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A time-series analysis of temperature-related mortality in South Africa between 1997 and 2012

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Introduction: There is an extensive literature reporting estimates of temperature-related mortality in developed countries, but far fewer in the developing world, particularly in Africa. Furthermore, these studies report results for only one or a few cities and over relatively short time periods.

Methods: We conducted a time-series analysis of the temperature-mortality relationship in South Africa using a national dataset covering all 8.5 million deaths that occurred in 1997-2013. Relationships were estimated with a distributed lag non-linear model with 21 days of lag, and pooled in a multivariate meta-analysis. Relative risks (RR) were then calculated for cold and heat (at 99th and 1st percentiles) using the 75th percentile as the reference.

Results: Preliminary assessment of nine urban districts did not find a clear association between heat and all-cause mortality, with a flat relationship beyond the reference and a pooled RR of 0.98 (95%CI: 0.92-1.04). Cold effects were evident but modest if compared to other country-level analyses, with a pooled RR of 1.19 (1.11-1.28). **Results** were similar across district, with limited heterogeneity. Future analyses will expand to include all remaining districts, compare effects over time and space and evaluate effect modification by individual and area-level characteristics..

Conclusions: A preliminary assessment of the largest ever dataset for analyzing temperature-mortality associations in (South) Africa indicates all-cause mortality burdens associated with cold but not heat. In addition to its rarely explored geographic region, the dataset allows for investigation of a number of unique factors not possible in most previous studies, including the impacts of a rapidly developing economy, a young population structure and a high prevalence of HIV.



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