

obstructive pulmonary disease among nonsmokers and ever-smokers.

In their study, Raju and colleagues used multivariate models adjusted for age, sex, race/ethnicity, region of residence, smoking duration, community poverty, urban/rural status, census-level data on the use of solid fuels in homes and the percentage of inhabitants in occupations associated with lung disease, and individual socioeconomic factors. However, some important factors that may affect the incidence of chronic obstructive pulmonary disease were not described in detail and seemed to be ignored in the study, such as FEV<sub>1</sub> (2) and the body mass index (3). It is quite possible that if the authors had adjusted for these factors in their multivariate models, they would have drawn a different conclusion. This issue should be resolved in future studies. ■

**Author disclosures** are available with the text of this letter at [www.atsjournals.org](http://www.atsjournals.org).

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## Reply to Wei

*From the Authors:*

We thank Dr. Wei for his letter and interest in our recent publication (1). Dr. Wei brings attention to the lack of lung function data in the National Health Interview Survey data used for

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Supported by National Institute on Minority Health and Health Disparities grant P50MD010431; National Institute of Environmental Health Sciences grants F32 ES029786-01 and R21ES025840; and Environmental Protection Agency grant R836150.

Originally Published in Press as DOI: 10.1164/rccm.201905-0974LE on May 20, 2019

our study. We noted in our paper that the lack of lung function data, including FEV<sub>1</sub>, was a limitation of our study. This limitation was partially countered by the large-scale nature of the National Health Interview Survey, which allowed us to uniquely examine the community and individual level factors that contribute to chronic obstructive pulmonary disease (COPD) development across the United States. We were additionally able to perform multiple sensitivity analyses within this data set, using differing definitions of COPD, demonstrating that rural residence remained independently associated with COPD. Ultimately, although confident in our study, we do agree that there should be efforts to validate these results in a nationally representative sample that includes lung function data. The second point Dr. Wei raises is in regard to whether body mass index and obesity may be confounders. Although not included in the final paper, an earlier version of our analysis accounted for obesity, which ultimately did not change the association between rural residence and COPD prevalence. Current efforts are underway to better understand the contribution of obesity and diet to COPD morbidity in rural regions of the United States. Last, the articles that Dr. Wei references describe the importance of better understanding factors that may contribute to lung development and early lung function impairment. Although this was beyond the scope of our cross-sectional analysis, we have great interest in future efforts to study factors in rural, poor regions, including nutrition and environmental exposures, which may influence lung development and contribute to the observed urban–rural disparities in COPD prevalence (2–4). ■

**Author disclosures** are available with the text of this letter at [www.atsjournals.org](http://www.atsjournals.org).

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