

Health & the environment session

Session organiser: Dr. Dermot Grenham

Rainfall variability and risk of infectious diseases in young children: a global analysis - Sara McElroy¹, Tarik Benmarhnia¹, Anna Dimitrova²; ¹University of California San Diego, ²Wittgenstein Centre for Demography and Global Human Capital

Preventable infectious diseases, such as pneumonia and diarrhea, are the leading cause of child death under the age of five worldwide. Populations in low- and middle-income countries bear the brunt due to poor living conditions which are conducive to such diseases. Increasing climate variability due to climate change will undermine future efforts to control infectious diseases. This paper provides new empirical evidence on the link between climate variability and human infectious diseases, focusing on symptoms of cough, fever and diarrhea in children under the age of five. We use the most recent Demographic and Health Surveys (DHS) for 20 low- and middle-income countries (n=450,000) in combination with high resolution climate data. A standardised measure of precipitation anomalies is constructed, which allows assessing the relationship between both dry and wet spells and the selected symptoms. Multi-level logistic regression with a random effect for the primary sampling unit and sampling weights and meta-analysis techniques are employed in the study. The preliminary results show that excessive precipitation raises the risk of diarrhoea, cough and fever among children under five years of age in 12 of the 20 countries examined. Unimproved sanitation and unsafe drinking water sources were key drivers of these associations. Effect measure modification analysis reveals that sharing a toilet with other families modifies the risk of these three diseases. As a next step, we plan to conduct a meta-analysis examining standardized precipitation anomalies and these three health outcomes to generate a pooled estimate of risk across all LMICs in the study.

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The effects of growing-season drought on young adult women's life course transitions in a sub-Saharan context – Liliana Andriano¹, Julia Berhman²; ¹University of Oxford, ²Northwestern University

Despite the vast importance of weather shocks for population processes, there is limited work that investigates the micro-level processes through which weather shocks influence the transition into adulthood in low-income contexts. This paper provides a conceptual overview and empirical investigation of how weather shocks impact the timing, sequencing, and characteristics of young adult women's life course transitions in low-income rural settings. Drawing on the case of Malawi, we combine repeated cross-sections of georeferenced Demographic and Health Survey data with georeferenced climate and calendar crop data to assess how drought shocks affect young women's life course transitions. Discrete-time event history analyses indicate that in this context, exposure to growing-season drought in adolescence has an accelerating effect on young adult women's transitions into first unions—including both marriage and cohabitation—and an accelerating effect on transitions into first births within union.

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Association between ambient temperature and mortality in South Asia: Systematic review and meta-analysis - Asya Dimitrova^{1, 2, 3}, Vijendra Ingole^{1, 2}, Xavier Basagaña^{1, 2, 3}, Otavio Ranzani^{1, 2}, Carles Milà^{1, 2}, Joan Ballester¹; ¹Barcelona Institute for Global Health, ²CIBER Epidemiología y Salud Pública, ³Universitat Pompeu Fabra

South Asia is highly vulnerable to climate change and is projected to experience some of the highest increases in temperatures throughout the century. Our aim was to systematically review the current state and quality of available evidence on the direct association between ambient temperature and mortality in South Asia. The databases Pubmed, Web of Science, Scopus and Embase were searched from 1990 to 2018 for relevant

observational quantitative studies. From the 5,840 screened papers, 22 were included in the qualitative synthesis and five in a meta-analysis. Studies reported an association of mortality with heatwave episodes and both high and low daily temperatures, but there was heterogeneity in the magnitude and direction of ascertained effects. The meta-analysis showed a U-shaped pattern, with increasing mortality for both high and low temperatures, but a statistically significant association was found only at higher temperatures — above 31° C for lag 0-1 days and above 34° C for lag 0-13 days. Effects were found to vary with cause of death, age, sex, location (urban vs. rural), level of education and socio-economic status, but the profile of vulnerabilities was somewhat inconsistent. The evidence base on temperature impacts on mortality in South Asia is limited due to the small number of studies, their skewed geographical distribution and methodological weaknesses. More studies on the main determinants of the temperature-mortality association and on potential adaptation options to high temperatures for a region that is a hotspot for climate vulnerability, urbanisation and population growth are needed.

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Seasonal variation in infant mortality in India - *Aashish Gupta, University of Pennsylvania*

Investigating seasonal variation in health and mortality helps understand disease dynamics and environmental health exposures. Using four available rounds of India's Demographic and Health Surveys (DHS), this paper examines seasonality in infant mortality in India. I use information on the birth month-year, survival status within the first year of life, and age (in months) at death (if the infant died) of more than 330,000 children born between 1989 and 2014 to estimate period mortality rates between ages 0 and 1 for each calendar month. Relative to the spring months, infant mortality is higher in the summer, monsoon, and winter months. If the mortality conditions in the spring months were prevalent throughout the year, infant mortality would have been less by 10.8 deaths per 1,000 infants alive per year in early 1990s and 4.1 deaths per 1,000 per year in the mid-2010s. Seasonal variation in infant mortality is higher among children born in less wealthy households, among children of less educated mothers, in rural areas, and in poorer regions. Although seasonality in infant mortality has attenuated over-time, seasonal variation in the early-childhood disease environment remains a concern, particularly in rural areas. These results highlight the multiple environmental health threats that infants in India face, and the limited period within a year when these threats are less salient.

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