

1.256 Adverse health impacts associated with urban and rural air pollution in India.

Early Career Scientist

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Abstract:

Ambient air pollution in India contributes to negative health impacts and early death. Ground-based monitors often used to quantify health impacts are located in urban regions, yet approximately 70% of India's population lives in rural communities. We simulate high-resolution concentrations of fine particulate matter (PM) and ozone from a regional air quality model over northern India, including updated estimates of anthropogenic emissions for transportation, residential combustion and location-based industrial and electrical generating emissions in a new anthropogenic emissions inventory. These simulations inform seasonal air quality and health impacts due to anthropogenic emissions, contrasting urban versus rural regions. We estimate 463 000 (95% confidence interval: 445 000–482 000) adults die prematurely each year from PM_{2.5} and that 38 000 (28 000–48 000) adults die prematurely each year from O₃. This translates to 5.8 deaths per 10 000 attributable to air pollution out of an annual rate of 72 deaths per 10 000 (8.1% of deaths) using 2010 estimates. We estimate that the majority of premature deaths resulting from PM_{2.5} and O₃ are in rural (384 000) as opposed to urban (117 000) regions, where we define urban as cities and towns with populations of at least 100 000 people. Further, we find that reducing emissions from predominantly urban transportation or predominantly rural residential combustion minimally mitigates future premature mortality despite increasing population and emissions over time. These findings indicate the need for rural monitoring and accompanying health studies to understand and mitigate the effects of ambient air pollution on this population in addition to supporting model evaluation.