Does extreme weather affect public health?

**Project summary: This project will analyse weekly mortality data from England and Wales (1981–2020) alongside historical weather records to explore correlations between extreme weather events and public health outcomes. By adjusting for regional population changes and combining health data with temperature, precipitation, and humidity trends, we will assess the short-term and long-term impacts of weather on mortality. Our findings will help stakeholders, such as health services and policymakers, improve preparedness, target vulnerable groups, and inform cost-benefit analyses of public health interventions. Our project will not necessarily identify the different causes of death, and will strictly be looking for trends between total deaths and weather patterns.**

We will be exploring correlations between health and weather trends in the United Kingdom from the year 1981 to 2020. We exclude the years since the beginning of the COVID-19 pandemic, since the pandemic has had a large and difficult to quantify effect on overall health trends.

For England and Wales (which have a joint population of around 60 million people) the National Health Service publishes large amounts of health related data. For our research, we will primarily look at the number of deaths which have occurred each week over a roughly 40 year period. This data is broken down by age. It is also broken down into 10 geographical regions. We will combine this data with historical weather records to determine general trends and assess the effects of unusually hot and cold periods on public health, as measured by mortality. This data does not contain any identifying information regarding the deceased. The data is obtained from

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/adhocs/1125weeklydeathoccurrencesbysexfiveyearagegroupandregionenglandandwales1981to2021>

Our health data will need to be weighed by each region’s changing population in order to make it comparable. For each of the regions we will look into, the official government population statistics are available here: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/adhocs/13221populationestimatesbylocalauthoritiesofgreatbritainmid1981tomid2019>

Historical, daily weather data from across the world can be obtained from [www.visualcrossing.com](http://www.visualcrossing.com/). To begin with, we will use weather data for each region’s most populous city as a proxy for the weather across its parent region. As we advance the project, this may be increased to e.g. the 5 most populous towns/cities.

Stakeholders:

* Health and emergency services
* Public health researchers
* Epidemiologists
* Climate researchers
* UK residents

Key Performance Indicators:

* Accuracy of models in predicting excess mortality based on weather anomalies
* If any trends or correlations are identified, they are expected to be consistent across all 10 of the regions analysed
* Establish a correlation between weather data (temperature, precipitation, humidity etc.) and hospitalization and mortality
* If trends are identified between extreme weather and excess mortality, stakeholders can use weather forecasts to generate accurate predictions of potential health impacts, supporting preparedness for both near-term effects on hospitalizations and long-term consequences of climate change.
* If certain age groups are identified as particularly at risk from extreme weather, public health campaigns can be precisely targeted e.g. on the elderly or the parents of very young children.
* The results of our study can be used to perform cost-benefit analyses on public spending proposals, such as winter fuel subsidies.