Overheating in UK domestic dwellings – What is it and what might affect it?

Abstract

The ability to define whether a domestic dwelling is overheating is imprecise. The majority of work regarding overheating and adaptive behaviour has been conducted in the non-domestic sector. The study explores what might constitute overheating placing particular emphasis on bedroom temperature. It is argued that the ability, or inability, of the occupant to adapt to bedroom temperature is paramount in the understanding of the conditions for overheating. The response of a domestic dwelling to its external environment will be a function of occupant behaviour, their adaptive capacity, the local climate and critically the age and construction of the dwelling, This study used dynamic simulation to define three domestic building variants that varied only by their construction method and investigated the effect of near term climate change and varying internal heat gains on their internal temperatures. A number of different metrics are proposed for defining an overheating problem. As might be expected, the problem appears most noticeable for buildings in the south of the UK and with lightweight constructions. Even with a window-opening schedule applied to such a scenario, the average internal temperature is simulated as being over 28°C for almost 12% of the year. A different metric, defined as “cooling nights”, suggests that there might be a cooling problem in bedroom areas for approximately a third of the year. In the North of the UK, and also for solid-wall dwellings, this problem diminishes significantly.