Thermal comfort in care homes: vulnerability, responsibility and the provision of 'thermal care'

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Abstract

Care homes are a distinctive setting for the management of thermal comfort, in part because of their hybrid characteristics and the expectations that come with providing both a home environment and caring service for older people. We report on qualitative research in six care homes in the UK that investigated how the thermal needs and demands of the care home setting are understood and how accordingly the management of thermal comfort is shaped and carried out. We conclude that the core function of providing good quality care is intimately related to providing for thermal comfort. The association between 'old and cold' and the obligations that follow for the provision of effective care, is deeply entrenched - from the routine provision of hot drinks, to the use of blankets and the non-stop operation of heating systems. The responsibility for what we term the provision of 'thermal care' for residents is challenging in its own right, but is further complicated by the diversity of people living (and working) together in the home, their occupation of communal spaces for long stretches of the day and interactions between the means of providing thermal comfort and physical safety. Implications are discussed for sustainable technology uptake, patterns of thermal related vulnerability and the ethics of thermal care provision. The need for further research and the directions this could take are also discussed.

Keywords: Care, Comfort, Older People.

Introduction

Care homes[1] provide the living spaces for approximately 400,000 older people in the UK, across over 18,000 care home units (Owen and Meyer, 2012) and significant growth is expected over coming decades as the over-65 population increases in absolute and relative terms (Department of Communities and Local Government, 2008). Care homes come in many shapes and sizes (Johnson et al., 2010) and are a hybrid category of building use and indoor environment – part long term residence, part nursing space, part working environment – slipping between conventional categorisations of home and work and public and private space. This distinctive category of building use is under-examined in research on thermal comfort, which tends to work with broad and familiar building types, population and use categories (home, commercial, office, and so on), into which care homes fail to fit neatly. Moreover, the work that has addressed thermal comfort in care homes has focused on particular features, such as the design of care homes for people with dementia (Van Hoof et al., 2010) or on management of heat waves (Brown, 2010; Brown and Walker, 2008). Our aim in this paper is a broader one: to draw on empirical research to reveal how the thermal needs and demands of the care home setting are understood, how accordingly the management of thermal comfort is shaped and carried out and to identify the implications that follow.

In so doing we approach comfort as a system (Nicol et al., 2012), involving complex and dynamic interactions between physiological, social, cultural and material components (Cole et al., 2010). We therefore position our work in what Shove et al. (2008; 1) see as a move away from relying on '*purely physical and physiological paradigms on comfort towards those which emphasise meanings and social settings*'. As we shall discuss, the social setting of the care home is complex in ways that have significant implications for the provision of thermal comfort. For example, it is both a collective living environment for multiple residents and a

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[1] Both residential and nursing homes were part of our sample. We thus use the term 'care homes' to cover both types of institution.

working environment for multiple staff and the residents may be particularly vulnerable to the effects of overly cold or hot conditions because of their age and physical and/or mental health problems.

We draw on qualitative research undertaken in six care homes in the UK in order to show how the everyday management of thermal comfort in care homes has distinctive meanings and qualities each related to the relationship between the provision of what we term 'thermal care' and the obligation to keep variously 'dependent' older people comfortable, well and safe. As well as discussing our findings we draw out significant implications for the uptake of sustainable technologies, for the relationship between thermal comfort, risk and vulnerability, and the ethics of thermal care provision. We also consider the directions that further research should take.

Before addressing our methods and empirical findings, a review of the approaches and ideas that have framed the research is first provided in order to situate the study within relevant existing literature.

Thermal comfort, older age and institutions: setting the scene

Thermal comfort is a field of research and practice somewhat in flux. Dominated for some time by engineering led approaches focused on measuring and producing optimal thermal conditions for building occupants, these have been challenged by critiques, coming from many different directions, questioning the reductionism, simplification and standardisation inherent to such approaches (Cooper, 1982; Chappells and Shove, 2005; Nicol et al., 2012). What Cooper (2010) refers to as the 'new approach' is far more open to diversity, to the systemic and adaptive character of thermal comfort in which people respond to the environments and conditions they inhabit, and to the historical and cultural underpinnings of how comfort is played out in everyday life. Research designs following this approach are accordingly not concerned with the abstract and experimental worlds of climate chambers

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and heat balance modelling, but rather with the way thermal comfort is experienced and adapted in situ, and how the 'demand' for comfort is socially and cultural produced (Wilhite, 2010) while being intimately wrapped up with its 'supply' through technologies, ideas and policies (Shove et al., 2008).

As Nicol et al. (2012) emphasise viewing thermal comfort in this way means giving attention to far more than buildings, heating and cooling technologies and people as bodily physiologies. It requires attention be paid to the dynamic thermal adaptations that people make in respect of clothing, food and drink intake, posture, movement and positioning, levels of activity, and the opening and closing of windows and blinds (and much more besides). Such adaptations, all of which are socially constituted, complicate the notion of simple relationships existing between discomfort and indoor thermal conditions. In particular situations such adaptations may also be more or less available or possible. In this respect Cole et al. (2008: 20) make a distinction between individual and collective experiences of comfort; the former characterised by residential settings where '*inhabitants typically have a greater degree of control and express their comfort needs and desires by adapting their indoor environments more readily*', and the latter, which normally offer much less opportunity to exercise control and place greater limits on the adaptations that can be made.

The nature of the limitations placed on an individual's ability to exercise control in a given collective setting may be different in each organizational or institutional context (Djongyang et al., 2010). For example, an office worker's control over what are normally centrally-organised heating and cooling infrastructures can be frustrated by a hierarchically organized workplace that prevents interaction with these systems (Barlow and Fiala, 2007). In hospitals the needs of infection control and other health issues particular to this setting may change the expectation of control over the indoor climate, with the needs of patients often prioritized above those of working members of staff (Khodakarami and Nasrollahi, 2012).

Given our specific interest in care home settings where older people are at once the recipients of care but also permanent (or semi-permanent) residents, and where there are both private and shared spaces (e.g. lounges and dining rooms), such questions are clearly very pertinent. There are also closely related issues connected to the health and care needs of the older residents. The literature that there is on the relationship between thermal comfort and older age tends to focus on issues of health, vulnerability and physiological difference and given the nature of care home populations this is an important part of the expectations and meanings that flow through our research topic. Before discussing this further though, we should note it is important not to generalise (and consequently stigmatise) older age as inherently involving infirmity and incapacity (Featherstone and Hepworth, 2005). People falling into an 'older' age category are inherently diverse (Thompson, 1992) and there is also much diversity within any one care home population - from people that are essentially bed-bound, through to people with mobility problems but fully functioning in other significant terms, through to people with dementia or other cognitive difficulties.

The physiology literature connects old age with a sense of physical decline and the decreasing ability of the body to cope with low temperatures. Colder conditions are considered to be a problem because older bodies are less able to restrict the amount of heat they lose (through reduced vasoconstriction and less effective body fat) and are less able to produce heat of their own (through a reduced metabolism) (Florez-Duquet and McDonald, 1998; Gomolin et al., 2005). Physiological evidence suggests high temperatures can be just as challenging. Older bodies are less able to withstand the stress put on them by the increased need to circulate blood to the extremities in order to cool down, and the increased likelihood of pre-existing cardio-vascular and pulmonary illnesses that develops in old age can heighten the risk of problems during vasodilation still further (Mackenbach and Borst 1997). The use of certain medications common in old age, such as those with psychotropic properties, can also be an aggravating factor (Bark 1998, Worfolk, 2000; Flynn and McGreevy 2005). Hajat et al. (2007) in reviewing the incidence of both heat-related and cold-

related deaths in England and Wales accordingly state that "Elderly people, particularly those in nursing and care homes, were most vulnerable" (pg 1) a conclusion that gives considerable significance to examining thermal comfort issues in these settings.

Picking up particularly on cold related risks, popular discourse often associates being old with fuel poverty (Day and Hitchings, 2011) and the health problems that come from not being able to afford to keep warm enough at home (Gasgcoine et al., 2010). Fuel poverty can be experienced by other age groups (Hills, 2012), but it is recognised that older people can be more severely affected because they often need to spend longer periods at home (Burholt and Windle, 2006), live in poorer quality, less energy efficient housing, and exist on lower incomes (Wright, 2004). We can note, though, that fuel poverty is *not* something associated with forms of institutional living, such as in care homes, a point that we return to later.

Issues of thermal comfort and health in older age are not just about physical health however. As van Hoof et al. (2010) emphasise in a review focused on home design for people living with dementia, there are a wider set of issues to address when needs and vulnerabilities also relate to mental competences. People suffering from age related mental illnesses, such as dementia, may not be able to interact with the control infrastructures of a heating system, express thermal preferences to others, or, in the advanced stages of dementia, even understand the sensation of thermal discomfort and be able to attribute it to their surrounding environment. Instead their thermal discomfort must often be inferred from patterns of behaviour interpreted by relatives and carers.

While van Hoof et al. (2010) note various particular considerations that can apply in institutional settings, specific research on thermal comfort in care homes is very limited. One exception is a study (by one of the current authors) focused specifically on care homes and vulnerability in heat waves (Brown and Walker, 2008; Brown, 2010). This study focused on understanding how ways of managing heat were shaped by the institutional context of the

home and why they could be inflexible to changing external environmental conditions. Key reasons included the fragmentation of control of the heating and cooling infrastructure across the hierarchical structure of the organization, and the strongly rhythmic and routine way activities were carried out and connected together. For example, practices like eating and drinking were fixed rigidly into the daily timetable and arranged days in advance, so that when hot weather arrived residents were expected to still consume hot food and drink and menus did not adapt. The management of thermal comfort in care homes was also embedded in the culture of the organization, which placed considerably more emphasis on keeping residents warm than keeping them cool.

The various lines of existing research that we have reviewed provide a foundation (albeit not as complete as we might like) for the empirical work we report on over the rest of the paper. They suggest that we may find some distinctive characteristics in how thermal comfort is understood and managed in care home settings, with Brown (2010) in particular opening up our understanding of the importance of the institutional context. Finally, we should also note that care homes in the UK are implicated in wider public debates about the standards and costs of care (Care Quality Commission, 2012, Commission on Funding of Care and Support, 2011), the pros and cons of keeping older people living independently at home or in specialised housing (Housing Learning and Improvement Network, 2009) and the reputation and solvency of some major care home businesses. This all shapes the context within which care homes are run and also people's expectations of them. These are matters we shall return to in the conclusion.

Methods

The research took place as part of a multi-university project[2] which examined the relationships between older people and thermal comfort across a range of different spaces and sets of living conditions.

Investigating the complexities shaping thermal comfort in care homes required an exploratory research design capable of generating a depth of insight. There was a need to capture information about the use of heating, ventilation and cooling technologies, but also to understand care practices, the meanings and expectations of thermal comfort held by different sets of staff in the home, and the nature of the home's organizational structure. To do this, in-depth semi-structured interviews were employed to create as full a picture of the workings of the institution as possible. Given our focus on the provision and management of thermal comfort, it is important to note that we did not set out to undertake a study that assessed the received and experienced thermal comfort from the perspective of home residents. Such a study would have required an extended, more intensive research design, we comment on this further in the conclusion.

An internet search was first used to identify care homes differentiated by criteria of size, location, age of building(s), form of ownership and types of thermal technologies. From a short list of potential case studies we then contacted each home, and, of those agreeing to participate, recruited a total of 6 care homes[3] to take part in the study. This number allowed for the development of a sense of the diversity across the care home sector, while enabling reasonably detailed research to be undertaken within each home. The key characteristics of each home are summarised in Table 1. To take some account of the variability of external climatic conditions homes were selected with a geographical spread from the north of

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[2] See: http://www.sed.manchester.ac.uk/research/marc/research/conditioningdemand/ [access date needed?]

[3] Table 1 shows the type of care provided at each home. Some homes have specialist units for caring for people with dementia. Others provide both residential and nursing care, the latter being for people who have medical needs that require regular nursing support.

Scotland to the South of England. Seasonal variations were included by undertaking the research in two phases. The first phase set of visits was conducted in the winter of 2011/12, a second round in the summer of 2012.

There was a need to capture some of the range of experiences and perspectives of different staff, rather than relying on say one interview with a home manager. In total there were 27 interviewees, and each interview was recorded and transcribed. In practice it proved easier to gain access to some categories of people than others, as reflected in the varying totals across Table 2 (although this also reflects the different profiles of the available on-site staff, for example varying considerably between small owner/manager homes and larger homes that are part of corporate chains). Longer interviews were undertaken during the first visit, with the second visit used to follow up on the first round (where that was possible, in some cases staff had left or were unavailable) and observe what might, or might not, be different in the summertime. Interviews were semi-structured with question schedules differentiated by the roles of interviews but with a core of common questions. Examples of interview questions are shown in Table 3.   In addition we undertook 'tours' of each care home (therefore 12 in total over two visits) which provided for observations of technology, layout and care arrangements along with recurrent informal discussions with staff and residents along the way. Where these tour discussions were more substantial a recording was made and transcribed, adding to the body of material to be analysed.

	Number of beds	Type of Care	Approximate age of building(s)	Type of ownership	Location	Thermal features of the building and heating technologies
Care Home 1	60-70	Residential and Dementia	0-5 years	Family owned and run	Northern England	New build, very high levels of insulation, solar hot water panels, double glazing, gas central heating with 2 boilers linked to underfloor heating system
Care Home 2	30-40	Residential and Nursing	part 0-5 years, part 25-30 years	Family owned and run	Eastern England	Recently extended building. Off gas location. New section heated by ground source heat pump, older section heated by electric panel heaters and storage heaters, double glazing throughout
Care Home 3	50-60	Residential and Dementia	part 5-10 years old, part 100-120 years old	Medium sized company (20 homes)	Southern England	The building comprises an older house with a recent extension. Heated by gas central heating system connected to radiators in the old section and underfloor heating in the new section. New section has modern insulating materials, the older section does not. Double glazing throughout.
Care Home 4	20-30	Residential and Nursing	200+ years old	Small company (5 homes)	Scotland	Old house with high ceilings, large rooms and very thick walls, but single glazed. It has 2 boilers, a biomass boiler and an oil fired boiler (for backup) connected to radiators. The home is remote and in an off gas location
Care Home 5	150+	Residential and Nursing	15-20 years old	large national company	Northern England	Gas central heating system with large surface radiators. This is controlled by a cutting edge Building Management System (BMS) that monitors and controls temperatures. This is controlled remotely from a company head office. The building is highly insulated and double glazed
Care Home 6	10-20	Residential	0-5 years old	council run	Scotland	Newly built home in an extremely remote location. Gas and oil stored in tanks. It uses a wind turbine to generate electricity and oil fired boilers connected to under floor heating. These are operated via a BMS controlled from a remote head office.

Table 1: Characteristics of the participating care homes

Role	No. of Interviewees
Owner of the Home	4
Manager of the Home	8
Care Staff	9
Maintenance Worker	6
Total	27

Table 2: Interviewees by role

Examples of interview questions for care staff	Are there any areas of the building that get too cold? Are there any areas of the building that get too hot? How able are the residents to keep themselves comfortable? How do you know if a resident is too hot or too cold? What do you do if someone is too hot or cold? How does what residents do change in hot and cold weather?
Examples of interview questions for care home management	What part does a comfortable indoor climate play in the running of the home? Is it important to have a stable indoor climate or should it vary over days/seasons? Which decisions around the heating system are made by the owners and which are made by management? Who determines the temperature of the building?
Examples of interview questions for maintenance staff	What proportion of your day is taken up with the heating system? How effective is the BMS (if there is one)? How does this building compare with other buildings in terms of comfort? What would you change about the building if you had the chance? What different maintenance issues are there?

Table 3: Examples of Interview Questions for Different Interviewee Roles

Conducting research in this type of care environment brings with it ethical issues that need careful consideration. Although it was important not to label all of the residents as vulnerable, their admittance to a care environment itself implied a degree of physical or mental impairment to which our research design would need to be sensitive. Their dependent situation also raised the potential for harm resulting from a loss of social standing within the home, should private information become public. The staff and management of each care home were in turn vulnerable to the possibility that evidence of (poor) standards of

care or professional conduct would become public, or that sensitive information would be revealed to competitors. In order to address these concerns the research was conducted on an entirely confidential, anonymous and consensual basis and ethical approval for these arrangements was obtained through established University procedures.

Data analysis of both interview and 'tour' transcripts was carried out thematically, coding into 12 main categories with more than 70 sub-categories The main categories were developed through separate members of the research team reading through interviews transcripts, identifying the key topics that were emerging and then discussing these as a team. A coding framework was then developed, going through several iterations and then applied consistently across all of the interview material using Atlas Ti software.

The four integrating themes discussed below are drawn from the coding and analysis process capturing the key ways in which the thermal needs and demands of the care home setting were understood *across* the body of interviews and how in parallel this shaped the ways in which thermal comfort was being managed on a day to day basis. We are careful in the following discussion to bring out differences between the care homes (where these are significant), alongside identifying areas of commonality.

Caring and thermal comfort

The primary function of a home is to care for the older residents and therefore this theme was explicitly or implicitly at the centre of much of the interview discussion. In nearly all of the accounts of our interviewees there was an emphasis on the age and potential frailty and vulnerability of the residents, with implications (along with many others for the running of the home) for the need to keep residents warm because of how they 'feel the cold' (a recurrent phrase). For example:

"*There is a general principle , that in the main, most people who are older will feel the cold more than we do. … they don't have the mobility that we have, and moving about and being very active in our lives is one of the things that helps us keep warm. Also, as you grow old, all your sort of metabolism slows down, so that your circulation is not so good, and circulation, you know, is what helps keeps your hands warm, keeps your feet warm, so generally they do feel colder.*" (Manager, Care Home 2)

Indeed this contributed for this care home manager to a key rationale for the very existence of care homes:

"*I mean that's the difference really, between them being at home and being here,… when somebody gets to the need of being in care … then suddenly sometimes their standard of life will increase and get better, because, they suddenly are getting warm, and getting fed, which perhaps they weren't doing as well before,*" (Manager, Care Home 2)

Along these lines and across many of the interviews with managers, owners and staff, a cold environment, while just seen as 'problematic' in other settings, was considered dangerous in a care home and this was visible in the urgency of the response when a problem arises. For example, as another manager explained:

"*I'll get on the phone and say …. It's urgent. I need somebody out today. You know, its very important that people have got heating, light and ventilation. It's not good. It's not good. People can die from it, it's very serious*" (Manager, Care Home 3)

This need for constancy and continuity of operation was also reflected in the design of the heating systems. As the maintenance worker for Care Home 5 explained his pumps were on constantly '*24/7 52 weeks a year*' with the system designed so that if one pump burnt out there was another one that would take over as a back up - "*we cannot afford to have a [residential] block go cold*" was his explanation for this inbuilt redundancy and system resilience. Again there are significant differences here from the normal domestic residential

environment where heating systems are typically used less constantly both through the day and the year. In care homes the constant responsibility for the welfare of residents and presence of care staff means the heating is not usually switched off overnight - both because residents can wake sporadically and need to get up at different times, and because it is a working environment for overnight staff. There might be some adjustment of temperature between day and night but not on a significant scale:

> *"Well, it's pretty, it's pretty flat-line. Before we had this … computer, what happened is that the heating would be on, and it [the water temperature] would be on at 42 degrees, 24 hours a day, but now, they drop the temperature a little bit now because people are in bed"* (Maintenance Worker, Care Home 5)

In terms of other elements of the thermal comfort 'system', adjustments to these could be so embedded in normal work patterns that it could be hard, initially, for some of the interviewees we spoke to recognise the ways in which their work was of relevance to our interest in thermal comfort. For example, they professed little knowledge of 'the heating system' seeing this as the only obvious reference point on matters of temperature and comfort. But on further questioning such interviewees did recognise that responding to resident's thermal needs, in a diversity of adaptive ways, was very much part of the habituated routine care practices of the homes, which appeared have a similar make-up across the six homes (although we were not able to investigate ongoing daily routines in detail). In this respect there was much discussion of the use of blankets, hot drinks, the wearing and adjustments of cardigans and other clothing, the positioning of residents within the rooms of the home (in response to colder and occasionally hotter weather) as all part of the essential and routine caring work of the staff. And as noted in the quote below, if the operation of this thermal system was out of balance, this was seen as a problem that needed to be addressed, with the repeat of 'obviously' emphasising the mundane nature of these demands :

"*obviously (I) make sure that they had enough clothes on and made sure that there was blankets and I made sure that the heat in the room was adequate enough, and if I thought for any reason that it was too cold, then I would obviously report it to the person in charge to say, "this is unacceptable*". (Senior Carer, Care Home 1)

In different ways therefore the interviews revealed the close relationship between the core caring function of the home and the need to keep the residents warm, so that we can talk about active forms of 'thermal care' being practised. In the face of their vulnerability and frailty, keeping residents warm was to keep them safe and well. A key obligation of the home was tto provide this care service as part of satisfying their contracted terms of operation. It was notable that there was much less emphasis on keeping residents cool, even during our summer visits to the homes. There were occasional references to the issues involved with overheating, but overall the cold dominated interview discussions. This has potentially significant consequences which we will return to later.

Responsibility and control

Care homes are different from a standard 'domestic environment' in which people generally have both autonomy and responsibility for looking after themselves and pretty immediate and direct control over their thermal comfort. They make adjustments to the heating system, their levels of clothing, the opening and closing of windows, and their proximity to sources of warmth, and much more besides, to suit their thermal needs[4]. But in a care home environment it was clear that this degree of agency and control is to some degree curtailed and bounded for individual residents and instead distributed around the different 'non-resident actors' within the home. This division of labour has important implications for the management and experience of thermal comfort in these settings.

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[4] Although care can also be provided in peoples own homes, particularly in older age, and relatives and external agencies may take on responsibility for various of these actions.

This expectation that adjusting the room temperature up and down was a task that fell within the staff domain was a recurring theme in our interviews. A commonly cited explanation given by staff was that where residents were suffering from illnesses that incapacitated them, such as dementia, the staff then had no choice but to intervene and take control of the heating controls. In care home 1 (and also in care home 3) the problem of residents 'playing' with the thermostat led to a policy of them being concealed, and accessible only to the 'handyman' with a screwdriver:

> *"Interviewee: in the bedrooms we actually have a concealed thermostat, because again if you've got a confused elderly lady or gentleman, they may just play with the thermostat and, so in order to adjust it, you need to use a screwdriver to take the cover off and then you adjust it internally. Obviously communal areas like these, these are manually adjusted by members of staff.*
>
> *Interviewer: So who adjusts the temperature in the bedrooms?*
>
> *interviewee: Well, we have a handyman, if [name] tells us that somebody's a little bit cold, or they're a little bit too warm, the handyman does that"* (Owner/Manager, Care Home 1)

As this interview extract demonstrates, across the range of staff there could be deliberate delimitations of responsibility that introduce both technical and human 'intermediaries' between the subjects of comfort and the setting of ambient temperatures in the rooms they were occupying. Care staff sometimes felt unable to make adjustments to the heating systems, even where they were formally able to, because of their lack of understanding of how the heating system worked and lack of confidence in their ability to correctly exercise control over it – particularly where an unfamiliar technology such as underfloor heating was involved. The end result was that the simple job of adjusting a thermostat could involve an involved and distributed sequence of actions. In one home the control of the indoor

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environment even extended beyond the home itself. The maintenance worker for Care Home 5, part of a large corporate organisation, explained that he had a very limited ability to control the working of the heating system, because it was operated remotely through a building management system that was monitored and updated from head office:

> "*If I wanted to, I couldn't do it, I cannot make these radiators go any warmer or hotter, it has to be done, at head office in [city], through the computer.*" (Maintenance Worker, Care Home 5)

Demarcations in 'who did what' were also evident in the adjustment of other elements of the 'comfort system', although with much variation. Care staff explained that some residents needed almost everything that could contribute to their thermal comfort doing for them. Dressing, providing and adjusting blankets, having hot or cold drinks or moving around were entirely dependent activities therefore requiring both judgement and action on the part of the care staff. Other residents had more autonomy, they were able to express what they wanted and to undertake all or some of these actions for themselves, reflecting both the individual resident's capacities as well as the operating culture of the home. As discussed by Brown and Walker (2008) the relationship between care staff and residents is complex with dependencies (of many forms) potentially reflecting '*not only of a decline in physical ability, but also an increasing acceptance of the norms in the residential home*' (p. 369). Accordingly rather than seeing dependencies as only reflecting the physical or mental capacity of residents, these can also be woven into the routine of daily life in the home as well as into '*the norms of care staff that are keen to help, and sometimes afraid not to*' (ibid). Whilst we were not able to undertake ongoing ethnographic observation of staff-resident interactions, we could still observe that different homes had different operating cultures around how much residents were expected to 'help themselves' and different degrees of embedded 'institutionalization' (Sidenvall et al 1996). Ethical issues come to the fore here, which will consider further in the conclusion.

Collectivity and diversity

Another distinctive feature of the care home setting is that they are both a collective living environment for multiple residents and a working environment for multiple staff. This introduces complexities to the management of thermal comfort, with contrasting and sometimes competing needs and expectations needing to be reconciled or coped with.

While residents have their own rooms (sometimes shared) they often spend most of the waking day in collectively occupied and utilised lounges, dining rooms and corridors. We encountered repeated comments as to the difficulties in providing universally comfortable conditions in these collective spaces, linked to the diversity in residents' thermal needs. While older people are seen to generally 'feel the cold' more, some, according to these accounts, prefer it warmer, some prefer it cooler. Interviewees drew on 'folk reasoning' to suggest this might be because of physical, cultural or gender differences, or preferences built up through historical patterns of behaviour. The following extracts provide different examples:

> *"we're all different aren't we? I mean like [name] who we've just spoken to, this is her room. She actually likes to be outside. She loves fresh air. So maybe this room would suit her. But maybe somebody who likes to be wrapped up warm, maybe they wouldn't be comfortable in this room. But she's a fresh air fanatic"* (Activities Coordinator during Home Tour, Care Home 3)

> *".... you do get some very frail people, who will feel the cold, if they're from the Caribbean, they're very frail and they do feel the cold. ..... But some, I don't know, I don't know what sort of background they come from, they perhaps work in an industry where it's very warm, and they're used to the warmth and the heat. I don't really know, but I do know that some people do feel it more than others .. you do tend to find that it's the ladies that feel it more than men".* (Maintenance Worker, Care home 5)

> *"We have a gentleman who's a beekeeper who loves his walks…,... He does walk around with his overcoat and his hat because that's where some time, most of the time he is. He thinks he's going to work. So it can be quite hot for him."* (Manager, Care Home 3)

Such observed differences played into the demarcation of responsibility for thermal control discussed in the previous section, meaning that residents were dissuaded from adjusting controls or opening windows in collective spaces, which could annoy or compromise the comfort of others. And whilst it was clear that staff were generally attempting to accommodate the differences between residents, by providing blankets, positioning them near or further away from heat sources and the like, this was in practice an imperfect process dependent on the staffs' capacity to pick up on such discomfort and act on it.

Whilst residents had diverse wants and needs that complicated the management of their comfort, the staff also could find their own comfort out of step with the measures taken to thermally care for residents. This generates a tension in the way the shared indoor environment is managed. Given the need for the temperature to be generally higher to deal with the vulnerability of older residents, staff reported that they were routinely overheating particularly after doing more physical work, such as lifting residents, rushing around to deal with the multiple needs of residents at busy times, or when the weather was warmer outside and sun was streaming in through windows. As one care worker commented:

> *"It's a difficult situation because you've got residents sitting around that can become quite cold, quite chilly. It might be a fine summer's day, we're working, rushing around and we're really quite hot. So you've got the two people in the same building. How do you get it right? You know, it's quite a difficult situation."* (Activities Coordinator during Home Tour, Care Home 3)

Like many other organizational settings care homes are required by health and safety law to maintain a 'reasonable' indoor temperature for their employees, but in practice the

simultaneous need to care for residents was a greater priority, with staff having to adapt by doing the best they could to wear light clothing and take other measures to cool down.

Safety and Security

Whilst we have emphasised the importance given to thermal comfort as part of the care service, this did not always sit in an easy relationship with other crucial elements of care home performance. In particular there were instances of how the provision of thermal comfort needed to be balanced against physical safety and security risks. For example, the use of windows to regulate temperature, an easy response to overheating and to summer solar again, was constrained by opening limiters and security devices. These were in place to ensure that on the one hand residents could not fall out or use windows to leave the home; and on the other that unwanted intruders could not get into the home, particularly through ground floor windows. The use of door opening for air circulation was similarly problematic, including interior doors that had to be kept shut for fire safety reasons. Hot surfaces and liquids used to provide warmth were also seen as a source of risk for residents. Including, in Care Home 5, the use of hot water bottles:

> "*If I'm honest, … safety-wise, we wouldn't use hot water bottles. Because they...in order for it to benefit somebody, you have to put boiling water in it, then you wrap a towel round it anyway. And it would be too risky on, with older people, with, who've got very often fragile skin anyway.*" (Manager, Care Home 5)

Any forms of open flame or concentrated heat source were universally seen as too risky and the hot surfaces of radiators were repeatedly problematized as unsafe, unless they were running at a low temperature or concealed from residents behind covers. One of the few references to the concerns of care home inspectors related to these:

> "*The safety bit is that inspectors quite like, and sometimes go over the top on, radiator guards and covers, particularly when you're working with people with dementia.*" (Manager, Care Home 5)

These examples stress the complexities of managing thermal comfort in the institutionalised setting of a care home. Heating technologies (broadly defined) that would be widely used within peoples' own houses become problematic once that same person enters the care home environment – the technology staying essentially the same, but the institutional setting shifting the technology's meaning in terms of its associations of risk and danger.

Conclusions and implications

We have shown that care homes provide a distinctive and challenging setting for the provision and management of thermal comfort. In the face of very little existing research literature on this topic, we have highlighted the importance of attention being given to this institutional setting in the thermal comfort literature and the need to distinguish it from others that might appear to be similar in character. Our qualitative approach, focused on revealing contextualised understandings, what is important to those working in care home settings and how they do their work, has shown that thermal comfort takes on multiple meanings. It is associated with vulnerability and risk, with being cold in older age, with physical safety and with the provision of effective care. We have used to term 'thermal care' to capture this sense of responsibility, one which is recognised as continuous and ongoing, a 24/7 requirement which is not just about keeping the technology controlling room temperature working well, but also, to some degree, about provisioning all of the types of adaptive responses that in other settings people would undertake for themselves – dressing in warmer or cooler clothing, using blankets, opening windows, having hot drinks and so on. This need for adaptations to be *provided* rather than self-determined is not generally incorporated into the growing adaptive thermal comfort literature, but in the care home

setting is all the more important because of the variety of wants and needs of residents often occupying collective spaces along with staff going about their work. Identifying those wants and needs can be in itself a difficult task. On top of that there are recognised boundaries around the types of local adaptive responses that can be made because of the need to maintain physical safety and security for vulnerable and dependent residents. All in all care home managers and staff therefore face a challenging set of demands and constraints on how thermal care is to be provided

We have studied six case study care homes with varied characteristics in order to derive these findings, identifying overarching themes whilst recognising some of the diversity in how these play out from home to home. As emphasised earlier our research design was seeking a diversity of experience rather than being statistically representative and this means that we cannot readily generalise across the whole of the care home sector in the UK. However,,our findings do provide insight into the distinctive nature of this setting and stress the need to look beyond only the private household in thinking about the energy and comfort related implications of the ageing of UK society (Hamza and Gilroy, 2011).

Having identified this particular combination of challenges for the management of thermal comfort there are a number of wider implications to be drawn out.. First are implications related to energy consumption and the use and uptake of sustainable technologies. Whilst we have approached thermal comfort in adaptive terms, recognising that it involves more than just the control of room temperature through technological means, there is no doubt that in care homes the working of heating systems provides the bedrock around which other adaptations are made. It was clear from our interviews that technological reliability and resilience are therefore vital, particularly during the winter period, and the constant operation means that energy consumption per building (although not necessarily per resident if compared to people living in their own homes) can be substantial. This might suggest that more efficient and sustainable thermal technologies would be well suited to the care home setting. Along these lines a recent report has calculated that the energy use in UK care

homes accounts for around £468.5 million in utility costs and around 2.3 million tonnes of CO_2 equivalent (NEP Energy Services 2012) and that an average 11% cut in energy use could be achieved through use of a range of technology options. Our research would though suggest that some careful consideration is needed of the range of factors that might act for and against the use of new technologies. For example, because of high labour and capital costs, energy bills may not be that significant for the balance sheets of care homes, producing only marginal savings – across our six case studies this was hard to determine reliably. Unfamiliar technologies might also be seen as risky in reliability terms whilst questions of physical safety and responsiveness to residents needs might also each act in favour or against particular new technological arrangements. Organisational structures are also important in shaping willingness to invest and innovate. In this respect the UK care home sector continues to be highly dynamic (Netten et al., 2005), predominantly now privately owned and increasingly corporatized, but also financially stretched.

Second, are implications related to the relationship between thermal comfort and health vulnerabilities. It may be reasonable to conclude that the degree of importance given in the care homes we researched to keeping residents warm (by various means) would mean that they constitute 'safe' environments in thermal comfort terms. Indeed set in the context of the excess winter deaths of older people that are routinely linked to fuel poverty (Gascoigne et al., 2010), moving into a care home could be an important protective measure for those struggling to keep warm at home[5]. However, it is necessary to add some caveats. An assumption in making this conclusion is that the 'importance' articulated in interviews is consistently acted on - that all care homes are well run and that responsible staff are able to respond effectively to the individual thermal needs of vulnerable residents. We were not able to make any judgements about the quality of 'thermal care' in our research, beyond pointing to the complexities of ensuring the ongoing thermal comfort of multiple, diverse older residents. However recent, highly publicised cases of badly run care homes and abuse by

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[5] By a corollary, policies focused on enabling people to stay in their own homes for longer may not be helping to address the prevalence of fuel poverty, although they have many other virtues.

staff should at least raise the possibility that thermal comfort could be part of the care provision that can become compromised, with vulnerable and dependent residents at risk of harm from poor thermal conditions. Furthermore, and perhaps most significantly, research by Brown (2010) has shown that the degree of focus on keeping residents warm can become a problem during periods of heat-related vulnerability in the summer. We noted earlier that warm weather also presents serious health risks for older people and whilst our research did not specifically focus on heat wave conditions, there was a similar stress amongst our interviewees on 'being cold' as a source of risk, and very little discussion of the dangers of residents becoming too warm, even when we were at the homes in the summer period. This stresses the importance of heatwave planning being properly integrated into care home operations and of awareness raising about the risks of heat. The recently revised NHS heatwave plan (NHS 2013a) includes specific guidance for care homes managers and staff (NHS 2013b), but how far this has been taken up into work on the ground remains an open question.

Third, and closely related, are ethical implications that follow from the degree to which the thermal comfort of residents becomes the responsibility of care home staff. Because of issues of vulnerability and dependency this becomes more than just another case of the more general and familiar phenomenon of 'collective' thermal comfort, in which people are unable to directly control the thermal conditions that they are situated within (Cole et al. 2008; Djongyang et al., 2010). As emphasised across a substantial literature, caring of whatever form, but particularly in situations of health-related dependence, raises important ethical questions (Estes et al., 2003; Lloyd, 2012). There is a danger that 'fraility' or 'vulnerability' becoming stigmatising terms that lead to a loss of agency and self-determination for the 'cared for' and for this reason it has been argued that the autonomy, agency and preferences of older people should as far as possible be sustained through 'fourth age' and 'end of life' periods, including in care homes (Higgs and Rees-Jones, 2009; Jolanki, 2009; Lloyd, 2012). Van Berlo (1997) provides a rare discussion of thermal comfort

in this context, drawing out potential dilemmas in providing thermal autonomy for people with dementia. Should a dementia sufferer's established preference to live at a high room temperature be sustained even if it is seen to be 'problematic' by others, and the person with dementia cannot cogently continue to express this preference? We encountered evidence of care staff attempting to be responsive to the perceived thermal needs, preferences and expectations of individual residents, but in energy terms a high room temperature or having a window open even in cold weather, may run counter to reducing consumption and waste. How far therefore should respecting autonomy go? Thermal comfort is similarly embodied in how people dress, another focus of ethical concern when people are not able to dress themselves. Van Hoof et al. (2010) argue that '*From an ethical point of view, people should have opportunities for control over the indoor climate and building services*' (p95) but in two of our case study homes bedroom thermostats were actively concealed from residents. Are these ethically problematic arrangements? Does control over thermal comfort matter as much as other dimensions of the quality and autonomy of older people's lives? We cannot provide answers here, but consider such questions important and in need of further careful attention by both practitioners and researchers.

Fourth, we can reflect on the approach to investigating thermal comfort that has underpinned this paper. Van Hoof and Hensen (2006) in reviewing evidence of the thermal comfort preferences of older people are critical of the widely used Fanger model and its failure to '*completely accurately predict thermal comfort for elderly*' people (p226). Our approach in seeing thermal comfort as making sense in particular social settings and through systemic adaptations that go far beyond experimentally derived 'preferences', more fundamentally questions the reliance on such models and therefore the need for greater 'accuracy' in abstract and demographic terms. Taking a step further our analysis also challenges how most understandings of thermal comfort see it as something that is focused on the immediate senses and responses of the individual body and person. In a care orientated setting thermal comfort emerges in much more relational terms, as something that is part of

an ethic of caring for others (Held, 2006) and taking on particular meanings in this context. This insight merits further elaboration, including into settings in which thermally caring for others is less overtly apparent and institutionalised.

A substantial agenda for further research therefore emerges from the foundation that we have established in this paper. This would include as we have already highlighted research examining the suitability of sustainable thermal technologies in care home settings, the levels of awareness and responsiveness to heat rather than cold risks amongst managers and staff and the involved ethics of thermal comfort provision. In addition there is a case for now following more intensive research designs that can (i) engage more directly with the residents of care homes in order to assess their experiences of thermal comfort alongside those of staff, (ii) study the ways that the detailed routines of care home operation serve to support or detract from the provision of thermal comfort in ways that differentiate between the needs of different residents and staff, and (iii) work towards identifying forms of good practice in thermal care and how home policies, management styles and staff training can be developed in positive directions. Whilst care homes are challenging environments for undertaking intensive research there are good examples of research designs that have been deployed for examining other care issues and challenges (Frogatt et al 2009) and this experience should be drawn on in the future by thermal comfort researchers.

References

Barlow, S. and Fiala, D. (2007). Occupant comfort in UK offices - How adaptive comfort theories might influence future low energy office refurbishment strategies, *Energy and Buildings,* 39(7), 837-84.

Bark N. (1998) Deaths of psychiatric patients during heat waves. *Psychiatr Serv.*; 49(8), 1088-90.

Brown, S. and Walker, G. (2008). Understanding Heat Wave Vulnerability in Nursing and Residential Homes. *Building Research and Information*, 36(4), 363-372.

Brown, S. (2010) *In the heat of power : understanding vulnerability to heatwaves in care homes for older people*, Unpublished PhD Thesis, Lancaster University.

Burholt, V. and G. Windle (2006). Keeping warm? Self-reported housing and home energy efficiency factors impacting on older people heating homes in North Wales. *Energy Policy* 34(10): 1198-1208.

Care Quality Commission (2012). *Health Care in Care Homes: a special review of the provision of health care to those in care homes*. CQC: London. Accessed 3/3/13 at http://www.cqc.org.uk

Chappells, H. and Shove, E. (2005). Debating the future of comfort: environmental sustainability, energy consumption and the indoor environment. *Building Research and Information*, 33(1), 32-40.

Cole, R. J., Robinson, J., Brown, Z. and O'Shea, M. (2008) Recontextualizing the notion of comfort, *Building Research and Information*, 36(4), 323-336.

Cooper, I. (1982). Comfort Theory and practice: barriers to the conservation of energy by building occupants. *Applied Energy*, 11, 243-288.

Commission on Funding of Care and Support (2011). *Fairer Care Funding: the report of the commission on funding of care and support.* Accessed 3/3/13 at https://www.wp.dh.gov.uk/carecommission.

Day, R. and Hitchings, R. (2009). *Older People and their Winter Warmth Behaviours: Understanding the Contextual Dynamics.* School of Geography, University of Birmingham / Department of Geography, University College London.

Day, R. and Hitchings, R. (2011). 'Only old ladies would do that': Age stigma and older people's strategies for dealing with winter cold. *Health and Place*, 17, 885-894.

Department of Communities and Local Government (2008) *Lifetime Homes, Lifetime Neighbourhoods: a national strategy for housing in an ageing society*, DCLG: London.

Djongyang, N., Tchinda, R. and Njomo, D. (2010). *Thermal comfort: A review paper. Renewable and Sustainable Energy Reviews*, 14, 2626-2640.

Estes, C. L., Biggs, S. and Phillipson, C. (2003) *Social Theory, Social Policy and Ageing: a critical introduction.* Open University Press: Maidenhead.

Flynn A, McGreevy C, Mulkerrin EC. (2005) Why do older patients die in a heatwave? *QJM,* 98(3), 227-229.

Featherstone, M., and Hepworth, M. (2005). Images of Ageing. In M. Johnson, V. Bengtson, G. Coleman & T. Kirkwood (Eds.) *The Cambridge Handbook of Age and Ageing*. Cambridge: Cambridge University Press.

Florez-Duquet, M., McDonald, R. B. (1998) Cold-induced thermoregulation and biological aging. *Physiol Rev.* 78(2), 339-58.

Froggatt, K., Davies, S. & Meyer, J. (2009) *Understanding care homes: a research and development perspective* London: Jessica Kingsley.

Gascoigne, C., Morgan, K., Gross, H. and Goodwin, J. (2010). Reducing the health risks of severe winter weather among older people in the United Kingdom: an evidence-based intervention. *Ageing & Society*, 30, 275-297.

Gomolin, I. H., Aung, M. M., Wolf-Klein, G., Auerbach, C. (2005). Older is colder: Temperature range and variation in older people. *Journal of the American Geriatrics Society*, 53(12), 2170-2172.

Hajat, S., Kovats, R.S. and Lachowycz, K. (2007) Heat-related and cold-related deaths in England and Wales: who is at risk?, *Occup Environ Med* 64, 93-100

Hamza, N. and Gilroy, R. (2011) The challenge to UK energy policy: An ageing population perspective on energy saving measures and consumption. *Energy Policy*, 39, 782-789.

Held, V. (2006) The Ethics of Care: Personal, Political, Global, Oxford: Oxford University Press.

Hills, J., (2012). Getting the Measure of *Fuel Poverty: Final Report of the Fuel Poverty Review*. CASE report 72. Department for Energy and Climate Change, London

Housing Learning and Improvement Network (2009). *Homes for our old age: independent living by design*, Commission for Architecture and the Built Environment. Accessed 3/3/13 at http://webarchive.nationalarchives.gov.uk/20110118095356/http:/www.cabe.org.uk/files/homes-for-our-old-age.pdf

Johnson, J., Rolph, S. and Smith, R. (2010). *Residential Care Transformed: Revisiting 'The Last Refuge'*. Basingstoke: Palgrave Macmillan

Khodakarami, J. and Nasrollahi, N. (2012) Thermal comfort in hospitals – A literature review. *Renewable and Sustainable Energy Reviews*, 16(6), 4071-4077.

Lloyd, L (2004) Mortality and morality: ageing and the ethics of care. *Ageing and Society* 24(2), 235-256

Lloyd, L. (2012) *Health and Care in Ageing Societies: a new international approach*. Policy Press: Bristol.

Mackenbach, J.P., and Borst, V., (1997) Heat-related mortality among nursing-home patients. *Lancet* 349 (9061), 1297.

Netten, A., Williams, J., and Darton, R. (2005) Care home closures in England: causes and implications. *Ageing and Society, 25(3),* 319-338.

Nichols, F., Humphreys, M. and Roaf, S. (2012) *Adaptive Thermal Comfort: Principles and Practice*, Routledge: Abingdon.

NHS (2013a) *Heatwave Plan 2013 For England*. Department of Health.

NHS (2013b) *Heatwave Plan 2013: Supporting Vulnerable People Before and During a Heatwave: Advice for Care Home Managers and Staff*. Department of Health.

Owen, T. and Meyer, J. (2012) *My home life: promoting quality of life in care homes*, Joseph Rowntree Foundation: York. Accessed 5/8/13 at www.jrf.org.uk.

Peace, Sheila and Johnson, Julia (1998). Living arrangements of older people. In: Bernard, Miriam and Phillips, Judith eds. *The social policy of old age.* London: Centre for Policy on Ageing, pp. 56–75.

Sidenvall, B., Fjellstrom, C. and Ek, A. (1996) Ritualized practices among care givers at meals in geriatric care. *Scandinavian Journal of the Caring Sciences*, 10, 53–61.

Shove, E., Chappells, H., Lutzenheiser, L. and Hackett, B. (2010). Introduction: Comfort in a Low Carbon Society. *Building Research and Information*, 36(4), 307-311.

Thompson, P. (1992). 'I Don't Feel Old': Subjective Ageing and the Search for Meaning in Later Life. *Ageing and Society, 12*, 23-47.

van Berlo, G.M.W. (1997). *Technology, ethics and dementia. Can technology support primary carers in the supervision of persons suffering from dementia?* Part 1. Foundation BeNeLux - University, Antwerp: Belgium.

van Hoof, J., Hensen, J. L. M. (2006). Thermal comfort and older adults. *Gerontechnology,* 4(4), 223-228.

van Hoof, J., Kort, H.S.M, Hensen, J.L.M, Duijnstee, M.S.H. and Rutten, P.G.S. (2010). Thermal comfort and the integrated design of homes for older people with dementia. *Building and Environment*, 45(2), 358-370.

Wilhite, H. (2010) The conditioning of comfort. In E. Shove, H, Chappells and L. Lutzenhiser (Eds). *Comfort in a Low Carbon Society.* Routledge: London.

Worfolk, J.B., (2000) Heat Waves: Their Impact on the Health of Elders. *Geriatric Nursing* 21 (2), 70 – 77.

Wright, F. (2004). Old and cold: Older people and policies failing to address fuel poverty. *Social Policy & Administration,* 38(5), 488-503.