**What’s in a cough?**

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Pneumonia is the leading cause of death in children under 5 years of age killing approximately 1 million children every year.1 The 2010 Global Burden of Disease study estimated that approximately half a million of these deaths are attributable to exposure to household air pollution from the use of dirty-burning fuels for cooking, heating and lighting.2 The case-control study by Howie S et al reported in this issue of the IJTLD was conducted to better understand the social, environmental and nutritional factors associated with this major cause of morbidity and mortality in children in The Gambia.3

Howie S et al found a strong association between bed-sharing with someone reporting a cough. Although there is a high risk of reporting bias in this context and other possible sources of error the relationship is biologically plausible as the authors indicate. The big question that follows and warrants investigation is: what’s in a cough? An understanding of the microbiology here (Respiratory Syncitial virus? Rhinovirus? Influenza? Streptococcus pneumoniae?) is needed if targeted interventions are to be developed. Pragmatically, the authors suggest that avoiding putting a child in the bed of a coughing person may be appropriate although it is not known whether this would be effective and moving a young child away from the comfort and security of their usual sleeping environment could bring risks.

It is not surprising that malnutrition and pneumonia are strongly associated and data from this study serve to emphasise the importance of food security and adequate nutritional intake for children to reduce the impact of pneumonia and other childhood illnesses.

What is surprising is that no association was identified between pneumonia and exposure to household air pollution. That exposure to household air pollution will have been almost universal may help to explain this finding: approximately 85% of case and control households used firewood for cooking. Firewood, in contract to charcoal, produces more particulate matter and less carbon monoxide when it is burnt which may also help explain this finding as well as the observation that exposure to carbon monoxide was generally low (1 ppm). In contract, exposures to fine particulate matter (PM2.5) were universally high with mean levels around 145 μg/m3 in case and control households. Even the lowest quintile of PM2.5 exposure (54 to 114 μg/m3) was well above safe limits set out in WHO air quality guidance (25 μg/m3 24-hour mean)4 and well beyond the steep part of the exposure response relationship between PM2.5 and risk of pneumonia.5 On balance, it is likely therefore that high levels of exposure to household air pollution is a risk factor for pneumonia in The Gambia but that an association wasn’t seen in this case-control study because exposures were universally high and beyond the steep part of the exposure-response curve.

Howie S et al’s study serves to remind us that pneumonia in young children remains a major cause of morbidity and mortality globally and that the scope to intervene is considerable.

**References**

1 Liu L, Oza S, Hogan D, Perin J, Rudan I, Lawn JE, Cousens S, Mathers C, Black RE. Global, regional, and national causes of child mortality in 2000-13, with projections to inform post- 2015 priorities: an updated systematic analysis. Lancet. 2014 Sep 30. PubMed PMID: 25280870. Epub 2014/10/05. Eng.

2 Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. The Lancet 2012;380:2224-2260

3 [reference for Howie et al paper Childhood pneumonia and crowding, bed-sharing and nutrition: a case-control study  from The Gambia]

4 WHO Air quality guidelines global update 2005: particulate matter, ozone, nitrogen dioxide. and sulfur dioxide Copenhagen: World Health Organization; 2006. (http://www.who.int/phe/health\_topics/outdoorair/outdoorair\_aqg/en/)

5 WHO guidelines for indoor air quality: household fuel combustion: World Health Organization; 2014. (http://www.who.int/indoorair/publications/household-fuel-combustion/en/)