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Mortality Trends Involving Lung Cancer and Cerebrovascular Disease in U.S. Adults, 1999–2024, With Projections to 2040

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Abstract

Background

Lung cancer and cerebrovascular disease (CeVD) are leading causes of mortality, with lung cancer heightening CeVD risks. This study analyzed U.S. mortality trends involving both conditions from 1999 to 2024 and forecasted rates through 2040 across demographic groups.

Methods

Using CDC WONDER (1999–2024), adult deaths involving lung cancer (ICD-10: C34) and CeVD (ICD-10: I60–I69) were extracted. Crude and age-adjusted mortality rates (AAMRs) per 1,000,000 were calculated. Joinpoint regression estimated annual percent changes (APC) and average annual percent changes (AAPC), stratified by sex, race/ethnicity, age, and region. ARIMA, ETS, and Prophet models forecasted trends through 2040 with 95% prediction intervals.

Results

Among 101,120 identified deaths, overall mortality significantly declined from 1999 to 2024 (AAPC: -1.08%; 95% CI: -1.29 to -0.82; $p < 0.001$). Rates dropped significantly in males (AAPC: -1.86%) but remained stable in females (-0.19%). Significant declines occurred in Non-Hispanic (NH) White (-1.05%) and NH Black (-0.93%) populations, but not among NH Asian/Pacific Islander (-1.40%) or Hispanic/Latino (-0.76%) groups. By region, declines were largest in the West (-1.51%), followed by the Northeast (-1.11%), Midwest (-0.70%), and South (-0.52%). Mortality decreased in adults aged ≥65 years (-1.18%) but remained stable in those aged 45–64 (0.24%). Forecasts indicate overall mortality will rise from 17.36 to 19.31 per 1,000,000 by 2040. Increases are projected for both females (15.35 to 19.41) and males (20.42 to 24.89), adults aged 45–64 (11.22 to 14.21), the Northeast (13.72 to 15.07), the West (14.23 to 15.08), and White individuals

(17.68 to 22.57), while declining in other subgroups.

Conclusion

Despite historical declines in combined lung cancer and CeVD mortality, rates are projected to rise through 2040 alongside persistent demographic disparities. Tailored clinical and preventive interventions are urgently needed.

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