

Investigating National Trends and Geographic Disparities in Cardiovascular Disease-Related Mortality Among Older Adults With Hematologic Malignancies in the United States

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Key
message

After two decades of decline, cardiovascular mortality in older adults with CLL, CML, and Hodgkin lymphoma rose sharply from 2018 to 2021 — and has **not returned to pre-2018 levels**.

Background

Advances in the management of chronic lymphocytic leukemia (CLL), chronic myeloid leukemia (CML), and Hodgkin lymphoma have improved survival, shifting causes of death away from the malignancies themselves and toward cardiovascular disease and second malignancies.

The pandemic era, however, affected patients with hematologic malignancies and may have altered cardiovascular mortality trends. This study analyzed temporal trends in cardiovascular disease–related mortality among older adults with these three malignancies in the United States.

Methods

Mortality data from 1999 to 2024 were obtained from **CDC WONDER** for adults aged ≥55 years in whom a hematologic malignancy and cardiovascular disease were listed as underlying or contributing causes of death.

Age-adjusted mortality rates (AAMRs) per 100,000 population were calculated, and temporal trends were analyzed with **Joinpoint Regression v6.0.1** to derive annual percentage changes (APCs). Analyses were stratified by year, sex, and census division.

Case definition

- C91.1** Chronic lymphocytic leukemia
- C92.1** Chronic myeloid leukemia
- C81** Hodgkin lymphoma
- I00–I99** Cardiovascular disease

ICD-10 codes, listed as underlying or contributing cause of death. Population: US adults aged ≥55 years, 1999–2024.

Limitations

Death-certificate data cannot establish causality, distinguish treatment-related cardiotoxicity from background cardiovascular risk, or adjust for stage, therapy, or comorbidity. Cause-of-death coding may be misclassified, and the 2018 inflection precedes the pandemic, so pandemic-era effects are temporal associations rather than attributed causes.

Figure 1 Age-adjusted CVD mortality by sex, 1999–2024

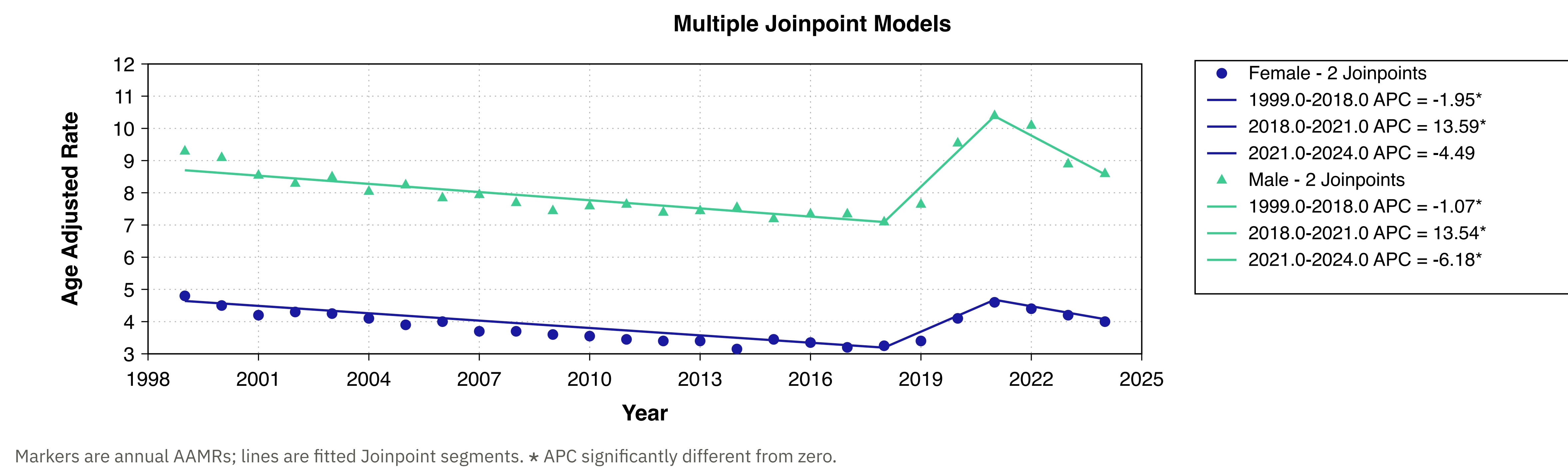
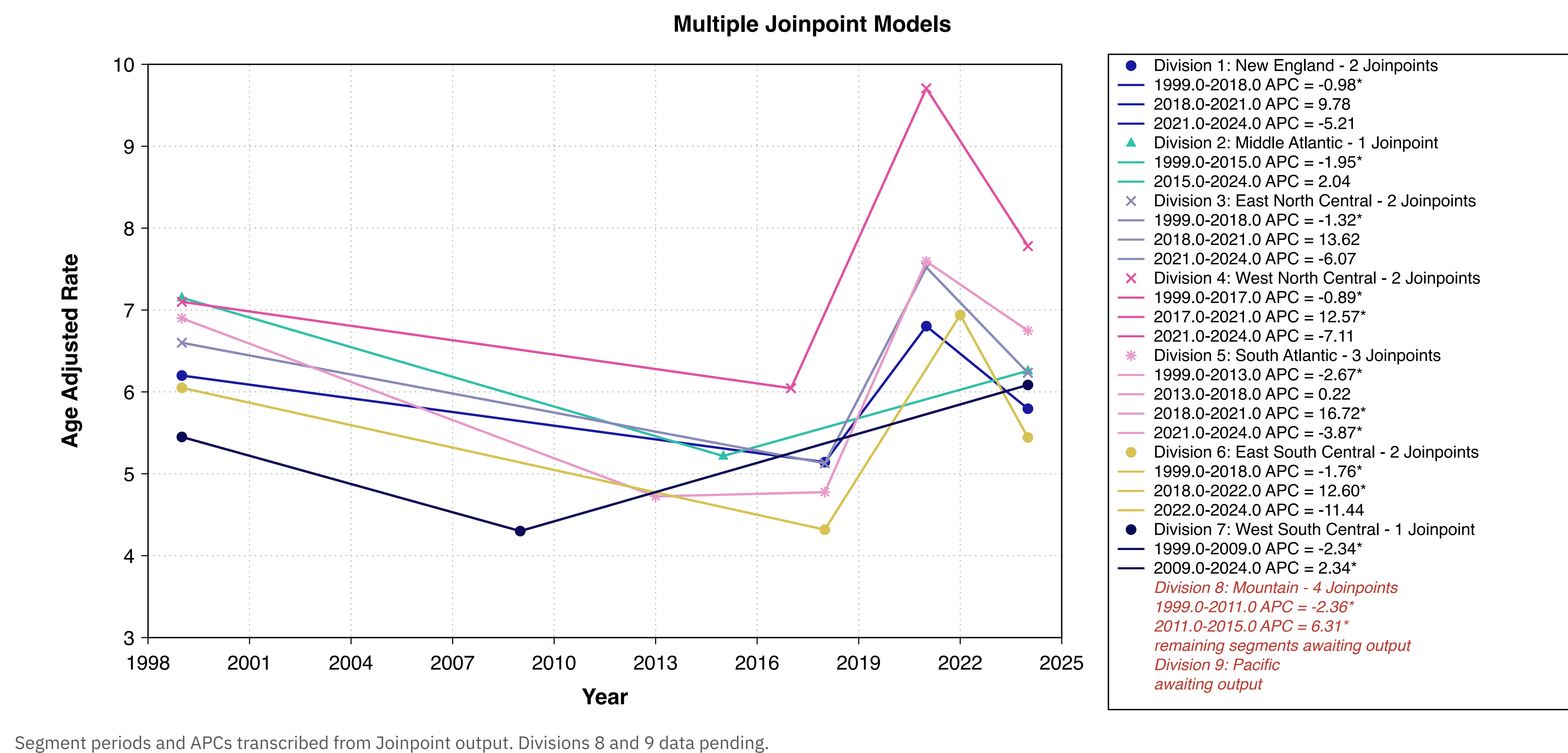


Figure 2 Age-adjusted CVD mortality by US census division, 1999–2024



109,035

CVD-related deaths in adults aged ≥55 years with CLL, CML, or Hodgkin lymphoma, 1999–2024

+13.5%/yr

APC in AAMR from 2018 to 2021 — nearly identical in men (+13.54) and women (+13.59)

2.3×

Male-to-female AAMR at the 2021 peak (10.4 vs 4.6 per 100,000)

Results

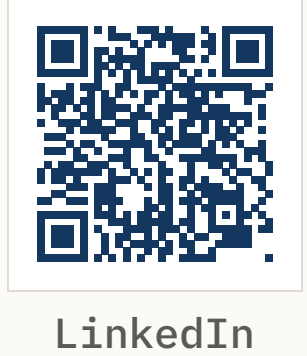
- A total of **109,035 deaths** were recorded.
- In **men**, AAMRs declined from 9.3 in 1999 to 7.1 in 2018 (APC −1.07), rose to 10.4 in 2021 (APC +13.54), then declined (APC −6.18).
- In **women**, AAMRs declined from 4.8 to 3.2 over the same period (APC −1.95), rose to 4.6 in 2021 (APC +13.59), then declined (APC −4.49).
- Most census divisions followed the same pattern: decline before 2018, sharp increase 2018–2021, partial decline thereafter.
- West North Central** showed one of the largest increases, from 5.7 in 2017 to 9.7 in 2021 (APC +12.57), declining after 2021 (APC −7.11).

Conclusions

After years of declining mortality, cardiovascular disease–related mortality among older adults with CLL, CML, and Hodgkin lymphoma **increased sharply during the pandemic era**, with persistent sex- and region-based disparities.

Although rates declined after 2021, they remain **higher than pre-pandemic levels** across most groups and regions.

These findings highlight the growing importance of **survivorship care, cardiovascular risk stratification, and cardio-oncology integration** in patients with hematologic malignancies.



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