

# Science for Environment Policy

## Health impacts of climate change in the indoor environment: a UK review

**The health risks associated with climate-induced changes to indoor environments are explored in a new study.** UK-based researchers synthesised findings of how climate change — and mitigation and adaptation measures — might affect the inside of buildings, through overheating, air quality, allergies and infections, flood risk and other exposure risks.

**In addition to its well-reported effects on the external environment, [changes to the climate](#) will also change conditions inside of buildings.** The resultant risks to human [health](#) include overheating, flood damage, indoor [air pollution](#), extremes of temperature and biological contamination (e.g. potential increases in pest infestations and airborne infectious diseases).

Given that people in high income countries typically spend over 90% of their time indoors, the threat may be significant. Vulnerable persons may spend even more time at home. To protect public health, it is important to consider the climate-change-mediated effects on dwellings, and the opportunities and risks adaptation and mitigation strategies can bring.

This paper reviewed the scientific literature on the subject, focusing on housing-related health effects in the UK likely to arise through climate change, as well as mitigation measures in the built environment. The authors explored four key consequences of climate change on the indoor environment: overheating, reduced ventilation and indoor air quality (which may lead to the growth of pathogens), allergens and infections, and mould and water damage through damp and [flooding](#).

The authors say climate change could exacerbate the health risks already present in these four categories. They say the population groups at highest risk are the elderly, those with pre-existing health conditions, and those who live in crowded accommodation or are economically deprived. The authors also discuss the unintended harmful effects of certain climate change mitigation policies. For example, making buildings increasingly airtight to increase energy efficiency could also increase concentrations of air pollutants such as fine particulate matter (PM<sub>2.5</sub>) and carbon monoxide. However, these effects can be mitigated by properly implemented ventilation systems, such as mechanical ventilation systems with heat recovery and air filtration.

Finally, the authors discuss opportunities to protect public health. They say measures designed to reduce greenhouse gas emissions could also reap health benefits, by reducing extreme temperatures and indoor exposure to air pollution, for instance. Changes to building design are particularly important for health protection. New buildings should be designed to address the health challenges of climate change while also reducing fossil fuel use. Existing buildings should be adapted using measures such as external shading devices and shutters, which can maintain comfortable indoor temperatures and minimise the need for air conditioning (which also has an environmental cost).

The review shows that understanding of how buildings affect health in the context of climate change is improving. However, the authors say that more research is needed, not only in the UK local context but in other countries as well. To develop knowledge, they recommend practical health impact assessment methodologies that consider the combined effects of climate change in the indoor environment. These should be based on exposure-response relationships from outdoor data, adjusted to reflect indoor environmental conditions.

Climate change will amplify existing health risks in the indoor environment, such as high temperatures, air pollution and damp due to flooding and heavy rainfall. Properly targeted and cost-effective adaptation/mitigation measures could minimise these risks. Policies should promote long-term energy-efficient building interventions, accompanied by proper ventilation and shading, and removal of indoor pollution sources such as tobacco smoke.



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