

Poverty and Lung Cancer Incidence

Boscoe et al reported a socioeconomic component of cancer incidence.¹ In Figure 2 of their article, they demonstrated a highly significant correlation between area poverty rate, race, and age-adjusted lung cancer incidence. However, they did not control for smoking because smoking data are not included in the central cancer registry data they used. We have examined age-adjusted lung cancer incidence in men in 50 US states and the District of Columbia. We can confirm that there is a significant negative correlation between lung cancer incidence in men and median income level. However, we found that this significant correlation disappears when multivariate analysis is performed to control for smoking, age, and race.

The lung cancer incidence data we used were obtained from the American Cancer Society.² Tobacco use for 2012 (percent of smokers) was obtained from the Centers for Disease Control and Prevention (apps.nccd.cdc.gov/brfss/list.asp?cat=TU&yr=2012&qkey=8161&state=All). Household income by state using the 3-year average medians was taken from the US Census Bureau (www.census.gov/hhes/www/income/data/statemedian/). Data regarding median age and percent white population by state were from the US Census Bureau (www.census.gov).

Univariate analysis of median income versus lung cancer incidence in men demonstrated a significant negative correlation (r-squared linear, 0.287; $P < .001$). However, the results of multivariate linear regression indicated that the correlation between income and lung cancer incidence in men is no longer statistically significant ($\beta = -.098$; $P = .378$). There were significant correlations noted between male lung cancer incidence and percent of smokers ($\beta = .704$; $P < .001$) and increased age ($\beta = .267$; $P = .004$), and a negative correlation was noted with percent white population ($\beta = -.202$; $P = .024$).

A weakness in our analysis is possible confounding by the ecological fallacy (or ecological inference fallacy), a

logical fallacy in the interpretation of statistical data in which inferences regarding the nature of individuals are derived from inference for the group to which those individuals belong.³ In this case, inferences regarding individuals are being drawn from the characteristics of the US states in which they reside, rather than from the individuals themselves.

Nevertheless, the results of our analysis confirm that smoking remains the most powerful risk factor for lung cancer.⁴ Moreover, lower incomes are associated with increased rates of smoking.⁵ These data suggest, at least in the case of lung cancer in men, that smoking is a far more significant independent risk factor than low income. Increasing the income of impoverished people will not reduce their lung cancer burden unless they stop smoking.

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