The Influence of Short-Term Weather Changes on Acute Hospital Admission Rates

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BACKGROUND

It is established that seasonal climate variation is associated with variation in hospital admission rates. It is less clear whether daily fluctuations in weather have a similar effect.

AIMS

To determine what weather factors are associated with acute medical admissions.
To determine whether associations make a day to day difference to admissions as well as having a seasonal effect.
To determine whether associations are due to adverse weather causing illness or changing patient behaviour.

METHOD

The study included all non-elective adult acute medical admissions to Salford Royal Hospital between 1st April 2012 and 31st March 2013, sorted by day of admission. Age, gender and presenting diagnosis were documented. Concurrent weather data were collected from Flixton Meteorological Station (6.7 miles from hospital, see map below right). Weather data collected were: mean daytime temperature; presence of and depth of rainfall; presence of hail, thunder, snow, fog; mean daytime humidity; mean sea level pressure; hours of sunlight; mean and maximum wind speed.

RESULTS

There were 11,979 admissions (mean 32.9 ± 6.7 per day) over the 12 months. The mean age was 64.0 ± 20.3 years, median length of stay 2.38 days (range 0 – 383), and 51.8% were female.

A (left) shows the monthly variation in daily admissions and temperature.
B (right) shows the monthly variation in mean daily admissions sorted by organ system of the presenting diagnosis. Only respiratory and cardiovascular admissions demonstrated a statistically significant variation.

E (left) indicates that there are on average 2 fewer respiratory admissions per day when the temperature is ≥10°C compared with temperatures of 0-4°C.
Similarly in F (right), there are fewer elderly admissions on days with rainfall compared to days without.
H (below left) shows that more patients require level 2 or 3 care if they present after 3 or more days of good weather. We propose that this is due to short term avoidance of hospital during good weather as shown in G, such that patients are more unwell when they eventually do present.
However, I (right) tells us that the severity of bad weather does not appear to affect patient behaviour in the way that good weather does.

REFERENCE


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SUMMARY AND DISCUSSION

• Low temperature is associated with increased hospital admissions due to respiratory disorders
• Fewer elderly patients attend hospital on rainy days
• Prolonged periods of good weather lead to a greater burden on critical care services, irrespective of cause
• It is not yet clear whether this is due to hot weather affecting patient behaviour or causing acute illness
• The day to day variation in admission rates is too small to independently predict changes in admission patterns without other variables being considered