Office for National Statistics

Article

Comparisons of all-cause mortality between European countries and regions: data up to week ending 3 September 2021

Mortality patterns and measures of excess mortality of selected European countries and regions, week ending 3 January 2020 to week ending 3 September 2021.

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Notice

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Rates for England and Wales in this release are not directly comparable with the Excess mortality and mortality displacement in England and Wales release.

This release uses 1 January European population estimates produced by Eurostat, to be comparable against all European countries. The Excess mortality and mortality displacement in England and Wales release uses mid-year population estimates produced by the Office for National Statistics, to be comparable against our other mortality outputs. These statistics are not designed to be comparable with one another as they are designed for differing comparability needs.

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1 . Main points

- The UK has seen a gradual but sustained increase in relative excess mortality since spring 2021, after an initial drop from the very high excess mortality in winter 2020 to 21.
- For much of the first half of 2021, relative excess mortality in the UK was higher for younger people (aged 0 to 64 years) than for older people; this differed from most countries except Slovakia, Hungary and Czechia.
- In 2021 countries in central Europe such as Poland, Bulgaria and Czechia increasingly overtook western Europe (including the UK) to have the highest relative cumulative excess mortality since the start of the pandemic by mid-2021, while the UK was similar to Spain and Portugal.
- The Nordic countries, with the exception of Sweden, have consistently had lower than average levels of cumulative excess mortality since the start of 2020, despite the coronavirus (COVID-19) pandemic.

This article looks at all-cause mortality as a comparable international indicator of the impact of the coronavirus (COVID-19) pandemic and does not specifically analyse deaths due to COVID-19.

2 . Comparability of the data

The best way of comparing the mortality impact of the coronavirus (COVID-19) pandemic internationally is by looking at all-cause mortality compared with the five-year average. All-cause mortality avoids the problem of different countries recording COVID-19 deaths in different ways, and also takes into account the indirect impact of the coronavirus pandemic, such as deaths from other causes that might be related to delayed access to healthcare.

We have sourced our European mortality and population data from databases published by Eurostat. There are strict criteria that data must meet to be included, so analysing data from this source provides an opportunity to be as comparable as possible. This means we are reliant on the availability of data submitted to Eurostat by participating countries. More information about the data used in this article can be found in the accompanying methods paper.

3 . Relative age-standardised mortality rates

Age-standardised mortality rates (ASMRs) show the number of deaths observed per 100,000 people, taking into account differences in population age-structure between places and over time.

Relative age-standardised mortality rates (rASMRs) are measures of excess mortality. They are expressed as the percentage difference per week in 2020 or 2021 from the average expected ASMR in 2015 to 2019. See the accompanying methods paper for details of how these are calculated.

A negative value indicates a weekly 2020 or 2021 ASMR below what is expected, given the 2015 to 2019 five-year average for that week. In contrast, a positive value indicates a weekly ASMR above the five-year average.

Figure 1 shows relative age-standardised mortality rates (rASMRs) for the UK, constituent countries of the UK and 11 European countries with the highest peak in excess mortality (rASMRs) in the first half of 2021.

In 2020, Portugal had one of the lowest peak excess mortality levels of all European countries (30.7% higher than the five-year average in week ending 17 July), but it then had the highest peak excess mortality in early 2021 (83.0% in week ending 22 January).

Figure 1: Portugal had among the lowest peak excess mortality in 2020 but the highest in early 2021

Relative age-standardised mortality rates, all ages, weeks ending 3 January 2020 to 18 June 2021, 16 selected European countries

Download the data

.xlsx

Notes:

1. Data are provisional.

2. For the UK countries, non-residents are excluded for figures from England, Scotland and Wales but are included for Northern Ireland. However, the numbers of non-residents included are very small.

3. Information about whether non-residents are included for countries outside the UK is not provided by Eurostat.

4. UK data are based on date of registration rather than date of death. Most other European countries are based on date of death.

5. Age-standardised mortality rates are standardised to the 2013 European standard population.

6. Relative age-standardised mortality rates (rASMRs) are expressed as the percentage change per week in 2020 or 2021 from the average expected age-standardised mortality rate in 2015 to 2019.

7. The 16 countries selected are the UK, constituent countries of the UK and the European countries with the highest weekly rASMR between the weeks ending 8 January 2021 and 18 June 2021 (the last week data was available for all countries).

Spikes in excess mortality are generally characterised by higher peaks for all ages than for those aged 0 to 64 years. This is because COVID-19 disproportionately affects people in older age groups (those aged 65 years and over). However, this trend has become less clear for some countries in the first half of 2021, most noticeably for the UK nations, Czechia and Hungary. Compared with all ages, those aged up to 64 years in these countries saw worse mortality rates (higher rASMRs) relative to the average in some or all weeks. This suggests that COVID-19 disproportionately impacted mortality rates for younger compared with older age groups in these countries in the first half of 2021. Data by age bands can be found in the accompanying datasets.

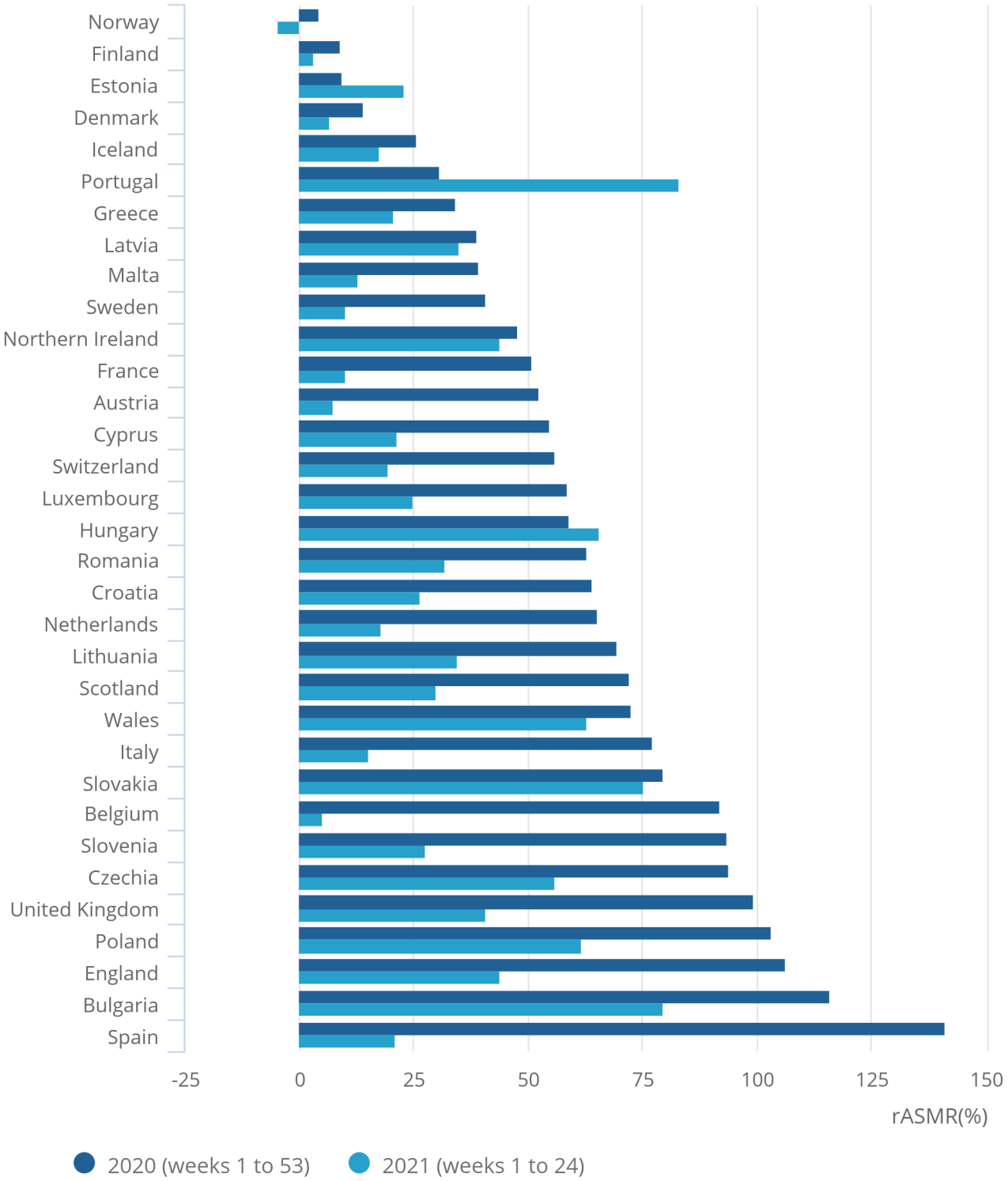
None of the 16 European countries with the highest peak excess mortality in the first half of 2021 were Nordic (a sub-region of Northern Europe comprising of Denmark, Finland, Iceland, Norway, and Sweden). Figure 2 shows that the Nordic countries had relatively low peak excess mortality in both 2020 and in the first half of 2021, compared with most other countries.

Figure 2: Compared with 2020, most countries had lower peak excess mortality in the first half of 2021

Relative age-standardised mortality rates, persons, all ages, weeks ending 3 January 2020 to 18 June 2021, European countries

Figure 2: Compared with 2020, most countries had lower peak excess mortality in the first half of 2021

Relative age-standardised mortality rates, persons, all ages, weeks ending 3 January 2020 to 18 June 2021, European countries



Source: Office for National Statistics, National Records Scotland, Northern Ireland Statistics and Research Agency, Eurostat

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Almost all countries had lower peak excess mortality in the first half of 2021 compared with 2020, except for Portugal (83.0% and 30.7%), Estonia (23.2% and 9.5%), and Hungary (65.5% and 59.0%). Spain had the highest peak excess mortality of all countries in 2020, and below average peak excess mortality in the first half of 2021, dropping from 141.2% to 21.1%.

Figure 3 shows a map of rASMRs at local authority level where data are available, using nomenclature of territorial units for statistics level 3 (NUTS3), a regional level of geography usually constituting one or two local government areas or municipalities.

The map depicts the spread of the coronavirus pandemic across Europe from spring 2020, starting in Lodi in northern Italy, through the relative low excess mortality for most countries during the summer months of 2020, followed by high levels of excess mortality in central Europe during winter 2020. During January to March 2021 there were again high levels of excess mortality as the winter and increased cases of COVID-19 took hold across much of Europe, with Portugal, countries in central Europe and the UK among the worst affected. Countries with high excess mortality in the second half of 2020 also tended to have high excess mortality in the first half of 2021, either as a continuation of a spike in excess mortality spanning both 2020 and 2021 (in Slovakia and the UK) or in two distinct spikes (in Bulgaria, Hungary and Poland)

Figure 3: Relative age-standardised mortality rates by week for local authorities (NUTS3 regions) of Europe, by age group

Interactive map, weeks ending 3 January 2020 to 3 September 2021

Download the data

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At the regional level, rASMRs had much larger variation than at national level because of smaller numbers of deaths involved, as well as specific areas within each country being more affected than others.

Excess mortality in the UK in 2021 peaked in January, before dropping to negative values (lower mortality compared with the five-year average) for all UK countries by the week ending 5 March 2021. Since then, excess mortality has steadily increased for all UK countries, and by the week ending 3 September 2021 ranged from -4.3% for England to 20.8% for Northern Ireland.

As seen in Figure 4, weekly rASMRs for the UK nations fluctuated considerably from week to week, and the UK nation with the highest excess mortality rate varied over time.

Figure 4: Excess mortality has been gradually increasing in all UK countries during 2021

Relative age-standardised mortality rates, all ages, weeks ending 3 January 2020 to 3 September 2021, UK countries

Download the data

.xlsx

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All 20 UK NUTS3 areas with the highest peak excess mortality levels in 2021 (up until 3 September 2021) are located in London, the South East, and the East of England, with the exception of Bridgend and Neath Port Talbot in South Wales (Table 1). The peak rates for these areas all occurred in January or in the first week of February 2021.

Table 1: Twenty UK NUTS3 areas with the highest weekly peak excess mortality in 2021 up to week ending 03 September 2021, persons, all ages

NUTs 3 area	rASMR (%)	Week ending
Enfield	226.2	15/01/2021
Tower Hamlets	213.7	22/01/2021
Hackney & Newham	178.0	15/01/2021
Norwich & East Norfolk	173.7	05/02/2021
Thurrock	173.6	08/01/2021
Redbridge & Waltham Forest	173.4	08/01/2021
Medway	172.4	15/01/2021
Barking & Dagenham and Havering	161.9	15/01/2021
Hounslow & Richmond upon Thames	145.4	29/01/2021
Bridgend and Neath Port Talbot	142.6	15/01/2021
Barnet	141.5	08/01/2021
Ealing	136.9	29/01/2021
Bromley	136.5	29/01/2021
Essex Haven Gateway	135.5	29/01/2021
Essex Thames Gateway	133.8	08/01/2021
Luton	132.5	15/01/2021
Bournemouth and Poole	132.5	05/02/2021
Bedford	131.0	15/01/2021
Mid Kent	130.8	08/01/2021
East Sussex CC	128.3	08/01/2021

Source: Source: Office for National Statistics, National Records Scotland, Northern Ireland Statistics and Research Agency

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5. Relative age-standardised mortality rates (rASMRs) are expressed as the percentage change per week in 2020 or 2021 from the average expected age-standardised mortality rate in 2015 to 2019.

4 . Relative cumulative age-standardised mortality rates

The next section uses relative cumulative age-standardised mortality rates (rcASMRs) to measure cumulative excess mortality relative to the 2015 to 2019 average mortality rates. Measures of cumulative mortality evaluate the total extent of mortality from one time point to another, relative to the average for an equivalent period in the past. The week ending 3 January 2020 is used as the start point in this article.

The rcASMRs we present for 2020 and 2021 show whether age-standardised mortality since the week ending 3 January 2020 has been above or below average up to that point. The rcASMR expresses this difference as a percentage relative to the average for an equivalent period in 2015 to 2019. A zero value for rcASMR indicates that age-standardised mortality for the period to date has been equal to the average. A positive value indicates worse than average mortality, and a negative value indicates better than average mortality. The rcASMR can increase or decrease over time.

By using an age-standardised rate-based measure of cumulative excess mortality, we are accounting for differences in both the age structures and seasonal mortality patterns of countries analysed. See the accompanying methods paper for further details of how rcASMRs are calculated.

Figure 5 shows the trend in rcASMR from the start of 2020 to week ending 18 June 2021 (the most recent week available at the time of analysis with data available for all countries) for the UK, constituent countries of the UK and11 countries with the highest rcASMRs by this point.

Figure 5: Most of the countries with the highest relative cumulative excess mortality by mid-2021 were in central Europe

Relative cumulative age-standardised mortality rates, persons, all ages and age 0 to 64 years, weeks ending 3 January 2020 to 18 June 2021, 16 selected European countries.

Download the data

.xlsx

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7. The 16 countries selected are the UK, constituent countries of the UK and the European countries with the highest weekly rASMR between the weeks ending 8 January 2021 and 18 June 2021 (the last week data was available for all countries).

By the week ending 18 June 2021, Poland had the highest rcASMR at 23.0% followed by Bulgaria at 20.8% and Czechia at 20.4%. All these countries had a negative rcASMR for the corresponding week in 2020 (ending 12 June), indicating that the rise in the rcASMR in these central European countries was driven entirely by excess mortality between mid-2020 and mid-2021. In contrast, following surges in mortality in the spring, many western European countries already had positive cumulative excess mortality by mid-2020, the highest being England (7.2%), the UK (6.7%), Spain (6.5%), Scotland (5.1%), and Wales (4.1%).

Negative rcASMRs indicate an overall improvement in mortality over time, while positive values indicate a worsening level of mortality. We recorded eight countries with negative rcASMR values by week ending 18 June 2021: Denmark, Cyprus, Finland, Iceland, Malta, Norway, Luxembourg, and Sweden. Norway had the lowest rcASMR, at -12.1%. These countries saw overall mortality rate improvement throughout 2020 and the first half of 2021 compared with the previous five years despite the coronavirus pandemic (see Figure 6 and Table 2).

Figure 6: While many central European countries have been hardest hit by the pandemic to date, most Nordic countries escaped with lower than expected relative cumulative excess mortality despite the pandemic

Relative cumulative age-standardised mortality rates, persons, all ages, weeks ending 3 January 2020 to week ending 3 September 2021, European countries.

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7. Weekly rcASMR from the week ending 3 January 2020 to the last week data was available are shown.

8. Countries included in this chart are Belgium, Spain, France, Italy, Netherlands, Sweden, United Kingdom

9. Countries included in this chart are Austria, Switzerland, Estonia, Greece, Croatia, Hungary, Lithuania, Luxembourg, Latvia, Malta, Portugal, Slovenia

10. Countries included in this chart are Cyprus, Denmark, Finland, Iceland, Norway

Table 2: Relative cumulative excess mortality in the week ending 18 June 2021, persons, selected age groups

		rcASMR (%)		
		All ages	0 to 64	65 years and over
Country	Poland	23.0	11.2	26.0
	Bulgaria	20.8	24.6	19.9
	Czechia	20.4	14.2	21.5
	Slovakia	17.1	12.9	18.0
	Romania	13.7	14.5	13.4
	Slovenia	10.2	-9.4	13.7
	Hungary	10.2	9.1	10.5
	Italy	9.1	2.5	10.1
	Wales	9.1	8.0	9.3
	Spain	8.3	3.6	9.1
	England	8.3	15.7	7.1
	United Kingdom	7.9	14.7	6.6
	Portugal	7.5	3.2	8.3
	Lithuania	7.4	3.9	8.4
	Croatia	5.4	1.0	6.2
	Belgium	4.9	-6.9	7.0
	Scotland	4.8	13.7	3.0
	Austria	4.0	-2.0	5.0
	Netherlands	3.6	-3.4	4.6
	France	3.5	-4.1	5.2
	Northern Ireland	3.0	8.9	2.0
	Latvia	2.3	-3.4	4.0
	Greece	1.6	2.7	1.4
	Switzerland	0.9	-8.2	2.1
	Estonia	0.3	-0.4	0.5
	Sweden	-2.3	-11.1	-1.1
	Luxembourg	-2.5	-6.0	-1.9
	Malta	-3.0	-7.0	-2.4
	Finland	-7.9	-6.4	-8.2
	Denmark	-8.3	-16.1	-7.0
	Cyprus	-10.6	7.4	-12.9
	Iceland	-10.8	4.4	-12.9
	Norway	-12.1	-14.5	-11.7

Source: Office for National Statistics, National Records Scotland, Northern Ireland Statistics and Research Agency, Eurostat

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For ages up to 64 years, Bulgaria had the highest rcASMR in the week ending 18 June 2021 by quite some way, at 24.6%, followed by England at 15.7%, the UK at 14.8%, and Romania at 14.5%. This means that England, and the UK as a whole, had higher excess mortality in the younger age groups than most other European countries.

In addition, several countries including Bulgaria, Romania, and (from late 2020/early 2021) all UK nations apart from Wales were unusual in having higher cumulative excess mortality for those aged up to 64 years than for those aged 65 years and over. This suggests that in relative terms, excess mortality of younger age groups in these countries has been adversely affected to a greater extent than for older age groups since the start of 2020, although the great majority of deaths were in the older age group.

For those aged 65 years and over, Poland had the highest rcASMR by 18 June 2021 (week 24) at 26.0%, followed by Czechia with 21.5% and Bulgaria with 19.9%.

In 2021, rcASMRs increased again for many countries, as combined winter pressures on health systems and increased numbers of COVID-19 infections led to higher-than-average levels of mortality. This increase was most evident for Poland, Bulgaria, Czechia, and Slovakia, all of which saw rcASMR increases in excess of 10% between the end of 2020 and mid-2021.

5 . Glossary

Age-standardised mortality rate

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. See the accompanying methods paper for how these are calculated.

Relative age-standardised mortality rate (rASMR)

Relative age-standardised mortality rates (rASMRs) are expressed as the percentage change per week in 2020 from the average expected age-standardised mortality rate in 2015 to 2019.

A negative value indicates a weekly 2020 ASMR below what is expected given the five-year average. In contrast, a positive value indicates a weekly ASMR above the five-year average.

Relative cumulative age-standardised mortality rate (rcASMR)

Relative cumulative age-standardised mortality rates (rcASMRs) are expressed as the percentage change per week in 2020 of the cumulative age-standardised mortality rate from the average cumulative age-standardised mortality rate in 2015 to 2019

A nil value for rcASMR indicates that age-standardised mortality for the year to date has been equal to the average. A positive value indicates worse than average mortality, and a negative value indicates better than average mortality.

6 . Data sources and quality

We use weekly all-cause death registration data published by Eurostat from contributing nations of the European Union and European Free Trade Association. There are clear criteria set out by Eurostat for data to be submitted to their database, based on official recording of deaths occurring in all settings, to maximise comparability.

For the UK we use Office for National Statistics (ONS) data for England and Wales, National Records Scotland (NRS) data for Scotland and Northern Ireland Statistics and Research Agency (NISRA) data for Northern Ireland.

Analysis of all-cause mortality allows us to examine the impact of the pandemic not only from deaths due to COVID-19 but also excess deaths that have occurred as a result of the wider impacts of the virus on healthcare systems and society. Given the widely differing practices in recording and reporting deaths relating to COVID-19 it is not possible at this time to conduct accurate international comparisons of deaths involving COVID-19 specifically.

More information can be fount in the accompanying methods paper.

7 . Related links

Eurostat data explorer
Webpage | Updated regularly
Deaths by week, five-year age group and NUTS 3 region.

NISRA Weekly deaths
Webpage | Updated weekly
Weekly death registrations in Northern Ireland.

Weekly and Monthly Data on Births and Deaths Registered in Scotland
Webpage | Updated regularly
Summary weekly and monthly data on births and deaths. All the figures for 2020 and 2021 are provisional and may be revised.

Deaths registered weekly in England and Wales
Webpage | Updated weekly
Provisional counts of the number of deaths registered in England and Wales, including deaths involving the coronavirus (COVID-19), by age, sex and region, in the latest weeks for which data are available.

Excess mortality and mortality displacement in England and Wales
Article | 15 October 2021
Deaths registered in England and Wales by week, from 28 December 2019 to 2 July 2021. Breakdowns include country, sex, age group, region, place of death, and leading cause. Includes analysis of excess deaths and relative cumulative age-standardised mortality rates.