



Original research article

# Heatwaves, cooling and young children at home: Integrating energy and health objectives



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## ABSTRACT

This paper examines the practices advised by health authorities and performed by parents to cool infants during hot weather. The aim is to explore how health and energy efficiency imperatives can be better integrated for households. Consumption of home air conditioning is increasing around the world alongside policy concerns about energy poverty, climate change and peak demand. This paper analyses online sources containing advice to parents about temperature, hot weather and infant health. The content of this ‘know-what’ for parents was considered alongside experience-based ‘know-how’ (Royston, 2014) as described by parents in 44 interviews and home tours in Australia. Air conditioning is frequently positioned by health authorities as superior to low or no energy practices. However, understandings of infant care during hot weather are diverse and unsettled – both amongst parents and authorities. The absence of health sector consensus leaves space for energy policymakers to engage with the health sector to develop integrated cross-sectoral policy approaches. Continued circulation of adaptive, less energy-intensive hot weather practices is needed. Arresting the trajectory towards widespread reliance on air conditioning can help household finances, reduce electricity demand during hot weather, and avoid leaving parents ill-equipped when high demand or unexpected events compromise electricity supply.

## 1. Introduction

*‘We installed reverse cycle air conditioners...so we were keeping [our daughter’s] room cooled all day’*

*‘I think fresh air’s the best thing, especially in children’*

This paper addresses a pressing energy policy concern: how to tackle the apparent inconsistencies between health and energy policy imperatives for households while addressing concerns about infants’ health during very hot weather. There is currently little integration between energy and health sector policies, which is a key problem in countries like Australia where extreme heat, housing and peak electricity demand are intimately linked [1]. Health authorities often advise using energy intensive mechanical/refrigerated cooling (‘air conditioning’) to mitigate adverse health impacts during heatwaves. However, many Australian households, particularly larger households with children, are struggling to pay energy bills [2,3]. As in many countries, Australian energy policy is committed to introducing higher prices for electricity used at peak times to ‘signal’ households to reduce use, particularly during periods of very hot weather when air conditioner use stretches the capacity of electricity infrastructure [4,5]. Parents currently need to navigate between energy sector messages

(reduce peak usage or pay higher bills) and health advice (use air conditioning because infants are vulnerable to heat), which sit alongside their own understandings and experiences about how to keep infants cool in hot weather. In addition, the energy sector appears reluctant to suggest households forgo air conditioning altogether which limits the scope for demand management.

In this paper we investigate health authorities’ advice for parents of infants (0–2 years old) in hot weather – what Royston terms ‘know-what’. We analyse this ‘formal’ advice alongside parents’ ‘know-how’ for keeping infants cool [6]. Know-how refers to the experience-based knowledge, meanings and competences underlying the practices performed. Insights into how parents make sense of the perceived needs to keep their infants cool in hot weather are drawn from 44 in-home interviews with parents in Australia. We explore how heat health ‘know-how’ and ‘know-what’ both inform and compete with each other to produce outcomes that may be counterproductive for energy aims. The major contributions of this paper flow from the finding that even though many health authorities present air conditioning as superior for infant health in hot weather, the position of air conditioning (and its significant energy demand) is quietly contested both between health authorities and by parents who utilise significant know-how to perform low and no energy practices to care for infants in hot weather. By

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demonstrating that health authorities are not settled on air conditioning as the healthiest approach to hot weather, and by showcasing the diversity in parents' practices, our analysis highlights new opportunities to address peak electricity demand and household health in extreme heat. More broadly, this can also shift focus away from striving to meet ever expanding peak demand.

In the remainder of this paper we outline the importance of household air conditioning and other hot weather practices from both energy and health perspectives. We then present the conceptual framing and methodological approach for our analysis. The findings are presented in three sections before discussing the implications for energy policy.

## 2. Background

Space heating and cooling use accounts for up to 40% of household energy use in Australia and most use more energy for heating than cooling [7]. Home heating is widely accepted as essential for health and wellbeing in cool climates but the role of air conditioned cooling is not well understood. The prevalence of home air conditioning is rising with a further 700 million air conditioners predicted to be installed worldwide in the near future [8]. Increased consumption of air conditioning hinders efforts to reduce greenhouse gas emissions and contributes to climate change-associated extreme weather [9] – during which parents with and without access to air conditioning need to manage the impact of hot weather on infants.

In Australia, heatwaves have caused more deaths than any other extreme weather event [10]. Epidemiological studies have established that the elderly, people with particular health conditions, and babies and children up to around 2 years old (collectively referred to as infants in this paper) are most at risk of adverse health outcomes or death from heatwaves Refs. [11,12]. Infants have limited ability to regulate body temperature and can dehydrate rapidly during hot weather [13]. The limited capacity of infants to comprehend, communicate and attend to their physical needs adds to their vulnerability and dependence on parental care. Access to home air conditioning has been found to be a 'protective' factor for health during heatwaves and some concerned with population health impacts from heatwaves have called for increased access to air conditioning [14–17]. These findings predominantly relate to elderly and socially isolated adults but paediatricians have also advocated this approach [13]. However the World Health Organisation notes risks including increased energy use, equity of access, and risk of power failure during heatwaves [18].

Over the past 20 years, home air conditioning has transitioned from a luxury to almost standard item now present in three quarters of Australian homes [19]. Due to limited attention to energy efficient design and construction, home sizes, and appliance inefficiency, air conditioning Australian homes typically demands substantial electricity. Meeting rising peak demand has contributed to rapid increase in electricity prices and household financial stress [20]. The energy sector is committed to introducing 'cost-reflective' tariffs involving higher prices for electricity used at time of peak demand such as time-of-use, capacity tariffs and critical peak pricing 'signal' to encourage households to manage peak energy consumption [4]. These higher electricity price signals will usually apply during periods of extremely hot weather and therefore, using air conditioning will have financial impacts on households [21].

Prior to the rapid uptake of air conditioning in Australia, households relied on a range of low- or no energy 'adaptive' practices including utilising water and air movement to keep cool [22]. Existing research tells us little about whether changes in household hot weather practices over recent decades have impacted infant health outcomes. However, Wallenborn and Wilhite and others have warned that increasing standardisation of indoor climates (e.g. via use of air conditioning) risks driving a decline in know-how for adapting to temperature extremes [23,24]. As such it is imperative to understand the position of

authorities on use of air conditioning and other low or no energy 'adaptive' ways of caring for health. Together with understandings of the infant heat health practices performed by parents, these insights are needed to guide energy policy which both supports health and manages the risk of unaffordable energy bills for families.

Energy researchers have not previously tackled the specific issue of infant-related air conditioning consumption or how it may be approached in the context of energy efficiency or peak demand aims. This paper targets this gap and adds to a body of research which questions the trajectory towards greater reliance on air conditioning both in the home and in non-domestic buildings (e.g. [25–27]). It also builds on other research about the role that understandings of health, and caring for children, play in shaping household energy demand [28–31]. In interrogating the apparent non-negotiability of infant-related air conditioning consumption, and highlighting the role of health policy in energy demand, this paper also contributes to an emerging area of 'invisible energy policy' research which seeks to understand how energy demand is shaped by policies from other sectors whose primary concerns are apparently unrelated, e.g. the education or health sectors [32]. Our analysis builds on Royston's methodological approach to understand how different types of knowledges (formal and informal) contribute to household cooling practices and energy outcomes.

In the following section, we outline the conceptual and methodological approach followed to generate these insights for energy and health policy.

## 3. Know-what and know-how for infant cooling in hot weather

Royston [6] notes that the birth of children requires parents to perform new practices for infant care. Advice is provided in the many publications and websites to assist new parents, particularly for addressing cold weather concerns. Government health departments, hospitals and other health agencies, and parenting websites or forums also commonly provide information for parents about caring for infants in heatwaves. During a severe heatwave in Australia in 2014, the 'Better Health Channel' website produced by the Victorian state government recorded a 435% increase in traffic to information about child safety in hot weather [33]. Such examples point towards the seeming importance of what Royston terms 'know-what' – the kinds of formal or official advice provided by authorities and agencies.

Alongside these types of knowledge, Royston draws attention to 'know-how', the 'practical knowledge, as distinct from factual or theoretical knowledge' () householders draw on to make sense of what to do during weather that may be a risk to health. Previous qualitative research has also drawn attention to the 'folk understandings' [34] and 'practical knowledge' householders draw on to perform practices [35], including those involved in staying warm or cool. In theories of social practice, this know-how is commonly identified as the practical accomplishments, competences or skills which circulate amongst everyday practitioners to inform what makes sense for them to do [36,37]. It sits alongside the meanings and materials which are also employed in the performance of a practice [37].

In this paper we analyse the key messages in know-what promoted to parents by health authorities and others who provide health information. We also consider how this know-what complements or competes with parents' know-how for keep children cool in hot weather. It is important to acknowledge that know-what and know-how are not mutually exclusive, fixed categories. Factual, theoretical or authoritative know-what *can* become part of practical know-how but *does not necessarily* underpin it. In addition, official know-what can be derived from the practical know-how developed by practitioners, in this case parents – the relationship is not one-directional. Despite their mutually constitutive role, the two terms assist analysis of household practices by focusing attention the role of both official and unofficial understandings of how things are or should be done.

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