Mortality Trends Related to Respiratory Infections in Adults with Non-Hodgkin Lymphoma: An Analysis of CDC Data from 1999 to 2020

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Introduction

- **Non-Hodgkin lymphoma (NHL)** is one of the most common haematological cancers, ranking **6th in cancer-related mortality** across the U.S.
- **Respiratory infections** are frequent and serious complications in NHL patients, especially after chemotherapy.
- These infections can lead to **hospitalization** and are associated with a **mortality rate of up to 33%**, despite overall favourable NHL outcomes.

Aim

This study analyzes **CDC WONDER data (1999–2020)** to examine long-term NHL-RI mortality trends. Focus is placed on identifying **demographic** and **geographic disparities** in NHL-RI mortality across the United States.

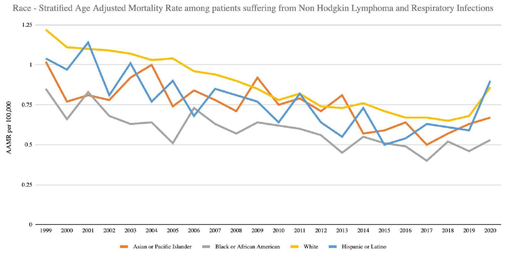
Objectives

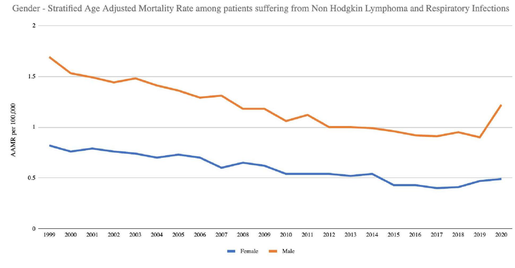
Monitoring NHL-related respiratory infection (**NHL-RI**) mortality trends is essential to:

- Identify at-risk populations
- Evaluate progress in treatment and infection control
- Guide future public health strategies

Methods

- National mortality data from CDC WONDER database (1999-2020) was analysed for adults aged 25-85+ years
- Deaths identified using ICD-10 codes: C82-C85 (non-Hodgkin lymphomas) AND J00-J22 (respiratory infections)
- Age-adjusted mortality rates calculated per 100,000 by sex, race/ethnicity, census region, state, and urbanization
- Temporal trends assessed using Joinpoint regression models with annual percentage changes via Monte Carlo Permutation and 95% confidence intervals

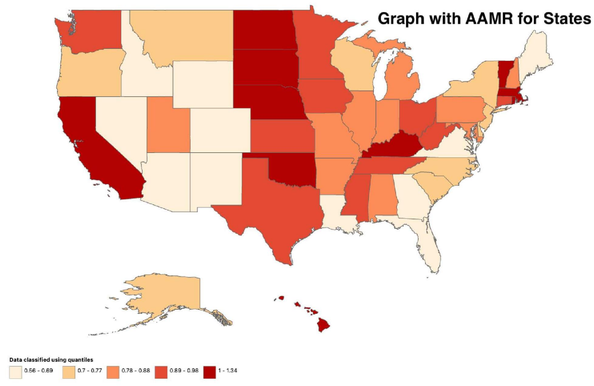




Results

Overall AAMR declined from 1.16 per 100,000 (1999) to 0.95 per 100,000 (2020), with steady decreases until 2018 followed by sharp increases through 2020

- **Gender:** Both sexes declined until 2018 (males APC = -3.31, females APC = -3.58), then rose sharply 2018-2020 with males showing greater increase (APC = 17.02 vs 8.06)
- **Race/Ethnicity:** Blacks and Asians showed consistent decline (APC = -2.26, -2.17). Whites and Hispanics declined until 2018 (APC = -3.35, -3.27) then increased sharply (APC = 15.16, 24.33)
- **Geography:** Midwest, Northeast, and South declined until 2018 (APC = -3.72, -3.2, -2.76) then increased (APC = 15.12, 12.07, 16.06). West consistently declined (APC = -3.40)
- **Urbanization:** All areas except small metro showed decline until 2018 followed by increases, with medium metro areas experiencing largest rise (APC = 16.04)
- **States:** Highest average AAMRs in Nebraska and Oklahoma (1.0-1.34), lowest in Louisiana and Arizona (0.56-0.69)



Census - Stratified Age Adjusted Mortality Rate among patients suffering from Non Hodgkin Lymphoma and Respiratory Infections

Discussion

- The observed "U-shaped" mortality pattern reflects evolving treatment landscapes: initial declines (1999-2018) likely resulted from improved NHL therapies including rituximab introduction in 1997, broad-spectrum antibiotic prophylaxis, and advanced treatments (monoclonal antibodies, PI3K inhibitors, immune checkpoint inhibitors)
- The sharp post-2018 mortality surge coincides with the COVID-19 pandemic emergence, highlighting NHL patients' heightened vulnerability to novel respiratory pathogens despite therapeutic advances
- Persistent racial disparities suggest structural healthcare inequities, with nearly half of Black and Native American patients in the lowest income quartile, affecting access to advanced treatments and preventive care

Clinical Implications

These findings emphasize need for :

- systematic infection prevention strategies,
- proactive immunosuppression monitoring, and
- equitable healthcare access to reduce disparities in high-risk NHL populations

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