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# Whether the Weather

## Feasibility of using Met Office weather data for epidemiological analysis

### OBJECTIVES & BACKGROUND

Some EM presentations are known to be weather-related (e.g. asthma, thunderstorms) but climatic conditions are rarely recorded in patient notes. It was, until recently, difficult and expensive to obtain weather reports retrospectively in the UK. This may have dissuaded anyone wishing to investigate associations between weather and EM presentations, either at the clinical or epidemiological/service pressure level.

In 2011, UK Met Office data was made available for free download as part of a government initiative to improve access to a variety of data sources.

With five years of weather data now available, we undertook an analysis – using our Mountain Medicine casualty database as an example – to assess the feasibility, limitations and potential utility of this data for EM research.

### METHOD

A subset of our database of mountain casualties brought to our hospital (13/06/2012–13/06/2016) was used to supply casualty data.

24-hour Met Office weather forecasts for the local area were obtained for each day in that period. Certain weather features are available as categorical variables (e.g. the general weather forecast is specified as one of 31 conditions such as “fog” or “hail”). Other features (chance of precipitation; temperature) are available as interval variable.

Simple descriptive statistics were explored and non-linear regression analysis using a Poisson model was carried out in the R statistics package to see if any characteristics of weather forecasts could be used to predict mountain casualties arriving at the ED. Confounding factors (month, day of week, Bank Holidays) were also included in the model.

### RESULTS

Simple statistics revealed that the majority of casualties occurred on days forecast to be sunny. There was a small but statistically significant positive correlation between thunderstorms and casualties, a negative correlation between drizzle and casualties, and a negative correlation between increasing chance of precipitation and number of casualties.

### CONCLUSION

It is feasible to use UK Met Office data to assess correlation between clinical and epidemiological data, and the weather on the day of incident. Difficulties were experienced extracting data from the Met Office servers: the amount of data is so large that downloading or working with the data sets is cumbersome and time consuming.

Caution should be noted, however, in that rarer weather patterns can appear disproportionately influential if they are accompanied by casualties. In our example, the only lightning-strike casualties we recorded in our 12-year series happened on a single day where thunderstorms had been forecast, producing a statistically significant correlation at odds with observed epidemiology.





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