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Race, Poverty, and Potential Exposure of Middle School Students to Air Emissions from Confined Swine Feeding Operations

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Abbreviations:

CAFO	Confined animal feeding operation
CI	Confidence interval
CMSA	Consolidated metropolitan statistical area
MSA	Metropolitan statistical area
PR	Prevalence ratio
SE	Standard error
SES	Socioeconomic status

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Abstract

Previous studies suggest that airborne effluent from confined swine feeding operations (swine CAFOs) may affect the health and quality of life of adults and the prevalence of asthma symptoms among children. To investigate the extent to which public school students may be exposed to airborne effluent from swine CAFOs and to evaluate the association between schools' demographic characteristics and swine CAFO exposures, we assessed the proximity of 226 schools to the nearest swine CAFO and conducted a survey of school employees to identify schools with noticeable livestock odor. We used publicly available information describing the enrollment of each school to assess the association between race and socioeconomic status (SES) and swine CAFO exposure. Odor from livestock was noticeable outside (n=47, 21%) and inside (n=19, 8%) school buildings. Schools with <63% enrollment of white students and $\geq 47\%$ of students receiving subsidized lunches at school were located closer to swine CAFOs (mean=4.9 miles) than the remaining schools (mean=10.8 miles) and were more likely to be located within three miles of an operation than schools with high white/high SES enrollment (prevalence ratio: 2.63; 95% confidence interval: 1.59, 4.33). The prevalence of reported livestock odor varied with economic status (low SES: 25%; high SES: 17%). These analyses indicate that the potential for in-school exposure to pollution arising from swine CAFOs in North Carolina and the environmental health risks associated with such exposures vary according to the racial and economic characteristics of enrolled students.