Temporal Trends and Demographic Patterns in Multiple Myeloma Incidence: A 22-Year Analysis of CDC WONDER Database (1999-2021)

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BACKGROUND

Multiple myeloma is a malignant neoplasm of plasma cells that accounts for approximately 10% of all hematologic cancers. It is characterized by clonal proliferation of plasma cells in the bone marrow leading to various systemic complications. The disease's epidemiology has evolved significantly over the past two decades, influenced by advances in diagnostics, therapeutic innovations, and demographic shifts in the population. The advancements have improved survival but disparities in incidence and outcomes persist across demographic groups. Understanding temporal and demographic trends in MM incidence is essential for identifying and management of high risk populations

METHODS

We conducted a retrospective analysis of multiple myeloma incidence rates using the CDC WONDER database from 1999 to 2021. The study analyzed age-adjusted crude rates per 100,000 across sex, race/ethnicity, and age groups, with linear regression used for temporal trends. Demographic comparisons were made across standardized CDC categories for sex, race/ethnicity, and age groups, with results visualized through various statistical plots.

RESULTS

The analysis revealed a consistent upward trend in myeloma incidence, with the age-adjusted crude rate increasing from 19.2 to 27.8 per 100,000 between 1999 and 2021 ($p < 0.001$). Males demonstrated higher incidence rates compared to females with a mean difference of 4.3 cases per 100,000 ($p < 0.001$), but both genders showed parallel increasing trends over time. Significant racial disparities were observed, with Black or African American individuals showing the highest incidence (42.3 per 100,000), followed by American Indian/Alaska Native (39.2) and White populations (23.1), and the lowest rates in Asian/Pacific Islanders (11.2).The heatmap showed a clear age-dependent rise in incidence, peaking in the 75–84 age group, with consistent patterns across sexes but higher rates in older males.

CONCLUSIONS

This comprehensive analysis reveals significant temporal increases in myeloma incidence over the past two decades, with pronounced demographic disparities. The findings highlight the need for enhanced screening protocols and targeted interventions for high risk populations, and further research into the causes of increasing incidence rates.

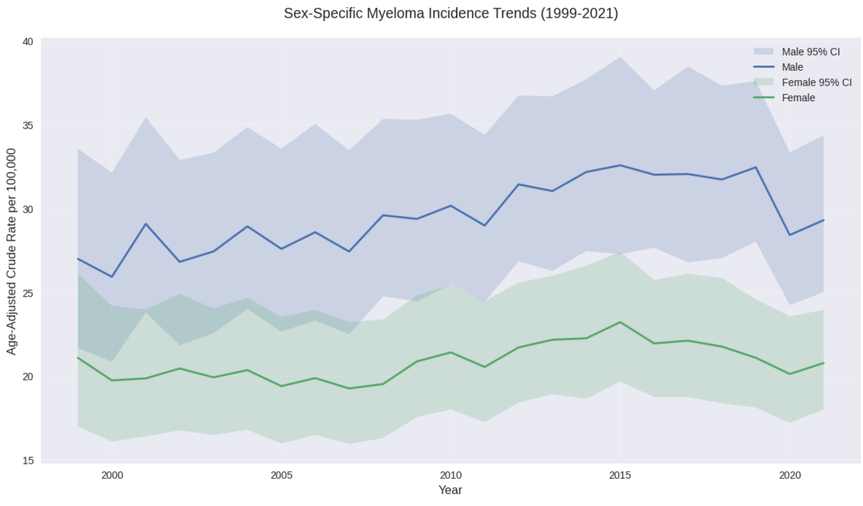


Figure 1. Age-adjusted incidence of multiple myeloma in the United States, 1999–2021, stratified by sex.

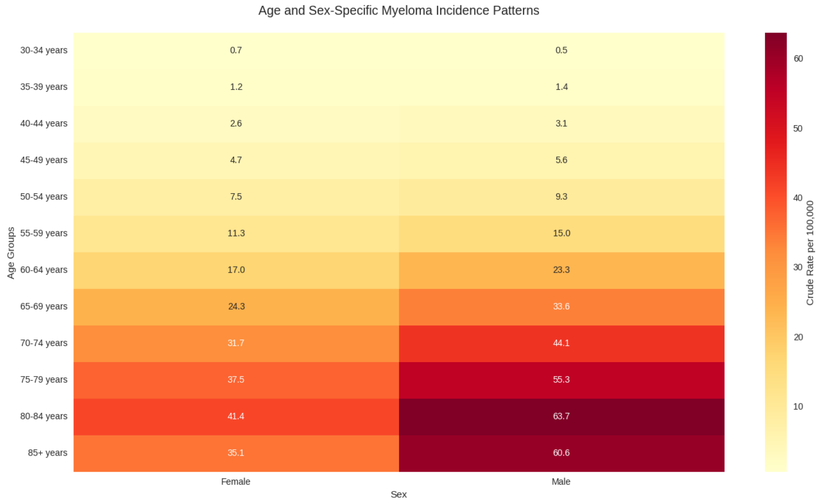


Figure 2. Heatmap of multiple myeloma incidence by age group and sex, demonstrating peak rates in ages 75–84.

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