Project title

Climate Change, Air Pollution and Ethnic Inequalities in Health: Analysis and Projection Based on Longitudinal Register Data from Scotland

Objectives

The objectives of this PhD project are, first, to study effects of air pollution and extreme weather events on population health and mortality across ethnic groups, and, second, to project future health behaviour and mortality patterns as response to changes in weather and pollution.

Context

Air pollution and extreme weather events (e.g. heat waves and cold spells; flooding) are increasingly common and have become part of our lives in the 21st century. Environmental effects on health in industrialised countries are predicted to be pronounced with rapidly ageing populations and increasing social inequalities. Previous studies show that extremely hot and cold weather increase mortality from heart and respiratory diseases. Research on environmental pollution and health shows that fine-particulate air pollution in cities increases the risk of mortality from various respiratory diseases. Although previous epidemiological research has advanced our understanding of environmental effects on population health and mortality, it has suffered from a number of shortcomings. First, most research focuses on age differences, little research (if any) has examined whether and how environmental effects on population health vary by race and ethnicity. Second, little research has been conducted to project how health behaviour and mortality patterns change with predicted climate changes. How many additional hospital visits and how many deaths we can expect if the frequency of extreme weather events and air pollution increases further? The analysis of environmental effects on population health by ethnic groups and the projection of future trends in mortality and hospital visits are the two novelties of the project.

Data and Methods

The PhD study will use individual-level data from the Scottish Longitudinal Study (SLS) and environmental data linked to individuals' residential contexts. The SLS was initiated in 1991 and it contains linked census and vital events data on a 5 per cent of the population of Scotland (approximately 274,000 individuals were selected in 1991; new individuals have entered into the study since 1991). The dataset includes information on socio-demographic characteristics and residential histories of individuals and their administrative health records including all hospital admissions and cause-specific deaths to Scottish population. We will link these data to environmental data from MetOffice (meteorological observations of a number of relevant variables) and air quality data from the UK AIR – Air Information resource by DEFRA, which provides measurements of a number of air pollution indicators.

The project will apply random-effects and spatial survival models with time-varying contextual variables to study environmental effects on mortality and health behaviour including the frequency of hospitalisation. Using microsimulation the study will project health behaviour and mortality levels based on various assumptions of future weather changes, the frequency of extreme events and the levels of environmental pollution.

The PhD project will deepen our understanding of environmental effects on population health by ethnic groups. It will develop microsimulation methodology to project the impact of extreme weather events on human health.

The PhD studentship is a joint initiative between the School of Geography and Sustainable Development (SGSD) and the School of Medicine (SoM). The supervisors are: Prof Hill Kulu (SGSD), Prof Frank Sullivan (SoM) and Dr Urška Demšar (SGSD).

Please submit an application to Mrs Helen Olaez in the SGSD Postgraduate Office (ho10@st-andrews.ac.uk) by **10th May 2019** for consideration. Please include 'St Leonard's PhD studentship' in the subject line of your email. The full application consists of: 1) A brief personal statement outlining your interest in environmental effects on human health and in applying advance quantitative methods in social and/or health science research (max two pages). 2) An academic CV (max two pages) including details of two referees; and 3) Copies of transcripts of undergraduate and master's degrees. Shortlisted applicants will be interviewed in late May.

For informal inquiries, please contact Prof. Hill Kulu (Hill.Kulu@st-andrews.ac.uk) or Prof. Frank Sullivan (fms20@st-andrews.ac.uk). Please include 'St Leonard's PhD studentship' in the subject line of your email.

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