# Disparities and Trends of Lymphoma Mortality from 1999 to 2023: A 24-year Retrospective Study

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## Background

Lymphoma is a cancer of the lymphatic system. Lymphoma represents 55.6% of all blood cancers in the US. Incidence and mortality have shifted over recent decades with improvements in diagnosis and therapy, yet substantial disparities remain by age, race/ethnicity, and region. Characterizing these patterns is important to inform public health efforts and resource allocation and to guide targeted interventions.

## Aim

This study aims to explore changes in trends and patterns in lymphoma mortality in the US from 1999 to 2023, stratified by gender, race, and geographic regions.

## Methods

We used the CDC-WONDER mortality database to extract age-adjusted mortality rates (AAMRs) per one million individuals for deaths from lymphoma from 1999 to 2023. The Joinpoint Regression Program was used to calculate the change in AAMRs as Annual Percentage Change (APC) and Average Annual Percentage Change (AAPC) with 95% Confidence Intervals (CI).

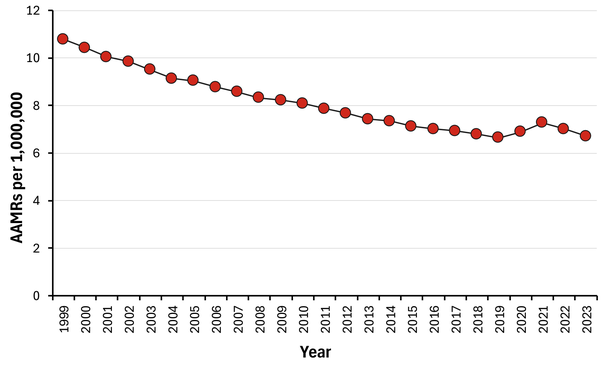
## Discussion

Our analysis of lymphoma mortality in the US from 1999 to 2023 reveals an overall decline interrupted by a concerning increase during 2018–2021, potentially reflecting healthcare disruptions such as those experienced during the COVID-19 pandemic, before sharply decreasing through 2023 [1]. Persistent disparities, higher mortality in males than females and non-Hispanic Whites than the other races, suggest that biological differences, care-seeking behaviors, and structural inequities may be responsible for this vulnerability [2]. The elevated mortality in the Midwest likely reflects regional disparities in healthcare access, socioeconomic status, and environmental exposures [3]. Older adults face higher lymphoma mortality because other illnesses, weaker immunity, and difficulty tolerating treatment make management more challenging. Collectively, these findings highlight the critical need for targeted interventions to improve access to advanced therapies, ensure continuity of care during crises, and tailor strategies that address demographic and geographic vulnerabilities in lymphoma mortality.

## Results

A total of 684,687 patients died due to lymphoma during 1999-2023. The AAMR decreased from 108.012 (95% CI: 106.78 – 109.24) in 1999 to 91.475 (90.38 – 92.57) in 2004 with an APC of -3.13% [-3.51 to -2.75]. The trend slowed down afterwards with AAMR reaching 67.99 till 2018 (APC: -2.24% [-2.34 to -2.15]). However, AAMR rose sharply till 2021, reaching 72.99 (72.15 – 73.84) with an APC of 2.41% [0.58 to 4.27]. Finally, AAMR decreased to 67.19 (66.40 – 67.98) in 2023 (APC: -3.10%, -4.79 to -1.39). Significant disparities were observed. The AAMR in females decreased from 85.91 (84.46 – 87.35) in 1999 to 49.55 (48.65 – 50.46) in 2023; APC: -2.21% (-2.71 to -1.71) vs AAMR in males decreased from 138 (135.82 – 140.19) in 1999 to 89.447 (88.07 – 90.83) in 2023; APC: -1.74% (-2.1 to -1.37). Non-Hispanic (NH) whites had the highest AAMR at 86.263 (85.13 – 87.39), followed by Hispanics (65.11), the black population (59.6), NH American Indians (54.47), and finally Asians (50.57). The Midwest had the highest AAMR at 88.4 (86.26 – 90.53), followed by the Northeast (81.18), the West (80.02), and the South (78.00). The 65+ age-group had the highest AAMR at 492.86 (486.12 – 499.6) with AAPC during 1999-2023 of -1.44% (-1.7 to -1.17).

**Trends in Lymphoma Mortality in the US,1999-2023**




## Conclusion

Lymphoma mortality had been decreasing from 1999 to 2018. Mortality increased from 2018 to 2021 and then declined again till 2023. Significant disparities were found. High-risk groups were males, NH whites, the Midwestern region, and elderly people. More research is needed to develop targeted interventions for these groups to address these disparities.

## References

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**The authors declare no conflict of interest**

**SOHO2025**