

Nationwide Trends in Acute Myeloid Leukemia Mortality Arising from Philadelphia Chromosome–Negative Myeloproliferative Neoplasms in the United States, 1999–2023

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INTRODUCTION

Philadelphia chromosome-negative myeloproliferative neoplasms (MPNs) — including polycythemia vera, essential thrombocythemia, and myelofibrosis — carry a recognized risk of leukemic transformation to acute myeloid leukemia (AML), which is associated with poor prognosis. National mortality trends specifically related to AML arising from antecedent MPNs remain incompletely characterized.

AIM

To characterize national trends in AML-related mortality arising from antecedent Philadelphia chromosome-negative MPNs in the United States from 1999 to 2023, and to identify disparities by sex, age, race, ethnicity, urbanization, and geography.

METHOD

We conducted a population-based study using the CDC WONDER Multiple Cause of Death database, 1999–2023. Deaths were identified when AML (ICD-10 C92.0) was listed as the underlying cause and an MPN (D45, D47.1, D47.3) as a contributing cause. Crude and age-adjusted mortality rates (AAMRs), standardized to the 2000 U.S. population, were calculated. Temporal trends were assessed using Joinpoint regression with weighted Bayesian Information Criterion, reporting annual percent change (APC) with 95% CIs. Analyses were stratified by sex, age, race, ethnicity, urbanization, state, and place of death.

CONCLUSIONS

AML-related mortality arising from Philadelphia chromosome-negative MPNs declined substantially from 1999 through the mid-2010s, followed by plateauing through 2023. Persistent differences by age, sex, and geography highlight ongoing disparities and unmet needs in risk stratification, disease-modifying therapy, and end-of-life care.

RESULTS

- 3,704 AML-related deaths among patients with MPNs identified, 1999–2023.
- Overall AAMR declined significantly (APC –1.44%; 95% CI –2.46 to –0.40; p=0.007), with steeper declines through the mid-2010s followed by attenuation through 2023.
- Mortality higher in males than females (56% vs 44%). Male AAMR declined 1999–2015 (APC –3.54%; p<0.001), then a nonsignificant increase; female AAMR declined 1999–2013 (APC –4.27%; p<0.001), then stabilized.
- >80% of deaths occurred in patients aged ≥65 years; rates peaked at ages 75–84.
- White individuals accounted for ~85–90% of deaths; Hispanic individuals ~4%.
- Crude mortality rose with decreasing urbanization, highest in micropolitan/rural areas.
- Most deaths occurred inpatient (44%) or at home (38%), with home deaths increasing in recent years.

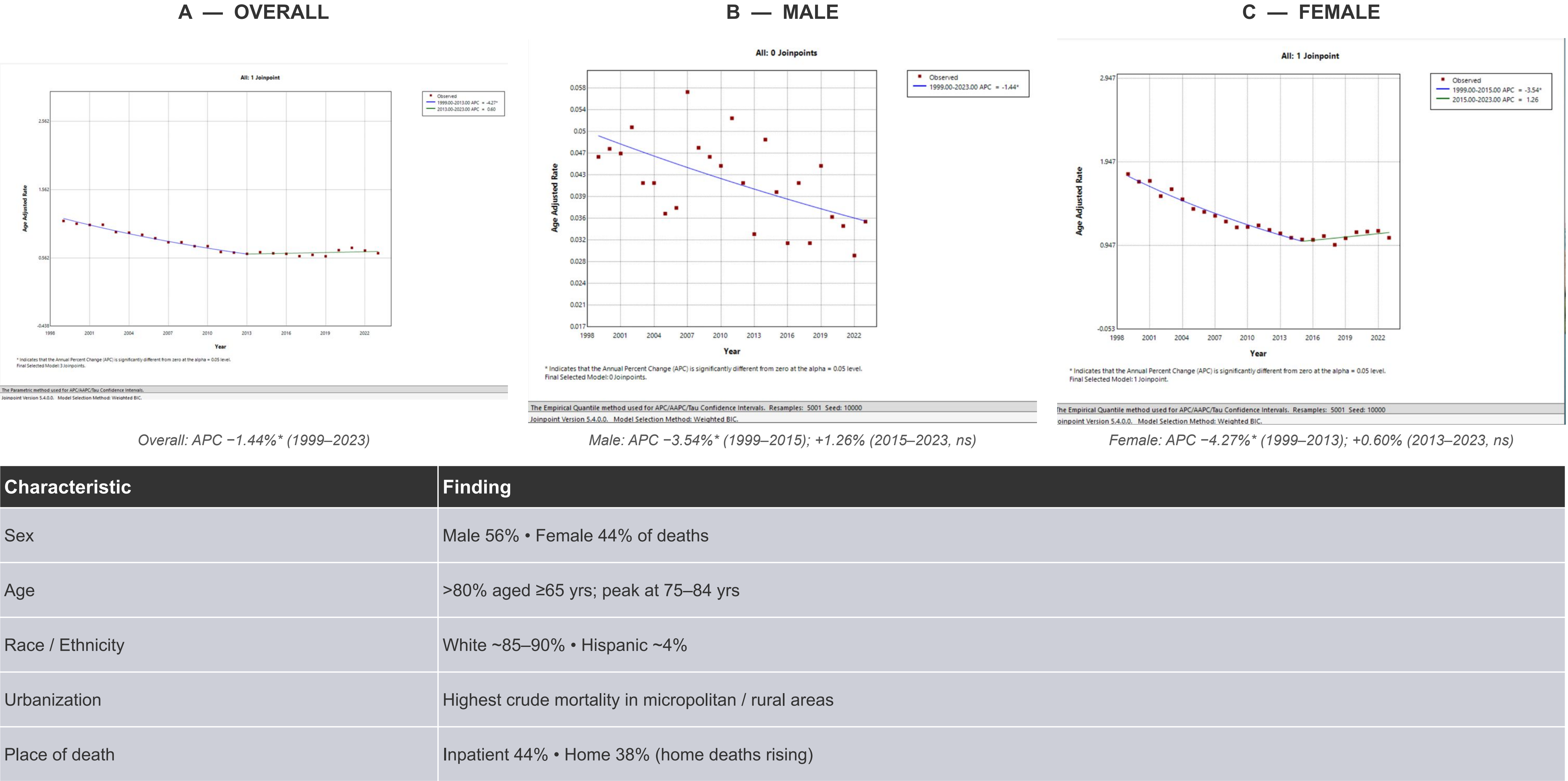


Figure 1. Age-adjusted AML mortality rate (AAMR) per 100,000, 1999–2023, by Joinpoint regression: (A) overall, (B) male, (C) female. APC = annual percent change; ns = not statistically significant; *p<0.05.

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REFERENCES

Data source: CDC WONDER Multiple Cause of Death Database, 1999–2023 (wonder.cdc.gov). Additional references available upon request.