| | |
|---|---|
| Title of PhD project / theme | **Weather impacts on diarrhoea morbidity and mortality in Dhaka, Bangladesh: empirical study and future climate change projection** |
| Supervisory team | **Dr Ai Milojevic** (Lead, LSHTM / PHP)<br>ai.miliojevic@lshtm.ac.uk tel. +44-(0)20-7927-2054<br>**Dr Chris Fook Sheng Ng** (Nagasaki University)<br>chrisng@nagasaki-u.ac.jp tel. Tel: +81 95 819 7893<br><br>Professor Masahiro Hashizume (Nagasaki University / University of Tokyo)<br>hashizum@nagasaki-u.ac.jp<br>Dr Shakoor Hajat (LSHTM / PHP)<br>shakoor.hajat@lshtm.ac.uk tel. +44-(0)20-7927-2512 |
| Brief description of project / theme | It is recognised that Dhaka, capital city of Bangladesh is exposed to multiple types of hazard induced by climate and environmental change including variations in temperature (heat waves and cold spells), extreme rainfall, water logging, flooding, and cyclones. These impacts on health were partially investigated by individual hazard type. However, the impacts seem to have more complicated structure due to rapid growth of urban population (high population density, poverty, rural-urban migration and illiteracy) without relevant urban planning or policy evaluation.<br><br>This project aims to investigate the combined health impacts of variation of temperature and rainfall, focusing on diarrhoea disease outcomes in Dhaka, and to evaluate the current and/or hypothetical city strategies/plans for co-benefit or mitigation of the adverse health impacts in light of socio-economic disproportionate health impacts. First, the project will involve empirical epidemiological analyses of individual diarrhoeal morbidity (and possibly mortality) data that is linked to weather and other environmental data. It will inform city-overall associations between temperature or rainfall and diarrhoea morbidity (and mortality) in Dhaka. Here, we can potentially explore spatial variability in the associations between weather and diarrhoea using finer scale of land surface temperature data derived from satellite images. Then, we will estimate future health impacts of diarrhoeal transmission according to climate change scenarios. The current WHO quantitative risk assessment provides diarrhoea |

mortality projections according to standard CCRA scenarios. One of the major limitations of this projection is the relationship between temperature and diarrhoeal deaths is based on morbidity data. We will explore data availability of diarrhoeal mortality to fill in this gap. Specific objectives are below.

Objectives:

1. To understand the current situation and historical trend of population health, especially diarrhoea morbidity and mortality in Dhaka (or Bangladesh including rural area) including driving force of transmission of risk, possible vulnerable group(s), possible associations with weather (mainly temperature and rainfall) and local / national / regional strategies to mitigate those impact through literature review; **[literature review]**
2. To identify and assemble spatially and temporally dissolved data on diarrhoea morbidity (and possibly mortality), weather (temperature and rainfall), other individual-, household-, and areal-level risk factors including socioeconomic status in Dhaka **[data collection]**
3. To quantify impacts of ambient temperature and rainfall on diarrhoea morbidity (and mortality) by empirical epidemiological analyses of the data assembled in Objective 2 **[exposure-response function (epidemiological analyses)]**;
4. To assess the impact of future climate change in terms of temperature- and rainfall-related diarrhoea morbidity (and mortality) risk based on the standard CCRA scenarios (three global climate models driven by A1b emission) for 2030-2050 by applying the local exposure-response functions observed in Objective 3 **[future projection (risk assessment)]**; and
5. To evaluate the current and planned policies/strategies to mitigate/adapt to climate change and/or co-benefit type strategies identified in Objective 1 **[evaluation of adaptation/co-benefit strategies]**.

Supervisory team has extensive experience of epidemiological analyses on extreme temperature, flooding and rainfall and future risk assessment. The outputs of this project could be shared with other developing urban cities and expected to be transferable knowledge.

| | |
|---|---|
| The role of LSHTM and NU in this collaborative project | The student will be based on mostly at LSHTM for training and data analysis with short-term research visits in Nagasaki for additional training or research experience. Full supervisory meeting will be conducted every fortnight remotely as well as weekly 1:1 face-to-face meeting with lead-supervisor. Advisory committee members will be appointed either internal or external to NU and LSHTM for specific advice as necessary. Based on existing research network that NU holds with ICDDR, B in Dhaka, this collaborative project will enhance researchers and institutes network in Japan, UK and Bangladesh. |
| Particular *prior* educational requirements for a student undertaking this project | MSc in public health, epidemiology or relevant area. Basic statistical skills and experience of quantitative analyses using environment and/or health data are required. Confident epidemiological background and relevant research experience would be beneficial but does not exclude the eligibility (i.e. students who are keen to learn and have high potential would be accepted). |
| Skills we expect a student to develop/acquire whilst pursuing this project | Quantitative data analysis skills including various types of multi regression analyses, time series analysis, episode analysis, and geographical mapping or spatial analysis. Designing relevant types of studies to investigate the impact of environmental factors on public health.<br><br>Communication skills in English with stakeholders as well as academic researchers. Presentation skills for academic audience and non-academic audience to transfer the findings of this project. |