PLANNING FOR HEAT

Planning for Heat: Exploring the Impact of Extreme Heat Events on Hospital Emergency Department Admissions

BACKGROUND

Extreme heat events are increasing in their frequency and duration, and cause more deaths in Australia than any other extreme weather event. These extreme heat events are causing an increase in global mortality and morbidity rates. The total economic cost of extreme weather events in Australia each year is estimated at $6.3 billion with this figure expected to double by 2030.

OBJECTIVE

This study investigated the association between extreme heat events and emergency department admissions to the Royal Hobart Hospital (RHH) for the period 2003-2010.

METHOD

Non-identifiable RHH emergency department data and climate data from the Australian Bureau of Meteorology was obtained for the period 2003-2010. Statistical analysis was conducted using the computer statistical software 'R' with a distributed lag non-linear model (DLNM) package used to fit a quassi-Poisson generalised linear regression model.

RESULTS

An overall picture of the effect of temperature on admissions is provided in Figure 1, showing a 3-D plot of the relative risk (RR) along temperature using a 14 day lag compared with a reference value of 24^{0}C, the point above which p values become significant ($> 24^0$C, $p < 0.05$) i.e. hospital admissions increase.

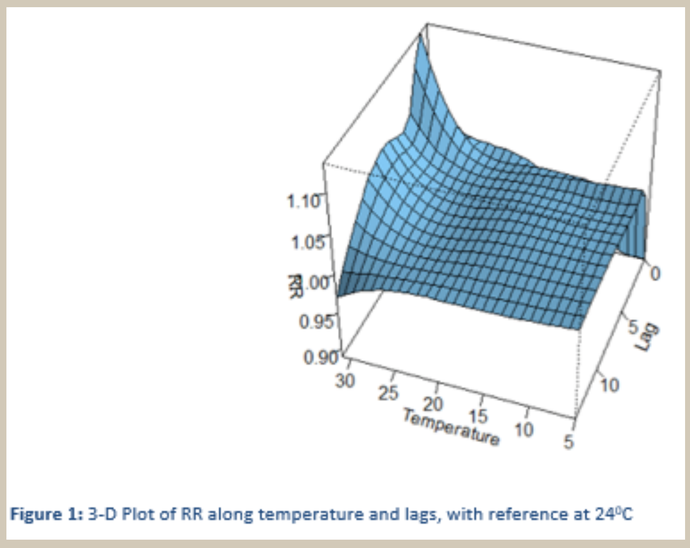

Figure 1: 3-D Plot of RR along temperature and lags, with reference at 24^{0}C

The 3-D plot summarises the overall relationship in the two dimensions, however it does not include uncertainty in the estimates. Therefore, to provide a more specific assessment of the relationship, RR by temperature for a specific lag of 14 days was plotted [refer Figure 2]. As can be seen, hospital admissions peaked one day after the heat event (temperature exceeded 24^{0}C) but effects continued to be felt up to 12 days after the heat event.

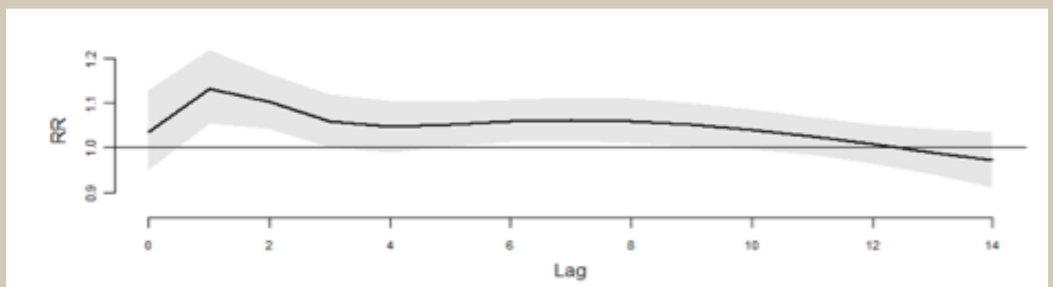

Figure 2: Plot of RR by temperature for a lag of 14 days

The overall effect of temperature on RHH admissions summarising the contributions for the 14 days of lag used in the analysis, was then plotted [refer Figure 3]. This plot clearly demonstrates that the RR of being admitted to RHH during the period 2003-2010 increases significantly above 24^{0}C.

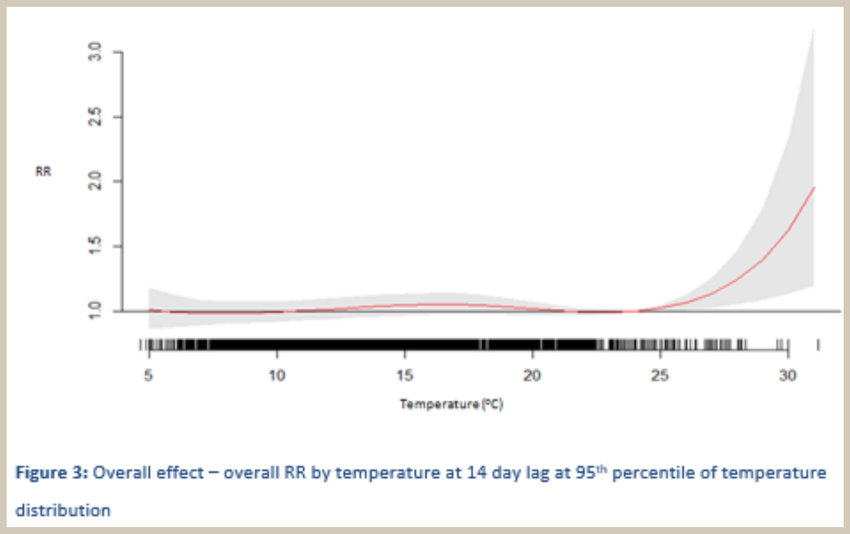

Figure 3: Overall effect – overall RR by temperature at 14 day lag at 95th percentile of temperature distribution

These results highlight a need for public health organisations to include contingency planning for extreme heat events and heat waves in their strategic planning processes to ensure continued capacity to appropriately deal with this expected increase in patient emergency department presentations. Public health system planners must be aware that increased public hospital emergency department presentations can be expected for several days after the actual extreme heat event. The results of this study demonstrate that until the Tasmanian population acclimatises to the warming of their climate, RHH can expect spikes in emergency department presentations when the maximum daily temperature exceeds 24^{0}C with increased numbers expected for up to 12 days afterwards. An increase in the frequency and severity of extreme events poses significant public health challenges for Tasmania.

CONCLUSION

This study highlights the significant impact extreme heat events have on hospital admissions. Importantly, this increased demand will last for days after a heat event. These findings corroborate those of international studies. Public health organisations need to implement adaptation strategies to prepare for a climate where heat events will occur more frequently.

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