Are patients with psychotic disorders at greater risk during a heatwave?

An audit of admissions to the Royal Adelaide Hospital during the 2009 heatwave

Dr Tam Le Cong

Introduction

- Heat waves kill more people than any other natural hazard in Australia
- From 1803-1992, 4287 people died from heat waves

Andrews, K. (1994) The consequences of heatwaves in Australia, Master of Science thesis, Macquarie University, NSW

PHEW! BIG DAY OUT GUIDE: ADELAIDE (SCENE)

The Advertiser

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BURNING UP

YESTERDAY
45°

TODAY
44

TOMORROW
41

SATURDAY
40

SUNDAY
40

- Longest stretch of 40C days for a century
- Heat forces public transport shutdowns
- Reports, pictures from around SA, Pages 4-5


Extra Cream ICE CREAM
CAUTION

Introduction

- A vulnerable segment of the population appears to be psychiatric patients
- A meta-analysis showed a three-fold increase in mortality in psychiatric patients during a heatwave
- In contrast to this, an Australian study found no overall excess mortality during heatwaves in Adelaide

Bouchama A, et al. Prognostic Factors in Heat Wave-Related Deaths. *Arch Intern Med*. 2007; 167(20):2170-2176
Nitschke M, Tucker GR, Bi P. Morbidity and mortality during heatwaves in metropolitan Adelaide. *MJA*. 2007;187:662-665

Objective

- To examine a case series of patients admitted during Adelaide's 2009 heatwave with a view to assessing
  - pattern of admissions
  - patient impact
- To assess vulnerability of patients with a psychotic illness

Methods

- Discharge summaries were reviewed for all patients admitted to RAH General Medicine between 27/1-9/2/2009
- OACIS was used to obtain the results of biochemistry on admission as well as how the admission was recorded according to ICD-10 codes

Methods

Inclusion

- If heat was documented as a significant factor

Exclusion

- Other causes of dehydration or collapse such as gastroenteritis or sepsis

Methods

- Demographics
- Living situation
- Availability of active cooling such as air-conditioning
- Temperature and cognitive state on presentation
- Serum sodium, urea and creatinine
- Past medical history
- History of mental illness
- Medications
- Length of stay
- Patients were separated into those with psychotic disorders and those without

Methods

- Outcomes were categorised as
  - Death
  - Unchanged living situation or increase in supports required on discharge

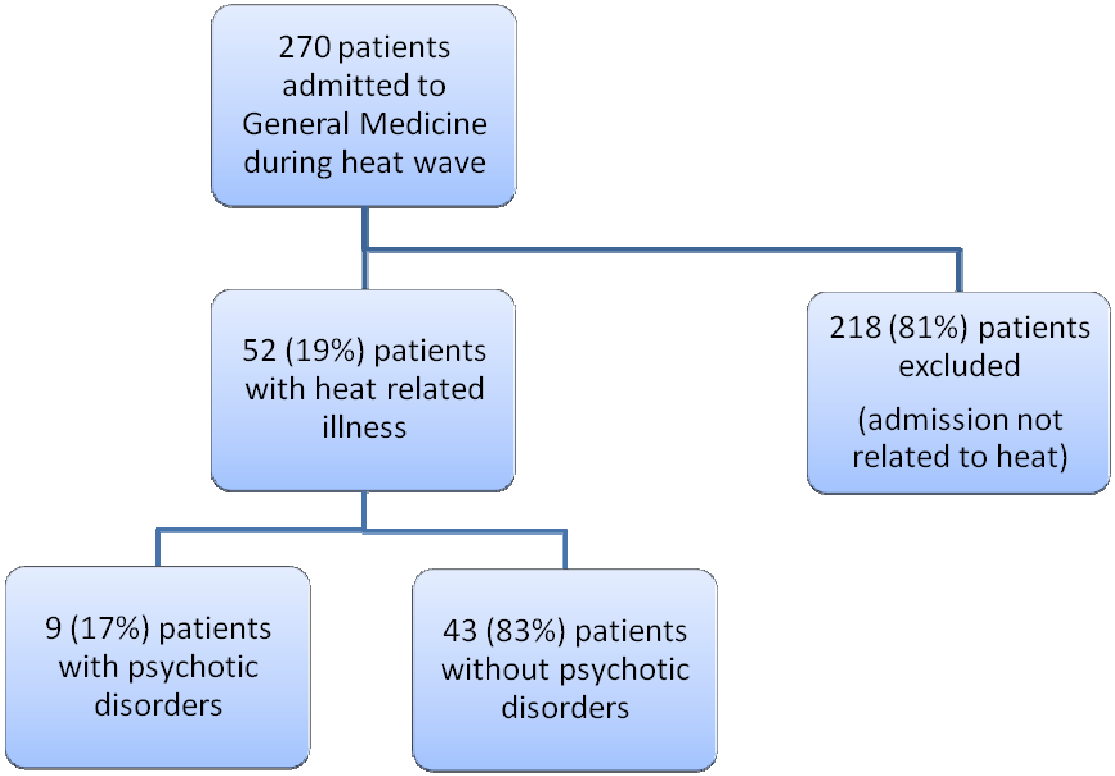
Definitions

- Heat stroke
  - severe illness resulting from exposure to heat or strenuous physical exercise
  - temperature > 40˚ C
  - central nervous system abnormalities
    - Delirium
    - Convulsions
    - Coma

Definitions

- Heat exhaustion
  - mild to moderate illness due to exposure to heat or strenuous physical exercise
  - temperature < 40˚ C
  - symptoms and signs
    - Weakness
    - Dizziness
    - Fainting
    - Headache

Subject Selection



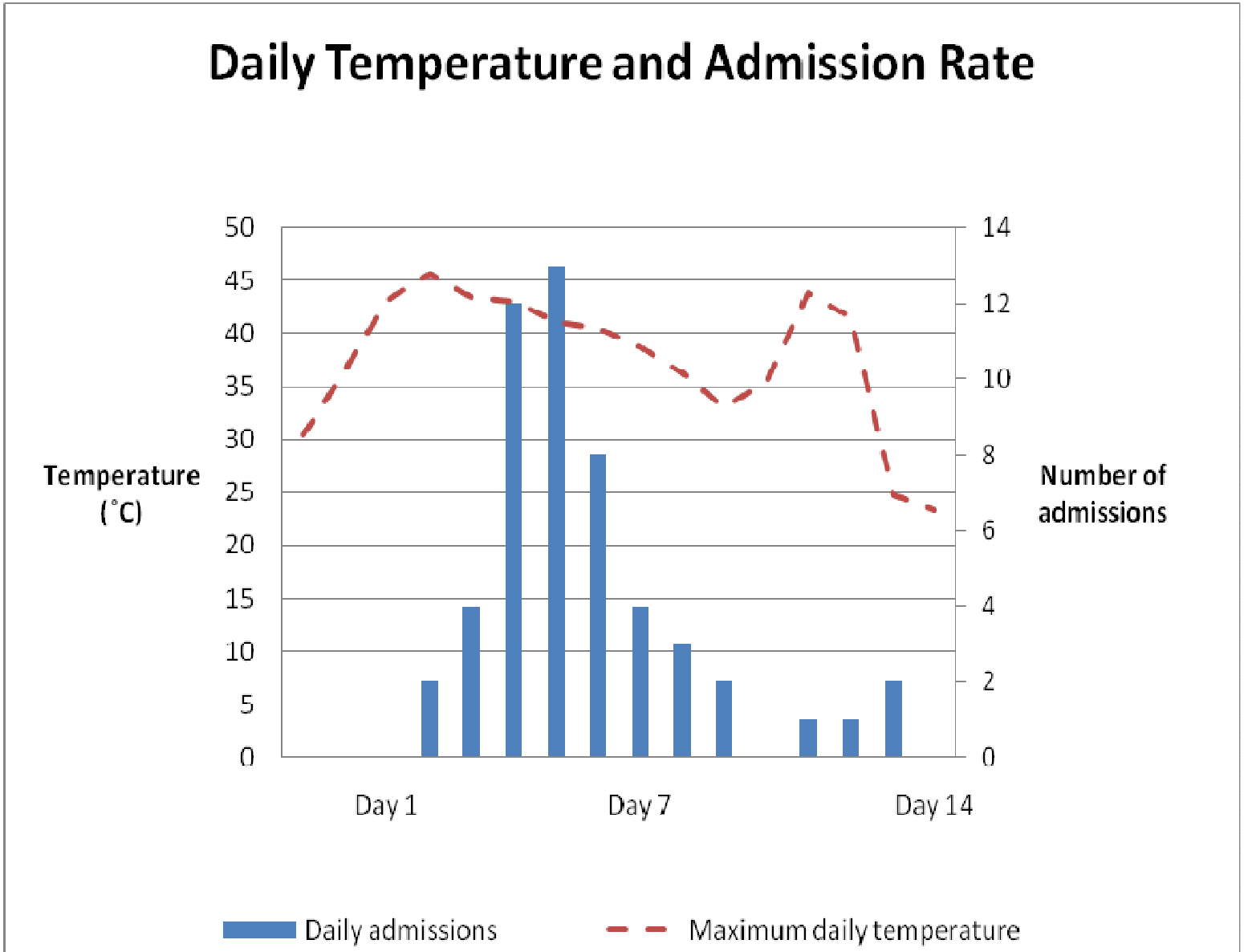


Figure 2. Number of heat related admissions each day and maximum daily temperature

Results

	All patients N=52	Psychotic disorder N=9 (17%)	No psychotic disorder N=43 (83%)
Median age (years)	79	66	81
Median length of stay (days)	4.90	7.27	4.67
Lives alone	21 (40%)	3 (33%)	18 (42%)
Inadequate air-conditioning	27 (52%)	8 (89%)	19 (44%)

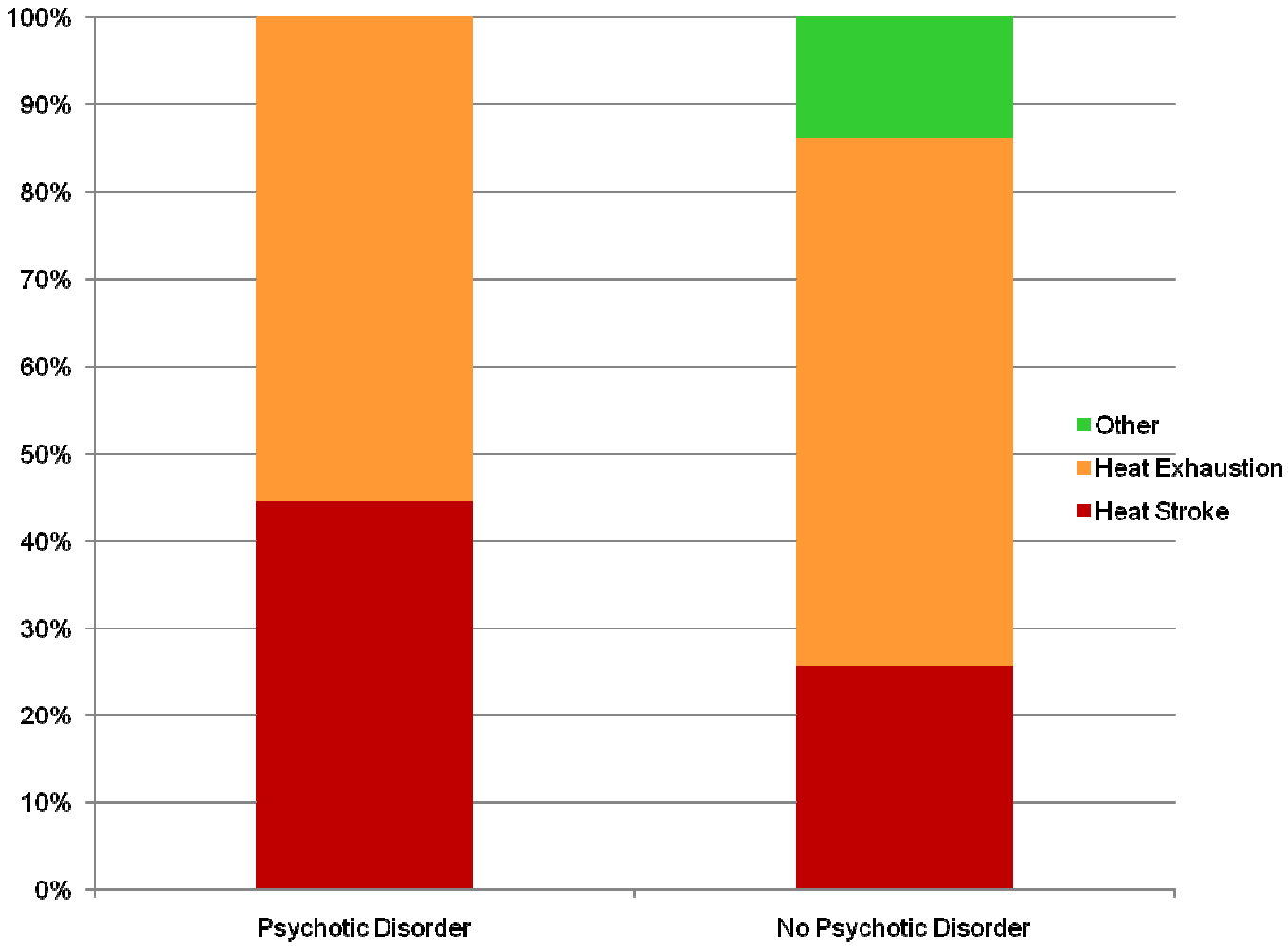
Results - biochemistry

	All patients N=52	Psychotic disorder N=9 (17%)	No psychotic disorder N=43 (83%)
Sodium (mmol/L)	137	138	136
Urea (mmol/L)	12.1	10.3	12.4
Creatinine (µmol/L)	140	132	145

Results

	All patients N=52	Psychotic disorder N=9 (17%)	No psychotic disorder N=43 (83%)
Heat stroke	15 (29%)	4 (44%)	11 (26%)
Heat exhaustion	31 (60%)	5 (56%)	26 (60%)
Died during admission	2 (4%)	0 (0%)	2 (5%)
Discharged to original accommodation	43 (83%)	8 (89%)	35 (81%)

Percentage of patients with heat stroke or heat exhaustion



Results

- 28 out of the 52 study patients (54%) were coded as having heat stroke
- Only 15 of these 28 patients (54%) actually met the criteria for heat stroke on admission
- The rest actually suffered from heat exhaustion

Discussion

- People with psychiatric illness are susceptible during a heat wave for several reasons
  - medications
  - impaired ability to take appropriate adaptive behaviour

Bark N. Deaths of psychiatric patients during heat waves. Psychiatr Serv. 1998;49(8):1088-1090

Discussion

- Risk factors for heat-related mortality
  - poor social circumstances
  - being elderly
  - social isolation
  - socioeconomic disadvantage
- In this case series, patients with a psychotic disorder were
  - younger
  - no more likely to be living alone

Basu R, Samet JM. Relation between elevated ambient temperature and mortality: a review of the epidemiologic evidence. Epidemiol Rev. 2002;24(2):190-202

Medications

- The main underlying pharmacological mechanisms appear to involve effects on central thermoregulation and sweating
- The disruption of hypothalamic thermoregulation is probably through depletion of dopamine
- Drugs with anticholinergic effects inhibit sweating, thereby reducing heat elimination

Clark WG, Lipton JM. Changes in body temperature after administration of amino acids, peptides, dopamine, neuroleptics and related agents: II. Neurosci Bioheav Rev. 1985;9(2):299-371

Air-conditioning is very protective

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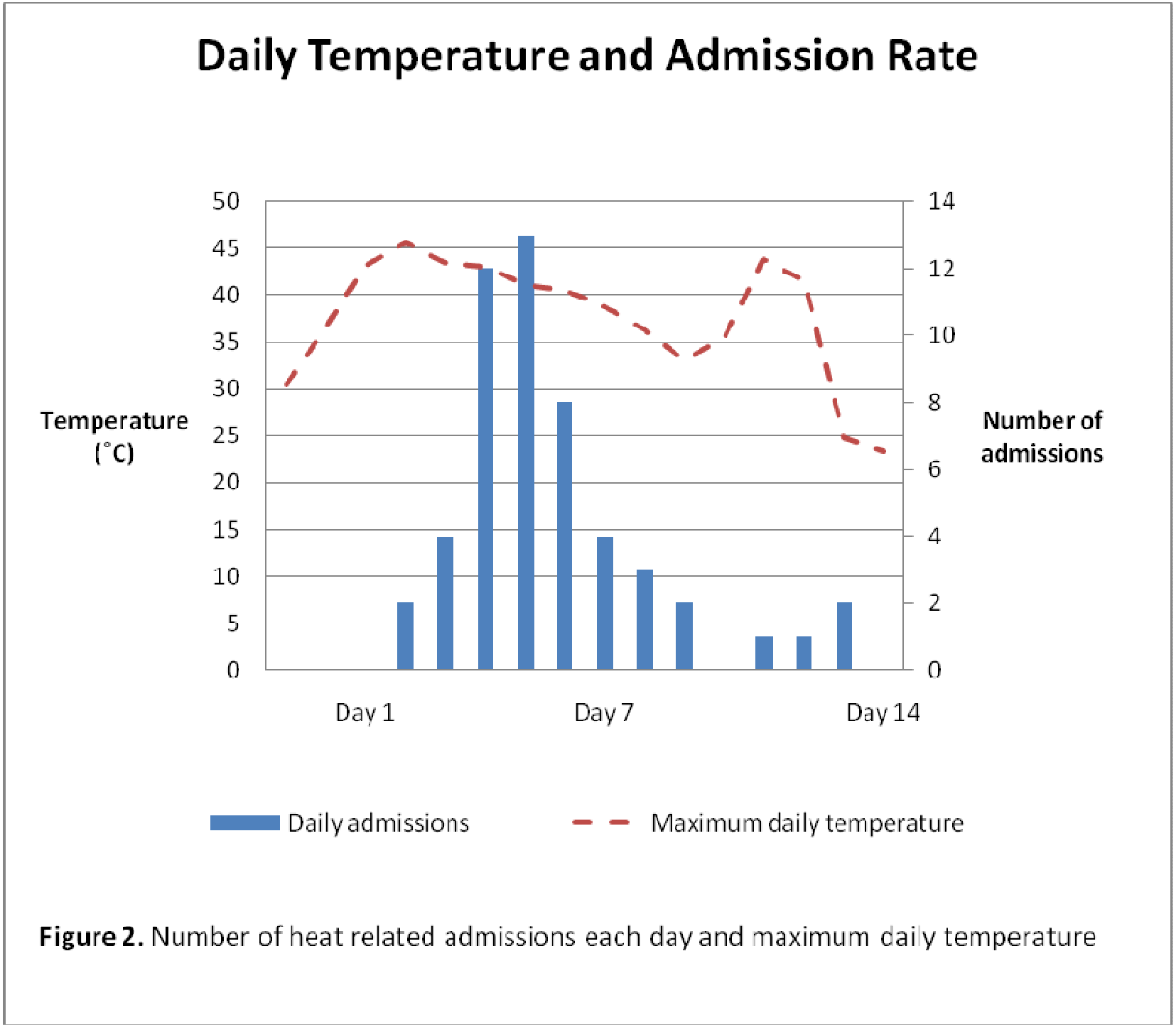

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Length of stay

- Greater length of stay may be related to being:
  - more unwell
  - greater difficulties in discharge planning

Summary

- A greater percentage of patients with psychotic disorders developed heat stroke with prolonged hospital admissions
- Mortality was no greater
- Close monitoring early on is indicated in this population during times of extreme heat

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