linked data from the Office for National Statistics' Public Health Data Asset. Experimental Statistics.

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1 . Main points

- For the first time, the Office for National Statistics (ONS) is able to provide estimates covering the risk of death involving coronavirus (COVID-19) faced by people with a hearing, vision or dual-sensory impairment identified via hospital records, adding to our existing work on the effect of the coronavirus pandemic on disabled people.

- During the coronavirus pandemic, we have seen higher mortality rates in people with a hearing, vision or dual-sensory impairment relative to people in our comparison group for whom these impairments were not found, as identified via hospital records.

- COVID-19 mortality rates were highest in older age groups (aged 70 to 100 years) compared with younger groups (aged 30 to 69 years).

- We saw the biggest differences in COVID-19-related mortality rates in the younger group (aged 30 to 69 years), whereby rates for people with either a hearing, vision, or dual-sensory impairment were respectively 4.0, 8.4 and 11.7 times higher than the mortality rates for the same age group in our comparison group.

- People with either a hearing, a vision or a dual-sensory impairment still faced a higher risk of death involving COVID-19 compared with people for whom these impairments were not found (1.3, 1.4 and 1.4 times higher, respectively), after adjusting for a wide range of characteristics including age, residence type, geography, socio-demographics, health and vaccination status.

- While no single factor explains this outstanding risk of COVID-19-related death, pre-existing conditions and hospital admissions explained a large part of the differences seen between people with a sensory impairment and people for whom no such impairment was found.

Statistician’s comment

“This is the first time we have published data exploring the risk of death from COVID-19 among people with hearing, vision or dual-sensory impairments as identified via hospital records.

“Today’s data show that death rates involving coronavirus for those with or without a sensory impairment decreased between second and third waves of the pandemic. However, the risk of death involving COVID-19 remained higher for people with a sensory impairment, even after accounting for characteristics such as age and pre-existing health conditions.

“This raised risk may be down to a range of disadvantages which can be experienced by this group and that we could not account for in our analysis, rather than down to one identifiable factor.”

Julie Stanborough, Deputy Director Data and Analysis for Social Care and Health, Office for National Statistics

2 . Overview of COVID-19 related deaths by hearing and vision impairment status

Certain population groups are more vulnerable to COVID-19 infection and death than others. Current coronavirus (COVID-19) mortality statistics show that older communities, ethnic minority groups, disabled people, individuals with specific comorbidities and deprived communities were more severely impacted by the coronavirus pandemic.

With the exception of learning disability, evidence on risk of COVID-19 death on individuals who experience different impairment types is sparse. In this article, we provide insights on differences in the risk of COVID-19 death, irrespective of the place of occurrence, over the course of the coronavirus pandemic among people with a hearing, vision or dual-sensory impairment. Impairment status is identified via hospital records.

Because of the limited registration of impairment or functioning indicators in the available data sources, we focus on new estimates for people with a selection of sensory impairments in this article: vision, hearing or dual-sensory impairment. For more information about our work assessing strategies to allow analysis for people with other impairment types, please refer to our article Improving disability data to understand the effects of coronavirus (COVID-19) pandemic on people with different impairment types.

We derived hearing, vision or dual-sensory impairment status via hospital records obtained between 2011 and 2020 from Hospital Episode Statistics (HES). To determine presence of one of those selected sensory impairments, we collaborated with experts to assess lists of medical codes (International Statistical Classification of Diseases and Related Health Problems (ICD-10) codes) featured in primary and secondary diagnosis fields of HES records.

In line with the World Health Organization's (WHO's) International Classification of Functioning, Disability and Health (ICF), impairments can be understood as problems, such as a significant deviation or loss, related to body function or structure. This can affect vision or hearing in day-to-day life. Please refer to the Glossary and Data sources and quality sections of this article for more details on the definition of impairment, the identification approach and coverage of the population.

Following identification of a hearing or vision impairment, we compared the risk of death involving COVID-19 across groups:

- people with a hearing impairment: individuals whose hospital record(s) mentioned at least once a presence of conductive, sensorineural or mixed hearing loss between 2011 and 2020
- people with a vision impairment: individuals whose hospital record(s) mentioned at least once a presence of a moderate or severe vision impairment or blindness between 2011 and 2020
- people with a dual-sensory impairment: individuals whose hospital record(s) mentioned a vision and a hearing impairment between 2011 and 2020; these mentions can be found within the same hospital record or via separate records across different years
- comparison group: individuals whose hospital record(s) did not feature any mention of a hearing or vision impairment between 2011 and 2020

These are Experimental Statistics providing more detailed data on people with sensory impairments identified via hospital records. This study does not reflect the prevalence of those impairments in the general population in England. This approach differs from the identification of disability under the Equality Act (2010) and from social model understandings of disability.

Please refer to the Glossary and Data sources and quality sections for more details on the identification and population. We welcome feedback to our approach and analysis, please contact health.data@ons.gov.uk.

The analyses covered deaths occurring from 24 January 2020 to 20 July 2022, registered by 3 August 2022 and for people aged 30 to 100 years. These are deaths involving COVID-19, which may have taken place at home, in a hospital, a care home or elsewhere. Where possible, we compared the differences in risk across the coronavirus pandemic waves:

- Wave 1 – deaths occurring between 24 January and 11 September 2020
- Wave 2 – deaths occurring between 12 September 2020 and 11 June 2021
- Wave 3 – deaths occurring between 12 June 2021 and 20 July 2022

Estimates for the third wave are provisional, as this extends beyond the study period. Also, it is possible that some deaths involving COVID-19 that occurred in this period have not yet been registered. Similarly, some vaccinations administered during the study period may not yet have been recorded.

In these analyses, the third wave covers the period where the Omicron variant became dominant. For more information on variants and data from different sources on COVID-19 infections, hospital admissions and deaths in England, please refer to the Coronavirus (COVID-19) Latest Insights tool.

3 . Crude and age-specific mortality rates involving COVID-19 by hearing, vision and dual impairment status

Crude mortality rates involving coronavirus (COVID-19) in the first, second and third wave of the coronavirus pandemic, among people aged 30 to 100 years in the study population, are shown in Figure 1.

Crude mortality rates are influenced by the underlying age profile of the population. Comparisons between crude rates of different groups should be made with caution as rate differences also capture differences in the age distribution of the groups being compared.

Figure 1: Rates of deaths involving COVID-19 were highest during the second wave and lowest during the third wave of the coronavirus (COVID-19) pandemic across all groups

Crude mortality rates for deaths involving COVID-19 with 95% confidence intervals, by hearing and vision impairment status, stratified by waves, for adults aged 30 to 100 years, England: 24 January 2020 to 20 July 2022

Notes:

1. These rates are expressed in 100,000 person-years at risk. For example, had we monitored 100,000 people with a dual-sensory impairment during a year, under the circumstances seen during the first pandemic wave, we would have expected 3,341 COVID-19-related deaths to have occurred, on average, in this group.
2. Office for National Statistics (ONS) figures are based on death involving COVID-19 occurring up to 20 July 2022 for people aged 30 to 100 years in the study population.
3. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10).
4. Impairment status was identified using expert-assessed proxies in primary and secondary diagnosis fields from Hospital Episodes Statistics records (HES).

Download the data

.xlsx

COVID-19-related mortality rates were highest for all groups in the second wave of the pandemic (for deaths occurring between 12 September 2020 and 11 June 2021). In the third wave of the pandemic (for deaths occurring until 20 July 2022), mortality rates decreased for everyone in the study population, with rates falling below levels seen in the first wave (Figure 1).

For example, COVID-19-related mortality rates in people with a dual-sensory impairment declined from 6,443 deaths to 1,391 deaths per 100,000 person-year between the second and third wave of the pandemic.

Age-specific crude rates to understand the rate of COVID-19-related deaths for younger age groups (30 to 69 years) and older age groups (70 to 100 years) are shown in Figure 2. Previous work has shown that risk of COVID-19-related death and the prevalence of hearing and vision impairments is highest among older populations ; therefore, we use age-specific rates to allow fairer comparisons between groups with different age profiles.

Figure 2: COVID-19 mortality rates were highest in older populations (aged 70 to 100 years) compared with younger populations (aged 30 to 69 years)

Age-specific crude mortality rates for deaths involving COVID-19 with 95% confidence intervals, by hearing and vision impairment status, for younger adults (aged 30 to 69 years) and older adults (aged 70 to 100 years), England: 24 January 2020 to 20 July 2022

Notes:

1. These rates are expressed in 100,000 person-years at risk. For example, had we monitored 100,000 older people (aged 70 to 100 years) with a dual-sensory impairment during a year, under the circumstances seen during the pandemic up to 20 July 2022, we would have expected 4,353 COVID-19-related deaths to have occurred, on average, in this group.

2. Office for National Statistics (ONS) figures are based on death involving COVID-19 occurring up to 20 July 2022 for people aged 30 to 100 years old in the study population.

3. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10).

4. Impairment status was identified using expert-assessed proxies in primary and secondary diagnosis fields from Hospital Episodes Statistics records (HES).

Download the data

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Across all study groups, older populations (aged 70 to 100 years) had significantly higher rates of COVID-19-related death, a finding consistent with previous work showing that the elderly population faces a higher COVID-19 mortality risk (Figure 2).

People with a hearing, vision and dual-sensory impairment had significantly higher COVID-19-related rates of death compared with the comparison group, across older (aged 70 to 100 years) and younger (aged 30 to 69 years) populations. This pattern of elevated COVID-19-related mortality rates in people with an impairment relative to the comparison group were seen across the first, second and third wave of the pandemic in older and younger populations all together (see Table 3 in the accompanying dataset).

The highest rates were seen in people with a dual-sensory impairment, compared with people with a hearing or a vision impairment and across older and younger populations all together. On average across the pandemic, COVID-19-related mortality rates in younger people with a dual-sensory impairment were 1.4, 2.9 and 11.7 times higher compared with people with a vision impairment, a hearing impairment, and with the comparison group, respectively. The rates in older people with a dual-sensory impairment were 1.7, 2.0 and 5.3 times higher than in people with a vision impairment, a hearing impairment, and in the comparison group, respectively.

While older populations (aged 70 to 100 years) had higher rates of COVID-19 mortality during the pandemic, differences in mortality rates between the comparison group and people with a sensory impairment were largest in younger populations (aged 30 to 69 years).

Compared with 69 deaths per 100,000 person-year seen in the younger comparison group, COVID-19-related mortality rates in younger people with a hearing, a vision, and a dual sensory impairment were 4.0, 8.4 and 11.7 times higher between 24 January 2020 and 20 July 2022, respectively. Comparatively, death rates in older people with a hearing, vision, and dual-sensory impairment were 2.6, 3.1 and 5.3 times higher than the older comparison group across the same period, respectively. Similar patterns were seen across each wave of the pandemic.

Younger and older men had higher rates of death involving COVID-19 than women, across the three waves of the pandemic and across people with and without a sensory impairment (see Table 2 in the accompanying dataset).

4 . Risk of death involving COVID-19 by hearing and vision impairment status

The differences seen between impairment status presented previously could be driven by a range of factors affecting both the risk of infection and the risk of death if infected, such as age, ethnicity, care home residency, or deprivation. Indeed, people with hearing, vision or dual-sensory impairments tend to be older, be more likely to live in a care home, or may disproportionately face disadvantageous circumstances relative to the comparison group.

We used statistical models (Cox proportional hazards regression) to estimate how differences in the risk of death involving coronavirus (COVID-19) varied by impairment status, after 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 may be driving the differences in mortality by impairment status.

We report hazard ratios (HR) for each impairment status relative to the comparison group in our study population. The HR is a measure of how much greater or lesser the risk of death involving COVID-19 is in people with a hearing, a vision or a dual-sensory impairment relative to the comparison group. A HR greater than 1 indicates a greater risk of death involving COVID-19 relative to the comparison group. A HR less than 1 indicates a lower risk of COVID-19 mortality relative to the comparison group.

In our baseline model, we present HRs adjusted for age only (model 1). We adjust sequentially for:

- type of residence – private household, care home, or other communal establishments (model 2)
- geography – local authority district and population density of the Lower layer Super Output Area (model 3)
- demographic and socio-economic factors – ethnicity, deprivation, household characteristics, socio-economic measures and occupational exposure (model 4)
- 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 between January 2015 and December 2019) (model 5); the model also allowed for the effect of all these health-related factors to vary depending on whether the individual is aged 70 years or over
- vaccination status (model 6) – we allow vaccination status to vary for each person in our study population, in the period from 8 December 2020 to 20 July 2022

Figure 3: Pre-existing comorbidities and hospital admissions explain a large part of the elevated risk of death involving COVID-19 in people with a dual-sensory impairment relative to the comparison group, after adjusting for various factors

Hazard ratios for deaths involving COVID-19 for people with a dual-sensory impairment individuals relative to comparison group, adjusting for age, residence type, geography, socio-economic and demographic factors, health characteristics and vaccination status, England: 24 January 2020 to 20 July 2022

Notes:

1. Cox proportional hazards models adjusting for age, residence type, geography, socio-economic and demographic factors, health status and vaccination status. More details about the covariates used can be found in the accompanying dataset and methodology articles.
2. Office for National Statistics (ONS) figures are based on death involving COVID-19 occurring up to 20 July 2022 for people aged 30 to 100 years old in the study population.
3. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10).

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.xlsx

The remaining risk of death involving COVID-19 in people with a dual-sensory impairment relative to the comparison group, after adjusting for different factors associated with COVID-19 infection and death, is shown in Figure 3.

Adjusting for age only, people with dual-sensory impairment were 2.46 times more at risk of death involving COVID-19 than the comparison group (Figure 3). The same age-adjusted risk of death from COVID-19 was 2.22 and 1.69 times higher in people with a vision impairment and hearing impairment relative to the comparison group, respectively (see Table 4 in the accompanying dataset).

Further adjusting for residence type, geography, demographic and socio-economic characteristics, the risk of COVID-19-related death in people with a dual-sensory impairment declined to 1.86 times higher than the risk in the comparison group (Figure 3). Similar reductions in COVID-19-related risk of death were seen in people with a vision impairment (HR declined from 2.22 to 1.80) and a hearing impairment (HR declined from 1.69 to 1.55).

The groups with a sensory impairment identified in our study were more likely to live in a care home than the comparison group, a factor known to be associated with a heightened vulnerability to the risk of COVID-19 infection and death.

In addition, differences in socio-demographic characteristics such as ethnicity, level of qualifications and occupation appear to be factors associated with an increased vulnerability to COVID-19-related death faced by people with a sensory impairment relative to the comparison group, after adjusting for age, residence type and geography.

Further adjusting for pre-coronavirus health status (including measures of pre-existing comorbidities and hospital admissions) had the largest effect on the HRs. Once adjusting for pre-existing conditions and hospital admissions, the risk of death in people with a hearing, a vision and a dual-sensory impairment was 1.31 (Figure 3), 1.40 and 1.45 times the risk in the comparison group, respectively. Controlling for age, people with a sensory impairment may be more likely to have other comorbidities associated with COVID-19 infection and death.

Further adjusting for vaccination status did not significantly decrease the elevated risk of COVID-19 death for all groups in the study. This shows that the differences in the proportions of people with and without a sensory impairment who have received the same number of vaccinations does not further explain the elevated risk of COVID-19-related death faced by disabled people, a trend shown in our previous COVID-19 publications looking at the disabled population in England.

Where the risk remains broadly the same after adjusting for vaccination status, it does not mean the vaccine is not effective. It simply means differences in vaccination coverage between the groups do not explain observed differences in mortality risk. For analyses of vaccine effectiveness, see Monitoring reports of the effectiveness of COVID-19 vaccination on GOV.UK.

Figure 4: An unexplained elevated risk of death involving COVID-19 remains in people with a sensory impairment after adjusting for factors associated with COVID-19 risk of infection and death

Hazard ratios for deaths involving COVID-19 for people with a hearing, a vision or a dual-sensory impairment relative to the comparison group, adjusting for age, residence type, geography, socio-economic and demographic factors, health characteristics and vaccination status, England: 24 January 2020 to 20 July 2022

Notes:

1. Cox proportional hazards models adjusting for age, residence type, geography, socio-economic and demographic factors, health status and vaccination status. More details about the covariates used can be found in the accompanying dataset and methodology articles.

2. Office for National Statistics (ONS) figures are based on death involving COVID-19 occurring up to 20 July 2022 for people aged 30 to 100 years old in the study population.

3. Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10).

Download the data

.xlsx

The drivers of the elevated risk of COVID-19-related death faced by people with a sensory impairment are complex.

Controlling for age, residence type, geography, demographics and socioeconomics, health characteristics and vaccination status do not fully account for the elevated risk shown in our findings. The risk of death involving COVID-19 remained 1.30 times, 1.38 times and 1.42 times higher for people with a hearing, a vision, or a dual-sensory impairment relative to the comparison group, respectively.

This unexplained elevated risk in people with a sensory impairment may be because of other unmeasured factors, which we were unable to account for, among which could be:

- access to services, such as transport, health care and personal assistance
- infection by different variants
- history of particular health conditions not available to us in administrative data
- experience of discrimination
- access to information and communication technology (ICT)
- measurement error in the factors we control for

5 . Acknowledgements

We would like to thank the Royal Association for Deaf People, the Macular Society, members of the Sight Loss Councils, Leonard Cheshire, Disability Rights UK and Inclusion London for their time discussing the strengths and limitations of this piece.

For assisting in the development of this analysis, we would like to thank:

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- Professor Piers Dawes, Professor of Audiology, University of Queensland

6 . Coronavirus (COVID-19) related deaths by hearing and vision impairment status

Estimates of coronavirus (COVID-19) related deaths by hearing and vision impairment status
Dataset | Released 18 November 2022
Estimates of the risk of death involving coronavirus (COVID-19) for people with and without a hearing or vision impairment identified via hospital records for deaths occurring between 24 January 2022 and 20 July 2022, using linked data from the Office for National Statistics' Public Health Data Asset. Experimental Statistics.

7 . Glossary

Crude mortality rates

Crude mortality rates are used to measure the incidence of coronavirus (COVID-19) related death in the study population. Crude mortality rates are used to allow comparisons between populations of different sizes; thus, they are a better measure to compare across time than numbers of deaths alone. We report annualised crude rates per 100,000 person-years, which can be interpreted as the number of deaths involving COVID-19 occurring in a group of 100,000 people within a year. Using a denominator per person-years enables us to control for number of deaths occurring across time periods of different lengths.

Crude mortality rates are influenced by the underlying profile of the population. Comparisons between crude rates of different groups should be made with caution as rate differences also capture differences in the age distribution of the groups being compared.

Age-specific mortality rates

Age-specific mortality rates are crude rates calculated for specific age groups. We use a younger (aged 30 to 69 years) and an older (aged 70 to 100 years) age group. Since impairment prevalence increases with age, people with and without an impairment are likely to have different underlying age structures. We use age-specific rates to allow comparisons between age groups within the population.

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 impairment status). It also adjusts for other characteristics expected to be associated with the outcome.

Hazard ratio

A hazard ratio (HR) is a measure of the relative differences in the instantaneous rate of mortality between groups. A HR 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

Deaths involving coronavirus (COVID-19) include those with an underlying cause, or any mention, of International Classification of Diseases, 10th Revision (ICD-10) codes U07.1 (COVID-19, virus identified), U07.2 (COVID-19, virus not identified) or U09.9 (post-COVID condition). A doctor can certify the involvement of COVID-19 based on symptoms and clinical findings – a positive test result is not required.

Impairment

The World Health Organization's (WHO's) International Classification of Functioning, Disability and Health (ICF) defines an impairment (PDF, 221KB) as problems, such as a significant deviation or loss, related to body function or structure. Indicators capturing specific impairment types, functioning or activity limitations are scarce in the currently available data.

To overcome this scarcity, we derived new indicators for a selection of sensory impairments. We identified hearing, vision and dual-sensory impairments using available electronic health records and the diagnosis of a clinician among individuals with a hospital record between 1 January 2011 and 23 January 2020.

In collaboration with experts, we assessed lists of medical codes (International Classification of Diseases and Health-related Problems, otherwise known as ICD-10 codes) found in primary and secondary diagnosis fields from Hospital Episode Statistics (HES) records. Primary fields of diagnosis indicate the main reason for an hospital admission. Secondary diagnosis fields record other underlying diseases, conditions, or comorbidities. While the primary reason for a hospital visit may not be related to a hearing, vision or dual-sensory impairment, it may still be recorded by a clinician as a secondary diagnosis.

As far as possible, we included ICD-10 codes capturing the selected sensory impairments where functioning problems were explicitly mentioned instead of diagnoses of potential health conditions that may occur on a spectrum of severity. More details about the exact ICD-10 codes that were selected as valid proxies for hearing- or vision-impairment, please refer to our accompanying methodology article: Coronavirus (COVID-19) related deaths by hearing and vision impairment status, England methodology.

This approach to defining impairment via electronic health records and clinical diagnoses does not capture the experience of disability and differs from the understanding of disability under the Equality Act (2010) and the social model of disability. The ICF describes experience of disability, or difficulties with functioning, as the result of interactions between an individual's health condition and their environment.

People with a hearing, vision or dual-sensory impairment may experience difficulties or limitations in functioning because of their environment, which are not strictly related to the body. Electronic health records or clinical diagnoses do not capture whether impairment is associated with those wider limitations in functioning. To fully understand and examine disability as understood by the ICF, one ideally has information on people's impairment, broader circumstances and whether the combination of these aspects causes a restriction in their daily activities or participation in society.

Furthermore, this approach does not rely on self-identification to the experience of disability. While we may capture people who identify as deaf/Deaf, hard-of-hearing, blind, partially sighted, or deafblind, we cannot make this assumption based on our identification approach. Please refer to Data sources and quality for an assessment of our approach.

This approach is not relevant to measure the prevalence of people with a hearing, vision, or dual-sensory impairment in the general population. However, this approach is relevant in the context of measuring differences in life outcomes between people with a hearing, vision, or dual-sensory impairment record, and people without such a record, as well as understanding what known factors (such as socio-demographic or health characteristics) may play a role in explaining differences in outcomes.

Statistical significance

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

8 . Data sources and quality

These analyses use data from the Office for National Statistics's (ONS's) Public Health Data Asset (PHDA) and build on the methods used in previous publications. The PHDA combines 2011 Census 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. We linked vaccination data from the National Immunisation Management Service (NIMS) to the PHDA based on NHS number to adjust for vaccination status.

Information about these data sources, how they have been linked, and the methods used for previous publications can be found in Estimates of coronavirus (COVID-19) related deaths by hearing and vision impairment status, England, methodology.

The study population consisted of people aged 30 to 100 years in England who were alive on 24 January 2020, could be linked to the 2011 Census and primary care records for current NHS patients and had at least one electronic hospital record between 1 January 2011 and 23 January 2020. People aged under 30 years were excluded because their living circumstances are more 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.

Strengths

The primary strength of the study is using nationwide linked population-level data. The data combine a rich set of demographic and socio-economic factors from the 2011 Census with death registrations data, pre-existing health conditions from electronic health records, and vaccination status from the National Immunisation Management System.

This study provides a methodological breakthrough given the scarcity of current indicators on specific impairment types in the current data landscape. Medical records are very important in identifying risk factors associated with coronavirus (COVID-19) infection and death. At present, available electronic health records for analysis do not provide clear indicators documenting functioning problems. This creates a wide evidence gap in the association of COVID-19 mortality with presence of an impairment.

This study is the first application of newly derived indicators from linked hospital records to show the association of COVID-19-related death with hearing, vision or dual-sensory impairments, and how mediating factors such as geography, socio-demographic characteristics, or health status can explain differences in COVID-19 outcomes between people with and without these impairments.

Limitations

Deriving impairment status through electronic health records is a specific channel of identification for the population with a sensory impairment. Therefore, this study does not reflect the true prevalence of hearing, vision and dual-sensory impairment in the general population in England. More specifically, it should be noted that:

- this identification approach may overrepresent people who acquired an impairment between 1 January 2011 and 23 January 2020

- this approach excludes people from the population who did not use hospital services during our study period, such as those who use private audiology services or those who did not seek any medical services at this point

- we cannot assess the possibility of a measurement error occurring during hospital registrations or clinical diagnosis whereby a hearing, vision or dual-sensory impairment is not recorded if the primary reason for visiting hospital is not related to one of these impairments

- as a consequence, we cannot exclude the possibility of individuals in the comparison group to have a hearing, vision or dual-impairment who is not captured by our identification criteria

- individuals with at least one hospital record are likely to have worse health outcomes compared with the general population; therefore, we have no indication of the differences in health outcomes between people with and without a sensory impairment for whom no hospital record was found

- selection or information bias is likely to occur in who constitutes the study population with an electronic hospital record between 1 January 2011 and 23 January 2020, as a number of population groups may be underrepresented in these records

Finally, the Public Health Data Asset (PHDA) 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

- people who registered with a general practitioner after the onset of the coronavirus pandemic, as we only account for pre-coronavirus pandemic health characteristics

Some of the socio-demographic characteristics might have changed since the 2011 Census and may not accurately reflect individuals' circumstances during the coronavirus pandemic. To mitigate measurement error, we restricted our analysis to people aged 30 years and over.

9 . Related links

Improving disability data to understand the effects of coronavirus (COVID-19) on people with different impairment types
Article | Released 7 June 2022
An overview of the strategies explored in an examination of administrative health data to provide more detail on the effects of coronavirus (COVID-19) on disabled people by impairment type.

Inclusive Data Taskforce recommendations report: Leaving no one behind – How can we be more inclusive in our data?
Report | Published 21 September 2021
An independent taskforce report commissioned by the National Statistician to recommend how best to make a step-change in the inclusivity of UK data and evidence.

Updated estimates of coronavirus (COVID-19) related deaths by disability status, England: 24 January 2020 to 9 March 2022
Article | Released 9 May 2022
Estimates of differences in coronavirus (COVID-19) mortality risk by self-reported disability status for deaths occurring up to 9 March 2022, using linked data from the Office for National Statistics' Public Health Data Asset.

Updated estimates of coronavirus (COVID-19) related deaths by pandemic wave and disability status, England: Article series
Article series| Latest release 9 May 2022
Series of articles covering estimates of coronavirus (COVID-19) related deaths by disability and learning disability status for deaths occurring up to 9 March 2022, using linked data from the 2011 Census, death registrations, and primary care and hospital records across each wave of the pandemic.

Disability pay gaps in the UK: 2021
Article | Released 25 April 2022
Earnings statistics for disabled and non-disabled employees in the UK, using regression analysis to provide more insight into factors that affect pay.

Outcomes for disabled people in the UK: 2021
Article | Released 10 February 2022
Outcomes for disabled people in the UK across a number of areas of life, such as employment, education, well-being, loneliness, crime and social participation. Statistical indicators based on annual data from various sources.

Coronavirus and the social impacts on disabled people in Great Britain: March 2020 to December 2021
Article | Released 2 February 2022
Analysis of the impact of the coronavirus (COVID-19) pandemic on disabled people in Great Britain during periods throughout the pandemic from March 2020 to December 2021. Based on estimates from the Opinions and Lifestyle Survey.

10 . Cite this article

Office for National Statistics (ONS), released 18 November 2022, ONS website, article, Estimates of coronavirus (COVID-19) related deaths by hearing and vision impairment status, England: 24 January 2020 to 20 July 2022