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Air-conditioning and antibiotics: Demand management insights from problematic health and household cooling practices

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HIGHLIGHTS

- Over-use of antibiotics and air-conditioning has social health implications.
- Focusing on financial incentives limits the potential of demand management programs.
- Explaining peak demand to households shifts the meanings of cooling practices.
- Emphasising the social health implications of antibiotics and air-conditioning may resurrect alternative practices.
- Analysing policy with social practice theory offers insights into policy approaches.

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ABSTRACT

Air-conditioners and antibiotics are two technologies that have both been traditionally framed around individual health and comfort needs, despite aspects of their use contributing to social health problems. The imprudent use of antibiotics is threatening the capacity of the healthcare system internationally. Similarly, in Australia the increasing reliance on air-conditioning to maintain thermal comfort is contributing to rising peak demand and electricity prices, and is placing an inequitable health and financial burden on vulnerable heat-stressed households. This paper analyses policy responses to these problems through the lens of social practice theory. In the health sector, campaigns are attempting to emphasise the social health implications of antibiotic use. In considering this approach in relation to the problem of air-conditioned cooling and how to change the ways in which people keep cool during peak times, our analysis draws on interviews with 80 Australian households. We find that the problem of peak electricity demand may be reduced through attention to the social health implications of air-conditioned cooling on very hot days. We conclude that social practice theory offers a fruitful analytical route for identifying new avenues for research and informing policy responses to emerging health and environmental problems.

1. Introduction

While not immediately obvious, the synergies between air-conditioning and antibiotics are striking. Both are individually administered and consumed, and both exacerbate global health and environmental problems such as antibiotic resistance, climate change and peak electricity demand. In particular, the imprudent use of antibiotics to treat minor infections, such as the common cold, is contributing to the emergence of antibiotic resistant microbes which can cause largely untreatable serious infections. Increasing antibiotic resistance is making societies vulnerable to outbreaks of infection and leading to a dramatic decline in healthcare capabilities. This is similar to the ways in which the increasing use of air-conditioning on hot summer days increases the complexity and costs of meeting peak electricity demand (Faruqui and Palmer, 2011). Peak electricity demand is creating serious health concerns, particularly for low-income households, where many of those most vulnerable to heat stress reside (Bi et al., 2011; Klinenberg, 2002). Some of those most in need of air-conditioning to maintain health are struggling with rapidly increasing electricity costs and either cannot afford to install an air-conditioner, or opt not to use an existing air-conditioner or fan during extreme heat events due to their concern about the impact on their electricity bill (Farbotko and Waitt, 2011; Sheridan, 2007). Furthermore, low-income homes are often affected by poor urban design and insufficient thermal insulation and ventilation which can exacerbate high temperatures and heat-related health impacts in summer (Bonnefoy et al., 2004; Morris and Simmonds, 2000).

The different policy responses to the problems of antibiotics and air-conditioning provide important insights for energy policy makers. The issue of peak electricity demand has prompted a suite

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of demand management initiatives, regulations and policies such as time-based or critical peak pricing, which penalise or reward households for increasing or reducing their peak consumption, particularly air-conditioning usage (Faruqui and Palmer, 2011; Strengers, 2013). These programs emphasise the personal benefits and savings householders receive for reducing peak demand (and in some cases environmental benefits). Policy responses to antibiotic use have also emphasised personal restraint and benefits, but recently greater emphasis is being placed on the wider social and health implications and the need for reduced or 'prudent' antibiotic use to protect the health of others and the healthcare system in the future (Davies, 2013). While the success or otherwise of this antibiotic strategy is not yet known, the social health implications of increasing antibiotic usage represents an important parallel with the energy sector, where increasing air-conditioning usage has important health and equity implications that are not being widely discussed or promoted. In this paper we explore the possibility of repositioning the problem of peak demand and air-conditioning use as a public health issue, rather than an issue of personal choice, and individual benefits. In particular, we speculate on how emphasising the social health implications of increased air-conditioning usage on hot summer days in demand management programs might change what makes sense for householders to do in order to stay cool during these times.

We approach this analysis from a social practice theoretical understanding of socio-technical change. Using Shove et al.'s (2012) summation of a practice 'entity', we position antibiotics and air-conditioners as technologies or *materials* of the social practices of treating minor infections (such as the common cold) and keeping cool on hot days, where they sit alongside the elements of *meanings* and *competences* which together co-constitute 'normal' ways of staying healthy and cool. Following Schatzki (2002) and Shove et al. (2012), we are also interested in practice-as-performance, and the ways in which 'new' and 'old' versions of these practices are performed. Practices of treating minor infections aim to reduce the symptoms of an ailment and facilitate rapid recovery. They are usually performed by health professionals and patients in concert. Practices of keeping cool on hot days in order to maintain bodily coolth, comfort and health are widely performed, but we focus here on the performance of these practices in households, by householders.

In undertaking this analysis, we do not wish to suggest that some policy interventions to reduce antibiotic or air-conditioning usage are framed from or informed by a social practices perspective while others are not. Rather, our aim is to explore the possibility that some policy responses are more likely to achieve practice change than others, by virtue of where and on who (or what) they focus their attention. The value of analysing policy responses in this way has been previously demonstrated by a growing number of scholars who have studied the impact of dominant and innovative policy responses on everyday practices to inform practice-oriented policy making (Evans et al., 2012; Hargreaves, 2011; Shove and Walker, 2010; Strengers, 2012). Our exploration is informed by qualitative research with 80 households from Australia, with whom we discussed the issue of peak electricity demand and current cooling practices.

It is important to clarify from the outset that we assume that access to affordable electricity to run air-conditioning or fans is essential to achieve healthy, equitable outcomes for a portion of vulnerable, elderly or chronically ill householders. While we do not preference air-conditioning as a solution to heat stress we do acknowledge that in some cases it may be necessary due to the poor thermal performance of many residential buildings, urban design problems and additional issues which can affect the capacity for householders to participate in other practices of keeping cool (Bonnefoy et al., 2004; Morris and Simmonds, 2000). Our focus is therefore on how policy makers and energy demand managers can reduce the use of air-conditioned cooling by the more able majority to alleviate peak electricity demand and air-conditioning reliance for the benefit of the vulnerable, the electricity system, and the environment.

The paper begins by further outlining our theoretical framework, drawing synergies between air-conditioning and antibiotics and the practices they are implicated in. We then turn to a distinctive emerging policy response in the healthcare sector, which we analyse as an attempt to change doctors' and patients' practices of using antibiotics to treat minor ailments. Taking cues from this example, we analyse our empirical data with Australian households to consider how practices of keeping cool are currently constituted and performed, and how policy makers and demand managers could encourage these practices to shift or change, particularly during peak times. We conclude by considering the research and policy opportunities from our analysis and the implications for energy demand management programs.

2. Antibiotics and air-conditioning as 'materials' of practice

Ancient human civilisations used techniques such as hanging moistened reeds to humidify and cool air as it passed through the home. In a similar vein, antibiotic substances produced by organisms to achieve competitive advantage in their environment have long been used by humans as part of traditional medicine practices. Scientific advances in the first half of the 20th Century included the identification and production of penicillin for use as an antibiotic medicine to treat infections and the application of refrigeration chemistry to develop mechanical air-conditioning units for home use. This harnessing of human scientific understanding to commodify natural processes in order to achieve a practical outcome constitutes both modern air-conditioning and commercial antibiotics as 'technologies'. Through the second half of the 20th Century these two technologies have revolutionised the respective practices of keeping cool and treating infections. The development of each of these technologies is typically viewed as an 'advance' in human civilisation whereby higher levels of health and/or sense of wellbeing are achieved (Spellberg et al., 2008; Trippett, 1979).

Following Shove et al. (2012) we treat the technologies of air-conditioning (primarily refrigerated cooling) and antibiotics as dominant 'materials' of their respective practices. As we outlined in the introduction, materials are an integral element of the social practice entity, sitting alongside competences (or skills) and meanings (or understandings), which relate to social, cultural or symbolic phenomena (Shove et al., 2012). Importantly, these elements are interrelated and overlapping; hence meanings can be held about materials or competences, such as meanings about competences electricity, using air-conditioning and keeping cool, and materials and competences can similarly inform meanings. Taken together, the use of the air-conditioner to keep cool relies on competences about how to use an air-conditioner and meanings of air-conditioned cooling as the best and most appropriate method for very hot days. While 'normal' ways of performing social practices are dynamic and change over time (Shove et al., 2012), in many countries antibiotics and air-conditioning are now both commonly considered necessary and superior materials of their respective suites of practice (Mangione-Smith et al., 2004; Shove, 2003).

As a material of practice, air-conditioning and its associated thermal comfort standards (ASHRAE, 2004) has played a critical role in changing householders' expectations of comfort, personal presentation and hygiene (Shove, 2003). For example, workplaces are air-conditioned to temperatures that accommodate the wearing of suits in summer. Sweating—the human body's in-built