"In May 2023, the month when the World Health Organization declared an end to the COVID-19 public-health emergency, excess mortality in the EU stood at 2.9% above the baseline, a slight decrease compared to April 2023."

"In May 2023, excess mortality continued to vary across the EU. Ten EU Member States recorded no excess deaths. More than half of the EU Member States recorded excess deaths, with the three most affected EU countries, Luxembourg, Finland and Ireland having excess mortality rates between 13.3% and 17.5%."

"Between March 2020 and May 2023, the EU recorded four distinct waves of excess mortality, with peaks in April 2020 (25.2%), November 2020 (40.0%, the highest), April 2021 (20.9%) and November 2021 (26.6%)."
In this article, **excess mortality** refers to the number of deaths from all causes measured during a crisis, above what could be observed under ‘normal’ conditions. The excess mortality indicator takes the number of people who died from any cause, in a given period, and compares it with a historical baseline from previous years in a period that was not affected by the COVID-19 pandemic. In this case, the baseline consists of the average number of deaths that occurred in each month during the period 2016-2019. The higher the value, the higher the amount of additional deaths compared with the baseline. In the case of a negative indicator, this means that fewer deaths occurred in a particular month compared with the baseline period.

This indicator – which is part of the [European Statistical Recovery Dashboard](https://ec.europa.eu/eurostat/web/recovery-dashboard) - highlights the magnitude of the health crisis by providing a comprehensive comparison of additional deaths among the European countries, allowing further analysis of the causes. While the international comparability of data directly associated with COVID-19 deaths may be arguable due to different rules for causes of death classification, as well as several under-coverage issues, this approach provides a general measure of the impact of the crisis on the mortality rate because it includes all deaths regardless of their cause.

The excess mortality indicator is based on a data collection in which National Statistical Institutes from the European Union ([EU](https://ec.europa.eu/eurostat)) and the European Free Trade Association ([EFTA](https://www.efta.int)) have transmitted weekly deaths data to
Eurostat on a voluntary basis since April 2020. The weekly deaths dataset that Eurostat publishes regularly is used to compute the monthly excess mortality indicator by mapping the deaths of each week to a full month. The data covered in this analysis include all deaths that have occurred since January 2020.

**Excess mortality in the EU between January 2020 and May 2023**

During the month of March 2020, the number of deaths rose rapidly in some European countries when compared with the average number of deaths in the period from 2016 to 2019. The COVID-19 pandemic affected every part of the EU, however, its impact was not evenly spread. The highest peaks of a higher-than-average number of deaths during the first increase in COVID-19 cases in March-April 2020 were initially recorded in Italy and Spain, followed by France, Belgium and the Netherlands. During the period between March 2020 and February 2021, the EU experienced two waves of excess mortality: the first between March and May 2020 (reaching a 25.2 % excess rate in April) and a second between August 2020 and the end of the year (reaching a 40.0 % excess rate in November, the highest rate for the whole year). In this second wave, excess mortality rose in all EU Member States, this time with a geographical prevalence in the eastern part of Europe (Poland, Bulgaria and Slovenia reached an excess of more than 90.0 % in November 2020).

Excess mortality levels reached a third peak in April 2021 (20.9 %) then decreased to a low of 5.7 % in July 2021, with some countries reaching a total number of deaths close to - or even below - the 2016-2019 baseline. During summer 2021, the downward trend reversed again and the EU rate increased to reach 12.8 % over the baseline period in September. Finally, in autumn-winter 2021, there was a fourth wave of excess mortality, this time with the EU rate reaching 26.6 % in November and 23.7 % in December 2021.

In the first quarter of 2022, the fourth wave of excess mortality weakened, with the overall rate falling to values more than three times lower than the November 2021 peak: 8.1 % in January and 8.3 % in February 2022, followed by 6.7 % in March 2022 (see Figure 1). In the second quarter, after a minor increase to 12.0 % in April 2022, in the following two months the EU excess mortality rate reverted to low values similar to the levels recorded at the beginning of the year: 8.0 % in May and 8.4 % in June. In the third quarter of 2022, the death rate in the EU increased in July and August compared with the previous months, to 17.1 % of the average number for the same period in 2016-2019 (it was 8.4 % in June). There were around 58 000 additional deaths in the EU in July 2022. This is an unusually high number for this month: the excess mortality rate was 2.8 % in July 2020 (11 500 excess deaths) and 5.7 % in July 2021 (19 700 excess deaths). In August 2022, excess mortality was again higher compared with the same month of the past two years: 13.9 % (52 500 additional deaths), versus an excess mortality rate of 7.6 % in August 2020 (27 300 excess deaths) and 9.1 % in August 2021 (36 000 excess deaths).

Based on the available information, some of the mortality increase in July and August 2022 compared with the same month of the past two years may be due to the heatwaves that affected parts of Europe during the reference period. In September 2022, excess mortality in the EU decreased compared with the previous month and was 10.3 % of the average number for the same period in 2016-2019.

In the last quarter of 2022, excess mortality continued to decrease in October and November to 11.6 % and 8.7 %, respectively. In December 2022, however, excess mortality in the EU increased compared with the previous month and was 20.0 % of the average number for the same period in 2016-2019. There were around 92 500 additional deaths in December 2022 in the EU. In comparison, the excess mortality rate was 29.7 % in December 2020 (135 000 excess deaths) and 23.7 % in December 2021 (115 000 excess deaths). In the first quarter of 2023 (January-March), excess mortality slightly varied from month to month. In January 2023, excess mortality in the EU decreased significantly compared with the previous months and was 3.9 % of the average number for the same period in 2016-2019. For reference, the excess mortality rate was 8.1 % (31 700 excess deaths) in January 2022 and 17.3 % in January 2021 (72 000 excess deaths). There were no excess deaths in January 2020 (pre-COVID-19 pandemic period) therefore, the excess mortality indicator was -5.7 %. In February 2023, for the first time since February 2020 (pre-COVID-19 pandemic period), there were no excess deaths and the indicator fell below the baseline to -1.4 %. In comparison, the excess mortality rate was 8.3 % in February 2022 (38 400 additional deaths), 6.0 % in February 2021 (27 000 excess deaths) and -2.5 % in February 2020. However, in March and April 2023, the mortality rate has returned to levels more in line with the rest of the COVID-19 pandemic period. In March 2023, excess mortality rose slightly above the baseline (2016-2019) to 0.9 % compared with excess mortality rates of 6.7 % in March 2022 (30 000 additional deaths), 10.7 % in March 2021 (33 300 additional deaths) and 13.6 % in...
March 2020 (47 500 additional deaths). In April 2023, excess mortality continued to rise, compared with the previous month, to 3.3 % (11 900 additional deaths) of the average number for the same period in 2016-2019. This can be compared with excess mortality rates of 12.0 % in April 2022 (40 200 excess deaths), 20.9 % in April 2021 (73 600 excess deaths) and 25.2 % in April 2020 (105 000 excess deaths). Excess mortality slightly decreased in May 2023, compared to the previous month, to 2.9 % (8 100 additional deaths). It was 8.0 % in May 2022 (31 100 additional deaths), 10.7 % in May 2021 (48 700 additional deaths) and 3.1 % in May 2020 (9 700 additional deaths).

Monthly excess mortality in the EU

![Diagram showing monthly excess mortality in the EU]

Note: Data for 2020-2023 are provisional.
Source: Eurostat (online data code: demo_mexrt)

Figure 1: Monthly excess mortality in the EU Source: Eurostat (demo_mexrt)

According to the weekly deaths statistics, between January 2020 and May 2023, around 1 765 000 additional deaths were recorded in the EU and EFTA countries, compared with the average number for the same period in 2016-2019 (see Weekly death statistics - Statistics Explained).

The annual excess mortality for the EU in 2020 was 11.8 % higher than the 2016-2019 average whilst in 2021 it was 14.0 % higher. In 2022, the annual excess mortality for the EU was 11.1 % higher than the 2016-2019 average while, in the first five months of 2023, the annual excess mortality for the EU was 1.9 % higher. There was wide variation in the same year among EU Member States, and from year to year for each Member State. In 2020, some EU Member States (Latvia, Denmark, Ireland, Estonia and Finland) reported an annual excess mortality rate below 5.0 %, while others (Belgium, Italy, Czechia, Spain, Slovenia, Malta and Poland) recorded rates of between 15.0 % and 20.0 %. In 2021, Sweden and Belgium, had an annual excess mortality rate below 5.0 %. By contrast, Bulgaria reported rates close to 40.0 %. Two of the countries which registered the most substantial improvements in the second year of the pandemic were Belgium (from an annual excess mortality rate of 16.3 % in 2020, to 3.0 % in 2021) and Spain (from 18.2 % in 2020 to 7.3 % in 2021). Unfortunately, there were several EU Member States where the annual excess mortality rates increased in 2021 compared with 2020: Slovakia (from 10.5 % to 35.7 %), Bulgaria (from 14.2 % to 38.0 %), Latvia (from 1.5 % to 21.7 %) and Estonia (from 2.3 % to 19.4 %). In 2022, differences in annual excess mortality rates remained between countries. The lowest annual rates were reported in Romania (3.4 %), Sweden (3.9 %) and Hungary (5.2 %) while the highest were in Cyprus (26.4 %), Malta (17.9 %) and Finland (17.1 %).
In the first five months of 2023, according to the available data, the lowest excess mortality rates were reported in Bulgaria (-9.3 %), Romania (-9.0 %) and Lithuania (-8.5 %) while the highest were reported in Ireland (10.2 %), the Netherlands (9.5 %) and Austria (9.3 %).

In order to assess the evolution of excess mortality since the beginning of the COVID-19 pandemic, the value of the indicator for the same period could be compared across all years (with the exception of 2020, where the considered period excludes the pre-COVID-19 pandemic months, January and February). Thus, excess mortality was 14.9 % in March-December 2020, 14.0 % in January-December 2021 and 11.1 % in January-December 2022. In the first five months of 2023, the excess mortality rate was 1.9 %.

The peaks of the outbreak vary greatly across EU Member States

EU countries were not affected in the same way or at the same time by the different waves of excess deaths. Table 1 and the Excel file below highlight the monthly rates of excess mortality in 2020-2023. The comparison of the number of deaths with data from the period 2016-2019 shows - at aggregate level - the exceptional situation that started in the first months of 2020. The first two months of the year presented lower values than those observed in previous years. However, while mortality normally started declining at the beginning of March, in 2020 – on the contrary – the number of deaths started to rise sharply. In March 2020, the values largely exceeded those recorded in the previous years, and this gap was at its height in April, while in the following month there was a sharp decrease. Values for the summer period of 2020 showed a lower level of mortality, compared with the average of the previous period, but a new upward trend started at the end of August and increased in October, reaching its peak in November 2020 at 40.0 %, the highest rate so far. This second wave continued until January-February 2021, and was more geographically balanced than the first one, with a prevalence of higher excess mortality in the eastern regions of the EU.

During the initial phase of the COVID-19 pandemic, the highest excess mortality rates in the EU were recorded in Spain (80.8 %), Belgium (73.1 %) and the Netherlands (53.8 %). Four other countries had a greater than 35.0 % increase in the number of deaths in April 2020, namely Italy (41.7 %, although the highest increase had already occurred in March at 49.6 %), Sweden (38.2 %), Ireland (38.0 %) and France (36.4 %). However, excess mortality spiked in several countries in other months of 2020: Malta in August (24.4 %), Cyprus in May (26.4 %), Portugal in July (25.8 %). In these countries, a relatively stable early summer period (compared with the 2016-2019 baseline) followed the high increase of mortality in spring. Then, a second sharp increase took place in most EU Member States, even in those less affected by the peaks in the spring of 2020. Increases of more than 10.0 %, compared with the baseline, were registered for the first time in Romania in July, in Poland in August and in Czechia in September 2020. Starting from September 2020, the increase was higher and more widespread, reaching new peaks in November, with significant rates in Poland (97.0 %), Bulgaria (94.0 %), Slovenia (91.3 %), Czechia (75.8 %), Romania (62.6 %) and Hungary (59.2 %). Countries with high values in spring 2020 recorded high excess mortality rates again in November 2020: Belgium (58.8 %), Italy (51.6 %), Austria (47.3 %), Malta (40.2 %), France (31.3 %) and Spain (24.4 %).
In January and February 2021, a slight decrease in excess mortality was observed for most countries, continuing the trend at the end of 2020. A third smaller spike then followed in March and April 2021, reaching 20.9% of excess mortality in April, compared with the baseline period 2016-2019. Some countries had very high rates, with excess mortality rates above 50.0% in Bulgaria (76.9% in April), Slovakia (74.9% in January), Poland (65.4% in April), Czechia (62.1% in March) and Hungary (50.6% in March). In May, June and July 2021, the overall number of deaths in the European Union declined further, reaching an overall rate of 5.7% in July 2021, the lowest rate since July 2020. Between September and November 2021, while the overall rate increased for a fourth time to reach 26.6% in November, excess mortality continued to vary considerably across the EU Member States. In October and November 2021, while some EU Member States (Romania, Bulgaria, Croatia, Slovenia, Czechia, Hungary, Slovakia, Poland, Latvia and Lithuania) recorded excess mortality rates higher than 40% (with Romania reaching 111.2% in October), some others recorded rates below 20.0%, or were even approaching a zero-excess rate (Table 1). In December 2021, excess mortality declined slightly to 23.7% but continued to vary across EU Member States: from 4.4% in Sweden to 65.0% in Slovakia and 69.1% in Poland.

In the first part of 2022, the fourth wave of COVID-19 pandemic weakened, but not in all EU Member States. Although the overall rate fell to values more than three times lower than in November 2021, some EU Member States recorded excess mortality rates many times higher than the EU rate: Bulgaria (47.0% in February), Cyprus (42.5% in March) and Romania (31.1% in February). By contrast, in Belgium, Germany and Sweden the total number of deaths, in the first half of the year, were very close to – or even below – their national monthly average for 2016-2019. In the second half of 2022, excess mortality continued to decrease from 17.1% in July to 8.7% in November. However, this trend changed once again in December when excess mortality reached the highest level of the 2022: 20.0%. The second part of the year was also marked by significant differences between the countries: Cyprus (21.9%), Germany (20.1%) and Finland (18.8%) recorded the highest rates in this period while Bulgaria (1.0%) and Romania (-1.3%) recorded low or no excess deaths in the last six months of 2022.

In the first quarter of 2023 (January-March), excess mortality declined considerably in comparison with the previous period to 3.9% in January, -1.4% in February and 0.9% in March. In January, at 3.9%, excess mortality fell to the lowest value since July 2020 but in February 2023, for the first time since February 2020 (pre-COVID-19 pandemic period), there were no excess deaths in the EU. However, there were still important differences between the countries in the first quarter of 2023 as thirteen EU Member States recorded excess deaths with the highest rates in Cyprus (10.2%) and the Netherlands (10.0%) while fourteen EU Member States recorded no excess deaths.

In April 2023, excess mortality rose to 3.3% and continued to vary across the EU. Among 19 EU Member States recorded excess deaths and among those, Austria (13.2%), Luxembourg (12.3%), Ireland (12.2%) and Finland (12.1%) recorded the highest excess mortality rates.

In May 2023, the World Health Organization declared an end to the COVID-19 public-health emergency. Excess

Table 1: Excess mortality indicator Source: Eurostat (demo_mexrt)
mortality in the EU fell slightly to 2.9% compared to April 2023. At the same time, more than half of the EU Member States recorded excess deaths - the highest rates were in Luxembourg (17.5%), Finland (14.3%) and Ireland (13.3%). Ten EU Member States recorded no excess deaths in May 2023: Romania (-8.8%), Bulgaria (-7.7%), Slovakia (-6.2%), Latvia (-6.0%), Lithuania (-3.7%), Czechia (-3.4%), Croatia (-3.2%), Hungary (-0.9%), Estonia (-0.7%) and Belgium (-0.5%).

In the tool below, you may select the country you would like to analyse.

**Further releases**

Data for the most recent months are provisional and subject to revision. This article and related table are updated monthly.

**Source data for tables and figures**

**Excess mortality data**

**Data sources**

The excess mortality indicator, covering EU and EFTA countries, is based on weekly deaths data transmitted to Eurostat by EU Member States on a voluntary basis. Data are classified by sex, five-year age groups and NUTS regions, and are continuously updated with more recent weeks of mortality statistics. These weekly data are then attributed pro-rata to months for computing the excess mortality indicator. For the purpose of the excess mortality indicator, the death figures for the latest weeks available in a Member State are corrected for incompleteness. Data from 2021 remain provisional and subject to revision with the next releases.

Thirty-one countries provide weekly mortality data: Belgium, Bulgaria, Czechia, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, Iceland, Liechtenstein, Norway and Switzerland. Data received from candidate and neighbouring countries are not present in this article. Due to missing or incomplete data from some countries, Eurostat has estimated the EU aggregate for May 2023, based on the latest available statistics. Data from Ireland were not included in the first phase of the excess mortality release: official timely data were not available because deaths in Ireland can be registered up to three months after the date of death. Because of the COVID-19 pandemic, the Central Statistics Office (CSO) of Ireland began to explore experimental ways of obtaining up-to-date mortality data. At the end of April 2021, CSO started publishing a time series from October 2019 until the most recent weeks, using death notices (see CSO website). For the purpose of this release, Eurostat is comparing the new 2020-2021 web-scraped series with a 2016-2019 baseline built using official data. CSO is periodically assessing the quality of these data.

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Data for several countries have been recalculated from 2021 onwards applying the new coefficients of data completeness transmitted by National Statistical Institutes in March 2023. For more information about Methodology, please consult Excess Mortality Metadata [1].

**Context**

The COVID-19 pandemic triggered tremendous interest in statistics. Hence, in April 2020, in cooperation with the National Statistical Institutes of the European Statistical System, Eurostat set up a special data collection on weekly deaths, in order to support the policy and research efforts related to the pandemic. National statistical institutes regularly and voluntarily transmit data to Eurostat on weekly deaths, up to the latest available week.

‘Excess mortality’ has been identified as the most useful indicator for assessing additional deaths, complementing the other indicators contained in the European Statistical Recovery Dashboard. In order to capture the dynamics of
mortality changes in a more stable way, the excess mortality indicator is calculated for each month, no later than 45
days after the end of the reference period (depending on data available to Eurostat from the national statistical
institutes). The indicator provides additional insight into the impact the COVID-19 crisis has had on European
societies. It should be stressed again that, while a substantial increase largely coincides with a COVID-19 outbreak
in each country, the indicator does not make a distinction between causes of death and does not differentiate sex or
age class. Statistics on excess deaths provide information about the burden of mortality potentially related to the
COVID-19 pandemic, thereby covering not only deaths that are directly attributed to the virus but also those
indirectly related to it. In addition to confirmed deaths, excess mortality captures COVID-19 deaths that were not
correctly diagnosed and reported, as well as deaths from other causes that may be attributed to the overall crisis
situation. It also accounts for the partial absence of deaths from other causes like accidents that did not occur due,
for example, to the limitations in commuting or travel during the lockdown periods.

See also

- Weekly death statistics
- Causes of death statistics
- Causes of death statistics by age group
- Mortality and life expectancy statistics

Database

- Mortality (DEMO_MEXRT), see:

  Excess mortality - monthly data (demo_mexrt)

  - Mortality (demomwk), see:

    Weekly deaths - special data collection (demomwk)

Dedicated section

- Population and health
- Population and Demography overview

Methodology

- Excess mortality (ESMS metadata file — demo_mexrt)

Visualisations

- Data Browser (Excess mortality line chart) - select geopolitical entity and time
- Data Browser (Excess mortality bar chart) - select time