



# The heat is on: the growing problem of overheating in domestic homes in England and the need for a national strategy

Noelene Marisa Yesudas, University of Glasgow

## Summary

Overheating in homes is a relatively new but rapidly expanding problem. Many homes in England face an alarming risk of overheating, impacting people's comfort, health and productivity. This briefing addresses the complex issue of overheating in homes. Drawing on findings from a small research project by academics from the University of Glasgow, the UK Collaborative Centre for Housing Evidence (CaCHE), and the Chartered Institute of Housing (CIH), the briefing sets out our current understanding of overheating in domestic homes, as well as key challenges and common mitigations. These findings point to considerable gaps in policy for addressing overheating in England. To begin to close these gaps, the briefing makes three recommendations for addressing and mitigating overheating risk.

- Develop a comprehensive National Overheating Strategy for all housing types and tenures.
- Collaborate with the Office for National Statistics (ONS) to develop a methodology for measuring and reporting overheating prevalence in homes in England.
- Make changes to Approved Document O to enhance its effectiveness in addressing overheating risks, particularly for vulnerable groups and in high-risk locations.

## 1. Overheating: What is the problem?

Overheating occurs when indoor temperatures rise to an uncomfortable level, to the point where they pose a threat to human health.<sup>i</sup> While comfort is a subjective measure, there have been reports of indoor temperatures in homes across England, such as in London, reaching up to 25°C, with occupants experiencing conditions that felt like 27°C.<sup>ii</sup> Additionally, mortality rates may rise when indoor temperatures surpass 25°C.<sup>iii</sup> Thus, this note considers overheating to occur when temperatures exceed 25°C. The UK has witnessed an average temperature increase of

approximately 0.3°C per decade since the 1980s<sup>iv</sup>, leading to longer periods of hot weather. In the summer of 2022, some parts of the country experienced temperatures exceeding 40°C, prompting the government to issue health warnings.<sup>v</sup> In addition to global warming, factors such as historical and contemporary home building practices, especially in relation to insufficient ventilation and glazing, and domestic practices inside the home, such as keeping windows closed because of noise, pollution, and safety concerns, can all contribute to the problem of overheating in homes.

Recent research undertaken by academics and government has begun to highlight the scale of overheating in England. In 2019, the then Ministry of Housing, Communities, and Local Government (MHCLG) conducted research on overheating in homes.<sup>i</sup> Utilising a methodology aligned with the Chartered Institution of Building Services Engineers (CIBSE) TM59 standard, the study revealed that none of the eight modelled housing typologies, consisting of houses and flats, met the acceptable risk criteria for overheating. It found that homes in the North of England and the Midlands surpassed the criteria by 10%, while homes in London surpassed this criteria by as much as 600%.<sup>i</sup>

### Box 1: CIBSE TM59 Standard to Assess Overheating

The CIBSE TM59 compliance standard to assess overheating within a space considers:

*“Criterion A applies to living rooms, kitchens, and bedrooms. It requires that the internal temperature does not exceed a defined comfort temperature by 1 °C or more for more than 3% of occupied hours over the summer period (1 May to 30 September).*

*Criterion B applies to bedrooms only and requires that the internal temperature between 10 pm and 7 am shall not exceed 26 °C for more than 1% of annual hours” (p.1).<sup>i</sup>*

Subsequent research investigating overheating in the unusually hot summer of 2018 identified that 19% of

bedrooms (4.6 million) and 15% of living rooms (3.6 million) overheated, with flats experiencing a significantly higher prevalence of living room overheating.<sup>vi</sup> Research has also demonstrated that specific spaces within homes, especially living rooms, bedrooms, conservatories, and loft conversions, were found to be particularly susceptible to overheating.<sup>vii</sup>

In addition, overheating risk is folded into existing societal inequalities, with evidence that it can be more prevalent in social housing and for low-income and older households<sup>vi</sup>. Households with mobility issues (e.g., musculoskeletal conditions) are potentially less likely to be able to use mitigation strategies like opening or closing windows and curtains to ventilate or shade their homes<sup>vi</sup> and low-income households are also less likely to be able to afford the necessary electricity to operate mechanical ventilation or fans.

Ultimately, overheating can result in increased morbidity and mortality. ONS data show that 56,303 deaths occurred in England and Wales during five periods of intense heat between June and August 2022, approximately 6% higher than the five-year average.<sup>viii</sup> Current climate trajectories suggest that such unusually hot summers will increasingly become the norm.

## 2. What Measures are Currently in Place to Address Overheating?

Effectively addressing overheating in residential buildings requires a comprehensive approach that integrates a diverse set of strategies and involves various stakeholders. Some broad potential strategies for mitigating overheating include passive, active, behavioural, and government-led interventions, all of which are essential for alleviating the adverse effects of high temperatures inside homes (see Box 2)<sup>ix</sup>.

### Box 2: Potential Strategies to Address Overheating

1. Passive strategies, applied at the building and urban design levels, involve developers implementing low-cost measures such as external shading, insulation, proper ventilation, and integrating water and green spaces to counteract the urban heat island effect.
2. Active cooling strategies rely on energy-intensive techniques, such as occupants using air conditioning to regulate internal temperatures.
3. Behavioural strategies focus on adaptive living, encouraging occupants to adopt personal cooling practices like using fans, taking cold showers, choosing lighter clothing and bedding, and participating in educational initiatives that promote awareness and adaptation to cooling practices.
4. Government-led strategies play a pivotal role, necessitating the formulation of a comprehensive vision for designing and decarbonising buildings.

At a government level, these strategies are brought together in the Building Regulations in Approved Document O (Part O<sup>x</sup>), which focuses on how overheating should be addressed in newly built homes. Its overarching objective is “to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures (p.4).” Part O aligns with the CIBSE TM59 standard of overheating, offering technical guidance for various residential buildings, including houses, flats, care facilities, residential colleges, student dormitories, and similar establishments.

Part O merges all earlier provisions pertaining to overheating in recognition of the shortcomings of earlier approaches, especially Part L of the Regulations, which focuses on energy performance and fuel and power conservation. However, Part O’s requirements and guidance are intended to be integrated with other Building Regulations, with the aim of ensuring a cohesive and practical approach to managing overheating risks in residential buildings.

In terms of guidance, it includes advice on reducing solar gains and ways to remove excess indoor heat. The guidance is spread across four sections, covering: the methodological requirements to mitigate overheating risks (Sections 1 and 2), the usability of the overheating mitigation strategy (Section 3), and explicit information provision to owners (Section 4). A summary of the regulation is provided in Box 3 below<sup>xi</sup>.

### Box 3: Summary of Building Regulations Part O: Overheating

Sections 1 and 2 present two compliance methods to address the new overheating requirement in the Building Regulations: The Simplified Method and the Dynamic Thermal Modelling Method.

1. The Simplified Method sets criteria based on location and cross-ventilation, relying on measurements and simple calculations. This method is suitable for designs without communal heating, but it necessitates early comprehensive information, individual testing and comes with certain design limitations.
2. The Dynamic Thermal Modelling Method is based on the CIBSE TM59 methodology. This method requires an experienced modeller, specialised software, and accurate inputs, making it a more time-consuming process. However, it offers greater design flexibility and applies to homes with communal heating and unique site conditions.
3. Upon choosing a method to meet the overheating prevention requirements for residences, Section 3 focuses on ensuring the safety and well-being of all occupants within the dwelling. This involves addressing noise, pollution, security, and safeguarding against falling and entrapment.
4. Lastly, Section 4 mandates that owners be provided with explicit information regarding the prevention of overheating and its maintenance.

However, more recent analysis has suggested that government policy on overheating would benefit from review. The National Audit Office stated in December 2023 that “there is no policy to address overheating in existing homes and buildings” (p.51), and that “plans for new developments do not thoroughly regulate or track adaptation for future climate resilience and there are no clear mechanisms to monitor and mitigate the effects of urban heat islands” (p.51)<sup>xiii</sup>.

A subsequent report by the Environmental Audit Committee in January 2024 recommended, among other steps, that the government should set out a national cooling action plan to address the growing prevalence of overheating in homes<sup>xiii</sup>. Furthermore, our understanding of how the housing sector approaches the associated risks and challenges of overheating is limited.

The remainder of this briefing draws on a review of existing reports, government policies, and relevant academic literature, as well as a deliberative workshop attended by relevant experts from academia, the social housing sector, and other built environment professions in January 2024. The briefing sets out below three key findings and associated recommendations for better mitigating overheating in domestic homes.

### 3. Findings and Recommendations

#### **3.1. The lack of a national strategy on overheating is hampering the development of coordinated policy to tackle overheating in new and existing homes.**

##### **Findings:**

Despite significant impacts, overheating is often overlooked and treated as a secondary concern, particularly beyond the summer season. This is concerning because evidence indicates a notable increase in overheating risk over the last decade, alongside heightened air conditioner usage.

A critical aspect of addressing overheating in homes lies in the fact that within the current housing stock, a large portion of homes weren't built under Part O building regulations. While Part O is a part of government proposals for the Future Homes and Buildings Standard, which focuses on new residential dwellings and buildings, there is no corresponding policy for national-level guidelines for existing homes. Energy efficiency improvements in the private and social housing sectors tend to prioritise lifting homes into higher Energy Performance Certificate (EPC) bandings, often through the installation of insulation measures. However, government is undertaking a broader review of the Decent Homes Standard (DHS) in social housing, and an amendment to the Renter's (Reform) Bill will see the DHS extended to the private rented sector for the first time. Government also intends to set out next steps on Minimum Energy Efficiency Standards in social housing. At the time of writing, it is unclear how these changes will address issues relating to overheating.

Additionally, overheating disproportionately affects some people more than others (e.g. children and older people), especially due to their heightened physiological susceptibility

to high temperatures or their ability to afford, access, and use appropriate cooling technologies.

**Recommendation:** The government should develop a national overheating strategy that prioritises mitigation in new and existing homes and across all housing tenures. It is crucial that such a strategy also considers the diverse needs of end-users. This should be underpinned by new legislation that gives the government a statutory duty to publish (and, where necessary, update) a strategy, including policies for achieving the objective of eliminating overheating by a set date.

#### **3.2. The lack of robust data on overheating obscures the extent of the problem, especially the extent to which it affects different societal groups in different parts of the country.**

##### **Findings:**

Diverse methods are employed to collect data on overheating, ranging from quantitative sensor-based information and online surveys to qualitative and participatory methods with open-ended questions on cooling behaviours and tenant consultations.

These diverse methods of data collection across academia, industry, housing associations and government bodies result in different approaches to measuring overheating in homes, leading to potential variations in results. It's important to recognise that socioeconomic factors, housing conditions, access to cooling resources, and geographic location significantly influence how various societal groups experience the effects of overheating, thereby shaping their response to data collection methods on overheating.

Therefore, accurate and comprehensive data collection is crucial to inform interventions addressing overheating in homes and to meet the specific needs of diverse and vulnerable societal groups, such as children and older people, in different parts of the country.

**Recommendation:** As part of its overheating strategy, the government should work with the ONS to develop a methodology for measuring and reporting the prevalence of overheating in English homes. These statistics should, where possible, include a disaggregation of the prevalence of overheating by the usual geographical hierarchies (region, local authority, parliamentary constituency, Middle Layer Super Output Area (MSOA) and Lower Layer Super Output Area (LSOA))<sup>xiv</sup> and by vulnerability and protected characteristics of the household reference person. The English Housing Survey could be a suitable vehicle for the deployment of this new methodology.

### 3.3. Approved Document O is a vital method for mitigating overheating risk in new homes but could be adjusted to respond to likely climate trajectories.

#### Findings:

The commonly used technical definition for overheating assessment (i.e., the CIBSE TM59 criteria) needs to have clear reasoning for its described limits and parameters. This is particularly important when considering compliance methods for addressing overheating in the new Building Regulations Part O (or Approved Document O), as home builders, landlords, and property managers must be able to comprehend the specific technical and measurable aspects they need to address.

In the simplified method, the categorisation of areas highlights specific high-risk locations, such as London and parts of Central Manchester, based on postcodes. However, relying solely on postcodes may lead to inconsistencies in assessing overheating risks, particularly concerning vulnerable populations.

There is also a lack of comprehensive information on overheating in care homes. Thus, there is a need to focus on various occupants' capabilities to cope with elevated temperatures.

**Recommendation:** The government should consider making changes to Approved Document O to enhance its effectiveness in addressing overheating risks, particularly for vulnerable groups and high-risk locations. One key adjustment to consider is updating Appendix C to better categorise areas of high- and moderate-risk outside of London and Manchester. This could be accomplished by using the Department for Environment, Food and Rural Affairs (DEFRA's) Rural Urban Classification to define areas of high urban density, which would allow the inclusion of high-risk urban areas in the simplified method from across the whole of England. Subsequently, government should also consider reviewing how existing government policy on mitigating overheating in new homes addresses the heightened risk of harm excess heat poses to vulnerable groups.

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- <sup>x</sup> [The Building Regulations 2010: Approved Document O: Overheating.](#)
- <sup>xi</sup> [The Future Homes Hub, 'Part O 2021 Technical Guidance' Document.](#)
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- <sup>xiii</sup> [Environmental Audit Committee \(2024\), 'Heat Resilience and Sustainable Cooling'. Fifth Report of Session 2023–24.](#)
- <sup>xiv</sup> [Office for National Statistics, 'Census 2021 Geographies'.](#)