THE EFFECTS OF CLIMATE VARIABLES ON THE OUTBREAK OF DENGUE IN QUEENSLAND 2008-2009

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Abstract. Outbreaks of dengue occur in Queensland, Australia nearly every summer. In 2008-2009, there was an unusually large, protracted outbreak of dengue, comprised of 1,200 cases. We investigated the weather variables and their contribution to the 2008-2009 dengue outbreak in Queensland. Case data were obtained from the Communicable Disease Branch of Queensland Health for 2000-2010 for the towns of Cairns and Townsville. Monthly weather data (rainfall, maximum temperature, minimum temperature) and Southern Oscillation Index (SOI) was obtained from the Bureau of Meteorology (BOM). We used a negative binomial model to test associations between these variables and dengue. Lagged models were also created for one, two and three months. Our models suggest all weather variables but not the SOI were associated with dengue in both Cairns and Townsville, without a lag ($p<0.01$). No significant lag was seen with the weather variables. Rainfall and temperature preceding the 2008-2009 outbreak were also not significantly different ($p<0.01$) from other years. Short-term (non-lagged) weather variables were associated with the number of dengue cases in Cairns and Townsville. No lag was seen and no association was seen between the SOI and the number of dengue cases, which suggests there may be limited potential to predict large dengue outbreaks using climate variability. The large outbreak in 2008-2009 may have been driven by other, non-weather factors in addition to the immediate weather effect.

Keywords: dengue, climate, outbreak, Queensland, Australia

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