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Abstract Number : 2263 | ID : P2-448

Health Impacts of the Pre-Harvest Burning of Sugarcane Straw in the State of São Paulo, Brazil

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Ethanol from sugarcane is consolidated as a renewable fuel which promotes further expansion of the culture of sugarcane in Brazil. As the controlled pre-harvest burning of sugarcane straw is still considered necessary for the economic viability of this crop in more than 70% of municipalities in the State of São Paulo the population is forced to live with this pollution. We examined the health effects of exposure to pre-harvesting straw burning of sugarcane in an ecological study of the 645 municipalities of São Paulo. A Bayesian multivariate regression model assessed changes in Standardized Mortality and Morbidity Ratio (SMR) of deaths and hospital admissions from respiratory diseases in children and elderly in each of the municipalities, controlling for socioeconomic factors (sanitation, education and income) and climate (temperature, humidity and precipitation). Exposure to the pre-harvest burning included percent of sugarcane area harvest with burning (PMQ), levels of aerosol and fires, both obtained by satellite images from Brazilian Institute for Space Research (INPE). Autocorrelation in the data was dealt with by building a neighborhood matrix of the 645 municipalities in the state. Markov Chain-Monte Carlo simulation method (MCMC) was used to 'soften' the estimates of the SMR.

Results indicated that the increase in outbreaks of burning fires was significantly associated with increased hospital admissions for respiratory diseases in children aged less than five years old (mean 0.0008, $p < 0.001$). This study indicated that pre-harvesting sugarcane straw burning effectively offers health risks to the population and its elimination should be enforced.



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27th Conference of the
International Society for
Environmental Epidemiology

"Addressing Environmental
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August 30th to September 3rd
Centro de Convenções Reboúças | São Paulo | Brazil