Heat waves & Health - An econometric approach

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Human health and well being are inextricably tangled with the provision of air, water and food and the protection provided by the Earth's biosphere. Climate change thus poses an unfamiliar challenge to population and planetary health leading "to significant increases in illness and death" (Durban Declaration, 2011). Any threat in the environment, through climate change or weather variation, can strain human physiological and psychological functions. Extreme weather events, such as heat waves and cold spells, will ubiquitously impact global human health albeit disproportionately affecting poor and disadvantaged populations (Haines et al., 2006; 2014) - the main uncertainty is to what degree it will exacerbate current burdens of disease. Of all weather factors studied under the health umbrella, air temperature has the most defined relationship with human health. Heat waves have been associated with substantial mortality and and increases in morbidity.

With the general consensus being that there will be increasing severity and frequency of such extreme weather events, heat waves will further challenge healthcare systems and delivery across the globe. Increased morbidity and mortality from climate change will comprise an important part of economic loss and likely increase pressures on hospital and health services. Such health impacts will stress wider health and social systems. Therefore, health systems will need to be equipped with the ability to anticipate and respond to these changes in disease and utilisation patterns. This further emphasies its importance as a public health concern.

Our goal is to assess the impact of extremely high temperature on health outcomes. Although current studies have provided a general overview of this relationship, a lot is yet to be learnt. Our data allows the first large-scale empirical assessment of the health impacts associated with events of extremely high temperatures (heat waves) as further consideration needs to consider methodologies that accurately assesses heat wave effects. The clearest way to isolate causal effects of the heat wave, accounting for confounding factors, would be to examine outcome differences between randomly assigned heat wave-affected areas and heat wave-unaffected areas over time. While this is not possible expost, our methods mimic this general structure and imposes little parametric restriction. Imposing linearity, which implies the relationship between temperature and health out comes is exactly the same at every degree Celsius and in every time period, is an inaccurate assumption that is strongly disputed by current literature. Therefore, we aim to exploit a natural experiment by employing a differences-in-differences research design to help isolate causal impacts.

Durban Declaration. Durban Declaration on Climate and Health. 373, (2011).

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