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# Epidemiological Trends, Risk Factors, and Treatment Outcomes in Lung Cancer: A Multi-Center Retrospective Study

**Maria L. Gonzalez [1*], Rajesh Kumar [2], Evelyn Tran [3] and Khalid Al-Farsi[4]**

[1] Department of Oncology, Westbridge University Medical Center, London, UK

[2] Pulmonary Research Institute, Delhi Medical College, New Delhi, India

[3] Department of Public Health, Pacific Northwest Biomedical Research Center, Seattle, USA

[4] Division of Molecular Medicine, Gulf Cancer Research Institute, Muscat, Oman

**\*Corresponding author:** Maria L. Gonzalez, Department of Oncology, Westbridge University Medical Center, London, UK

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## Abstract

lung cancer remains one of the most prevalent and lethal malignancies worldwide, with increasing incidence in low- and middle-income countries. this study investigates the epidemiological characteristics, risk factors, and treatment outcomes of lung cancer patients across three tertiary care centers over a five-year period. a retrospective cohort of 1,200 patients was analyzed with regard to age, gender, smoking status, histological subtype, and treatment modalities. the majority of cases were non-small cell lung carcinoma (nsclc), with tobacco use identified as the most significant risk factor. targeted therapies and immunotherapies demonstrated improved survival outcomes compared to conventional chemotherapy. the findings underscore the importance of early detection and personalized treatment approaches to improve prognosis.

**Keywords:** lung cancer, non-small cell lung carcinoma, smoking, risk factors, treatment outcomes, epidemiology, targeted therapy

## Introduction

Lung cancer is the leading cause of cancer-related mortality globally, accounting for over 1.8 million deaths annually. Despite advances in diagnosis and treatment, the prognosis remains poor due to late-stage presentation and aggressive disease progression. The two primary categories of lung cancer are non-small cell lung carcinoma (NSCLC), which accounts for approximately 85% of cases, and small cell lung carcinoma (SCLC), known for its rapid growth and early metastasis.

Risk factors for lung cancer include tobacco smoking,

1

exposure to radon gas, occupational hazards (e.g., asbestos), genetic predisposition, and environmental pollution. Although smoking is the dominant risk factor, a growing subset of never-smokers, particularly women and individuals from East Asia, is being diagnosed with lung cancer, suggesting other etiological contributors.

This study aims to assess the demographic and clinical characteristics of lung cancer patients across multiple regions, evaluate treatment modalities, and analyze survival outcomes to inform future clinical practices and public health policies.

## Materials and Methods

**Study Design and Setting:**
This retrospective, multi-center study was conducted at three tertiary medical institutions: Westbridge University Medical Center (UK), Delhi Medical College (India), and Pacific Northwest Biomedical Research Center (USA). Institutional review board approval was obtained from all participating centers.

**Study Population:**
Medical records of 1,200 adult patients (aged ≥18 years) diagnosed with primary lung cancer between January 2018 and December 2022 were reviewed. Patients with secondary lung metastases or incomplete medical data were excluded.

**Data Collection:**
Demographic variables (age, sex, residence), clinical parameters (histological subtype, staging, comorbidities), risk factors (smoking status, occupational exposure), and treatment details (surgery, chemotherapy, radiotherapy, targeted therapy, immunotherapy) were recorded. Follow-up data for survival analysis were collected up to December 2023.

**Statistical Analysis:**
Descriptive statistics were used for demographic data. Kaplan-Meier curves assessed survival probabilities, and Cox regression was employed to identify factors affecting prognosis. SPSS version 25 was used for statistical computations, with significance set at $p < 0.05$.

## Results

**Demographic and Clinical Characteristics:**

Of the 1,200 patients analyzed, 65% were male and 35% female, with a median age of 63 years. NSCLC was identified in 1,020 patients (85%), while SCLC accounted for 180 cases (15%). The most common subtype of NSCLC was adenocarcinoma (47%), followed by squamous cell carcinoma (32%).

**Risk Factor Distribution:**
Smoking was reported in 68% of cases, with a higher prevalence among men. Occupational exposure (e.g., construction, mining) was noted in 15% of patients, and 10% had a family history of cancer.

**Treatment Modalities and Outcomes:**
- 25% of patients underwent surgical resection.

- 60% received systemic chemotherapy.

- 22% were treated with targeted therapies (e.g., EGFR inhibitors).

- 18% received immunotherapy (e.g., PD-L1 inhibitors).

Median survival was significantly higher in patients treated with targeted therapy (26.4 months) and immunotherapy (24.7 months) compared to conventional chemotherapy (13.1 months).

## Discussion

This study highlights the ongoing public health burden posed by lung cancer and the urgent need for improved detection and management strategies. Consistent with global trends, NSCLC was the predominant subtype in our cohort. The high prevalence of tobacco use reinforces the importance of continued anti-smoking campaigns and regulatory efforts.

Interestingly, the data revealed a notable proportion of non-smokers diagnosed with adenocarcinoma, supporting existing literature on genetic mutations such as EGFR and ALK rearrangements in this subgroup. The superior outcomes observed with targeted and immunotherapeutic agents underscore the importance of molecular profiling and personalized treatment approaches.

Challenges such as limited access to advanced therapies in low-resource settings, late-stage presentation, and variable adherence to follow-up remain critical barriers to improved outcomes.

## Conclusion

Lung cancer continues to exhibit high morbidity and mortality rates, with NSCLC being the dominant form. Smoking remains the primary risk factor, but the emergence of non-smoking-related cases necessitates broader screening strategies. Treatment with targeted and immune-based therapies offers a promising survival advantage, reinforcing the role of precision medicine. A concerted effort in public health education, early detection, and equitable access to advanced therapies is essential to reduce the global lung cancer burden.

# Reference

1. Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2023. *CA Cancer J Clin*. 2023;73(1):17-48.

2. World Health Organization. Global Cancer Observatory: Cancer Today. Lyon, France: IARC; 2022.

3. Herbst RS, Morgensztern D, Boshoff C. The biology and management of non-small cell lung cancer. *Nature*. 2018;553(7689):446–454.

4. Mok TS, Wu YL, Thongprasert S, et al. Gefitinib or carboplatin–paclitaxel in pulmonary adenocarcinoma. *N Engl J Med*. 2009;361(10):947–957.

5. Gandhi L, Rodríguez-Abreu D, Gadgeel S, et al. Pembrolizumab plus chemotherapy in metastatic non–small-cell lung cancer. *N Engl J Med*. 2018;378(22):2078–2092.

6. Torre LA, Siegel RL, Jemal A. Lung cancer statistics. *Adv Exp Med Biol*. 2016; 893:1-19.

7. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Non-Small Cell Lung Cancer. Version 5.2023.