**Early engagement notice – Risks to health and the health service due to extreme heat**

**A Pre-Procurement Notice from the Climate Change Committee**

**Background**

The Climate Change Committee (CCC) is an independent, statutory body established under the 2008 Climate Change Act. It is tasked with:

* Providing independent advice to the Government on risks and opportunities to the UK from climate change, in part through the UK Climate Change Risk Assessment, and reporting to Parliament on progress in adapting to climate change.
* Providing independent advice to Government on setting and meeting carbon budgets in line with the UK’s longer-term target to reduce greenhouse gas (GHG) emissions to net zero by 2050 and reporting to Parliament on the progress made.

To do this, we conduct independent analysis into climate science, economics and policy, and engage with a wide range of organisations and individuals to share evidence and analysis. Our past reports are available [here](http://www.theccc.org.uk/publications/).

The UK Climate Change Act 2008 requires that every five years, the UK government must publish a Climate Change Risk Assessment (CCRA). The CCRA seeks to provide an authoritative and up-to-date assessment of the risks and opportunities facing the UK from climate change and the adaptation actions that need to be put in place across society to ensure that the UK is well-placed to manage these risks. The Fourth UK Climate Change Risk Assessment (CCRA4) Government Report is due to be published in January 2027. As with CCRA2 and CCRA3 it will be based on an Independent Assessment that the CCC has been commissioned by Defra to lead; this will be published in mid-2026.

As part of CCRA4, the CCC will be developing a new output to complement the Technical Report as produced in previous CCRAs. This output – to be known as the ‘Well-adapted UK report’ (WA report) – will focus on the potential for key aspects of the UK adaptation challenge to reduce the climate risks threatening the achievement of key UK policy and societal outcomes and hence set out a vision for aspects of a well-adapted UK. The WA report aims to provide a policy-relevant evidence base on effective systemic adaptation scenarios, their costs and benefits (and how these are distributed across society). It aims to use this information to establish a resilience standard against the risks modelled for key societal systems and establish the investment requirements to meet this standard.

The report will be tailored to best inform the development of effective actions in the next set of national adaptation programmes from governments across the UK (covering the late 2020s and early 2030s). It also seeks to provide a more spatial and quantitative representation of UK climate risks and adaptation, an improved understanding of the potential for cascading climate risks, and their interactions with other key policy priorities such as delivering Net Zero.

This WA report will be informed by a set of commissioned, bespoke analysis projects, in-house CCC analysis and wider external evidence. The analysis will need to be developed collaboratively with decision makers and consider both risk and adaptation interventions as systemically as possible, while focusing on delivering social and economic analysis and evidence at appropriate spatial scales.

One of these commissioned projects will focus on **the risks to health and the health service due to extreme heat**.

High temperatures and heatwaves cause heat-related mortality (there were 2,985 excess deaths in 2022 in England[[1]](#footnote-2)) and morbidity. Heat impacts are disproportionately high for vulnerable groups (for example the elderly or those with existing health conditions), due to a combination of exposure, higher sensitivity and lower capacity to respond (including through support networks). Vulnerable people are more likely to suffer increased fatalities from cardiac and respiratory disease during hot weather and heatwaves. Urban environments and their occupants are likely to be at particular risk of future heat impacts, with urbanisation increasing the risk of hazards through the urban heat islands effect, and exposure, through growing population densities and numbers of built environment assets. This is likely to lead to increased demand for healthcare services and extra pressure on the NHS and care sector.

The number of heat-related deaths in the UK could increase six-fold from a 2007-2018 baseline average estimate of around 1,600 deaths per year, up to 10,000 per year by the 2050s (under a high warming scenario and in the absence of additional adaptation).[[2]](#footnote-3)

There is limited existing research on the impacts of heat across the UK and how adaptation actions can reduce impacts.

The analysis will aim to answer the following questions:

* What are the scale and costs of current and future impacts on heat-related mortality, morbidity and the subsequent increased demand on healthcare services?
* What are the scale and costs of current and future heat impacts on health care sector productivity?
* What kind of adaptation interventions are the most cost-effective for reducing these health-related impacts of extreme heat and to what scale can they be deployed?

**Potential project**

We are planning to advertise a tender for this research project in February 2024, with the intention that the research should commence in March 2024 and last for a duration of around 12 months.

At a high-level, the methodology for this analysis is expected to cover the following central tasks:

1. Risk and impact analysis for present day, 2030s and 2050s, under a range of credible climate change and socioeconomic change scenarios.
2. Assess what kind of adaptation interventions (across public health and healthcare delivery) are the most cost-effective for reducing the impacts of extreme heat. Assess what the effectiveness of these are in 2030 and 2050.
3. Upscale risk analysis to assess national-scale impacts.

1. Risk and impact analysis

The supplier should carry out a review of modelling approaches for best assessing the impacts of heat on health and health service delivery and determine for this project what the largest climate/weather determinant of mortality and morbidity is (for example, is it max temperature and heatwave duration or the relative change from ‘normal’ or something else). This should include specific considerations of how this might differ across the UK and include input from the project steering group.

We’d then expect the consultants to develop a bespoke modelling tool to understand mortality and morbidity impacts based on future evolutions of these metrics (consistent with the CCC’s wider climate change scenarios). While also being able to adjust the tool in such a way as to proxy the effects of adaptation (in an evidence-based way). The consultants should also estimate how mortality and morbidity impact healthcare delivery (using additional assumptions where necessary).

Risk assessments should be carried out using the CCRA4 agreed climate scenarios and population change/GDP scenarios for the baseline at specified time periods. We are advocating for an approach using epidemiology modelling. We’d like the supplier to include mortality and morbidity curves at different temperatures with economic measures of impact such as QALYS used and consider the following impacts:

* Cost (e.g. in £ via QUALYS) of additional heat-related mortality
* Costs (in £) of greater healthcare needs (through morbidity) and of delayed healthcare due to increased demand for services
* Costs (in £) of public sector productivity in NHS

2. Assess adaptation interventions

Working with the CCC, and key stakeholders we will expect the supplier to identify and propose a range of adaptation actions, analyse the effectiveness of those actions in reducing heat risks to health and healthcare delivery and develop adaptive pathways for improving resilience. The analysis should focus on public health, heat-health planning, behaviour changes, emergency response and healthcare level adaptation interventions, but also include actions across the built environment level (e.g. passive cooling and greenspace) that will have health benefits. Evidence from existing literature and case studies – including from outside the UK – should be considered to select adaptation packages. The committee are aware that it may be challenging to represent any adaptation options within epidemiology modelling in a non-proxy way. It is expected that the supplier uses proxy benefits for specific building adaptations (e.g. care homes and residential buildings with vulnerable occupants) without the need for detailed physical modelling. This may involve using some outputs from wider CCC work on built environment adaptation.

The supplier will be expected to develop and cost packages of adaptation interventions, starting with the lowest regret, ‘win-win’ measures. The supplier should analyse the effectiveness of adaptation actions by considering the following based on bespoke modelling of: (1) the effect on mortality and morbidity epidemiology curves at different temperatures and impacts to healthcare delivery of the interventions during periods of future heat extremes; (2) the avoidance of associated economic costs after adaptation and the investment costs needed to deploy the adaptation options; (3) any wider co-benefits.

The costs and benefits of applying adaptation measures should be produced as an output.

3. Scale analysis to national level

We require the modelling in step 1 and 2 to be constructed spatially (to capture variations in hazard, exposure and vulnerability), at the local authority level where possible (based on UKCP18). We will also require cost-benefit analysis to be applicable at the national scale. Therefore, the supplier should work with the CCC to decide on suitable assumptions for this analysis. Scale analysis should estimate the national adaptation gap and cost-benefit rationale for interventions to manage heat-related impacts on health and healthcare delivery.

The final output should be an assessment of an overall optimal level of resilience to manage heat risks across the UK.

**Questions for suppliers**

We are inviting feedback on the idea outlined above to gauge the feasibility of undertaking credible and robust analysis within the timelines described. In particular, we would be interesting in understanding:

Overarching:

* How could we best use built environment modelling to proxy the health benefits of built environment adaptation without having to explicitly undertake that as part of this project?
* The health and social care systems in the UK are intrinsically linked. How do you see the impact of social care feeding into this project?
* How challenging would it be to extend this type of analysis beyond heat to consider other climate impacts (e.g. flooding) and what would be the resource implications of doing so?

Methodology:

* What kinds of input data do suppliers envisage needing and are there are any concerns with accessing some of these data or known data gaps?
* What methods exist to quantitatively assess impacts on mortality from heat accounting for future climate change and population changes?
* How credible is it to extend from mortality (where estimates and projections do exist to some extent) to morbidity and impacts on healthcare service delivery?
* What methods exist to quantitatively map adaptation actions to reduced health impacts under future climate and population changes? If the project uses epidemiology curves, can we credibly represent adaptation interventions in epidemiology models and what data would be needed to do this?
* Is the proposed methodology possible for each nation of the UK? What issues/nuances should we be aware of for the UK nations?
* Which data and methods could be used to up-scale cost-benefit analysis, to carry out a national-scale assessment of impacts on health and investment needed for UK-wide adaptation to future risk?
* How can resilience be measured within this project? E.g., should it be cost, or a set number/scale of impacts?

We are inviting interested suppliers who have ideas on how to refine the project scope or want further information to get in touch with Gemma Holmes (gemma.holmes@theccc.org.uk) by 7th February 2024.

1. UKHSA (2023) *Heat mortality monitoring report: 2022,* www.gov.uk/government/publications/heat-mortality-monitoring-reports/heat-mortality-monitoring-report-2022 [↑](#footnote-ref-2)
2. UKHSA (2023) *Health Effects of Climate Change (HECC) in the UK.* [↑](#footnote-ref-3)