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INTRODUCTION

Lung cancer remains the leading cause of cancer-related mortality in Kazakhstan and imposes a substantial burden on the healthcare system. Despite national tobacco control measures and efforts to reduce risk factor exposure, incidence and mortality remain high. Comprehensive long-term population-based studies evaluating trends in incidence, mortality, and stage distribution are lacking, limiting assessment of current strategies and optimization of oncological care. In the present study, we evaluated 20-year population-level trends in lung cancer incidence, mortality, and stage distribution in Kazakhstan.

METHODS

Histologically confirmed cases of lung cancer registered in the National Electronic Cancer Registry of Kazakhstan between 2005 and 2024 were included. Age-standardized incidence (ASIR) and mortality rates (ASMR) were calculated using the World Standard Population. Stage distribution (I-IV) was analyzed for 2011-2024. Temporal trends were assessed using Joinpoint regression (AAPC), and differences in stage distribution were evaluated with the χ^2 test.

CONCLUSION

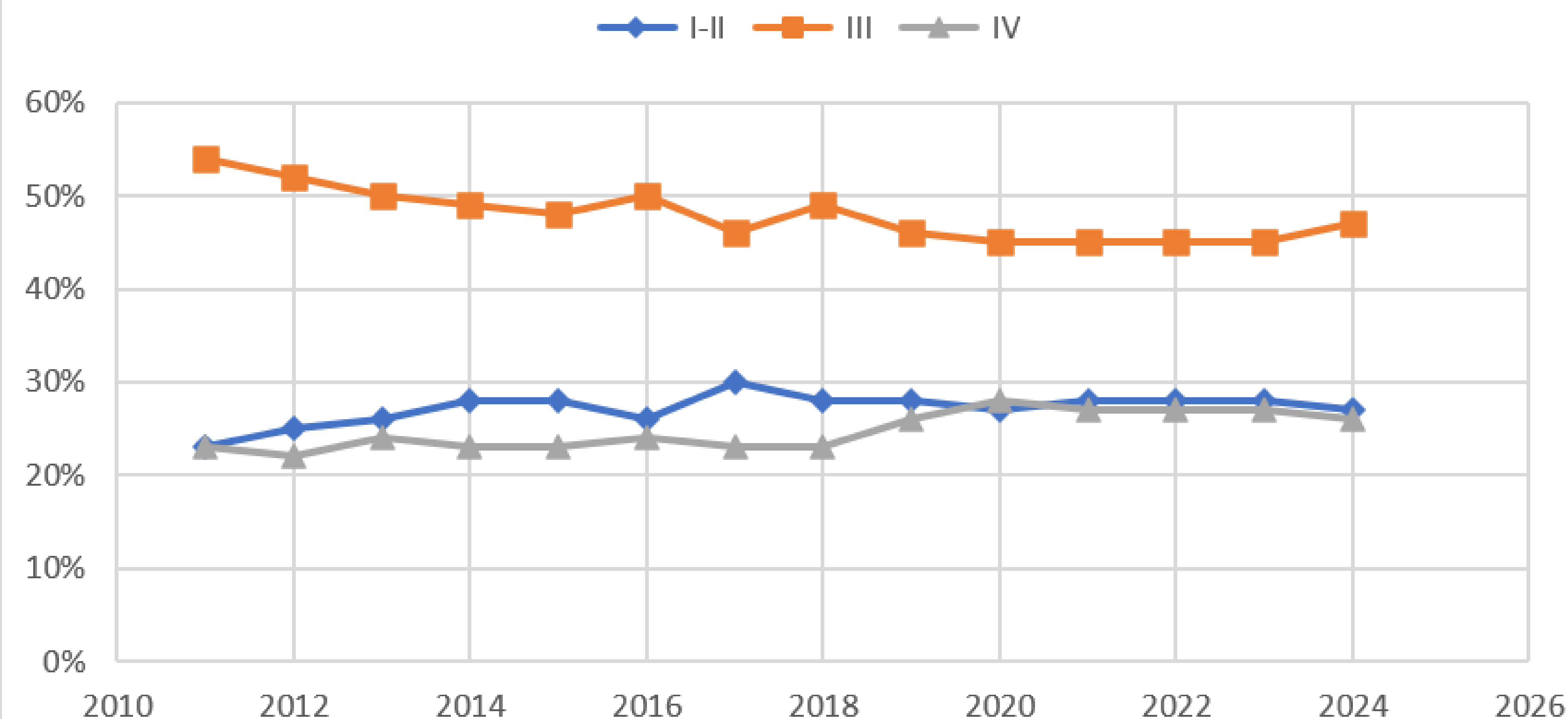
A pronounced gender difference was observed, with incidence and mortality significantly higher in men than in women, reflecting historical and current exposure to risk factors such as smoking, mining work, radon, and air pollution. The decline in incidence and mortality among men is likely associated with stricter tobacco control measures, regular occupational health screenings, and improved working conditions. In women, incidence remains relatively high due to the growing number of smokers and poor air quality. The increase in early-stage cases indicates partial improvement in early detection; however, stage III still predominates, highlighting the lack of a national screening program. These findings provide robust evidence to support organized LDCT screening, enhanced tobacco control, and targeted regional interventions.

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LUNG CANCER STAGE DISTRIBUTION, KAZAKHSTAN, 2011-2024



RESULTS

A total of 73,710 lung cancer cases were registered, 80% in men. Overall ASIR was 22.4 per 100,000, and ASMR was 16.6 per 100,000. Male-to-female incidence and mortality ratios were 6.26 and 4.70, respectively. The proportion of early-stage disease (I-II) increased from 23% in 2011 to 30% in 2017 (7% increase). Stage III decreased from 54% to 45% (9% decrease; AAPC -1.19% , $p < 0.001$), and stage IV increased from 23% to 26% (3% increase; AAPC $+1.5\%$, $p = 0.0005$). Male ASIR declined from 57.9 to 32.1 per 100,000 (AAPC -2.4% , $p < 0.001$), while female ASIR slightly rose from 6.9 to 8.6 (AAPC $+0.6\%$, $p = 0.03$). ASMR decreased in men from 53.2 to 17.7 per 100,000 (-35.5 ; APC -3.58%) and in women from 5.5 to 3.4 (-2.1 ; APC -2.31%), representing a 61% overall reduction in mortality.