

GHA: New homes and our health

Overheating in UK homes: occurrence, causes and solutions

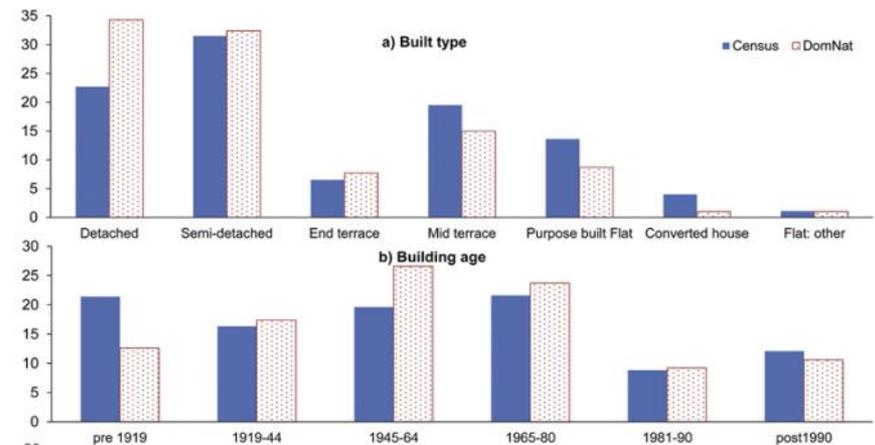
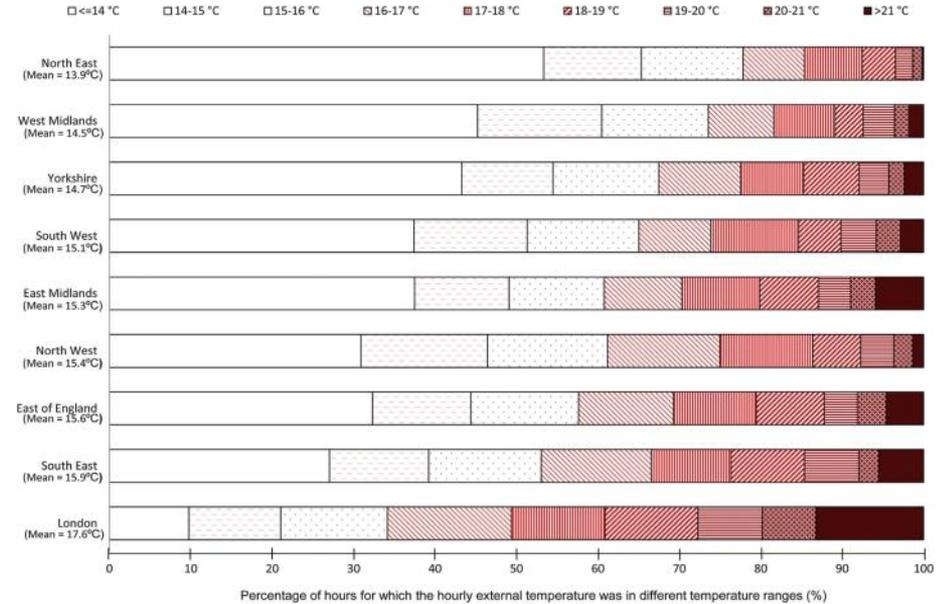
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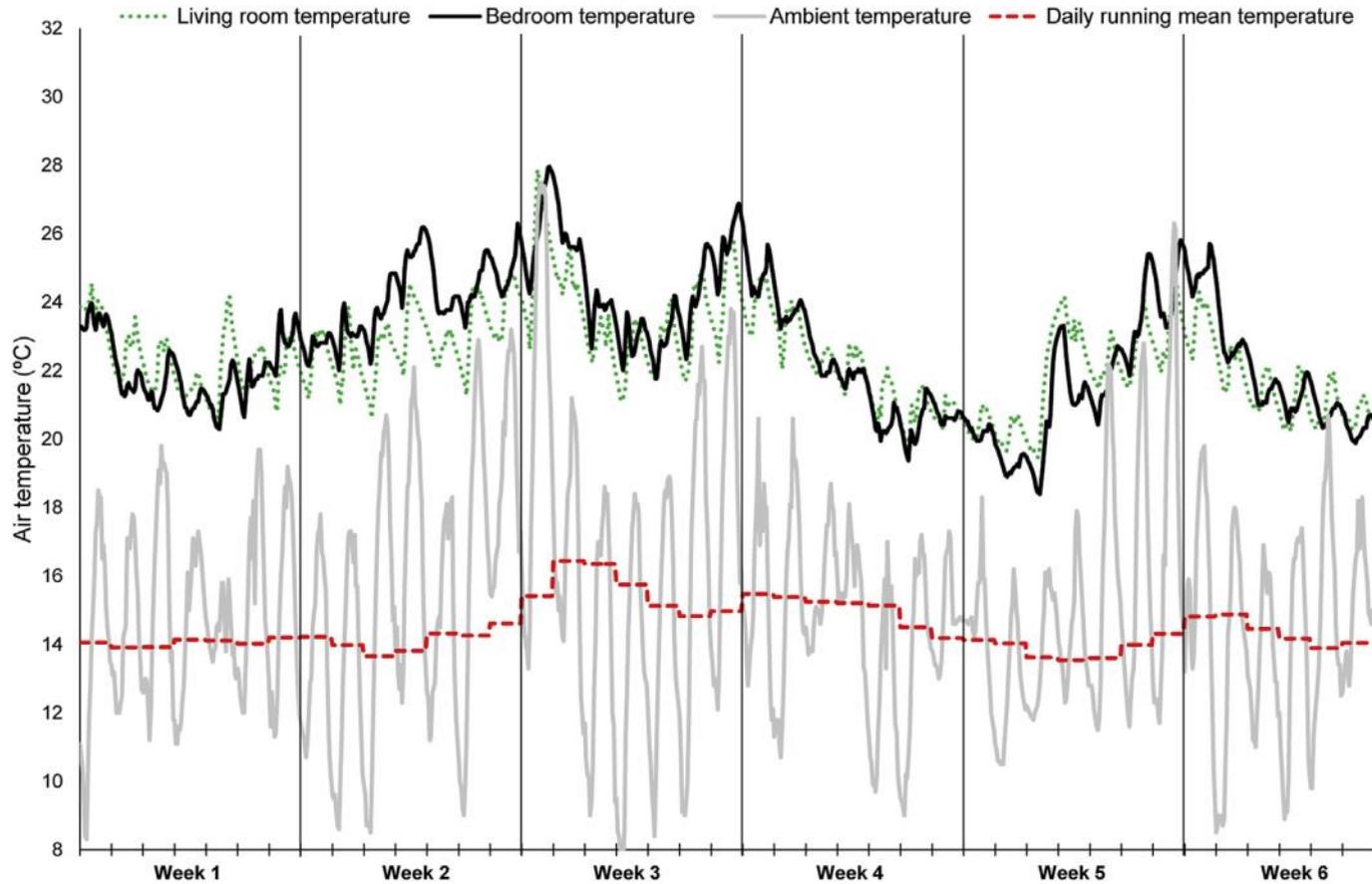
Five Questions about Overheating

- How widespread is overheating?
- Why is overheating a problem and why now?
- When is a building overheated?
- How do people respond to heat?
- What should we do next?

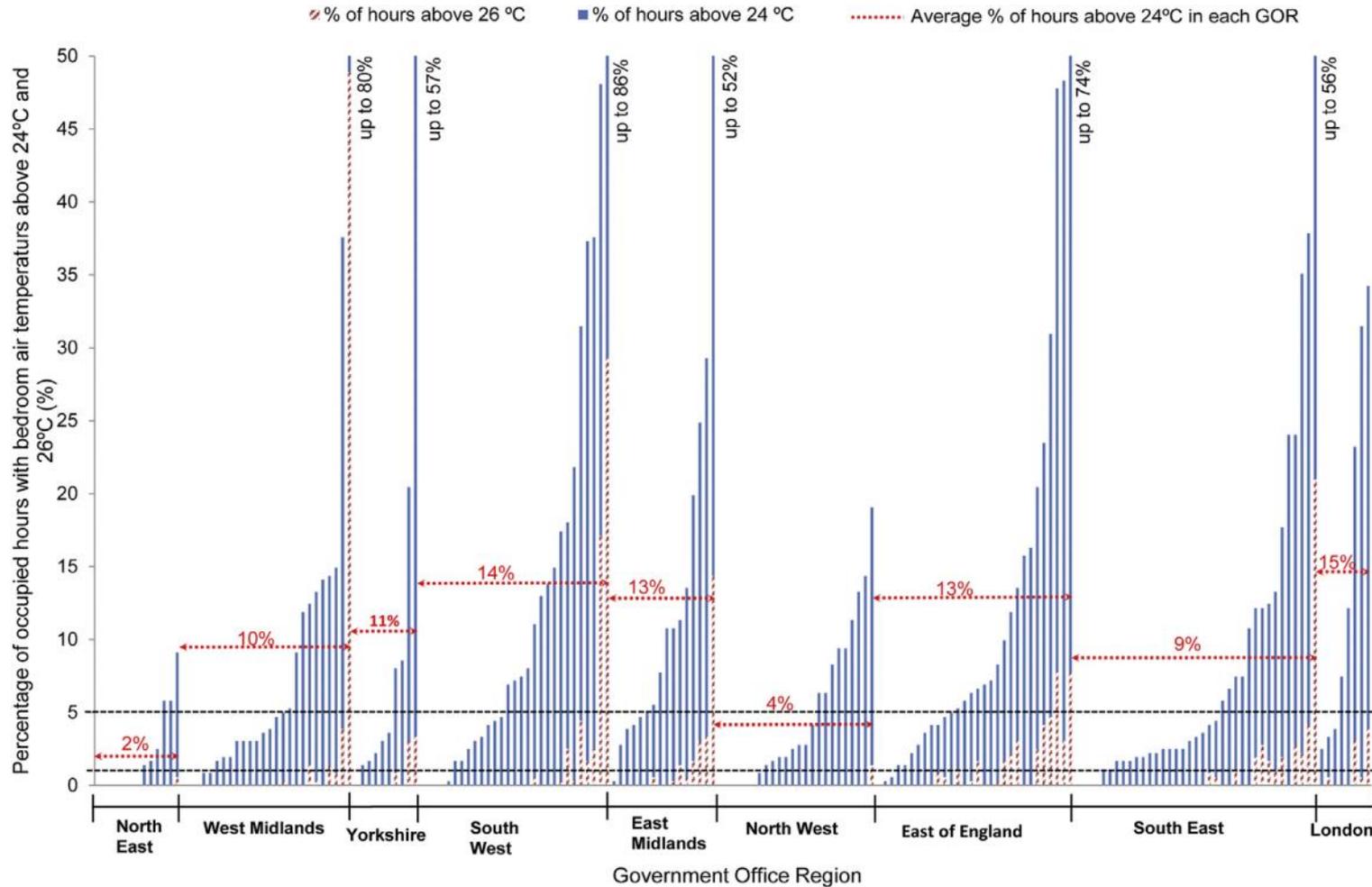
How widespread is overheating?



Example measured temperatures

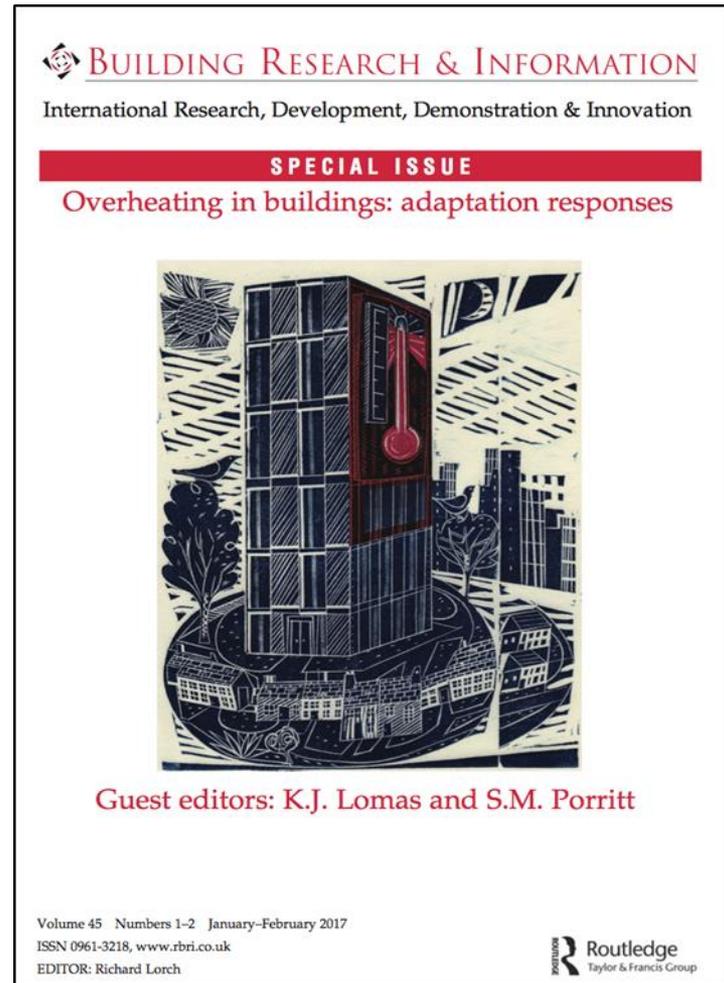


Bedroom temperatures – % hours over 24°C and 26°C



A literature survey

- Overheating has been observed in buildings right across the England, N. Ireland and in well insulated houses in Scotland.
- Flats, very well insulated homes, and thermally light weight dwelling are more likely to overheat.
- Inherent overheating risk is exacerbated by occupant behaviour.
- Temperatures are higher in vulnerable¹, households.
- Predictions of overheating risk from SAP and PHPP are unreliable



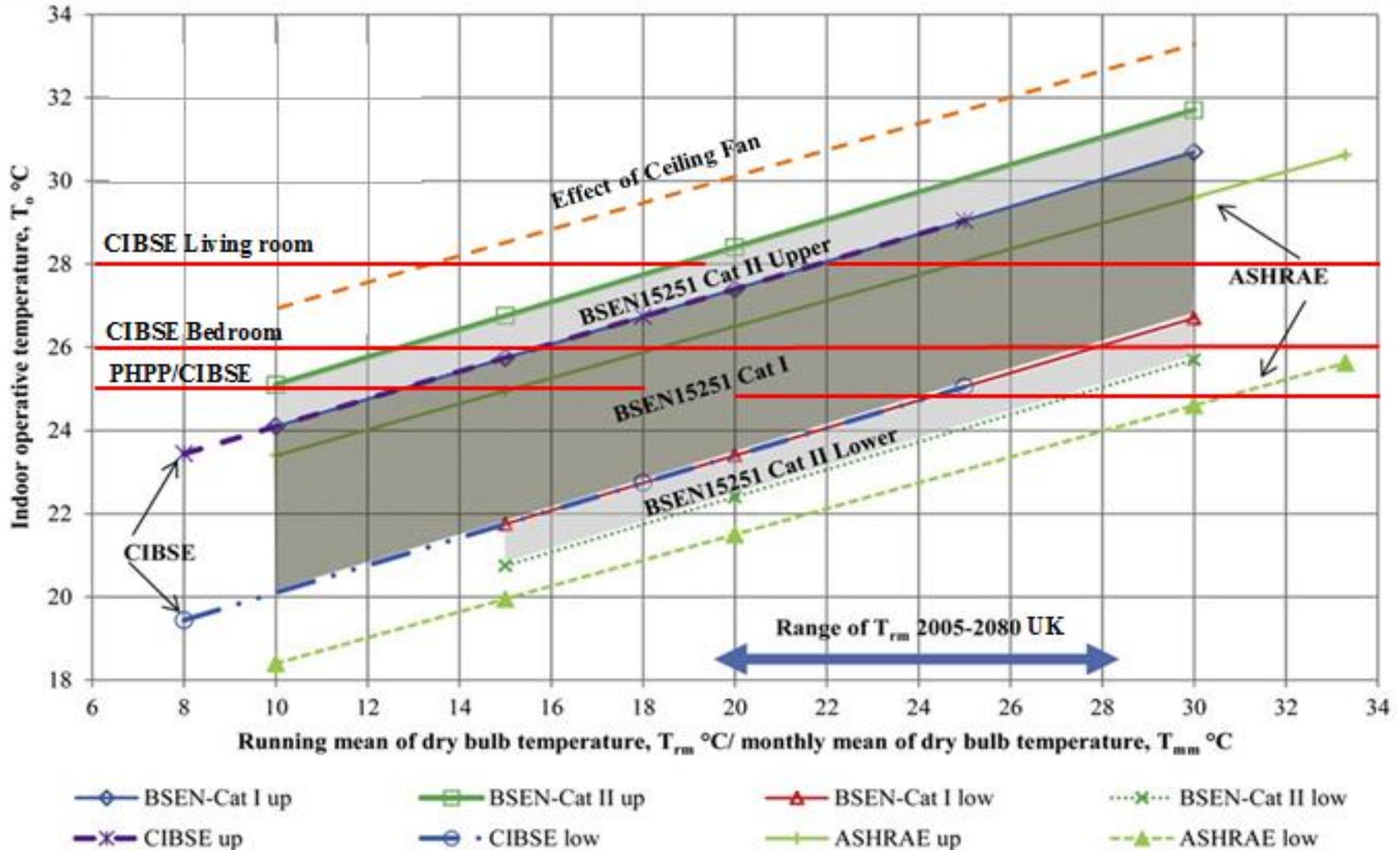
Why is overheating a problem and why now?

1. Energy efficiency and decarbonisation
2. Changing climate
3. Urbanisation
4. Curbing construction costs
5. Increasing land prices
6. Aesthetic predisposition
7. An aging population
8. Our ability to identify the problem
9. Social and cultural knowledge



A
‘perfect storm’

When is a building overheated?



The CIBSE TM52: three criteria - two fails

- Criterion 1: No more than 3% of the occupied hours during the non-heating season should be more than 1K over the BS EN 15251 adaptive comfort threshold.
- Criterion 2: Exceedance of the chosen threshold on any one day to be less than 6 degree-hours (K.hr).
- Criterion 3: No single occupied hour more than 4 K over the threshold.

The CIBSE guide says - non-heating season is typically 1 May–30 September (153 days).

Criteria 2 and 3 not limited to summer only.

Criteria and application for in-use assessment

- CIBSE Guide (2015) says:
 - ‘*The measurement period for all measured parameters should be long enough to be representative, for example 10 days’ and ‘under representative weather conditions’.*
- Whether occupied or unoccupied periods is left moot.

Do the criteria match the preferences of people?

Two identical homes, next door to each other:-

- 46% hrs over 25°C – occupants reported no overheating

Next door

- 13% hrs over 25°C – occupants concerned about overheating
- In 53 Scottish homes - no relationship between hours over 25°C and reporting of overheating.

Conclusion:

‘in certain households, what is defined ... as overheating is simply the desired comfort range of the occupants’.

How do people respond to heat?

- Given adaptive opportunity people will take action to maintain their thermal comfort.
- People feel hot at different temperatures. They will take action at different times and in different ways.
But they need the opportunity to do so.
- Curtailment of sleep harms health and well-being.
- People need to recognise impending overheating and responding appropriately.
But this is not culturally engrained.

The vulnerable – sick, disabled or elderly



What should we do next?

- Refurbishment must be holistic - considering energy efficiency and overheating risk.
- There is a need for a robust, operable methodology for quantifying overheating through in-situ monitoring of existing buildings.
- Might new build regulations include requirements to identify, and design out, overheating?
- We need much better ways of predicting if a building will overheat. Simple checklists may be poor indicators of overheating risk.
- Occupants, carers, landlords and others need adaptive opportunities to enable effective action during hot weather.

The End

Thank you