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# Childhood pneumonia: a neglected climate-sensitive disease?

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Reports from the World Health Organization (WHO) and the Intergovernmental Panel on Climate Change (IPCC) list undernutrition, diarrhoea and vector borne diseases as the most important health impacts of climate change.[1, 2] Although these disorders are of major importance, childhood pneumonia, which is responsible for 17% of childhood deaths worldwide[3] is rarely mentioned in the context of climate change. Respiratory infections follow seasonal patterns. In temperate settings, respiratory illness is most common in winter months.[4, 5] However, the epidemiology is quite different in tropical settings, where the vast majority of childhood deaths due to pneumonia occur, with the incidence of lower respiratory tract infection being generally highest during the rainy season.[5-10] For example, in The Gambia, West Africa, the incidence of clinical pneumonia in children (per 1000 person years) was estimated to be 409 (95%CI 391-427) in the rainy season, compared to 243 (95%CI 229-258) in the hot dry season, and 160 (95%CI 148-173) in the cool dry season[7]. In time series analyses, the number of days of rainfall per month in Malaysia was positively associated with incidence of respiratory syncytial virus (RSV) in children (p=0.01).[9] Similarly, daily occurrence of rainfall in Indonesia was positively associated with incidence of RSV infection in children (incidence ratio 1.64, 95%CI 1.13 to 2.38, p=0.009).[10] Rainfall models from the IPCC predict overall increases in tropical rainfall, with more intense rainy seasons in Asia, Africa, the Pacific, and in parts of South America, than in subtropical and some temperate regions.[11] Such changes are likely to be associated with an increase in childhood pneumonia.

The health impacts of climate change are very much on WHO's agenda, exemplified by international meetings in the lead up to The 16th Conference of the Parties to the UN Framework

Convention on Climate Change to be held in Cancun, Mexico from November 29th to December 10th 2010. In view of the association between seasonal rainfall and childhood pneumonia in the tropics, climate change could potentially increase the incidence of childhood pneumonia in tropical settings, both directly and indirectly, and delegates should consider this effect when advocating for health concerns to be included in policy initiatives. Many biologically plausible mechanisms may contribute to an increase in pneumonia incidence as a result of climate change. More time indoors or under cover because of increased rainfall will increase crowding and exposure to biomass fuel smoke, and reduce exposure to sunlight. Crowding will be further exacerbated by large scale population displacement. Bacterial survival and virus stability in aerosols may be increased by higher humidity.[12] An increase in childhood undernutrition because of climate change will increase deaths from pneumonia: 44% of pneumonia deaths in children under 5 years are attributable to undernutrition.[13] In many parts of Africa and Asia, the rainy season coincides with the pre-harvest season when food shortages are most likely to occur, particularly in poorer communities. If climate change leads to delayed rainy periods, this seasonal undernutrition might increase, and excessive rain may reduce crop yield and compromise food security.[14] Increased temperatures and drier dry seasons are expected to further reduce global food supplies, with the largest burden falling on those living in lower latitudes.[1, 2]

Childhood pneumonia is climate-sensitive and too important to ignore. The seasonal drivers of the incidence of childhood pneumonia in tropical countries need to be elucidated to better predict the health effects of climate change in tropical settings. Future assessments of the health effect of climate change for low-income and middle-income countries in tropical settings should specifically quantify the predicted impact of climate change on childhood pneumonia.

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