

RENAL HEALTH OUTCOMES IN RELATION TO TEMPERATURE AND HEATWAVES IN ADELAIDE, SOUTH AUSTRALIA

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Background: Heatwaves have been linked to an increase in renal disease in several cities, including Adelaide.¹ Adelaide has frequent heatwaves that are becoming longer, more intense, and more frequent with climate change.²

Objectives: This ecological study aimed to explore the relationship between daily heatwaves and kidney disease to separately inspect the incidence of eight temperature-prone specific renal disease categories in metropolitan Adelaide, South Australia.

Methods: Daily data for metropolitan hospital inpatient and emergency department admissions for a range of renal disorders were acquired from the SA Department of Health from 2003 to 2014 in Adelaide. Renal outcomes were analysed in relation to daily temperature (maximum, minimum and average) and heatwaves using three separate heatwave definitions using time-stratified negative binomial regression models during the warm season (from the months of October to March).

Results: Daily temperature and heatwaves were associated with increased hospital admissions (both emergency department and inpatient) for total renal disease, urolithiasis, renal failure and acute kidney injury. Daily temperature was also associated with increased inpatient admissions for urinary tract infections and lower urinary tract infections. The strongest associations between heat and admissions occurred with acute kidney injury and renal failure; using the Bureau of Meteorology's heatwave definition, daily emergency department admissions for renal failure and acute kidney injury increased by 50.8% (IRR 1.508, 95% CI 1.268 – 1.794) and 88.3% (IRR 1.883, 95% CI 1.531 – 2.315), respectively. For renal failure and acute kidney injury, a 1°C increase in daily minimum temperature was associated with an increase in daily emergency department admissions of 3.0% (IRR 1.030, 95% CI 1.022 – 1.039) and 3.7% (IRR 1.037, 95% CI 1.026 – 1.048), respectively, during the warm season.

Conclusions: Our results suggest that increasing temperatures and numbers of heatwaves due to climate change will lead to an increasing population burden of specific categories of renal disease and demand for tailored health services. These results have clinical and public health implications for the future management of renal diseases.

References

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