The Influence of Air Quality on Lung Cancer Never-Smokers Compared to Smokers

Objective
Lung cancer is the leading cause of cancer-related death in the United States. The percentage of patients with lung cancer and no smoking history has risen in recent years, but clear alternative risk factors or specific carcinogens have not been well studied. As such, our goal was to determine the impact of air quality on incidence and outcome of lung cancer in never-smokers compared to smokers.

Methods
The Cancer Registry from a large urban medical center was queried to include every new diagnosis of lung cancer from 2012 to 2023 in Wayne County, Michigan. Air quality and pollution data for the county were obtained from the United States Environmental Protection Agency from 1980 to 2018. Patient demographics, tumor stage, smoking history and survival were recorded. Statistical analyses were conducted in Stata. A spatial empirical Bayesian approach was used to map lung cancer incidence rates per 100,000 population for never-smokers and smokers.

Results
A total of 2,762 new cases of lung cancer were identified during the study period. Mean age was 69.1 years (68.6 years for never-smokers). There was a nonsmoking rate of 7.2 percent. A total of 39.8 percent of patients (1,099/2,762) identified as a racial minority. Overall mortality was similar when comparing never-smokers to smokers in each stage. When analyzing geographic distribution of incidence, incidence of lung cancer among never-smokers was more closely associated with highly polluted areas and industrial facilities compared to smokers (Figure 1, > 90% confidence).

Conclusions
Newly diagnosed lung cancer among never-smokers appears to be more closely associated with poor air quality and industrial facilities than in smokers. Future studies are needed to examine the associations of specific pollutants with lung cancer incidence and mortality.

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