Indoor air pollution and lower respiratory tract infections in children

World Health Organization

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Report of a symposium and a workshop held at the International Society of Environmental Epidemiology, Paris, 4 September 2006, presenting preliminary results of a randomized intervention trial in Guatemala and discussing the implication for policy, advocacy and future research

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Executive summary

To study the effect of the reduction in air pollution exposures on health outcomes such as pneumonia in young children, a randomized control trial (RCT) using improved woodstoves with chimneys as the intervention was carried out from 2002–2004. The study aimed at improving our understanding of the relationship between pneumonia and indoor air pollution. It was undertaken in the highlands of Guatemala on a population of over 500 Mayan Indian children aged 0–18 months in households that used open wood fires for cooking.

At a symposium at the International Society of Environmental Epidemiology in Paris in September 2006, preliminary results of the trial were presented as 5 papers, – describing the process and methods in conducting the control trial of acute lower respiratory infections and indoor air pollution; – evaluating the performance to optimize case-finding for childhood pneumonia; – examining the impact of a chimney wood stove on the risk of pneumonia in children aged less than 18 months in a rural area; – assessing the impact of a chimney stove on women's lung health in a rural wood-burning community; and – measuring the impact of social and environmental factors on a vulnerable population by their effects on birth weight, growth, and mortality.

This symposium was followed by a workshop which summarized first some trial findings which were not reported at the symposium, such as effects on blood pressure, upper respiratory tract infections, self perceived health and non-health outcomes (e.g. time and fuel savings). Workshop participants discussed methodological lessons learned and problems encountered, and gaps in knowledge and further research needs.

It was concluded that further trials in different geographical settings are needed. Designs, potential sites and request for such research were considered. Nevertheless, it was considered that there was now a more solid basis for arguing about the effect of air pollution reduction on child health, and that advocacy efforts to donors and governments needed to be scaled up, to address this major risk factor for child mortality.

1 Introduction

The deaths every year of nearly 2 million children under the age of 5 years in developing countries from acute lower respiratory infections (ALRI) have not been fully accounted for by well-established risk factors such as malnutrition. Over a dozen observational studies have found consistent associations with indoor air pollution (IAP), including the use of solid fuels in households, but they fall short of fully confirming a causal exposure-response relationship. A randomized control trial (RCT) using improved woodstoves with chimneys as the intervention, originally planned in the mid-1980s but not funded until 2001, was recently carried out to improve our understanding of the relationship between ALRI and IAP. This study, known by the acronym RESPIRE (Randomized Exposure Study of Pollution Indoors and Respiratory Effects), took place from 2002 to 2004 in the highlands of Guatemala on a population of over 500 Mayan Indian children aged 0–18 months in households that used open wood fires for cooking. Primary funding for the trial was provided by the U.S. National Institutes of Health, with additional contribution by WHO.