



US Population All-Cause Mortality

Excess mortality declines to 0.4% in 2024

August 2025

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In brief

Understanding excess death rates in the wake of the COVID-19 pandemic is essential to assessing its lingering burden. In this report, RGA has updated its analysis of US population data to understand how all-cause excess mortality settled in 2024, the fifth year of COVID-19.

While we have observed persistent excess mortality in the US population following the acute phase of the COVID-19 pandemic, recent mortality trends suggest that all-cause mortality rates have continued to decrease substantially, with 2024 total excess mortality settling at just 0.4%. Minimal mortality burden from the past two flu seasons – impacting the 2024 calendar year – helped drive down excess mortality.

Age and sex differences significantly impact US population excess mortality estimates, which suggests the underlying drivers of persistent excess mortality vary based on these factors. To understand where population excess mortality may be headed in the medium term, a comprehensive evaluation of each major cause of death is essential. RGA will examine some of the trends in specific causes in subsequent reports.

Key takeaways

- US population mortality is a key source of granular and current mortality experience. Emerging US results may provide leading insights into mortality trends for insured lives applicable to multiple markets and multiple functions within an insurer. These population trends might also signal the time when insurers can confidently and reasonably redevelop new mortality bases from insured data.
- Using an updated US population expected basis, we approximate that US excess mortality in 2024 was 0.4%, a significant reduction from the 3.2% estimated in 2023. Age and sex differences significantly impact US population excess mortality estimates.
- The 2023–2024 and 2024–2025 flu seasons had diminished impacts on 2024 mortality, with peaks occurring in late 2023 and early 2025, respectively; this helped drive down overall excess mortality in 2024.

Introduction

Our [last report](#) presented US mortality experience in years 2020–2023, comparing actual mortality with pre-pandemic expectations. We also included “2024 outlook” statements suggesting where we expected overall US population excess mortality to settle by the end of that year. Here we review full-year 2024 excess mortality, including age and sex breakdowns, while separating COVID-19 and non-COVID-19 deaths.

Expected mortality rates are derived from an RGA-developed expected basis that uses US population mortality data from 2011–2019 inclusive. The baseline for comparison is a key assumption when calculating excess deaths. Expected mortality rates can be produced in numerous ways and will determine the excess results derived – read more about this in our [introductory report](#). In this current report, we have revised the expected basis, providing an updated assessment of the excess deaths that have occurred.

The prior basis included projected mortality rates for the 2020–2024 period and incorporated seasonality and improvement trends observed in the 2011–2019 data. March 2025 marked five years since the pandemic officially began. It is questionable whether estimates of excess mortality based on extrapolations of pre-pandemic mortality trends remain sensible over such an extended period. Consequently, we now include age- and sex-specific long-term rates (LTRs) of mortality improvement, reached after age- and sex-specific convergence periods, in the expected basis.

LTRs were derived using average annual improvements observed in the US from 1933 to 2023; mortality rates were taken from the [Human Mortality Database](#). While the expected basis again includes seasonality and begins with the trends supported by the 2011–2019 data, the expected mortality rates now converge toward LTRs. One additional, important update to the basis is our incorporation of the US Census Bureau’s (USCB’s) 2010–2020 intercensal population estimates, which were released in late 2024.

The results presented here use publicly available data from the US Centers for Disease Control and Prevention (CDC) and the USCB. The CDC and the USCB regularly update this data, and results presented in this analysis may change as new data becomes available.

All-cause mortality by period

US population age-adjusted death rates (AADRs) by pandemic period are shown in Figure 1. By calendar year, acute-phase excess mortality was 21.0% for 2020 (March–December), 18.8% for 2021, 11.3% for 2022, 3.2% for 2023, and 0.4% for 2024; see Table 1. Note: Some excess estimates are different than those published in our [last report](#), given the changes to the expected basis as described above.

Figure 1: Monthly actual and expected age-adjusted death rates (AADRs) for all ages (0–100) by calendar month for the pre-pandemic period February 2018–February 2020, the acute phase (March 2020–March 2022), and the post-acute phase (April 2022–December 2024) of the pandemic.

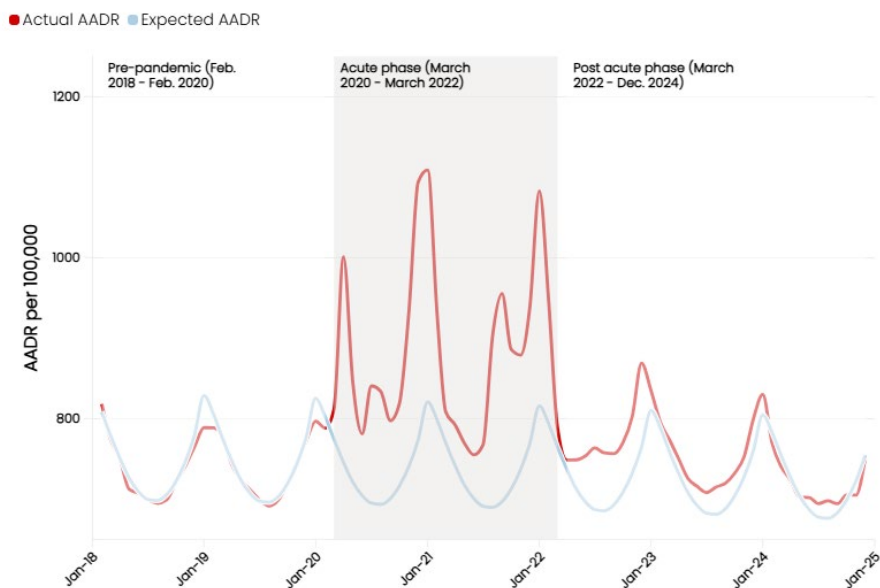


Table 1: Age-adjusted excess all-cause mortality (actual AADR/expected AADR – 1) by sex, age band, and calendar year.

Year	Female					Male					Total
	25–44	45–59	60–74	75–84	85+	25–44	45–59	60–74	75–84	85+	
2020*	19.1%	19.7%	19.1%	19.5%	20.2%	23.3%	25.9%	22.1%	22.0%	19.6%	21.0%
2021	34.0%	32.4%	22.8%	14.5%	7.7%	35.9%	37.8%	23.9%	16.1%	8.7%	18.8%
2022	17.2%	15.9%	13.1%	9.7%	7.9%	20.4%	19.1%	12.7%	9.4%	6.1%	11.3%
2023	7.1%	5.8%	5.2%	2.6%	1.4%	11.0%	9.6%	4.5%	0.7%	–2.3%	3.2%
2024	–1.9%	2.5%	3.9%	1.5%	–0.2%	–1.7%	4.0%	2.6%	–0.8%	–4.9%	0.4%

* March to December

All-cause mortality trends by age and sex

Figures 2 and 3 clearly illustrate that – for ages 25–100 – all-cause AADRs and COVID-19 deaths continued to decline in 2024, resulting in a substantial decrease in excess mortality. In our [last report](#), we suggested that excess mortality might settle in the range of 1%–3% for 2024 in total, mainly due to the recent shift forward in winter seasonal deaths among older lives. However, the 2023–2024 and 2024–2025 flu seasons had diminished impacts on 2024 mortality as they peaked in late 2023 and early 2025, respectively; this helped drive down excess mortality in 2024.

Figure 2: Monthly actual and expected AADRs for ages 25–100 for females and males. The period shown is January 2015 to December 2024.

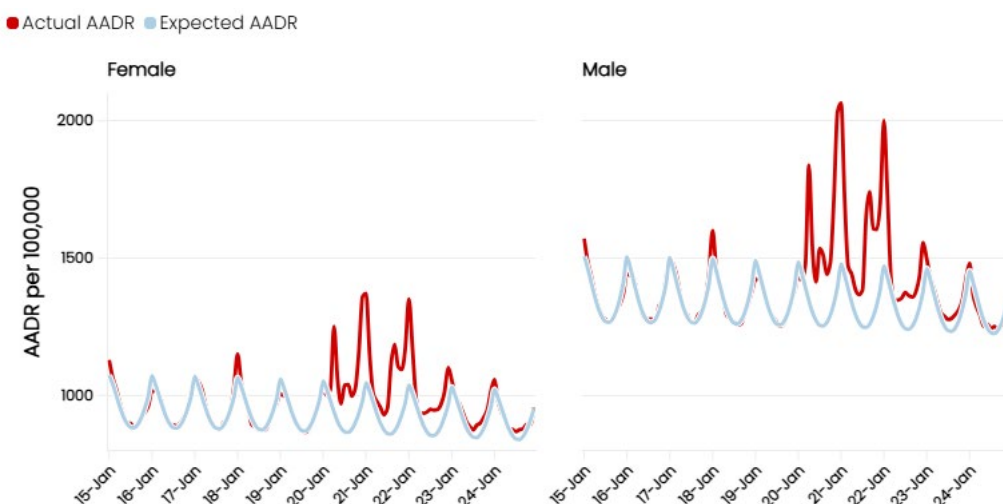
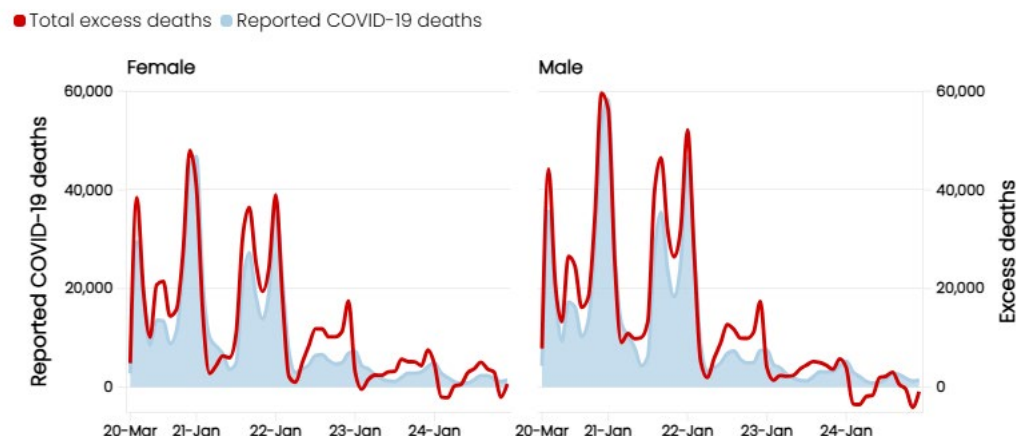


Figure 3: Total excess all deaths (reported deaths + IBNR deaths – expected deaths) and reported COVID-19-involved deaths by month for ages 25–100 for females and males. The period shown is March 2020 to December 2024.



Ages 25 to 44

Mortality trends among early adults in the US were recently reported by [Wrigley-Field et al.](#); as in our report, the researchers showed that mortality rates in early adulthood (ages 25–44 years) have risen substantially in two stages: 2011–2019 and 2020–2023; see Figure 4. From 2011 to 2019, we estimate that all-cause male annual dis-improvement was approximately 3.2%, while female dis-improvement was approximately 2.1% per annum. A significant rise in drug overdose deaths in this period helped fuel a large increase in all-cause mortality for this age group. The rise only worsened during the pandemic’s acute phase.

As predicted in our [last report](#), this age group has now achieved three straight years of improvement. A clear and obvious decline in mortality rates started after the acute phase of the pandemic; however, excess mortality remained higher than expected based on pre-pandemic levels in 2023. Using an updated expected basis, we estimate that 2023 excess mortality was 7.1% in females and 11.0% in males. These estimates are higher than we previously reported due to the convergence to LTRs in our existing expected basis.

The research by Wrigley-Field et al. indicated that the largest fraction of 2023 excess mortality was due to drug poisoning, but many other external and natural causes of death surpassed what historic trends would have projected. COVID-19 itself contributed much less to this group's excess than the sum of all other causes; see Figure 5.

Figure 4: Monthly actual and expected AADRs for ages 25-44 for females and males. The period shown is January 2015 to December 2024.

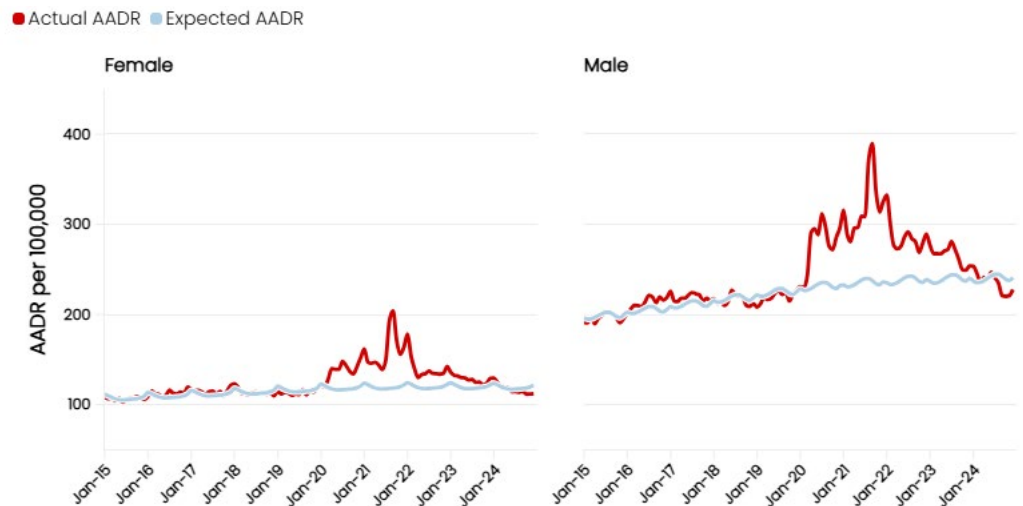
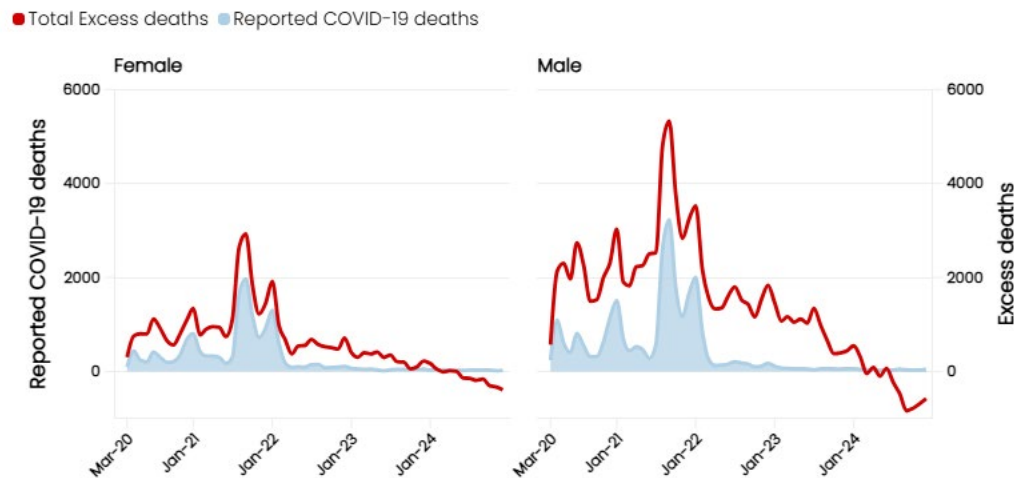


Figure 5: Total excess all deaths (reported deaths + IBNR deaths – expected deaths) and reported COVID-19 deaths by month for ages 25-44 for females and males. The period shown is March 2020 to December 2024.



2024 excess

Remarkably, 2024 AADRs in this age group nearly returned to 2019 levels for men and women. This is an astonishing recovery, considering the 2020–2023 trend, with significant year-on-year dis-improvements. Indeed, using the updated expected basis, we estimate that 2024 excess mortality ran negative: -1.9% in females and -1.7% in males. There remains a long way to go for this group to achieve what could be considered favorable mortality, but the 2024 result is a basis for cautious optimism.

Ages 45 to 59

From 2011 to 2019, AADRs in this age group were quite flat. The pandemic disrupted this trend; see Figure 6. During the acute phase of the pandemic, 45-to-59-year-olds suffered increased cardiovascular and metabolic disease deaths; research studies indicate that the pandemic exacerbated existing health issues, leading to more severe cases and higher mortality rates in individuals with these pre-existing conditions. Emerging from the public health emergency, excess cardiovascular deaths have continued at a slower pace while metabolic diseases have remained elevated, along with cancer deaths. In 2023, excess mortality was 5.8% for females and 9.6% for males; non-COVID-19 causes of death make up most of the excess, especially in males; see Figure 7.

Figure 6: Monthly actual and expected AADRs for ages 45-59 for females and males. The period shown is January 2015 to December 2024.

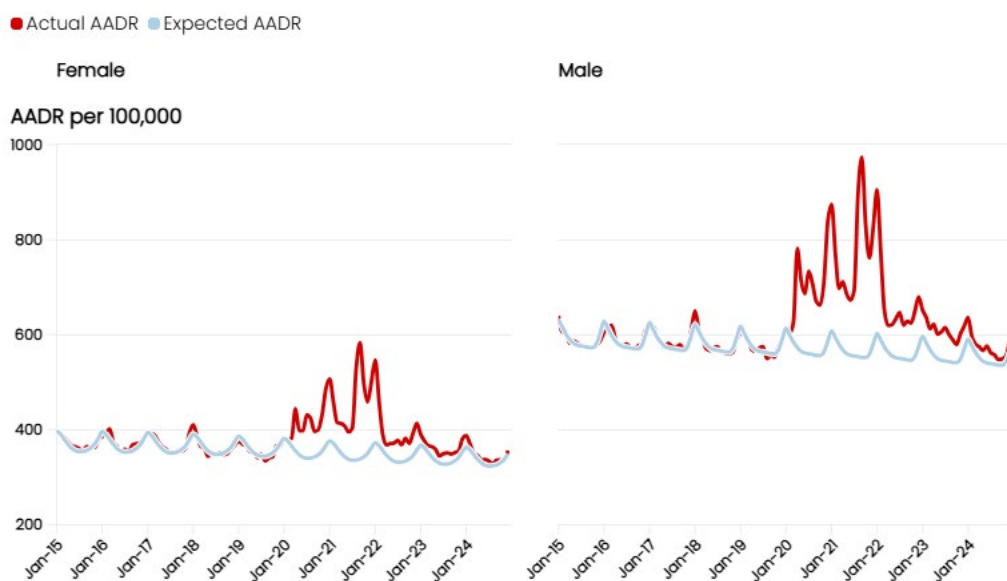
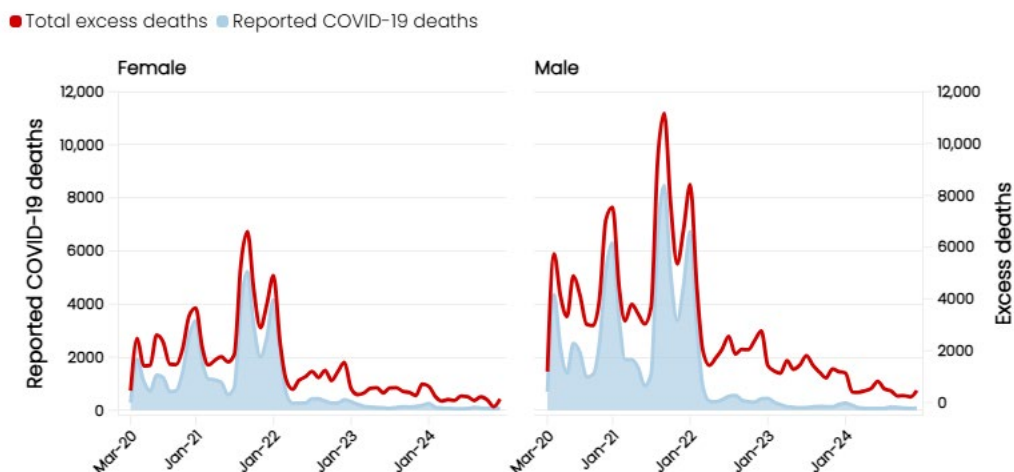


Figure 7: Total excess all deaths (reported deaths + IBNR deaths – expected deaths) and reported COVID-19-involved deaths by month for ages 45-59 for females and males. The period shown is March 2020 to December 2024.



2024 excess

Excess mortality in 2024 remained sizeable in this age group: 2.5% in females and 4.0% in males. COVID-19 was only a small contributor to the observed excess, with cancer and metabolic diseases being the most important drivers.

Ages 60 to 74

The 60-to-74-year-old cohort is a significant segment of the overall US population, often referred to as the “young-old” within the broader category of older adults. Recently published USCB data shows that, as the US population continued to age, the share of the population aged 65 and older increased from 12.4% in 2004 to 18.0% in 2024.

Mortality improvements, 2011-2019, have been minimal for this age group. AADRs have followed a strikingly comparable pattern for females and males in the period 2015-2024; see Figure 8. Furthermore, the pattern of excess mortality experienced between females and males is most similar in this age group compared to other age groups; see Figure 9. Using our updated expected basis – with the inclusion of LTRs – reveals that the excess mortality estimate for males increased in 2023; our latest estimates of 2023 excess mortality are 5.2% for females and 4.5% for males.

Figure 8: Monthly actual and expected AADRs for ages 60-74 for females and males. The period shown is January 2015 to December 2024.

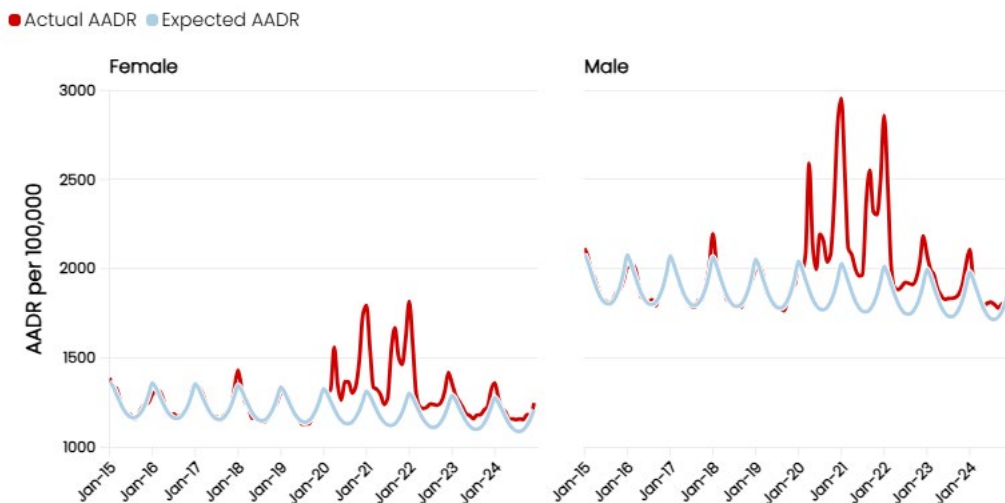
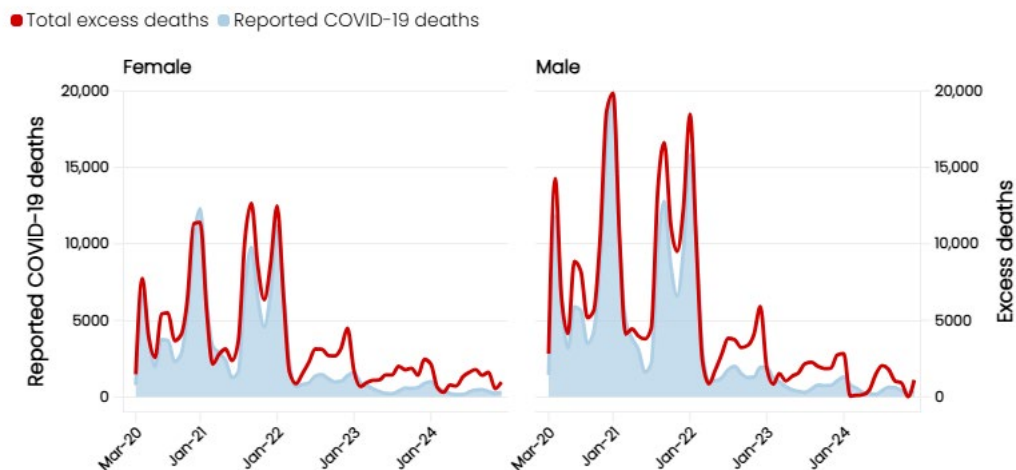


Figure 9: Total excess all deaths (reported deaths + IBNR deaths – expected deaths) and reported COVID-19 deaths by month for ages 60-74 for females and males. The period shown is March 2020 to December 2024.



2024 excess

Excess mortality in 2024 continues to be significant in this age group: 3.9% in females and 2.6% in males. On the other hand, 2024 AADRs in this age group are very close to pre-pandemic levels for both men and women.

Ages 75 to 84

The leading causes of death for this age group are very similar to the 60–74 age group, although pre-pandemic annual improvement rates have been higher in 75–84-year-olds. In the period 2011–2019, per annum improvements in AADRs were 0.8% for males and females; see Figure 10. In this age group, COVID-19 has driven almost all excess mortality since the pandemic began; see Figure 11.

Adjustments to the expected basis have had minimal impact on our [previously reported](#) excess mortality estimates. In 2023, excess mortality was 2.6% for females and 0.7% for males. The post-acute phase has seen a continuance of good experience from non-COVID-19 causes of death while COVID-19 mortality has slowly subsided; see Figure 11.

Figure 10: Monthly actual and expected AADRs for ages 75–84 for females and males. The period shown is January 2015 to December 2024.

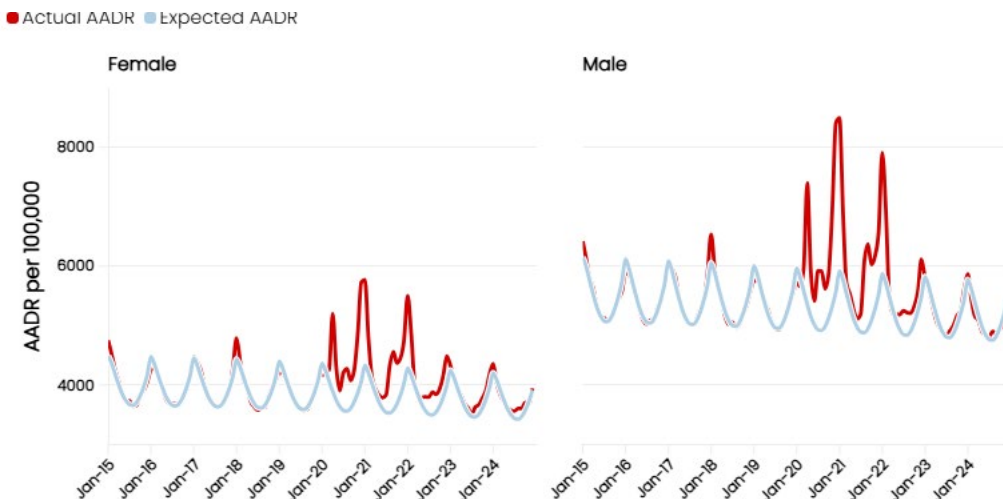
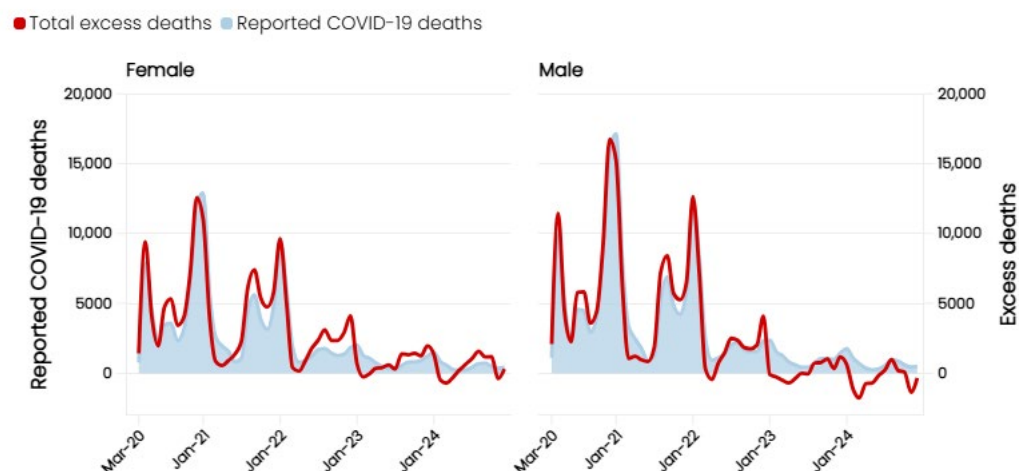


Figure 11: Total excess all deaths (reported deaths + IBNR deaths – expected deaths) and reported COVID-19 deaths by month for ages 75–84 for females and males. The period shown is March 2020 to December 2024.



2024 excess

Excess mortality in 2024 was quite different by sex: 1.5% in females and –0.8% in males. Minimal mortality burden from the past two flu seasons helped drive down excess mortality. Importantly, 2024 AADRs – in both men and women – are at levels lower than observed pre-pandemic. COVID-19 continues to be an important factor.

The higher excess in females relative to males appears to be a consequence of a material rise in cancer deaths; [modeling studies](#) support the hypothesis that declines in breast cancer screening and diagnosis during the pandemic could have material impact on cancer mortality in this timeframe.

Ages 85 and older

Incorporating the USCB's latest population estimates in our expected basis has had a material impact on the excess results for this age group. This is due to a significant change to our population exposure estimates in persons aged 85 and older.

Prior to the pandemic, this age group experienced substantial mortality improvement – around 1.4% per year in the period 2011-2019; see Figure 12.

This age group was the most vulnerable to COVID-19; according to [the CDC](#), the death rate for COVID-19 among adults aged 85 and over (1,645.0 per 100,000 population) was 2.8 times higher than the rate for ages 75–84 (589.8), and seven times higher than that for ages 65–74 (234.3) in 2020. While COVID-19 mortality rates in this age group decreased significantly over the course of the pandemic, they remained higher in 2023 than those for all other age groups. As in the acute phase, COVID-19 still appears to somewhat accelerate and displace deaths in this group, as indicated by the peaks in COVID-19 deaths followed by troughs in total excess deaths; see Figure 13.

Using our updated expected basis, we now report significantly different estimates of 2023 excess mortality: 1.4% in females and -2.3% in males. These estimates are much lower than our previous figures, given that we now reflect updates to the USCB's population estimates as well as convergence to LTRs.

Figure 12: Monthly actual and expected AADRs for ages 85 and older for females and males. The period shown is January 2015 to December 2024.

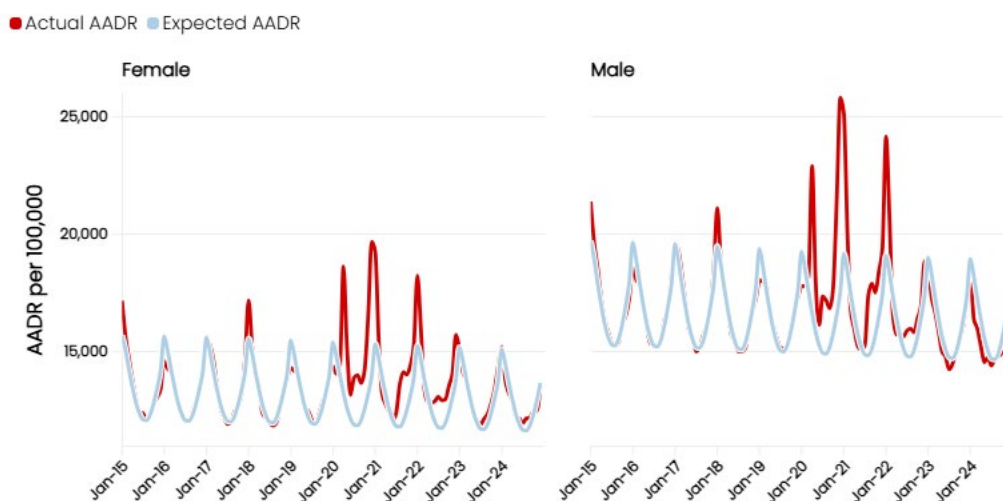
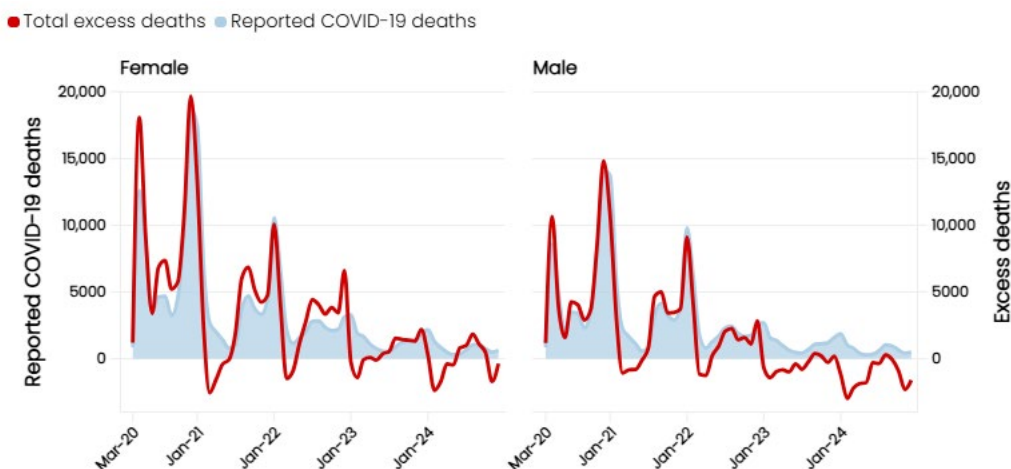


Figure 13: Total excess all deaths (reported deaths + IBNR deaths – expected deaths) and reported COVID-19 deaths by month for ages 85 and older for females and males. The period shown is March 2020 to December 2024.



2024 excess

Older adults, especially those aged 85+, are at a significantly higher risk of severe complications and death from influenza. Seasonal influenza's impact on all-cause mortality varies from year to year, with more severe seasons leading to higher mortality rates. The 2024–2025 influenza season in the US has been classified as “high severity” – the first high-severity designation since the 2017–2018 season.

Our [previous report](#) suggested that, due to concerns around the mortality burden of the 2024–2025 flu season, excess mortality and AADRs in this age group might remain higher than pre-pandemic expectations in 2024. The 2023–2024 and 2024–2025 flu seasons had diminished impacts on 2024 mortality in this age group, as they peaked in late 2023 and early 2025, respectively. This has certainly eased overall excess mortality in 2024.

AADRs have returned to pre-pandemic levels for both men and women. Indeed, male AADRs are the lowest we have ever observed. Consequently, our excess mortality estimates for 2024 are: –0.2% in females and –4.9% in males.

What's next?

RGA will continue to monitor US population mortality using the best data available and in near-real time, incorporating updates weekly and liaising with experts from the CDC, the USCB, and demographers as necessary. The results of this analysis are subject to change as new data becomes available.

To understand where population excess mortality may be headed in the medium term, a comprehensive evaluation of each major cause of death is essential. We will examine some of the trends for specific causes in subsequent reports.

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