

**From:** Dan Watkins, Cabinet Member for Adult Social Care and Public Health

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**To:** Health Reform and Public Health Cabinet Committee, 19 November 2024

**Subject:** **Implications of Climate Change for Public Health**

**Classification:** Unrestricted

**Summary:** The report provides an overview of the implications of climate change on public health.

**Recommendation:** The Health Reform and Public Health Cabinet Committee is asked to **NOTE** and **COMMENT** on the content of this report.

## 1. Introduction

The purpose of this report is to provide an overview of the implications of climate change on public health. This report will focus on climate change and public health and not on the multiple actions on climate change which are already being undertaken in Kent. Climate is one of the wider determinants of health impacting particularly on more deprived communities and groups.

### 1.1 What is climate change?

Climate change means shifts in weather patterns and warmer temperatures across the globe. The science is unequivocal: human influence has warmed the atmosphere, oceans and land, disrupting natural and human systems. Climate change means more droughts, scarce water, wildfires, melting polar ice, rising sea levels, extreme weather, flooding, catastrophic storms and declining biodiversity.

This long-term climate change has been caused by human activity, mainly from the widespread burning of fossil fuels- coal, oil and gas- in homes, factories and transport. When fossil fuels burn, they release greenhouse gases- mostly carbon dioxide (CO<sub>2</sub>). This traps extra energy in the atmosphere near the Earth's surface, causing the planet to heat up.

By making choices that reduce greenhouse gas emissions and preparing for the changes expected in the future, we can reduce the health risks from climate change.

There are some potential benefits and opportunities for health with the changing climate. Warmer winters will reduce health risks due to extreme cold and there may be some benefits to agricultural production for certain crops e.g. grapes. The extent to which health benefits can be gained from climate change will

largely depend upon if, how and how fast the UK and its health and care systems adapt to warming.

## 1.2 Political and strategic context

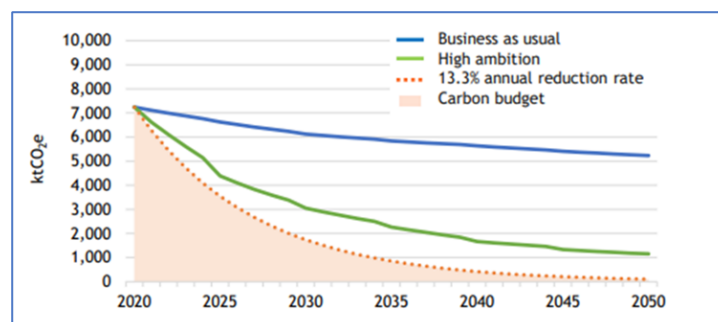
At a global level, the United Kingdom (UK) has signed the [Paris Agreement](#), a legal commitment to keep global temperatures below 2 degrees Celsius and reduce carbon emissions by 45% by 2030.

At a national level, the [UK Climate Change Act 2008](#) requires the government to undertake 5 yearly assessments of climate risks and produce a National Adaptation Plan for responding to the identified risks, including the risks to health and wellbeing. In addition, the Act requires the government to reduce emissions to net zero by 2050 relative to 1990 levels and it sets out how it will achieve this in the 2021 [Net Zero Strategy: Build Back Greener - GOV.UK \(www.gov.uk\)](#)

Locally, Kent County Council (KCC) recognised the UK climate emergency in 2019 and committed resources and to align its policies to address this. Through the framework of the [Kent and Medway Energy and Low Emissions Strategy - Kent County Council](#), KCC in partnership with Medway Council and the Kent district councils have committed to reducing greenhouse gas emissions from the whole county to Net Zero by 2050.

KCC's current strategy [Framing Kent's Future - Our Council Strategy 2022-2026](#) includes Priority 3; 'Environmental Step Change', that includes a commitment to work towards Kent being Net Zero by 2050, to support Kent to become a leading county for carbon zero energy production and use and to ensure the county is well placed to adapt to climate change.

In November 2022, Kent Chiefs and Leaders signed up to a '*High Ambition Emission Reduction Pathway*' committing Kent and Medway to reducing emissions as quickly as possible. The High Ambition Pathway is the green line in the graph below. This aims for a 50-60% reduction in Scope 1 and 2 emissions by 2030 Kent-wide from a 2019 baseline. Local authorities in Kent are decarbonising in accordance with the pathway.



More recently, the [Kent and Medway Integrated Care Strategy](#) addresses the environmental determinants that enable healthy lives with a specific mention of climate change.

### 1.3 Impacts of climate change in Kent

In 2019, a Climate Change Risk and Impact Assessment for Kent and Medway (CCRIA) was produced to describe the changes Kent might face and the potential risks to Kent's society, economy and environment. [Climate Change Risk and Impact Assessment for Kent and Medway \(CCRIA\)](#)

Understanding the potential future impacts of warmer, wetter winters and hotter, drier summers is crucial for future prosperity, environmental quality and health and wellbeing of communities.

Based on the [Met Office's UK Climate Projections \(UKCP\)](#) for the south east, by 2080

- Winters are likely to be warmer by around 3°C to 4°C
- Summers are likely to be hotter by around 5°C to 6°C
- Summer rainfall is likely to decrease by 30% to 50%
- Winter rainfall is likely to increase by 20% to 30%
- Sea level rise is likely to increase by 0.8m

The Kent and Medway CCRIA, states that the top 5 climate change risks include:

- Heat leading to increased mortality
- Overheating homes and public buildings causing productivity and health issues
- Overheating of public spaces affecting health
- Water scarcity and droughts affecting access to water
- Increase in flood risk impacting people's homes, businesses, health and social care facilities and access.

Kent's climate is already changing but its impacts are likely to be felt acutely in Kent with its long, strategically important coastline, large number of properties at risk of flooding and warm summers compared to the rest of the UK. It is important that the impacts of climate change are considered alongside other drivers of change including economic fluctuations, population growth and demographic shifts.

There are plans to update the CCRIA in 2025 based on new climate models and projections.

## 1.4 The climate crisis is a public health crisis

Climate Change is the greatest threat to global health and requires an emergency response.

The UK's 3<sup>rd</sup> Climate Change Risk Assessment Independent Report by the Climate Change Committee sets out the direct and indirect ways in which climate change can negatively impact our health. [3rd UK Climate Risk Report](#)

A warming climate affects health in 3 main ways:

1. Effects of extreme weather, such as heatwaves, flooding, wildfires, storms and drought on physical and mental health (e.g. injuries and trauma, heat-related illness).
2. Effects on the planet's life-support systems, such as rising sea levels and safe water availability, changing patterns of zoonotic and vector borne disease (e.g. malaria, dengue fever), reduced pollination and crop failure leading to food shortages.
3. Effects mediated by social systems, such as livelihood loss, rising prices of food and fuel, supply chain disruption, conflict or forced migration and pressure on health and care services.

[UK Climate Change Risk Assessment 2022 - GOV.UK](#)

## 2. Climate Change and Public Health- Key Messages:

2.1 There is substantial and growing evidence of the effects of climate change on health in the UK

### 2.1.1 Heat and Cold

In the UK an estimated 2295 heat related deaths occurred during the summer of 2023 and almost 3000 in the summer of 2022, when temperatures exceeded 40°C for the first time. Extreme heat has also affected the UK's health service, as heatwaves in 2022 led to surgeries being cancelled largely because of staff and bed shortages and overheating operating theatres, causing IT systems to fail in three London hospitals.

More [frequent and intense heatwaves due to rising temperatures](#) could lead to a dramatic increase in heat-related deaths. By the 2070s, under a high-warming scenario without adaptation, the UK could see over 21,000 additional heat-related deaths annually. Despite the warming climate, deaths from cold are also expected to rise, mainly due to an ageing population.

### 2.1.2 Flooding

Since 1988, flooding in England and Wales has become more frequent. In a 2019 report on 'Climate Risk to the Health and Social Care Sector in Kent', there were approximately 64,000 properties at risk of coastal and fluvial flooding and 24,000 <sup>1</sup>at risk of flooding from surface runoff in Kent. In Kent, users of the Severe Weather Impacts Monitoring System (SWIMS) recorded 19 flood events

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<sup>1</sup> Solastalgia definition: distress caused by environmental change

between 2012 and 2018, with a total reported cost of £1.05 million to public services.

Flood risk is projected to increase more steeply under high warming scenarios (4 degrees C of warming) compared to 2°C warming.

The risk of severe flooding in these coastal areas is likely to increase as a result of rising sea levels and increased storm surges. Over the last 30 years, Kent has lost more land to urbanisation and housing than any other county, and this increases the county's risk of being impacted by major weather events such as flooding". (Page 9 Framing Kents Future).

Coastal communities in Kent already experience considerable health inequalities and social vulnerability. They have less (financial) capacity to deal with climate shocks. Additionally, coastal climate risks can harm physical and mental health in three main ways:

1. Coastal hazards such as flooding or landslides cause injury, morbidities, poor health or death
2. Solastalgia<sup>1</sup> health consequences in coastal communities that must relocate due to loss of land, amenities or income
3. Economic and social impacts that can drive subsequent poor health such as loss of tourism leading to increased stress in the local population.

The report [Flood Risk to Health and Social Care Infrastructure in Kent in 2019](#) concluded that nearly 10% of health and social care services/assets were found to be in or near an area of flood risk from rivers and the sea and a smaller number at risk from tidal flooding. Two-thirds of these assets were in coastal areas. Given the vulnerable populations that these services/assets care for, its important that these assets are adapted to the changing climate.

### **2.1.3 Sensitive infectious diseases**

Any infectious disease whose transmission and spread are influenced by changes and variations in climate and weather is considered a climate-sensitive infectious disease. These include diseases that are spread by air, food, water or vectors. Vector-borne diseases are those caused by pathogens that have been transmitted to a human by a vector, such as a snail, fly, tick or mosquito. Changes in temperature and rainfall can have significant impacts on the spread of these vectors. Of particular note, are ticks and mosquitos. Warmer temperatures are leading to the expansion of the geographical range and seasonal duration of these vectors.

There is already a large increase in distribution of ticks in southern counties of England and there is the potential for a warming climate to increase the UK distribution of several tick species including *Ixodes Ricinus*, which can transmit Lyme disease and tick-borne encephalitis (TBE). Lyme disease is already increasing in the UK and although the risk of TBE is currently very low, there have been a small number of TBE detections in the UK since 2019. Increases in

these two infections are the most likely emergence tick-borne risks in the UK as the climate warms.

A concern under warming temperatures is the potential introduction and establishment of invasive mosquito species in the UK, particularly *Aedes albopictus* (*Ae. Albopictus*), a mosquito species that transmits dengue, chikungunya and Zika arboviruses. Invasive mosquitoes are actively monitored by the UK Health Security Agency (UKHSA) in Kent and have been detected. Their spread is being prevented through targeted interventions.

Climate change will also increase the risk of West Nile Virus (WNV) in the UK. So far, there have been no cases of this infection acquired in the UK,

UKHSA monitor populations of mosquitoes in the UK particularly at points of entry and urban centres. They also monitor tick species.

Rising temperatures and changing weather patterns will increase the risk of food-borne and water-borne bacterial infections like salmonella, campylobacter, and *Vibrio* spp leading to increased gastrointestinal illness.

#### **2.1.4 Food imports and volatile pricing**

Climate change has the potential to disrupt food supply systems with consequent risks to public health.

As the climate warms and impacts are felt, this is likely to mean that food imports and prices will be more volatile. This will impact availability of food and consumption of healthy food.

Many healthy foods are associated with lower greenhouse gas emissions - so there are potential co-benefits to health from switching to a healthier diet. Supply of both home-grown and imported fruit, vegetables and legumes will need to increase to meet the UK's dietary and health requirements.

Workforce issues and higher costs are putting pressure on Kent farms leading many to struggle. Locally demand is increasing for UK-grown sustainable long lasting produce grown without pesticides which requires investment in innovative growing techniques such as vertical farming. Support for farmers will be needed to enable them to boost local fruit and vegetable production.

#### **2.1.5 Droughts and Food security**

Since the 1950s, the frequency of heatwaves and droughts has increased, and it is expected that drought events will further increase in a warming world. As the planet continues to warm, water consumption will increase, with the Environment Agency (EA) concluding that an additional 3,435 million litres of water will be needed every day to meet public consumption by 2050.

Causes of drought include lack of rainfall, increased evaporation of surface water and declining water tables which can be exacerbated by human use of the water supply.

The primary concern of drought in the South East resides around water supply shortage. In Kent, 73% of the public water supply is from groundwater sources, predominantly from chalk aquifers, with the rest collected from rivers. Across the county, it is estimated that only 34% of rainfall reaches the water table, of which 11% is abstracted and 23% recharging groundwater supplies and rivers. With the population density of London and the South East of England being so high, this leaves a relatively small amount of water per person.

Droughts typically have slow onset and their health effects are harder to identify and are poorly understood. Droughts can impact health directly as they may affect water quality and quantity, and compromise crop yields, with implications for food supply and nutrition.

Droughts also have indirect effects, for example on vector-borne disease and have been linked to biodiversity loss, wildfires, increased concentrations of certain allergens and harmful mental health impacts (such as distress caused by loss of livelihood through damage to crops or livestock). As many effects are indirect, there is normally a delay in health impacts which are also often compounded by other concurrent weather-related events (such as heatwaves or wildfires). It is therefore difficult to quantitatively attribute morbidity and mortality specifically to drought.

Droughts followed by extreme rainfall may also occur more frequently, exacerbating existing health risks.

### 2.1.6 **Wildfires**

The heatwave in the summer of 2022, led to an unprecedented number of wildfires in urban locations, including one on Dartford Heath requiring 30 fire engines in response. [Climate change and environment | Kent Fire and Rescue Service \(fire-uk.org\)](#)

Wildfires can lead to a range of health impacts, including injuries, respiratory and cardiovascular effects from smoke exposure, harmful mental health effects and can negatively impact health services. Wildfires can alter the properties of soil, increasing the risk of flooding and landslides and affecting water quality. Whilst there is extensive evidence of health impacts from other countries, there is relatively limited but growing evidence specific to the UK. For example, studies of the impact of the large wildfires on Saddleworth Moor (northwest England) in 2018 found that as many as 4.5 million people were exposed to poor air quality caused by smoke and estimated that this may have increased air pollution related mortality by 2 and half times.

While it's currently uncertain if climate change is increasing wildfire incidence in the UK, Met Office projections suggest that a 2°C rise in global temperatures will double the days with very high fire danger and extend the wildfire season into late summer and autumn, particularly in the South and East of England.

### 2.1.7 **Aeroallergens**

Aeroallergens are airborne particles that can cause or exacerbate allergic conditions such as pollen and fungal spores. Aeroallergens can trigger hay fever and exacerbate asthma which affects about 11% of the UK population.

The changing climate is likely to shift and prolong the pollen season.

### 2.1.8 **Exposure to chemicals and ultraviolet radiation**

Experts agree that it is almost certain that climate change will affect human exposure to chemicals which could impact health.

Climate change affects how chemicals behave in the environment (air, water, soil, etc.). Higher temperatures and less rain can release more chemicals like pesticides into the air, increasing pollution.

Other ways climate change increases chemical exposure include:

- More use of pesticides and fertilizers due to changes in farming.
- Pests thriving and spreading, leading to more pesticide use.
- Chemicals from waste and industrial sites being released during extreme weather.

Temperature changes can make chemicals like pesticides vaporize and spread through the air. Warmer water can dissolve more pollutants, making them more widespread. Heatwaves can cause wildfires, releasing pollutants into the air.

Changes in rainfall can cause chemicals to run off into water bodies, affecting soil and groundwater. Dry soils from longer dry periods can lead to more runoff during heavy rain. Different rainfall patterns can change how some pollutants are distributed.

Sunlight has health benefits like Vitamin D production and mental health improvement, but too much Ultra Violet (UV) radiation can cause skin damage and cancer. Climate change can alter UV levels due to changes in ozone, clouds, and pollution. Predicting sunlight exposure changes in the UK is hard because it depends on lifestyle and behaviour more than climate change.

### 2.1.9 **Antimicrobial Resistance (AMR)**

Changes in temperature already shows an increase in infection rates and new infectious agents leading to bacteria resistant to antibiotic treatment. This constitutes a major global public health risk.

### 2.1.10 **Air Quality**

Air pollution is a major environmental risk in the UK, linked to an estimated 29,000 to 43,000 deaths annually. In a landmark case, air pollution was ruled a cause of Ella Kissi-Debrah's death, with the coroner noting that failure to meet legal pollution limits and lack of information on its effects on asthma contributed to her death.

Key outdoor pollutants include particulate matter (PM), nitrogen dioxide (NO<sub>2</sub>), and ozone (O<sub>3</sub>), which are associated with reduced life expectancy and various



health issues like respiratory and cardiovascular diseases. People living near busy roads face higher pollution levels, and some vulnerable groups are more susceptible to the health effects of air pollution include those with pre-existing health conditions, pregnant women, young people, older adults, and low-income communities.

There are many interactions between air quality and climate change which could impact health.

#### **2.1.11 Greenhouse gases and air pollutants often come from the same source**

Reducing greenhouse gas emissions from Transport, Housing, and Business and Industry in Kent not only addresses climate change but also reduces air pollution, thereby lowering health risks, with current legislation supporting these efforts, though future actions are crucial for continued progress.

#### **2.1.12 Some local pollutants are climate-active**

Some local air pollutants like black carbon, ozone, and methane, which are short-lived but have a high global warming potential, can significantly impact the climate, and reducing them quickly benefits both the climate and human health.

#### **2.1.13 Climate change is expected to make air quality problems worse**

Climate change is expected to bring hotter, drier summers, leading to more heatwaves and wildfires, which will increase pollution events with high ozone and particle levels, exacerbating health impacts.

#### **2.1.14 Air pollution contributes to climate change**

Air pollution affects the climate by influencing atmospheric processes like cloud formation and traveling long distances, even reaching remote areas like the polar regions, which reduces sunlight reflection, and it harms ecosystems, impacting their ability to absorb carbon dioxide and affecting clean water, biodiversity, and crop yields.

Addressing air quality and climate change can reduce health inequalities and promote social justice, as vulnerable communities are disproportionately affected by both air pollution and climate change impacts.

### **2.2 The health risks of climate change will not be distributed equally across the UK or even in Kent**

2.2.1 Climate risks to health will vary, with emerging vector-borne diseases, drought, and wildfires likely affecting southern UK regions first, while the increase in sea-levels and flooding will impact coastal towns and low-lying areas. Older adults and those with pre-existing health conditions are at the greatest risk from rising temperatures, and an ageing population will drive national climate vulnerability. Vulnerable groups, including children, people with disabilities, pregnant women, communities of colour, and those in specific settings like prisons and schools, will face heightened risks, reflecting existing health inequalities.

### 3. **The health risks of climate change will not be distributed equally across generations.**

3.1 Climate change affects different generations in various ways:

1. **Optimistic Scenario:** If we manage to keep warming low, temperatures will peak around mid-century. Current adults will be older and more vulnerable, while those who are young now will have to adapt the most in the 2050s to 2080s.
2. **Less Optimistic Scenario:** If warming continues as it is now, temperatures might not drop after mid-century or could keep rising. This means today's children and young people will face severe warming into their old age, and their children will also be affected.

3.2 In summary, climate change poses significant health risks for all generations, with current children and young people facing the most severe impacts as they age.

### 4. **Health impacts will increase with progressive warming**

4.1 Whilst the impacts of climate change are already being felt, the health risks from climate change over the next century depend on how much and how quickly the planet warms:

1. **Flood Risk:** More warming means more people at risk of flooding in the UK. By 2050, a modest warming (+2°C) could increase flood risk by 61%, while high warming (+4°C) could increase it by 118%.
2. **Sea-Level Rise:** Higher warming leads to greater sea-level rise, with about a one-meter difference between low and high warming scenarios.
3. **Resistant Infections:** Warmer temperatures and changing human behaviours could increase the spread of resistant infections, making it harder to fight antimicrobial resistance (AMR).
4. **Mosquito-Borne Diseases:** Higher warming will likely bring new mosquitoes to the UK, increasing the risk of diseases like dengue, chikungunya, and West Nile virus. By the 2040s and 2050s, most of England could see new domestic mosquitoes.
5. **Decarbonisation:** Reducing warming through decarbonisation can lessen these impacts and give society more time to prepare and adapt.

4.2 In short, less warming means fewer health risks and more time to adapt.

### 5. **Many adverse health impacts are avoidable with climate change mitigation and preventable at lower warming levels through effective adaptation**

5.1 At lower levels of warming, specific actions can save lives and reduce health problems from climate change. Effective measures include:

1. **Multi-Sectoral Actions:** National heat and cold alert systems, better housing with energy efficiency, shading, and greenspaces can reduce health risks.
2. **Multiple Benefits:** Some actions, like improving housing, offer multiple benefits (win-win), while others might create new risks (trade-offs).

3. **Climate Goals:** It's important to choose actions that protect health, support the UK's climate goals, and meet other societal needs.
4. **Mitigation Measures:** Using low-carbon heating and cooling, energy-efficient lighting, and solar energy can make homes more energy-efficient, reduce fuel poverty, and improve comfort. However, without good ventilation, indoor air quality might suffer. Air conditioning can protect against extreme heat but uses a lot of energy and carbon.

5.2 Therefore, it's crucial to minimize trade-offs and maximize health benefits in climate policies and planning.

## 6. There are many potential health co-benefits of climate action

- 6.1 The UK aims to reach net zero greenhouse gas (GHG) emissions by 2050, which will benefit health by reducing adverse impacts from climate change and providing other health co-benefits.
- 6.2 Transport, the largest contributor to UK GHG emissions, is a key focus for decarbonisation, with actions like promoting active travel and switching to electric vehicles offering significant health benefits. Improving the UK's poorly insulated housing stock can reduce heating demand, GHG emissions, and cold-related health issues, while also requiring adequate ventilation to prevent indoor air pollution. Transitioning farming practices and increasing plant-based food intake can reduce emissions and improve nutritional health, while nature-based solutions like urban greenspaces can lower temperatures and enhance mental health. The health sector can contribute to decarbonisation by switching to electric vehicles and low-carbon alternatives for anaesthetic gases and inhalers, highlighting the importance of integrating health considerations into climate actions.

## 7. Conclusion

- 7.1 There is substantial and growing evidence of the effects of climate change on health in the UK, potential impacts will be very significant and wide-ranging. The health risks of climate change will not be distributed equally across the UK or across Kent. Health impacts will increase with progressive warming. Many adverse health impacts of climate change are avoidable through climate change mitigation and others are preventable through effective adaptation. Maximising the health co-benefits of decarbonisation represents a key opportunity for health.

## 8. Recommendations

8.1 Recommendation: The Health Reform and Public Health Cabinet Committee is asked to **NOTE** and **COMMENT** on the content of this report.

## 9. Background Documents

UK Health Security Agency, Climate change: health effects in the UK, 2024.: <https://www.gov.uk/government/publications/climate-change-health-effects-in-the-uk>

Kent County Council. Climate Risk to the Health and Social Care Sector: a literature review. [FRAMES literature review\\_VF.pdf \(projectenportfolio.nl\)](#)

Environmental Policy Implementation Community. Integrating Action on Air Quality and Climate Change: A Guide for Local Authorities, 2024. [Integrating Action on Air Quality & Climate Change: A Guide for Local Authorities | www.the-ies.org](#)

## 10. Contact details

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