

Climate Change Adaptation Plan 2026

Identifying risks and vulnerabilities from the
impact of climate change



Contents



04	Executive summary
05	Risk ranking
06	Impacts
07	Actions
08	Contributors
09	Scope of this plan
10	Background & drivers
14	Infrastructural risks
17	Clinical risks
23	Networks & partnerships
25	Governance & reporting
30	Glossary
33	Appendices

Foreword

Climate change is one of the most serious global health threats of the 21st century. The effects of climate change are already happening all around the world and are predicted to intensify over the coming years.

Improving our ability to cope with projected climatic shifts is a key part of our Green Plan and the role we play as an anchor institution within our local community. Improving the resilience of our infrastructure, services and supply chain against extreme weather and long-term climatic changes is vital to protect our local population, current and future patients and staff.

We are already experiencing the effects of climate change within London and across the UK, from changing rainfall patterns to more frequent heatwave events. Many of the actions set out in this plan bring tangible benefits in the present, such as greening our estate and improving patient experience through temperature control and reduced flood risk.

This plan goes hand-in-hand with our ambitions to achieve net zero carbon by 2040. Whilst we are working to deliver a Greener NHS, the impacts of climate change may not be preventable, and these adaptations will therefore help the Trust cope with new risks and challenges presented by new climate patterns.

This plan sets out our ambitions to empower staff, patients and the community to take action to adapt to climate change and raise awareness. We will continue to work alongside our partners at South East London Integrated Care System and with local Councils to embed climate literacy, action and preparedness at the heart of our Trust strategies and planning.

With this plan, we are initiating our journey to embed climate change adaptation into daily practice across all parts of the Trust. Supported by guidance from the Greener NHS and NHS England, we will continue to review the risks presented to Guy's & St Thomas' assets, services and people and take action to ensure a climate-ready health service. I encourage us all to consider how the projected impacts of climate change presented in this report will affect us and support the necessary actions we need to take now to boost our resilience.

**Tendai Wileman, Executive Director Corporate Development,
Trust Chief of Staff and Executive Lead for Sustainability**



Executive summary

The Intergovernmental Panel on Climate Change (IPCC) is clear that climate change adversely impacts people's physical and mental health alongside loss and damage to natural systems. For Guy's and St Thomas' NHS Foundation Trust (the Trust) it is important to recognise how these risks may manifest and take steps to manage them, especially as the uneven distribution of consequences is alarming - vulnerable communities who have contributed the least to the climate crisis are disproportionately affected (IPCC, 2023).

The Climate Change Act 2008 in the UK initiated first-of-a-kind legal mandates to assess risks and adapt, a directive reinforced in the Climate Change Risk Assessment and National Adaptation Programme which report every five years with up-to-date climate-risk data. A series of NHS Health and Care Adaptation Reports - the most recent one published in 2025 highlighted the threat presented to health and how adaptation is vital to ensure a high level of care is maintained. However, despite general recognition, the third National Adaptation Programme (NAP3) published in 2023 said that the UK is not taking the required action to avoid increasing risks, while the Committee on Climate Change has declared that no sector is taking adequate action.

The development of this Climate Change Adaptation Plan (CCAP) aims at enhancing the adaptive capacity of our infrastructure, services and workforce to reduce impacts from climate-related hazards and is a step forward in our Sustainability Strategy 2021-2031. This plan identifies priority climate risk areas by examining current climate risks and the future projections of climate change impacts across each of our four large sites: Guy's Hospital, St Thomas' Hospital, the Royal Brompton Hospital and Harefield Hospital. The CCAP also considers the potential for local clinical risks and the influence of wider implications of climate change on the national/international infrastructure and supply chains upon which we depend. Initial assessments have identified the key climate risks across our primary sites, to include extreme heat, flooding, and compromised air quality.

Following a preliminary review of the current actions on climate change adaptation across the Trust and a series of stakeholder interviews conducted to generate in-depth insights, recommendations have been made on making our four sites more resilient across our built infrastructure, clinical services, operational services, workforce, and community. These include:

- Measures to enhance temperature regulation and ventilation
- Integrate air quality monitoring into clinical pathways, particularly in highly affected areas
- Conduct site-specific flood risk assessments
- Raise awareness and understanding of climate change adaptation by introducing training and integration with job descriptions
- Increase collaboration with local authorities, suppliers and NHS partners to better identify and fund adaptation measures
- Expand remote monitoring and virtual hospitals
- Convene a Climate Change Adaptation Working Group responsible for providing quarterly progress updates to the Trust's Green Plan Delivery Board (GPDB).

Risk ranking

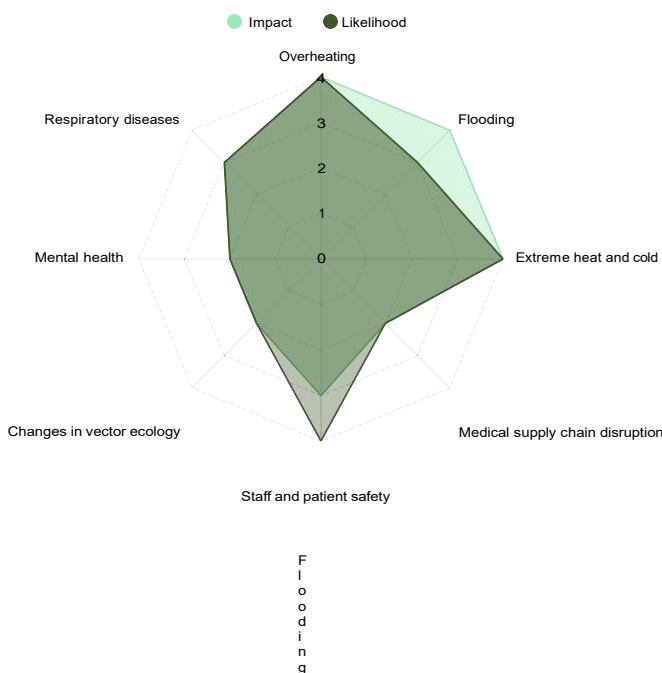
The risks associated with climate change have been assessed using the selection of likelihood and impact scores which have been drawn from a thematic analysis of qualitative data collected across the stakeholder interviews - informed by real, lived experience of staff encountering climate change related incidents.

Likelihood scores are based on historical frequency, and informed by stakeholder input, ranging from 1 (rare for unlikely incidents) to 5 (frequent occurrences), helping to quantify the probability of recurrence and prioritise mitigation efforts. In assessing risk impact, we consider scores from 1 to 5, where 1 reflects minor inconveniences to clinicians with minimal disruption to patient care, and 5 indicates a critical event where severe service disruptions could lead to serious patient harm due to clinicians' inability to respond adequately.

The following risk themes were assessed as part of this plan:

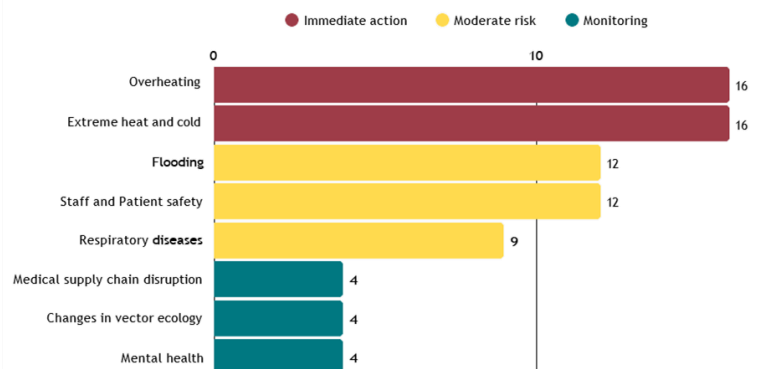
- Overheating: extreme temperatures and heatwaves causing overheating in buildings and IT system failures
- Flooding: proximity to rivers and outdated drainage systems leading to leaks, closures and operational impacts
- Extreme heat and cold: Overheating can impact the ability to keep staff and patients cool. Adversely cold temperatures during winter periods are also impacting on staff and patients.
- Medical supply chain disruption: Climate change and extreme weather can disrupt supply chains, causing shortages in clinical supplies including essential medications
- Staff and patient safety: The clinical setting can require staff to travel from site to site to deliver inpatient care, work in challenging conditions and patients alike can be vulnerable to changes in their environment
- Changes in vector ecology: Climate change may lead to increased rates of infections and disease, putting pressure on services
- Mental health: Stress and anxiety induced by exposure to climate risks and future predictions
- Respiratory diseases: Air pollution in and around the clinical setting due to extreme weather and inefficient ventilation can exacerbate illnesses and disease, worsening underlying respiratory conditions

Risk Impact and Likelihood



Overheating and extreme heat and cold were found to have the highest-ranking risk, requiring immediate action.

Flooding and Staff and Patient Safety has the second highest risk ranking.



Impacts

Risk

Impact

Ageing infrastructure

Overheating, flooding, poor ventilation

Older building profiles across the 4 sites are not well adapted to managing climate risks compared to newer buildings, particularly in cooling efficiently when overheating occurs.

Limited budgets

Flooding, temperature monitoring limitations, inconsistent IT infrastructure

The Trust is aware that refurbishing their buildings, especially older infrastructure, is a vital part of the climate agenda, but does not have specific budget available. Making infrastructure climate resilient can be deprioritised for immediate fire and water safety risk.

Communications

Supply chain disruption, extreme weather conditions, overheating, flooding

Trust staff don't fully understand the link between delivering organizational sustainability commitments and the individual activities of their job. Some staff may be unclear on the link between their role and how interventions can reduce climate risk.

Waste

Supply chain disruption, overheating

In the clinical setting, single-use devices are common, and medications can be disposed of ahead of their expiry or not monitored efficiently. The adaptation opportunity is reviewing medical supplies to prioritise them to be durable and reusable to reduce supply chain risks.

Temperature monitoring

Overheating, extreme weather conditions, poor ventilation

Manual reporting for temperature issues can introduce human error, risking timely intervention and rectification, putting staff and patients at risk.

Inconsistencies in IT infrastructure

Overheating

Some IT systems are on the Cloud, while older legacy systems remain on-site and have not been transitioned. Without adapting the IT infrastructure, the Trust is vulnerable to extreme weather events such as the 2022 heatwave.

Actions

Improve ventilation
and temperature
control

Estates &
facilities

Develop CCAP Working
Group Action Plan

Sustainability team

Digital transformation
for remote care

Remote monitoring and virtual clinic
options will minimise travel undertaken
by staff to and between sites and

support healthcare provision

Clinical/DT&I

Produce a flood resilience plan and contingency
plan

Carry out a flood risk assessment that
considers flood risk levels across all four
sites to include present
day and future flood risks. This can be
used to inform the action plan and help
to plan future healthcare services

Emergency
Preparedness Team
(EPRR)

Integrate air quality monitoring
into the clinical pathway

Use air quality data to alert clinicians to risk and to
inform mitigation and healthcare planning.

Clinical/Sustainability team

Invest in digital inventory to reduce
waste

Estates & facilities
/DT&I/ Pharmacy

Assess climate change impact
on Demand and Capacity

Understand the impact of climate change on
health, services and resources due to climate
impacts across multiple timescales.

Clinical/Sustainability team/EPRR

Interventions to respond to
emerging infectious disease
risks

Develop action plan for infection and disease risks associated
with changing vector ecology resulting
from climate change.

Estates &
Facilities/
Clinical/EPRR

Engage regional
sustainability networks

Coordinate climate adaptation efforts, share knowledge, and drive collaborative
action. Link in with the CCAP Working Group to align priorities and maximise
impact across all partnerships.

Sustainability team

Contributors

13 key stakeholders were interviewed during 2024 when developing this plan. The stakeholders were asked about how climate change was already impacting their departments and the challenges they think they may face in the future as climate risks evolve.

Trust Strategy Lead

Associate Director for Sustainability

Head of Emergency Preparedness, Resilience & Response (EPRR)

Trust Head of Risk & Quality Assurance

Assistant Director for Property and Asset Management

Palliative Care Doctor

Associate Director for Pharmacy Operations

Associate Director for Assurance and Compliance

Chief Procurement Officer

Procurement Specialist

Clinical Consultant

Director of Engineering

Integrated and Specialist Medicine Chief of Staff

Scope of this plan

This plan identifies the Trust's risks and vulnerabilities related to the impact of climate change, focusing on its services and infrastructure. It will also consider relevant climate change strategies and plans from regional and local boroughs, and includes:

- A bespoke and data-driven climate change risk assessment
- Local mapping of climate categories across the estate
- A summary of the actions for the next phase of work on climate adaptation

This Climate Change Adaption Plan aims to:

1. Build an understanding of current and future climate risks
2. Analyse the current weather-related risks for southeast London and our sites through conducting a baseline risk assessment at our four key sites, including Guy's, St Thomas', the Royal Brompton Hospital and Harefield Hospital based on well-established data and information sources
3. Use projections from climate models to identify how climate change may accentuate existing risks and create new risks in the future
4. Prioritise the key climate risks and opportunities for action
5. Examine environmental and social impacts through stakeholder engagement across operational, clinical and the built infrastructure services to identify current climate risks and adaptation measures

The plan maps out potential climate change adaptation measures for the Trust, providing a framework that:

- Identifies the scale at which to tackle the risks identified within this plan
- Facilitates action, highlighting where collaborative working with councils, NHS Trusts and wider stakeholder partners will increase the efficiency and effectiveness of any action taken
- Identifies and prioritises any critical gaps where further work is required to understand climate change impacts on the demand and capacity of healthcare services
- Establishes a strategic process by which Our Healthier South East London Integrated Care System can put in place the measures necessary to adapt to future climate change
- Supports education on climate change and raises awareness of the impact climate change can have on the Trust's capacity and the demand for healthcare services at the four key sites.
- Considers climate change mitigation measures, adaptation, and provides early warning signals • Demonstrates how we can become a regional and national exemplar on climate adaptation

There have been a series of climate-related acts, policies and reports at international and national levels which are also considered within this plan, aligning the legislation and proposed measures with feedback from the key stakeholders.

Background & drivers

The importance of acting on climate change, both for mitigation and adaptation purposes, has been outlined by a series of acts, policies and reports from international level down to Trust-specific policies which push for more sustainable practices.

Climate Change Act 2008

The integration of climate change into UK policy was established by the Climate Change Act 2008. This legislation mandates the reduction of greenhouse gas emissions, including CO₂ and initially set a target of cutting emissions by 80% by 2050 compared to 1990 levels. This ambition has since been raised to achieve net zero (100%) emissions by 2050. Additionally, the Climate Change Act requires the UK government to conduct a Climate Change Risk Assessment (CCRA) and develop a National Adaptation Programme (NAP) every five years.

IPCC Climate Change Assessment Reports

The importance of proactive climate action is emphasised by the IPCC's Sixth Assessment report on Climate Change 2022: Impacts, Adaptation and Vulnerability (IPCC, 2022) which highlights that climate change will substantially increase ill health and premature deaths in the near to long-term future.

The most recent UK Climate Change Risk Assessment (CCRA3) was published in January 2022. The report highlights the growing risks posed by climate change, such as extreme weather events, which are expected to increasingly affect the UK's health and social care systems. Consequently, this report identifies key risks including overheating and flooding, emphasising the urgency of adaptation measures, particularly for critical infrastructure like health systems. The report stresses the urgent need for adaptation measures, particularly to safeguard vulnerable populations and maintain the continuity of healthcare services during climate events. Early investments in climate resilience are highlighted as highly effective, offering substantial economic benefits that far outweigh the upfront costs.

National Adaptation Programme

The most recent National Adaptation Programme (NAP) was published by Defra in 2023, setting forth the national strategy for adapting to both observed and anticipated climate change impacts over the next five years. This report recognises the increasing health risks associated with climate change and emphasises the critical need for health systems to adapt to protect individuals from the impacts of climate change. NAP3 explains the government's plans to adapt from 2023 to 2028, including protecting public health and communities. The programme also highlights the importance of collaborative efforts across various sectors to enhance resilience and ensure that health services can effectively respond to climate-related challenges.

United Nations Sustainable Development Goals

Highlighting the United Nations Sustainable Development Goals, the NHS' Forth Health and Care Adaptation Report and our Green Plan, we are aiming to produce a comprehensive plan which can be integrated into Trust policy and service delivery.

This report considers the Trust's requirements and those of our wider community. Four key focus areas have been identified for this Climate Change Adaptation Plan and include the outcomes in relation to the UN Sustainable Development Goals as set out in figure 11 under Appendix D. The four focus areas include: - built infrastructure; health and clinical services; operational services; workforce and community.

For a Greener NHS

The NHS Long Term Plan acknowledges the need for substantial action to align the NHS to meet the expectations set by the Climate Change Act 2008. It lays out initiatives aimed at enhancing efficiency, reducing waste and building resilience within healthcare systems and services.

Building on this foundation, the Greener NHS programme emphasises collaboration between NHS staff, hospitals and partners to minimise the healthcare sector's environmental impact and combat climate change's effect on public health. Commitment is reflected in the Delivering a Net Zero National Health Service report (NHS, 2020), which outlines an ambitious strategy to achieve net zero carbon emissions at a faster rate than mandated by the Climate Change Act. The report also highlights the critical relationship between climate mitigation and adaptation, underscoring the ongoing need to integrate adaptation measures into the NHS's climate response. In alignment with this trajectory, the 2021/22 NHS Standard Contract (NHS, 2021a) mandates that all NHS providers develop and regularly update a Green Plan, detailing each Trust's approach to achieving net zero emissions.

In 2021, our Sustainability Strategy was published, outlining our current emissions baseline and ambitious mission focusing on 3 key themes and 9 focus areas. Adapting to climate change was identified as one of the key focus areas, to invest in adaptation measures that will improve air quality and enhance protection of our people and estate from the impacts of climate change by 2031. A new Green Plan (Sustainability Strategy) was launched in January 2026.

Further progress was documented in December 2021 with the release of the NHS Third Health and Care Adaptation Report which reviewed advancements since the previous 2015 report and identified major climate risks (Figure 1) and provided the next steps to assess risks and build resilience. These actions include the development of long-term planning to tackle risks that vulnerable sites face from climate-related hazards e.g. overheating and flooding.

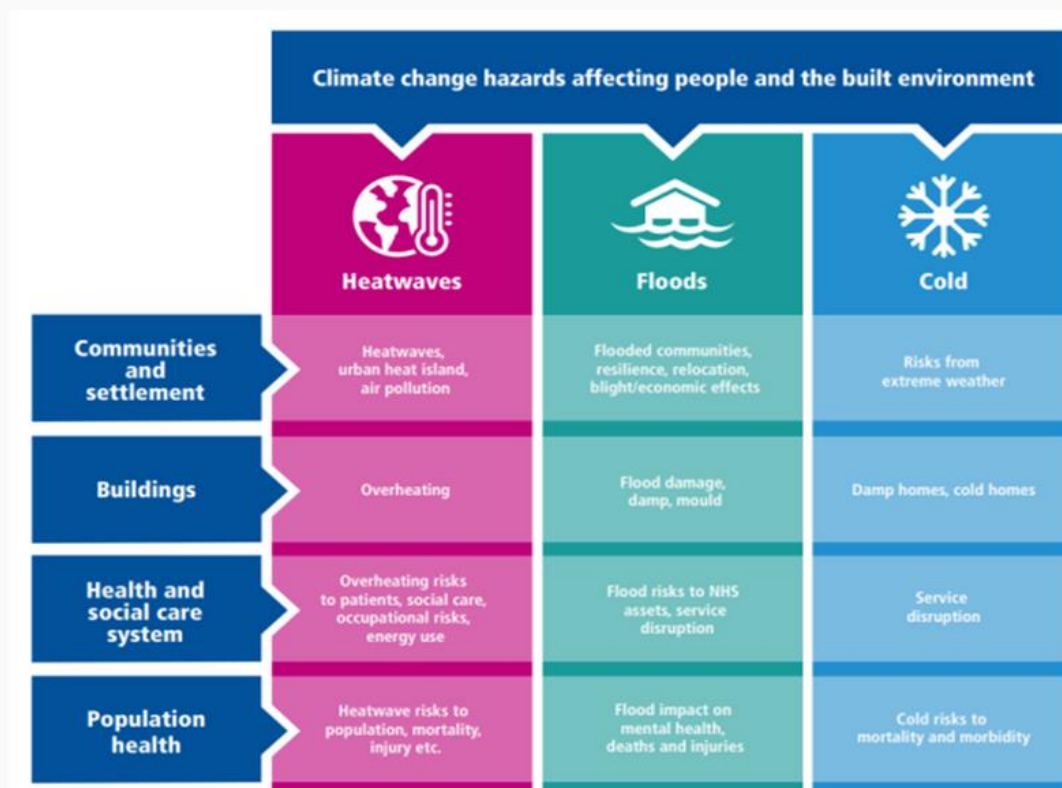


Figure 1: Climate change hazards affecting people and the built environment, (Ref: NHS, 2021b)

Existing strategy and policy

Our priority is to reduce risks against climate-related hazards through our Sustainability Strategy and other mitigation strategies. We have emergency plans in place, some of which are applicable across all sites and others tailored to address site-specific risks and contexts. Our objective is to strengthen resilience and fully integrate adaptation measures within existing Trust strategies, pathways, and policies. A key example is our Clean Air Plan 2023-26, in partnership with King's College Hospital NHS Foundation Trust. This plan raises awareness of the harmful effects of poor air quality and promotes community collaboration to reduce pollution. It sets forth several commitments and priorities to be achieved by 2026.

Key policies play a significant role in strengthening the climate resilience of the Trust's estates including the following:

- The NHS Emergency Preparedness, Resilience, and Response (EPRR) framework distills requirements under the Civil Contingencies Act 2004, which mandates that NHS organisations and providers of NHS funded care demonstrate their capability to sustain service provision despite emergencies like extreme weather events. The Trust EPRR team offers training courses for stakeholders to enhance the Trust's resilience and emergency preparedness.
- Multiple emergency-related plans are in place at the Trust for different incidents, including:
 - The Adverse Weather and Natural Hazard Plan;
 - Air Pollution Alerts Plan;
 - Fuel Supply Disruption Plan;
 - Heatwave Plan; and
 - Business Continuity Management and Corporate Plans, which help ensure that essential operations persist during disruptions.

Additional policies include the new Essentia strategy which highlights the modernisation of infrastructure as one of the Trust's strategic priorities. The strategy is displayed in Appendix E (more detail is discussed in the section titled Changing Structure).

Local councils

The NHS is not alone in its ambition to successfully implement climate adaptation. Local councils are also determined to incorporate climate adaptation measures, driven by London's plans to become net zero by 2030. Tackling such a complex challenge requires taking a planned and collaborative approach.

The Trust operates across London and parts of Kent. There is the opportunity to engage with Lambeth, Southwark, Lewisham, Hillingdon and Kensington & Chelsea London borough councils, as well as Kent County Council. Evidence exists that each of these councils are already employing strategies to improve sustainability and achieve carbon emission reduction aligned with NHS net zero targets.

Given that the Trust has experience working with external stakeholders in partnerships as highlighted during stakeholder interviews, collaboration would benefit the Trust in improving its policies and strategies and the Trust has a goal of increasing engagement with other organisations as part of its role as an anchor institution.

Notably in 2019, Lambeth was the first London borough to declare a climate emergency. To set out priorities with the hope of achieving the goal of net zero by 2030, a citizens' assembly on the climate crisis was conducted in 2021 which repeatedly highlighted engagement with the NHS as an important step in achieving climate change action. The council has developed a Climate Action Plan describing their adaptation goals that they aim to achieve by 2030.

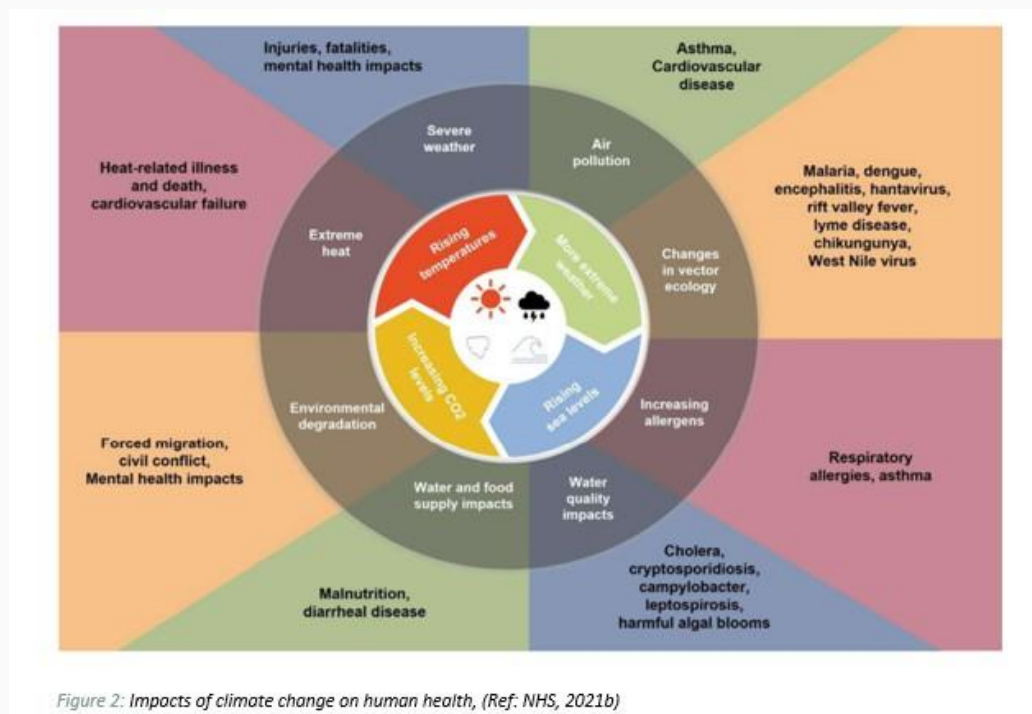
Additionally, both Southwark and Lewisham Councils have aligned themselves with this 2030 net zero target and have declared climate emergencies. Southwark Council is also leading the Resilient and Green London action plan and has further outlined that engagement with local NHS Trusts as part of a borough partnership is one way in which collaboration can help identify opportunities to reduce carbon emissions. Lewisham Council has further emphasised climate resilience by developing a Strategic Flood Risk Management Strategy and is advancing urban adaptation through sustainable drainage solutions to mitigate surface water flooding.

Kent County Council has prioritised climate adaptation as a means of reducing the impacts of climate change. In 2019, the council produced a comprehensive Climate Change Risk and Impact Assessment, outlining the potential economic, environmental and social risks Kent may face because of climate change. The Council has several projects in progress, including the Severe Weather Monitoring System (SWIM), Adaptation Catalyst e-tool and the Cool Towns programme.

Understanding the future climate

The IPCC's most recent report concludes that historical and ongoing production of greenhouse gases at its current trajectory will cause inevitable long-term changes to our climate system (IPCC, 2023). The report calls for urgent action, highlighting that even a temporary overshoot beyond 1.5°C will bring more severe climate impacts, and in some cases, irreversible effects. There is still some ambiguity around the magnitude of these changes, however, it is understood by the scientific community that observed patterns of increasing mean land temperature and rainfall are expected to intensify in England (Slingo, 2021) alongside increases in both temperature and precipitation extremes (as outlined in the following section).

Within the healthcare context, climate change displays a multi-faceted and inter-linked threat (Figure 2). There are several climate change impacts, and they occur through different mechanisms with the potential to result in a shifting pattern of disease and have the possibility to impact the infrastructure that a health service requires to function.



The following section of the plan will outline the known potential impacts of climate change on the Trust's services under the headings of 'Infrastructure risks' and 'Clinical risks'.

Infrastructure risks

This section outlines the direct risks to local infrastructure that are associated with the Trust's four sites: Guy's Hospital, St Thomas' Hospital, Royal Brompton Hospital, and Harefield Hospital.

“The design of infrastructure is not well adapted for the hazards” - Operational Services, Community setting

Overheating

“St Thomas handed out ice lollies to people unable to cope with overheating. Overheating is on the list of priorities!” - Operational Services, Sustainability

The UK HSA (2023) report highlights increasing temperatures, particularly in the summer, will increasingly pose overheating risks to buildings. Overheating can exacerbate the health risk associated with extreme temperatures and amplify secondary risks like spreading disease. For example, research suggests that even if global mean temperatures are limited to below 2°C relative to pre-industrial levels, in line with the Paris Agreement, then peak summer temperatures could rise from 37°C to 38.5°C at Guy's Hospital and St Thomas' Hospital (Dale and Stylianou, 2021).

Additionally, projections indicate that urban heat island intensity will increase as a result of climate change, with nighttime temperatures in particular increasing at a rate of 0.45 to 0.55°C per decade in cities during the 21st century (Slingo, 2021). Consequently, this will place further strain on the Trust's infrastructure to keep buildings cool and may lead to overheating which affects patient and staff comfort and affects key infrastructure including IT.

The 2022 summer heatwave saw temperatures in London reach 40°C with the highest temperature recorded in the St Thomas' data center being 26.5°C (Guy's and St Thomas', 2023), which caused IT service outages at the Trust, highlighting the current vulnerability of the Trust's buildings to climate-related stressors. Currently, the area around Guy's Hospital is more susceptible to heat risks than that which surround St Thomas' Hospital. Both Guy's Hospital and St Thomas' Hospital face greater heat risks compared to Harefield Hospital and Royal Brompton Hospital with Harefield Hospital having the lowest heat risk out of the four sites. When carrying out stakeholder interviews, one of the Trust staff mentioned how the four sites which includes Guy's, St Thomas', Royal Brompton and Harefield Hospital generate significant amounts of carbon emissions across the estate and therefore should be the core focus for targeting decarbonization and adaptation measures together.

All four of these sites are freehold along with some community sites including Lambeth Community Care Centre, Minnie Kidd House and the Pulross Centre. The remainder of the estate is made up of leased premises e.g. rented and Private Finance Initiative (PFI) schemes and therefore not under the Trust's ownership. Consequently, the Trust can drive the most change across the four main sites for which they have full ownership compared to the remaining estate which is leased. the Trust's actions are likely to be impacted by ownership status when seeking approvals from landlords for infrastructure changes at leased sites. Consideration should be given when renewing or signing new agreements.

IMPACT: On buildings, services, and health

ACTION: Improve ventilation and temperature control; digital transformation for remote care

Figure 3 defines heat risk based on population vulnerability factors, including age, deprivation, average land surface temperature, air pollution, and greenspace provision.

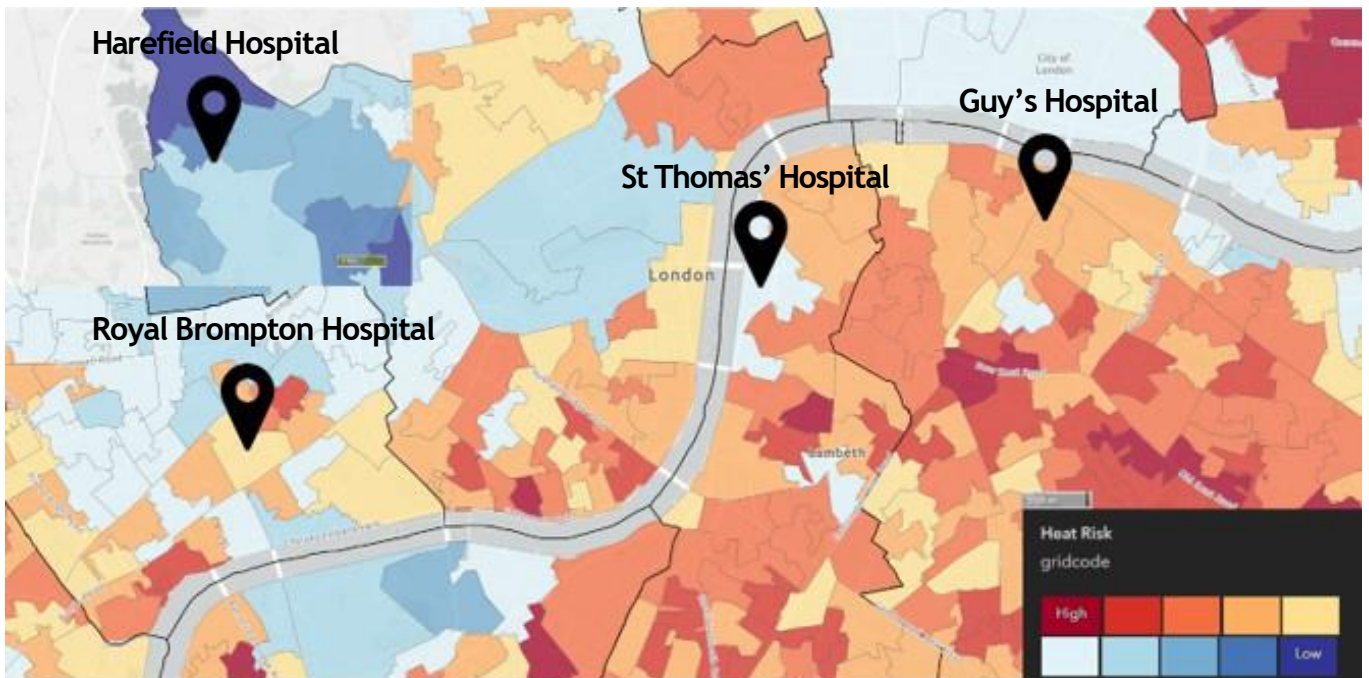


Figure 3: A map to show the current heat risk of Royal Brompton Hospital, Harefield Hospital, Guy's Tower and St Thomas Hospital and surrounding areas (London Climate Risk Maps, 2024)

Flooding

Assessments of the Trust's current flood risk show that vulnerability levels are approximately equal across Guy's Hospital and the St Thomas' Hospital. The flood risk is greater across these two sites compared to Royal Brompton Hospital and Harefield Hospital.

Notably, the Environment Agency data report shows that both Guy's Hospital and the St Thomas' Hospital are located within areas of relatively low flood risk (see Figure 4).

While Royal Brompton Hospital and Harefield Hospital seem to be similar in their flood risk vulnerability levels, Harefield Hospital is least vulnerable out of the four listed sites.

However, further investigations are necessary to fully understand the nature of flood risks at each site given the variety of potential flood risks resulting from climate change.

“

'Local flooding is caused by a combination of rainfall volume, existing system design limitations, building defects, blockages etc. This has affected roofs, car parks and internal space' -
Director of Engineering

”

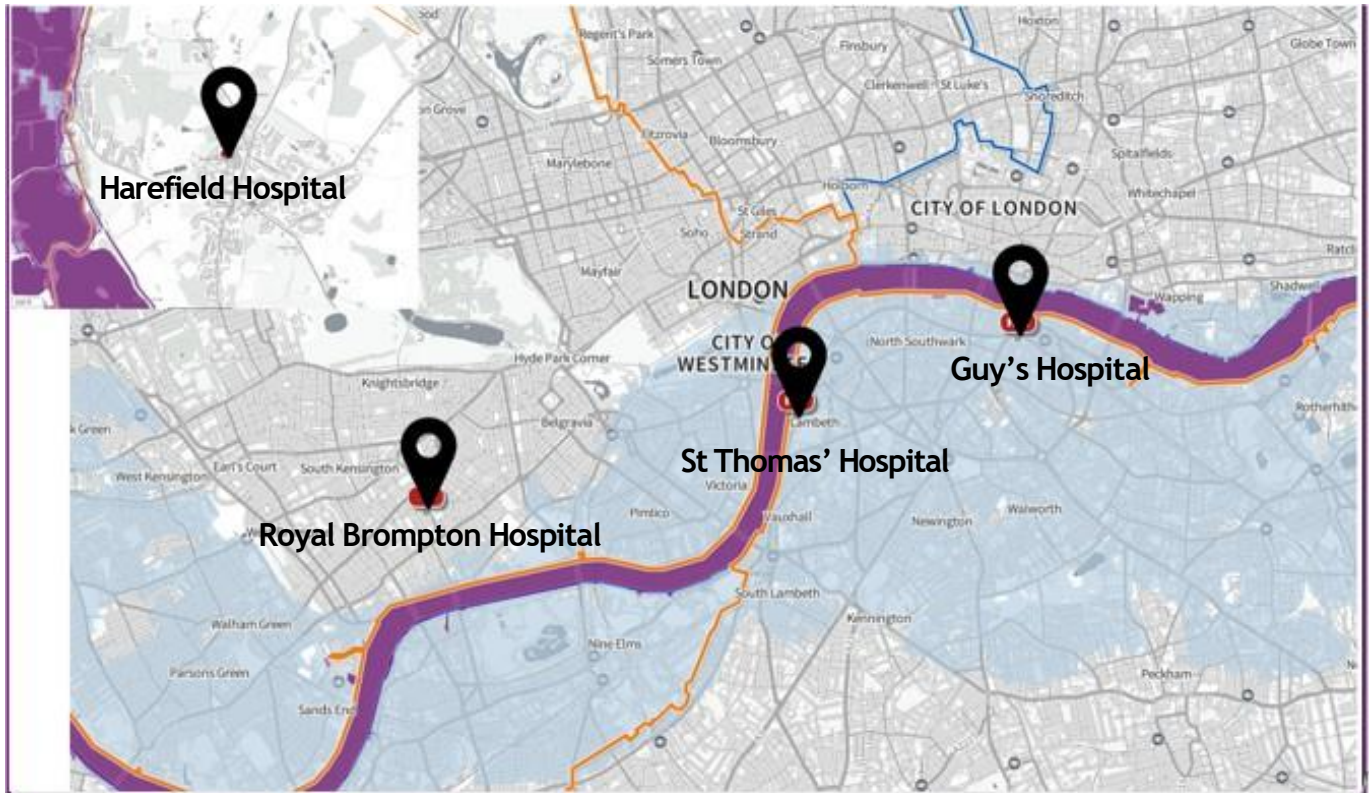


Figure 4: A map to show current flood risk from rivers and sea at Royal Brompton Hospital, Harefield Hospital, Guy's Tower and St Thomas' Hospitals

Flood risk may also be expected to change over time. The Climate Change Committee (2022) has projected increases in average winter rainfall and heavy rainfall events under a range of climate change scenarios. The Met Office (2021b) reported that such changes are expected to have significant consequences on surface water flooding in urban areas.

Furthermore, increased winter rainfall is likely to lead to greater ground saturation, thereby increasing the rate of runoff into rivers. This suggests that a larger proportion of healthcare assets may be exposed to flooding events nationally (Landeg et al, 2019).

Climate projections in line with both 2 and 4°C of warming relative to pre-industrial temperatures indicate that while the number of rainy days remain similar, the intensity of peak summer and winter rainfall events could increase at the Trust's four major sites (Dale and Stylianou, 2021).

IMPACT: On buildings and access to services

ACTION: Produce a flood resilience plan and contingency plan; digital transformation for remote care

Clinical risks

This section outlines the perceived impacts of a changing climate on the clinical services that the Trust provide or future services that the Trust may be expected to provide.

Extreme heat

The UK HSA reported an estimated 2,295 heat-related deaths during five significant heat episodes in the summer of 2023 (UKHSA, 2024). Research further links 37% of heat-related deaths globally to human-induced climate change, highlighting a direct correlation between rising temperatures and health impacts (Vicedo-Cabrera et al, 2021).

Heat-related deaths are commonly associated with heat stroke which occurs when the body loses its ability to regulate temperature and so uncontrolled rises occur. This can result in organ damage, including to the heart, lungs, kidneys, intestines, and the liver and can be particularly severe for those with pre-existing medical conditions such as cardiovascular issues (Ebi et al., 2021b). Other effects of heat on human health include various cardiovascular diseases, skin and eye health, renal health, and mental health and wellbeing impacts.

Under a global 2°C scenario, peak summer temperatures at the Trust's two main sites: Guy's and St Thomas' Hospital are projected to increase by 1.5°C to reach 37°C, with the number of summer days exceeding 25°C rising from an average of six days a month to eleven days. It is therefore evident that the frequency and severity of heatwaves is likely to intensify by the end of the century and increase their impact on human healthcare and service demand (Ebi et al, 2021b). Simultaneously, the UK aging population is increasing with more people becoming vulnerable to heat-related clinical risks.

An estimated 90% of NHS buildings are vulnerable to overheating, and studies have shown that hot weather causes significant disruption to health services, facilities, and equipment, in addition to increasing staff and patient discomfort.

The impacts of heat on health are generally seen within 24 hours of high temperature onset (UK HAS, 2024), leaving little time to react. This escalates the need for timely action and having plans in place to prevent climate events becoming an emergency incident.

“The backup generators failed and overheated so 3 out of 4 units broke. When the system went down, it had to be restarted in steps, and it felt like a cyberattack losing data” - Operational Services, Risk

These increasingly frequent occurrences of extreme heat are also likely to present a clinical risk and increase pressure on services. There can be challenges in delivering patient care where hospital rooms require a certain level of heating and ventilation to optimise patient safety and the storage of medication by pharmacists which require maintaining at certain temperatures. It is therefore important that climate change adaptation measures support alleviation of clinical risk and ensure that relevant services are functioning effectively to manage the impacts of warming temperatures.

IMPACT: On buildings, services, and health

ACTION: Improve ventilation and temperature control, digital transformation for remote care

Extreme cold

Extreme cold remains a significant public health threat, as highlighted in the NHS' Third Health and Care Adaptation Report (2021). Even moderate cold (between 4°C to 8°C) can have direct and indirect impacts on people's health, contributing to increased health risks, including heart attacks, strokes, respiratory disease, flu, hypothermia, injuries from falls, mental health and social isolation, reduced indoor air quality, and effects of damp and mold.

Cold-related deaths often spike during and up to four weeks following cold weather events, with the risk of mortality increasing as temperatures fall or if mild cold weather persists for prolonged periods. (UK HSA, 2024). In 2014, the Adaptation Sub Committee reported that although cold related mortality is likely to decline with rising temperatures, it is still expected to remain the largest weather-related health risk in England with approximately 40,000 excess deaths annually by 2050.

This is partially because an ageing population is expected to increase population vulnerability to health impacts such as pneumonia, strokes, and heart attacks given that the elderly are generally less effective at temperature regulation. Those with dementia and Alzheimer's face additional risks, as cognitive impairments reduce their ability to feel the cold. Deaths related to the cold are expected to increase, surpassing those of extreme heat until 2070 (UK HAS, 2024) resulting in a combined impact on healthcare services.

IMPACT: On health

ACTION: Digital transformation for remote care to reduce pressure on hospitals and engage regional networks for community support

“We are struggling with current temperatures and cooling buildings... there are buildings that are notoriously cold in winter, and the installation of heating measures is hard” - Built Infrastructure, Assurance and Compliance

Cold weather also strains healthcare systems directly, with evidence showing that every 1°C reduction in air temp. can reduce service performance for ambulances and call outs by 1.3%.

It is important that adaptation measures to mitigate cold weather impacts on health are implemented but equally that any adaptation measures do not conflict with the need to manage other climate risks like extreme heat.

Medical supply chain disruptions

The reliability of medical and pharmaceutical supply chains faces growing risks from climate driven events, such as flooding, storms, and extreme temperatures. These events disrupt production, transport, and delivery of supplies, posing potential challenges for the Trust in meeting patient care needs as global supply chains become less predictable.

Given the international scope of medical supply chains, such climatic risks to procurement are present both within and outside the UK (NHS, 2021b). For example, the location of suppliers may be in particularly climate vulnerable areas and climate change may also reduce the availability of certain climate-sensitive raw materials. Furthermore, given the previously noted implications of climate change on risks to energy and water security, these vulnerabilities represent threats to the production processes of medical and pharmaceutical supplies.

Whilst the NHS supply chain's existing emergency plans address extreme weather-related disruptions (NHS 2021b), current protocols do not ensure that the suppliers implement adequate adaptation measures. Therefore, without enhanced climate resilience across procurement channels, Trusts may face supply shortages that compromise essential services.

Various stakeholders, notably those staff in the clinical setting, identified how extreme weather such as overheating and flooding have an impact on the production and distribution of essential medical supplies. This is a significant risk particularly for more vulnerable patients who require regular medications to treat their illnesses and manage their symptoms. Managing overprescribing of medications may be a joint mitigation and adaptation measure that is taken to ensure patients have a sufficient supply of their medications available while reducing consumption emissions.

“ ‘As a clinician, I see the impact of regular shortages of vital medications for my patients due to extreme weather events’ - Clinical Services, Hospital setting ”

In reference to drug storage specifically, trust staff mentioned that there are air-conditioned areas, but these can fail as they come under pressure from exposure to warmer temperatures outside.

The Climate Change Resilience Assessment report (ARUP, 2022) assessed the performance of mechanical and electrical systems. The report highlighted that several chillers across the estate experienced issues due to extreme temperatures during the summer period during

2022. The report supports how warmer temperatures can impact the ability of infrastructure to function efficiently and keep areas cool, also highlighting the need to incorporate a Climate Adaptation Plan which includes infrastructure and maintenance. There is also a need to improve the methods used to monitor the temperatures of drugs stored.

IMPACT: On infrastructure and maintenance impacting pharmaceutical supplies

ACTION: Improve ventilation and temperature control; invest in digital inventory to reduce waste

Staff and patient safety

The Trust is reliant on transport infrastructure to deliver healthcare services. Disruptions to the transport network pose a risk to the Trust's ability to deliver timely care.

Increases in climate events such as flooding can impede Emergency Response and Non-Emergency Patient Transport services, affecting emergency care delivery and routine patient access to the Trust's sites.

“ ‘In order to run the service, it is best done face to face. People clock up miles going site to site, a risk that cannot be controlled. It can be minimised but is a huge part of the work’ - Operational Services, Community setting ”

Additionally, extreme weather events may limit both staff and patient access to facilities, disrupting operations across the Trust sites. Stakeholders at the Trust across various settings, including clinical and operational all collectively agree that staff travelling across sites to deliver patient services poses a health and safety risk. This is due to being exposed to various climate risks such as overheating alongside the ventilation challenges mentioned. There is also a risk that patients in a hospital setting which is already warm are at risk of overheating.

IMPACT: On operations and staff

ACTION: Improve ventilation and temperature control; Integrate air quality into the clinical pathway; Produce a flood resilience plan and contingency plan

Changes in vector ecology

Climate change is influencing vector ecology, impacting the spread of vector-borne diseases such as malaria, dengue and the Zika virus. These diseases, transmitted primarily by vectors like mosquitoes, are already seeing shifts in transmission patterns and geographical spread due to climate driven changes in temperature, humidity, and precipitation (Caminade et al, 2019). Europe has seen significant enough climate shifts to support the emergence of diseases that were previously rare or absent (Semanza and Paz, 2021).

The exact implications of climate change for vector-borne diseases are not entirely known given that the precise relationships between vectors, diseases and the climate are often complex, whilst changes in precipitation and ecosystems are also relatively uncertain. However, it is certain that warmer temperatures expand the range of certain vectors, allowing them to move to higher latitudes and altitudes, potentially increasing the prevalence of vector-borne diseases in regions previously unaffected (Rocklöv and Dubrow, 2020, Semanza and Paz, 2021). The risk is also expected to be compounded by globalisation, urbanisation, and changes in land use, which can also support vector spread and disease transmission (Medlock and Leach, 2015).

These shifts may translate to increased demand for services, particularly in infectious disease management and public health interventions. Climate adaptation plans should therefore include provisions for responding to emerging infectious disease risks associated with changing vector ecology, ensuring that the Trust's healthcare system remains resilient in the face of new and evolving climate-related health threats.

IMPACT: On health and disease management

ACTION: Intervention plan to respond to emerging infectious disease risks

Mental health

The relationship between climate change and mental health issues are largely understudied, due to the complex and largely unique nature of the two (Cianconi et al, 2020). In this regard, the risks are both short and long term, occurring due to both direct and indirect exposure to climate change. Additionally, experiences of mental health issues associated with climate change can vary in magnitude from minimal stress to post-traumatic stress and suicidal thoughts (Cianconi et al, 2020).

One notable study in Bradford, UK, found that mental health issues accounted for most health impacts reported after severe flooding, surpassing the frequency of physical health complaints (Fewtrell and Kay, 2008). Additionally, climate anxiety refers to the psychological effects of persistent worry about the broader climate crisis, independent of any single event (Wu et al, 2020). Such stresses may be particularly significant among young people given their generally greater vulnerability to anxiety and stress due to their ongoing development and increased likelihood of encountering repeated climate stressors across their lives (Wu et al, 2020).

Extreme weather events such as heatwaves and cold snaps are also heavily linked to mental health and wellbeing, with some studies showing a significant correlation between heatwaves and suicide, as well as links between social isolation and worsened wellbeing during cold weather (UK HSA, 2024). Stakeholders agreed that staff and patient safety is an issue due to climate risks and hazards, and it is likely that the stress induced from this may have an impact on wellbeing. Therefore, whilst difficult to predict the exact nature of climate change-induced mental health challenges over time, in the context of a climate which is projected to experience more frequent and extreme weather events, we can infer that further mental health challenges may be observed amongst both our staff and wider community.

IMPACT: On mental health and wellbeing

ACTION: Engage regional sustainability networks and communicate positive changes

Respiratory diseases

Respiratory diseases including chronic obstructive pulmonary disease, pneumonia and asthma currently affect around one in five people in England. The economic burden of all lung related diseases including lung cancer is estimated to cost NHS England £11 billion annually. Respiratory disease is the third leading cause of death in England (NHS, 2024), and hospital admissions for these conditions have risen threefold compared to overall admission rates over the past seven years.

There is considerable evidence that air pollution is a primary contributor of respiratory disease, especially in vulnerable populations (Tran et al, 2023). The World Health Organisation (WHO) estimates that 99% of the global population lives in places where air quality standards are not met, leading to 4.2 million premature deaths per year from ambient air pollution. Fossil fuel combustion, such as petrol and diesel, used for transportation and energy production, is a major source of both greenhouse gases and pollutants that harm respiratory health.

Climate change is expected to exacerbate the incidence and severity of respiratory diseases through several mechanisms, which includes the occurrence of airborne aeroallergens including pollen and fungal spores which are predicted to increase due to climate change, with some location-specific studies already having shown increases in peak pollen concentration (Beggs, 2021). Aeroallergens can trigger allergic reactions associated with multiple illnesses including asthma, atopic dermatitis (eczema), and allergic rhinitis (hay fever) (Reid and Gamble, 2009) and therefore can also impact on pharmaceutical demands and supplies.

Similarly, ground-level ozone which is formed by reactions involving heat, ultraviolet radiation, hydrocarbons, and nitrogen dioxide (Demain, 2018), is a pollutant gas that acts as a respiratory irritant, and has significant impact on human morbidity. Historic records indicate that ground level ozone levels correlate with summer periods with the highest number of hot days (Demain, 2018).

Therefore, due to warming temperatures and the potential for increasing UV levels because of climate change, it could be expected that ground-level ozone concentrations will also increase and thus increase the number of respiratory conditions faced by healthcare services generally.

Given projections of increasing air pollution, ground level ozone, and aeroallergens due to climate change, respiratory disease cases are likely to rise, placing additional strain on healthcare resources at the Trust.

“Our most vulnerable populations often live in areas with the poorest air quality, creating a cycle of worsening health outcomes’ - Clinical Services, Hospital setting”

Past data on respiratory-related mortality will continue to be monitored to support this adaptation plan and ensure that the Trust is prepared for the expected increase in respiratory health challenges. Local CCG data on respiratory diseases highlights an increase from 2016-2019 in the total number of registered patients and the death registrations attributed to respiratory disease highlighting a potential correlation between climate change and poor air quality which is having significant implications for the population's health. Across the Trust, the relative risk for respiratory disease from air pollution varies by location as shown in Figure 6.



Figure 6: A map to show air quality defined by vulnerability of population to concentration of PM2.5, at and surrounding Royal Brompton Hospital, Harefield Hospital, Guy's Tower and St Thomas' Hospitals (Shape Place Atlas, 2024)

IMPACT: On health and pharmaceutical supplies

ACTION: Decarbonisation of buildings; Green travel plan; Integrate air quality monitoring into the clinical pathway

Networks and partnerships

South East London Integrated Care System

The Trust strongly believes that the local level can and must play a significant role in climate adaptation. Regional collaboration with our NHS partners has a key role in addressing this topic. By collaborating with regional NHS partners, we aim to enhance climate preparedness across the local healthcare landscape. As an anchor institution, the Trust is positioned to foster connections between the health service, local businesses, and communities, contributing to wider resilience efforts.

Our Healthier South East London Integrated Care System (ICS) plays a central role in defining and coordinating these efforts, working to create a cohesive climate resilience strategy that safeguards our services and benefits the local community. The Trust is committed to sharing insights from our adaptation initiatives to support alignment with regional policies, while engaging local councils, suppliers, and key community stakeholders to enhance overall climate resilience.

NHS England and Greener NHS

Coordination and alignment with NHS England well as the Greener NHS is key to ensure we are compliant with central policy and undertaking the steps required to build climate adaptation. The Trust will continually review the wider health implications of climate change and utilise current and future Health and Climate Change Adaptation Reports to cover these topics and align adaptation and mitigation where risks are increasingly likely.

The NHS National Emergency Preparedness, Resilience and Response (EPRR) team will include climate adaptation planning in any future revisions of the EPRR core standards. The Trust will ensure our EPRR policies are updated in line with these standards, reinforcing our abilities to manage climate impacts and protect the continuity of patient care across our services.

Local authorities

The Trust is working closely with local councils surrounding Southwark, Lambeth, Kensington and Chelsea and Hillingdon, to enhance climate adaptation efforts and address specific community needs. We have identified key areas of collaboration below:

- Transport and access – To ensure continued access for patients, emergency response, and supply chain deliveries. The Trust will work with local councils and Transport for London (TfL) to influence future transport planning, with a particular focus on areas prone to surface flooding, ensuring that critical services remain accessible even during extreme weather events

- Local engagement – The Trust is committed to raising awareness in the community about climate risks and mitigation strategies. By aligning with councils' communication efforts, we aim to empower residents and businesses with the knowledge to adapt to climate impacts, reinforcing broader efforts in carbon reduction and sustainable development, greenspaces and sustainable drainage systems – collaborating to enhance green spaces across South East London
- Resilience - The Trust and local councils will work to increase resilience to flooding, improve local air quality, and provide areas of shading and respite for patients, residents and visitors
- Joint funding – The Trust and local councils will pursue funding initiatives that support mutual climate adaptation objectives, including projects aligned with the Trust's wider Green Travel Plan and sustainability strategy ambitions
- Planning policy – To embed climate resilience into our built environment, the Trust will work closely with council planning departments to ensure our capital projects meet or exceed their ambitions for new builds and refurbishments

Academic institutions

Kings College London, University College London and other institutions of higher education are key partners in the framework of knowledge build-up regarding climate change. Their research supports understanding climate change impacts on public health and care services, alongside potential adaptation measures.

Local stakeholders

Climate adaptation requires cooperation with various external stakeholders in urban spaces. In addition to South East London, residents, businesses, project developers, Transport for London, knowledge institutions, and interest groups can play a role in making the NHS climate resilient.

Governance and reporting

In line with the Trust's Green Plan, the Trust is committed to monitoring and periodically evaluating our climate adaptation policies. Key indicators are listed below, part of which are being annually monitored and reported for the sustainability section of the Trust's annual reporting.

Implementation of the Climate Change Adaptation Plan will be driven by the Sustainability team at the Trust alongside other key stakeholders both internally and externally.

National indicators on climate change and vulnerability

National Aeronautics and Space Administration (NASA) has developed a series of interactive maps and graphs to describe the global climate and how it has changed over time. They focus on 5 key climate indicators:

- Carbon dioxide concentration
- Global surface temperature
- Arctic sea ice
- Land ice
- Sea level

Climate Change Committee (CCC) provides independent assessments of carbon reduction efforts and climate adaptation readiness. The CCC provides insight into carbon reduction progress and conduct independent analysis into climate change science, economics and policy.

The Met Office UK Climate Projections (UKCP) can be used as a climate projection toolkit, which projects future UK climate scenarios.

Local indicators for the Climate Change Adaptation Plan

The following resources will support the ongoing review and identification of climate-related risks and impacts:

- Greater London Authority (GLA) Climate Risk Map: a series of London-wide climate risk maps showing climate exposure and vulnerability. These maps were produced to help the GLA, and other London-based organisations to deliver equitable responses to the impacts of climate change and target resources to support communities at highest risk. These will assist the review and identification of areas to target action.

- Climate vulnerability relates to people's exposure to climate impacts like flooding or heatwaves, but also to personal and social factors that affect their ability to cope with and respond to extreme events. High climate risk coincides with areas of income and health inequalities. A series of city-wide maps overlay key metrics to identify areas within London that are most exposed to climate impacts with high concentrations of vulnerable populations.
- Alongside our ICS partners, air quality monitors are to be installed across our sites to build a London network to monitor air pollution. Additionally, we will utilise the air pollution forecast provided by the Met Office to build a greater understanding of current and future levels that may impact population health and risks to service provision.
- The Environmental Public Health Surveillance System (EPHSS) is a particularly useful tool, used to collect and analyse data on a range of environmental risks, exposures, and health outcomes, ranging from acute environmental events, lead exposure in children, and meteorological variables.
- The Strategic Health Asset Planning and Evaluation (SHAPE) tool supports strategic planning for all healthcare services. Local organisations and health services use the tool to map local risks, to assess the best locations for services, and evaluate any impact of service configuration on population health. The SHAPE tool also informs the development of flood, emergency responses, and community plans. SHAPE Atlas provides mapping for a range of risk indicators across the UK split by NHS regions. This includes flood risk, particulate matter (PM) levels, air pollution vulnerability, open greenspace and other population indices.

Reporting and implementation

We will ensure alignment with national guidance that is to be released e.g. any new KPIs, reporting requirements from ERIC. Currently, the NHS monitors the number of overheating events that trigger a risk assessment via the Estates Record Information Collection (ERIC) returns, and it is expected that reporting requirements linked to climate change will expand.

As stated in the NHS' Third Health and Care Adaptation Report (2021), the CQC will identify sites that trigger risk assessments from overheating and include this in its national reporting. CQC could identify these events through Greener NHS data collection and include their consideration in future assessments. Where appropriate, their inspection outputs could recommend a review of the Trust's CCAP and action plan progress.

The Climate Adaptation Risk Assessment identifies the significant risks facing our four key areas (built infrastructure, clinical services, operational services, workforce and community) and sets out the adaptation actions required. The Trust has adapted the template to help identify the risks and mitigation measures which apply specifically to our infrastructure, services and people.

The implementation of the Climate Change Adaptation Plan will be monitored annually using appropriate KPIs developed by the CCAP Working Group.

Governance

Our Adaptation Lead will manage adaptation activities and ensure action plan outcomes are reported to the GPDB.

A CCAP Working Group, closely aligned with the GPDB, will be established, including the following roles:

- Adaptation Lead
- Sustainability Lead
- Infrastructure: Director of Capital, Estates and Facilities; Emergency Planning Managers; Travel and Logistics Manager
- Clinical Services: Respiratory Consultant; Director of Infection Prevention and Control (IPC)
- Operational Services: Director of ICT; Associate Chief Pharmacist; procurement team and sustainability lead
- Workforce and Community: Associate Director Workforce; Health and Wellbeing Manager; Local council climate change leads

The working group will review and report progress quarterly, with an annual update to the GPDB.

Changing structure

Essentia has outlined the Trust's strategic priorities, its own strategic priorities and the objectives that it aims to achieve to deliver on its vision and enhance the Trust's environmental performance (more detail can be found in Appendix E).

The recent restructuring within Essentia introduces a more streamlined hierarchy, consolidating roles and reducing the workforce in critical areas like project management and healthcare planning. This revised structure limits the number of healthcare planners and project management teams, which may impact the capacity for initiating and managing climate adaptation projects. There will also likely be an increased focus on prioritising high-impact adaptation measures, leading to a more agile framework for adaptation delivery. Cross-function teams will be expected to take on broader responsibilities.

However, the restructuring also presents opportunities for streamlining and teamwork collaboration prospects. While there will be fewer staff, individuals can work more closely together on the sustainability agenda and organise themselves efficiently to construct a plan to effectively implement recommended mitigation and adaptation measures.

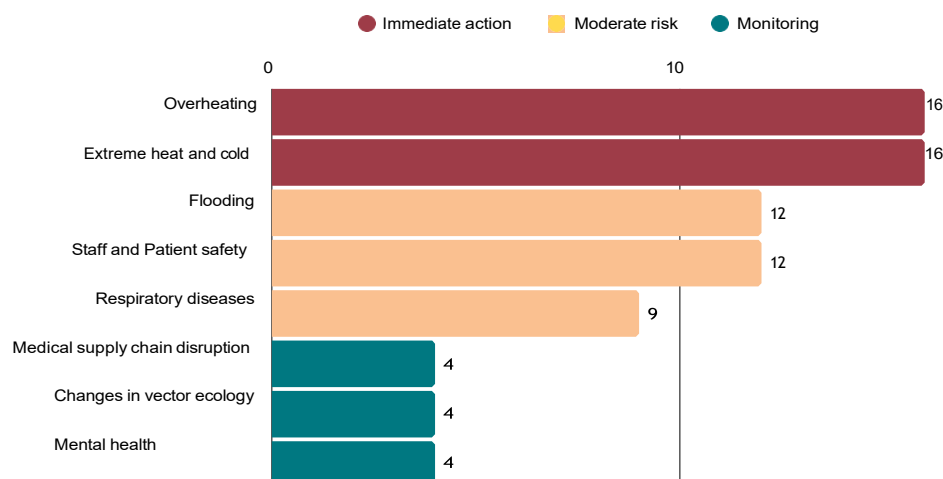
This change also presents an opportunity for external partnerships. The Trust can contract specialised roles to ensure that adaptation initiatives maintain momentum during the transition. Stakeholder interviews have highlighted that the Trust are already engaged in various public and private partnerships including the potential for a partnership with Team London Bridge which envisions utilising the River Thames as a heat source, alongside various green space initiatives.

While the above outlined partnerships allow the Trust to build relationships with external stakeholders, the Trust may be more dependent on utilising these partnerships as opposed to having well-resourced internal teams who can also implement infrastructural changes and energy efficient solutions. Effective climate adaptation will depend on maintaining a balance in the approach taken, with limited resources.

Action Plan Roadmap

The risks associated with climate change have been assessed to produce the likelihood and impact scores from the analysis of qualitative data collected from the Trust stakeholder interviews. An Action Plan has been created to guide next steps.

The likelihood and impact scores are prioritized below:



Climate Impact	Action	Purpose	Lead
General	Develop a Working Group Action Plan	Incorporate the actions identified into a Working Group Action Plan	Sustainability team
- Overheating - Flooding - Respiratory	Assess the climate impact of Demand and Capacity	Understand the impact of climate change on health, services and resources due to extreme weather events	Clinical/Sustainability team/Emergency Preparedness Team (EPRR)
- Overheating - Extreme heat and cold - Staff and patient safety - Medical supply disruption	Improve ventilation and temperature control	Improve air quality and reduce the impact of extreme heat and extreme cold on staff and patients. Protect medical supplies which need to be stored at certain temperatures	Estates & facilities/Pharmacy
- Overheating - Staff and patient safety	Digital transformation for care	Remote monitoring and virtual clinic options will minimise travel undertaken by staff to and between sites and support healthcare resilience	Clinical/DT&I
Flooding	Produce a flood resilience plan and contingency plan	Carry out a flood risk assessment that considers flood risk across all four sites based on the latest government data. This can be used to inform action plans for preventative and emergency response.	Estates & facilities /EPRR
Staff and patient safety	Integrate air quality monitoring into the clinical pathway	Use air quality data to alert clinicians to risks and to inform mitigation measures and healthcare planning	Clinical/ Sustainability team
Changes in vector ecology	Respond to emerging infectious disease risks	Develop action plan for infection and disease risks associated with changing vector ecology from climate change	Estates & facilities /Clinical Leads/ EPRR
Medical supply chain disruption	Invest in digital inventory to reduce waste	Climate impact on health will increase reliance on medical supplies. Digital inventory can manage supplies; map increasing use and reduce waste	Estates & facilities/DT&I/ Pharmacy
Mental health	Engage regional sustainability networks	Coordinate climate adaptation efforts, share knowledge, and drive collaborative action. Link in with the Trust's Climate Adaptation Working Group to align priorities and maximise impact across all partnerships	Sustainability team

Updates and next steps

This plan will be updated with new guidance from UK Health Security Agency, NHS England, and the Department of Health and Social Care.

The next step is to develop a working group action plan which incorporates the actions identified which need to be taken over the short to medium term to address the risks to demand and capacity due to climate change. The action plan will need to include KPIs to monitor progress and report against.

In addition, the projected demand and capacity of each hospital can be modelled to assess the impact of heat, flooding and air quality on the functioning of each of the four key sites, along with the climate impact on demand for each of these sites through measuring the number of events and the probability of these increasing in line with climate models.

Once demand and capacity has been projected, healthcare strategy and planning can be updated, incorporating future climate change impacts and fed into any estates and clinical strategies. It is important to remember that the Trust also operates from other sites beyond those identified within this plan and site-specific risks will require consideration.

Glossary

AD – Associate Director

BEIS – The Department for Business, Energy, and Industrial Strategy. A UK government department responsible for promoting action on climate change in the UK and internationally.

Carbon sink – A process, activity or mechanism that removes carbon from the atmosphere and stores it e.g. forests, oceans, and peatland.

Carbon source – A process, activity or mechanism that releases more carbon dioxide into the atmosphere than it absorbs e.g. burning coal.

CCAP – Climate Change Adaptation Plan

CCC - Climate Change Committee. Established as an independent, statutory body under the Climate Change Act 2008, the CCC report on progress made in reporting greenhouse gas emissions and advise the UK government on emissions targets.

CCRA - Climate Change Risk Assessment. Required under the Climate Change Act 2008, UK-wide Climate Change Risk Assessments are published every five years and assess the risks from current and predicted impacts of climate change.

CCRA3 – The UK's Third Climate Change Risk Assessment, the technical report of which was published in 2021. CCROA – Climate Change Risk and Opportunities Assessment.

CDC – Centre for Disease Control and Prevention.

Climate change – Long-term shifts in temperature and weather patterns that can occur naturally and as a consequence of human activities such as the burning of fossil fuels which release greenhouse gases.

Climate Change Act – A piece of UK legislation published in November 2008 which sets a target of reducing UK greenhouse gas emissions by 80 per cent by 2050 whilst also prompting the establishment of the Climate Change Committee and requiring a UK wide Climate Change Risk Assessment to be undertaken every five years. Since updated in 2019 to set the UK target at Net Zero by 2050.

Climate change adaptation –refers to the actions required to manage the effects of unavoidable expected climate change e.g. increasing frequency and severity of heatwaves.

Climate change mitigation – refers to actions to prevent or reduce greenhouse gas emissions to address the underlying causes of climate change.

CQC – Care Quality Commission. The independent regulator of all health and social care services in England.

Defra – The Department for Environment, Food and Rural Affairs. The UK Government Department leading domestic climate change adaptation.

Delivering a Net Zero National Health Service Report – A report published by the NHS in October 2020 which outlines the NHS' targets on climate change; notably including Net Zero from emissions directly controlled by 2040 and for the emissions the NHS can influence by 2045.

EPHSS – Environmental Public Health Surveillance System. A Public Health England surveillance project which approaches the systematic collection of data on environmental hazards, exposures and health outcomes.

EPRR – Emergency Preparedness, Resilience and Response. A programme of work within the health community to outline planned responses to emergencies which may affect health or patient care, including extreme weather events.

ERIC – Estates Record Information Collection. A mandatory, yearly data collection for all NHS Trust's on their estates.

Flooding – An event in which land that is typically dry, is inundated by water. Can be triggered through multiple different mechanisms: Coastal – inundation by seawater, for example because of a storm surge. Fluvial – where the volume of water in a river or stream exceeds its normal channel. Surface – where the capacity of drainage systems is exceeded, creating localised flooding.

GLA – The Greater London Authority, also known as City Hall, operate as the democratically elected governance body for Greater London.

GPDB – Green Plan Delivery Board. The committee responsible for overseeing the delivery of the Trust's Green Plan.

Green Plan – A document that NHS Trusts are required to produce in line with the 2021/22 NHS Standard Contract. It outlines an individual Trust's approach to reducing their emissions in line with national trajectories.

Greenhouse gases – Specific atmospheric gases including carbon dioxide that regulate the Earth's atmospheric conditions by trapping heat radiating from the earth's surface.

IPCC – Intergovernmental Panel on Climate Change. An intergovernmental body of the United Nations that is responsible for assessing the science relating to climate change.

NAP – National Adaptation Programme. A document produced by Defra every five years as required by the Climate Change Act 2008. It communicates the extent, nature and immediacy of different climate risks and the actions that the UK government intends to do to address them.

Net Zero – Refers to a state in which an overall balance is achieved between the greenhouse gas emissions entering the atmosphere e.g. from burning fossil fuels and those which are removed e.g. through restoring natural carbon sinks.

NHS – National Health Service

NHS Long Term Plan – This document was published in January 2019 and outlines the long-term ambitions of the NHS regarding sustainable operations through several measures including increasing digitalisation of NHS services.

NHS Third Health Care and Adaptation Report – This document was published in December 2021 and summarises the current and future effects of climate change on the health and social care sector and outlines steps to adapt and so manage these risks.

ONS – Office for National Statistics

Paris Agreement – A legally binding international treaty on climate change, adopted by 196 countries in 2015. It outlines an agreed upon goal to limit warming to well below 2, preferably to 1.5 degrees Celsius compared to preindustrial levels.

PFI – Private finance initiative

SDGs – Sustainable Development Goals. A series of 17 goals for 2030 developed by the United Nations and adopted in 2015 which call for global action to achieve progress against several key areas e.g. on poverty, education, inequality and climate action.

SEL ICS – The South East London Integrated Care System. A partnership between the numerous organisations that meet health and care needs across the South East of London which aims to coordinate services to improve population health and reduce inequality.

SHAPE – Strategic Health Asset Planning and Evaluation. A web enabled, evidence-based Geographic Information System tool which can be used to inform and support the strategic planning of services and assets.

TfL – Transport for London. The integrated transport authority responsible for managing London's strategy on public transport in addition to its roads.

The Trust – Guy's & St Thomas' NHS Foundation Trust.

UKCP – The UK Climate Projections. A climate analysis tool supported by BEIS and Defra that provides assessments of how the UK climate may change in the future.

UKCP18 – The latest generation of national climate change projections for the United Kingdom, originally published in 2018 and consequently updated in 2019 and 2021.

UV – Ultraviolet. A form of non-ionizing radiation emitted by the sun and artificial sources, such as tanning beds. UVI – Ultraviolet index which measures the intensity of UV exposure at any one time and location.

WHO – The World Health Organization. A specialised United Nations Agency who are responsible for international public health.

Appendix A – The Climate Challenge for the Trust

The destabilisation of the Earth's climate systems, triggered by certain human activities and which gathered momentum during the Industrial Revolution, has caused instability and unprecedented change. This poses a significant threat to society, resulting in a global climate emergency. Due to climate complexities, the intensity and implications of climate change vary spatially. However, the Climate Change Committee confirmed that in 2023 global average temperatures exceeded 1.5°C above pre-industrial levels for most of the year, passing the threshold set by the Paris Agreement. 2024 was the first year to officially breach the 1.5°C threshold.

Whilst the Earth has previously experienced changes in climate, the magnitude at which change is currently occurring exceeds changes typically caused by natural variations such as cycles in the Earth's orbit and variations in the solar output of the sun. Responding to such changes therefore requires both climate change adaptation and mitigation. Climate change adaptation refers to adjustments in ecological, social or economic systems as a response to actual or expected climatic stimuli and their implications. More specifically, the term means a change in processes, practices and structures to mitigate against potential impacts or to benefit from opportunities linked to climate change (UNFCCC, 2024). Contrastingly, climate change mitigation means reducing the flow of heat-trapping greenhouse gases into the atmosphere which involves efforts being made to generally enhance carbon sinks (for example peat restoration or forestation) or reducing carbon sources (for example reducing the burning of fossil fuels).

Mitigation and adaptation should be implemented simultaneously, as mitigation addresses the root cause of climate change, whereas adaptation addresses the effects climate change has on society. While successful mitigation actions should reduce the extent to which adaptation is required, observed warming already requires reaction whilst further shifts in climatic conditions are inevitable because of lag times in climatic processes. Consequently, the need for effective climate change adaptation is clear; to decrease the vulnerability of communities and the broader global population to climatic hazards. The Trust's commitment to Net Zero by 2040 works toward climate change mitigation. However, our climate is already changing, and adaptation measures must also be taken to prevent the Trust from being affected by the climate impacts we are already experiencing. Regardless of our effectiveness in curbing greenhouse gas emissions, the need to adapt to climate change remains imperative. This is because the effects of previous emissions have already altered the climate systems and will lead to changes in our climate for many decades to come.

This plan will assess the implications of climate change on the ability of the Trust to provide healthcare services to our community. It will identify factors, such as flooding and heatwaves, which cause risks to the functioning of the Trust facilities. This document can be used to inform the development of an action plan, in which adaptive measures can be implemented to avoid the identified risks, improving our resilience to climate related events.

Through this plan, we will outline the challenges the Trust faces in the short and medium term as a result of changes we expect in the future climate. We will also outline the next steps following on from this climate adaptation plan which can be noted in the recommendations section and how this document can be used effectively in the future once delivery of the plan commences.

Appendix B – The global climate emergency

Climate change is the long-term changes in temperature and weather patterns that form our climate. Research shows a clear relationship between increasing concentrations of greenhouse gases, such as CO₂, in the atmosphere and the rising temperatures experienced on Earth (IPCC, 2014), with global surface temperatures reaching 1.1 degrees Celsius above 1850-1900 in 2011-2020 (IPCC, 2023). This temperature shift and CO₂ increase have been associated with human activities, most notably burning fossil fuels, which started during the Industrial Revolution. Global greenhouse gas emissions have continued to increase as humans engage in unsustainable practices including fossil fuel energy use, land use change, growing lifestyle patterns of consumption and production regionally, nationally and at the individual level (IPCC, 2023). Burning fossil fuels releases greenhouse gases into the atmosphere, trapping the sun's energy that would usually be released and so causes a temperature increase longer term. The impacts of this are clearly shown in the figure below, as there is a steep increase in both



Figure 7: A graph to show changing CO₂ concentrations and temperature from 1000AD onwards (Ref: CO₂ Levels.org)

CO₂ emissions and temperature following 1850.

Fluctuations in weather patterns and temperature are normal over short periods of time. However, changes that span decades to centuries are uncommon. Due to the complex nature of Earth's regulatory systems, a shift in temperature can cause a knock-on effect resulting in an unpredictable rate and magnitude of change. Each increase in global warming will intensify multiple and simultaneous hazards (IPCC, 2023). This unpredictable climate constitutes a global climate emergency and adaptation is required to minimise the risks to society.

Climate change causes several concerns for the healthcare sector, with risks to human health and impacting the ability to access healthcare services. These risks include potential changes in exposure to various vectors of disease, the direct impacts of increasing temperatures and air pollution on health, and both the physical and mental effects of extreme weather events. Additionally, risks to key infrastructure including access to water and energy at local, national, and international scales each have the potential to disrupt the ability of healthcare providers, including the ability of the Trust to maintain the services that we provide.

Appendix C – Our local changing climate

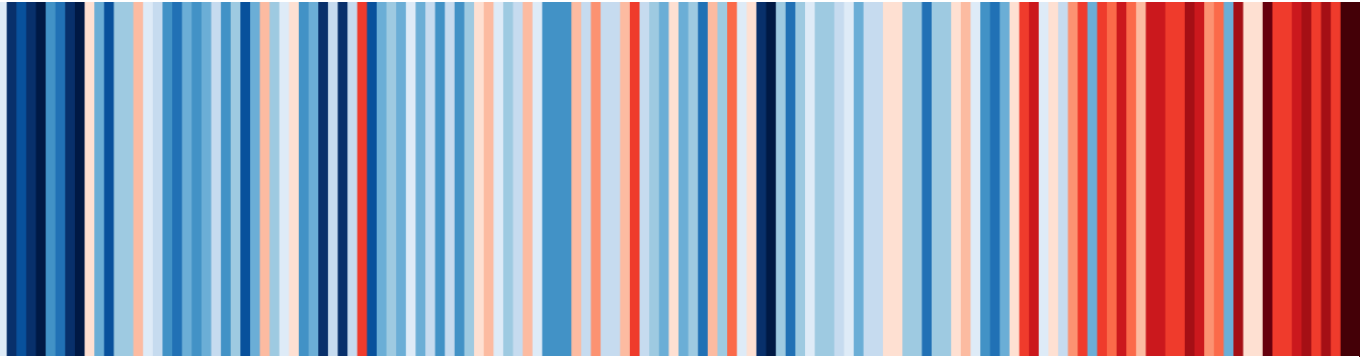


Figure 8: Climate Stripes of England – 1884-2023 (Ref: Hawkins, 2024)

England has been experiencing the impacts of anthropogenic changing climate for many years, with temperatures consistently measuring warmer than the average across the latter part of the 20th century. The Climate Stripes, shown in Figure 8, demonstrate the increasing temperature in England with each stripe representing the temperature average over a year. With England's hottest day reaching 40.3°C in 2022, the highest temperature on record. Temperatures in London have not yet reached the national record high however, this is likely to change under the future warming scenarios outlined in Figure 9 below.

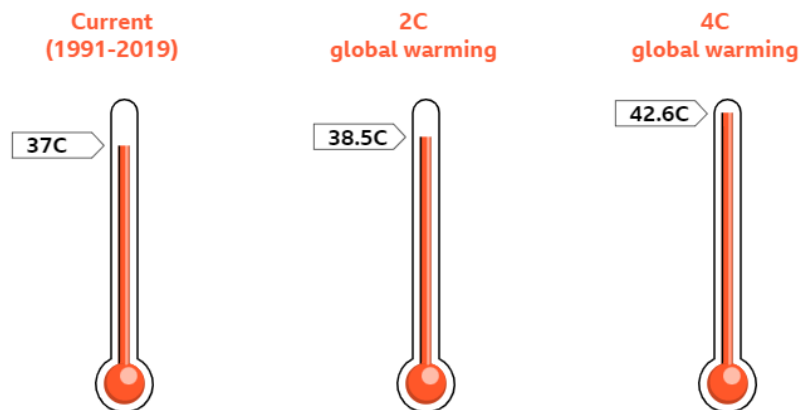


Figure 9: Projections of temperature at St Thomas' Hospital under contrasting climate change scenarios (Ref: Dale and Stylianou, 2021)

The UK recorded the second warmest year on record since 1884 in 2023, one of the ten warmest years, which have all occurred since 2003. Last year also saw the highest concentrations of carbon dioxide in our atmosphere in the last 2 million years (Met Office, 2024). Furthermore, in London, mean temperatures increased by around 1.9°C (JCSC, 2019) and according to the government's latest UK climate change projections, by the 2050s London could expect an increase in mean summer temperature of 2.7 degrees (London Government, 2024).



Between 1961 and 2020 the average temperature in the UK has increased by 0.8°C, rainfall by 7.3% and sunshine by 5.6% (Met Office, 2021). The UK saw some of the most extreme weather in 2022, with Storm Eunice being the most severe storm in 4 years. The same year the UK reached a new all-time temperature high of 40°C (Kendon et. al, 2023). Global temperatures were abnormally high in 2023/24 with the 2023 annual average reaching 1.5 degrees Celsius above pre-industrial levels (Cattiaux et al, 2024). This was followed by heavy rainfall during September 2024 in central and southern England with many places predicted to have received between 60mm and 80mm of rain, with up to 120mm in some areas (Murray, 2024).



The outlined trends, patterns and correlations come with severe hazards. Three heatwave periods during the summer of 2020 resulted in more than 2,500 excess deaths across England (Public Health England, 2020). More recently, Storm Henk in January 2024 resulted in heavy winds and flooding across the UK, issuing almost 300 flood warnings and causing power outages and transport disruption. Some places experienced extremely high wind gusts such as 94mph at Needles Old Battery in the Isle of Wight and 81mph at Exeter Airport (Met Office, 2024).

UK Climate Change Projections

Due to the nature of the inherently interlinked relationship between some anthropogenic activities and climate change, the future climate change projections within the UK show variability in proportion to their forecasted timescales. The UK Climate change Projections (UKCP18) use feasible emissions pathways as well as peer reviewed data from Met Office Climate Models to predict the future climate and its conditions across the UK.

Figure 10 outlines the headline findings of this research which clearly highlight that the impacts of climate change will increasingly differ spatially across the UK. It is also apparent that the magnitude of climate change will largely depend on the extent to which climate change mitigation measures are able to achieve a reduction in greenhouse gas emissions.

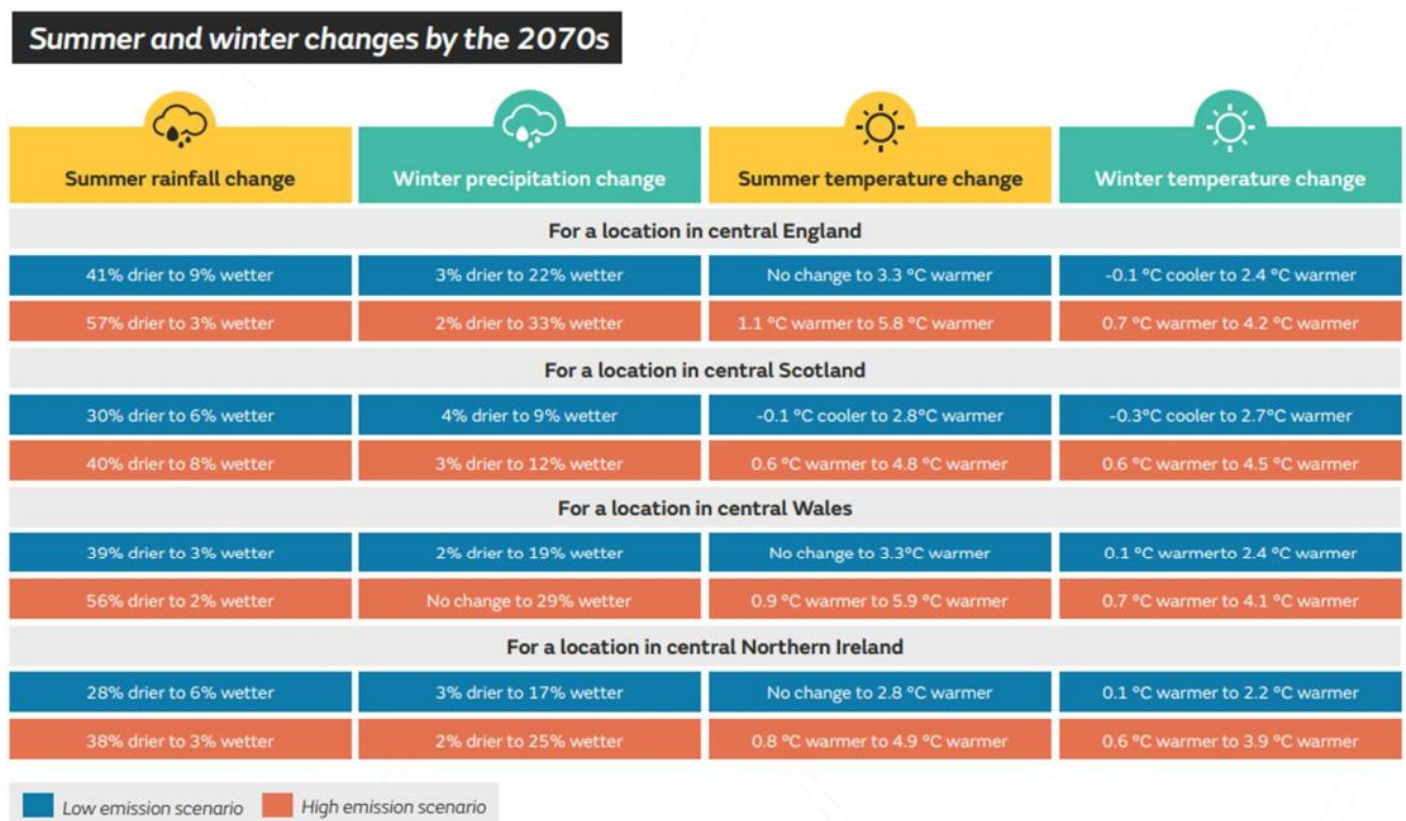


Figure 10. Headline findings for the projected impacts of climate change across the United Kingdom (Ref: The Met Office, 2021a)

From the figure above, it is clear that across the UK, temperatures are generally expected to increase resulting in a higher frequency of hotter summers. This is likely to manifest in a dryer summer though accompanied by more intense heavy summer rainfall events. Consequently, it is crucial that our Climate Change Adaptation Plan recognises the broad range of possible climate risks and implications to ensure that the Trust take the necessary steps to minimise potential impacts.

Appendix D – Sustainable Development Goals

Four key focus areas have been identified for the Climate Change Adaptation Plan which can be seen below. The figure also includes the outcomes and Sustainable Development Goals (SDGs) we aim to contribute towards. Highlighting the United Nations SDG's, the NHS' Third Health and Care Adaptation Report and our Green Plan, we aim to promote a comprehensive plan that can be integrated into policy and service delivery that considers the Trust's requirements and those of our wider community.

Built infrastructure also includes Royal Brompton Hospital and Harefield Hospital which were added to the scope of the CCAP at a later stage to be assessed.

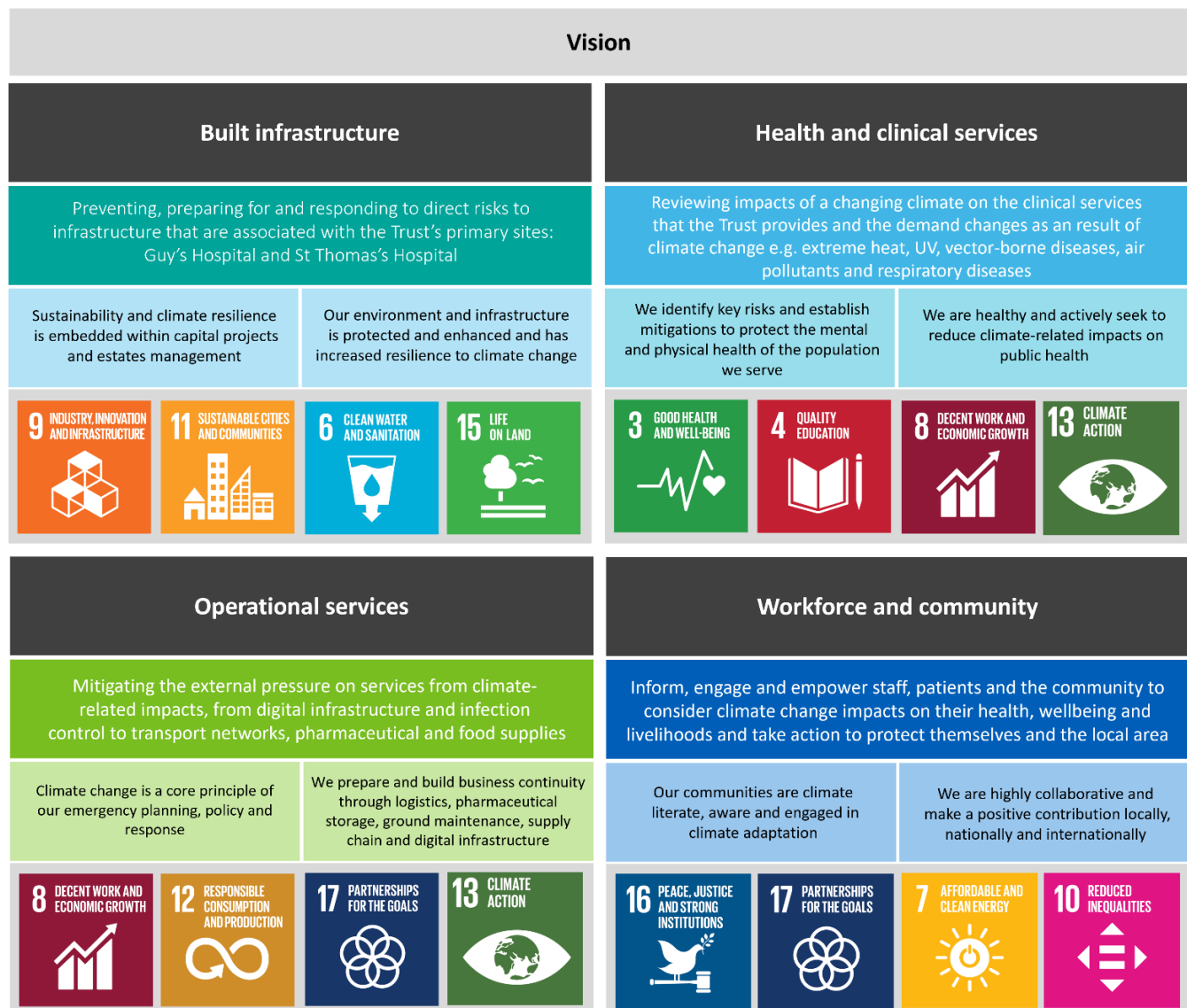


Figure 11.

Appendix E – New Essentia Strategy

Essentia strategy on a page

Trust's strategic priorities	Essentia's strategic priorities	Essentia's strategic objectives
Delivering healthcare excellence	Safety, Quality & Efficiency	Strengthen culture of safety, assurance and quality Support the delivery of clinical group priorities, objectives and strategies Make the case for investment in our estate & infrastructure, delivering estate projects to time & budget
Improving the health of our populations	Generate social & economic value for our communities	Continue to strengthen relationships across ICS Form new partnerships (public/private with aligned values) to support delivery of strategic priorities Continue to drive positive social and economic value for our local communities
Valuing all our people	Invest in the growth of our people	Continue to invest in the growth of our people through the People and Essentia Academy strategies Develop succession plans to manage risks associated with an aging workforce / supply of skilled labour Alignment of FM service delivery models across all sites – ensuring equity and equality
Innovating for a better future	Implement the Essentia Digital Strategy	Develop and implement the Essentia digital strategy – embracing digital FM solutions Identify innovative solutions to consolidate/rationalise space/services to free up space on acute sites Promote innovative procurement and commercial partnerships
Modernising our infrastructure	Estate resilience, reliability & development	Improve the resilience, reliability, utilisation and experience of our buildings Continue to make progress towards net zero carbon objectives Support the development of our estate and facilities to support clinical group strategies and priorities

Figure 12.

References

1. **ARUP** (2022). Climate Change Resilience Assessment, Guy's and St. Thomas' NHS Foundation Trust.
2. **Bernhard, G.H., Neale, R.E., Barnes, P.W., et al.** (2020). Environmental effects of stratospheric ozone depletion, UV radiation and interactions with climate change: UNEP Environmental Effects Assessment Panel, update 2019. *Photochemical & Photobiological Sciences*, 19, pp. 542-584.
3. **Caminade, C., McIntyre, K.M., Jones, A.E.** (2019). Impact of recent and future climate change on vector-borne diseases. *Annals of the New York Academy of Sciences*, 1436, pp. 157-173.
4. **Cattiaux, J., Ribes, A., and Cariou, E.** (2024). How Extreme Were Daily Global Temperatures in 2023 and Early 2024? *Geophysical Research Letters*, 51(19), p.e 2024GL110531, pp. 1-9.
5. **Climate Central.** [Online]. Available at: Climate Central | Land projected to be below annual flood level in 2050. (Accessed 26/07/24).
6. **Climate Change Committee** (2022). UK Climate Change Risk Assessment 2022. [Online]. Available at: Climate Change Committee (theccc.org.uk). (Accessed 25/10/24)
7. **Dale, B., Stylianou, N.** (2021). What will climate change look like near me? [Online]. *BBC News*. Available at: What will climate change look like in your area? - BBC News. (Accessed 29/07/24).
8. **Demain, J.G.** (2018). Climate Change and the Impact on Respiratory and Allergic Disease: 2018. *Current Allergy and Asthma Reports*, 18(22).
9. **Ebi, K.L., Capon, A., Berry, P., et al.** (2021b). Hot weather and heat extremes: health risks. *The Lancet*, 398 (10301), pp. 698-708.
10. **Guy's and St Thomas'** (2023). REVIEW OF THE GUY'S AND ST THOMAS' IT CRITICAL INCIDENT FINAL REPORT FROM THE DEPUTY CHIEF EXECUTIVE OFFICER JANUARY 2023. [Online]. Available at: Guys and St Thomas NHS UK (guysandstthomas.nhs.uk) – critical-incident-review. (Accessed 19/12/2024).
11. **Hawkins, E.** (2024). #Show your stripes, Europe, United Kingdom, England. *Institute for Environmental Analytics*. [Online]. Available at: #ShowYourStripes. (Accessed 26/07/24).
12. **HM Government.** (2022). UK Climate Change Risk Assessment 2022. [Online]. Available at: UK Climate Change Risk Assessment 2022 (publishing.service.gov.uk). (Accessed 28/07/24).
13. **IPCC.** (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. *IPCC*, Geneva, Switzerland, 151 pp.
14. **IPCC** (2022). Sixth Assessment Report — IPCC. [Online]. Available at: Sixth Assessment Report (ipcc.ch). (Accessed 18/10/2024).
15. **IPCC** (2023). AR6 Synthesis Report, Headline Statements. [Online]. Available at: AR6 Synthesis Report: Summary for Policymakers Headline Statements (ipcc.ch). (Accessed 18/10/24).
16. **JCSC.** (2019). Climate Change Risks for London: A Review of Evidence Under 1.5°C and Different Warming Scenarios. *Jones Climate Sustainability Consulting*. [Online]. Available at: Marshall Inc. (london.gov.uk). (Accessed 31/07/24).

17. **Kendon, M., McCarthy, M., et al.** (2023). State of the UK Climate 2022. *International Journal of Climatology*, 43(S1), 1–82.
18. **Landeg, O., Whitman, G., et al.** (2019). Coastal flooding and frontline health care services: challenges for flood risk resilience in the English health care system. *Journal of Health Services Research and Policy*, 24(4), pp. 219-228.
19. **London Climate Risk Maps.** [Online]. Available at: London Climate Risk Maps (arcgis.com). (Accessed 26/07/24).
20. **London Government.** (2024). Context and Strategy, A changing climate. [Online]. Available at: A changing climate | London City Hall. (Accessed 18/10/24).
21. **Medlock, J.M., Leach, S.A.** (2015). Effect of climate change on vector-borne disease risk in the UK. *The Lancet Infectious Diseases*, 15(6), pp. 721-730.
22. **Met Office.** (2021). Charting the UK's Changing Climate. [Online]. Available at: Charting the UK's changing climate - Met Office. (Accessed 31/07/24).
23. **Met Office.** (2021b). UK Climate Projections: Headline Findings July 2021. [Online]. Available at: ukcp18_headline_findings_v3.pdf (metoffice.gov.uk). (Accessed 26/07/24).
24. **Met Office.** (2024). 2023 was second warmest year on record for UK. [Online]. Available at: 2023 was second warmest year on record for UK - Met Office. (Accessed 31/07/24).
25. **Met Office.** (2024). Storm Henk, 2 January 2024. [Online]. Available at: Microsoft Word - 2024_01_storm_henk_v1.docx. (Accessed 18/10/2024).
26. **Mikellidou, C.V., Shakou, L.M., et al.** (2018). Energy critical infrastructure at risk from climate change: A state of the art review. *Safety Science*, 110, pp. 110-120.
27. **Molotoks, A., Smith, P., Dawson, T.P.** (2021). Impacts of land use, population, and climate change on global food security. *Food and Energy Security*, 10(1).
28. **Murray, J.** (2024). Flooding causes chaos after month's rain falls in a day in parts of England. *The Guardian*. [Online]. Available at: Flooding causes chaos after month's rain falls in a day in parts of England | UK weather | The Guardian. (Accessed 18/10/2024).
29. **NHS.** (2021b). Third Health and Care Adaptation Report. *National Health Service*. [Online]. Available at: NHS-third-health-and-care-adaptation-report-2021.pdf (england.nhs.uk). (Accessed 29/07/24).
30. **NHS Digital.** (2022). Under 75 mortality from respiratory disease. [Online]. Available at: 1.6 Under 75 mortality from respiratory disease - NHS Digital. (Accessed 18/03/22).
31. **NHS England.** (2024). Respiratory Disease. [Online]. Available at: NHS England » Respiratory disease. (Accessed 30/07/2024).
32. **Rocklöv, J., Dubrow, R.** (2020). Climate change: an enduring challenge for vector-borne disease prevention and control. *Nature Immunology*, 21, pp. 479-483.
33. **Shape Place Atlas.** [Online]. Available at: SHAPE - Shape (shapeatlas.net). (Accessed 26/07/24).
34. **Sustainability West Midlands.** (2021). Evidence for the third UK Climate Change Risk Assessment (CCRA3), Summary for England. [Online]. Available at: CCRA-Evidence-Report-England-Summary-Final.pdf (ukclimaterisk.org). (Accessed 10/03/22).

35. **The Environment Agency.** (2020). Meeting our future water needs: a national framework for water resources. [Online]. Available at: Meeting our future water needs (publishing.service.gov.uk). (Accessed 29/07/24).
36. **The Environment Agency.** (2024). Meeting our Water Needs for the Next 25 Years. [Online]. Available at: Meeting our Water Needs for the Next 25 Years (blog.gov.uk). (Accessed 29/07/24).
37. **Third National Adaptation Programme (NAP3).** (2023). Department for Environment, Food & Rural Affairs. [Online]. Available at: Understanding climate adaptation and the third National Adaptation Programme (NAP3) - GOV.UK.
38. **UK HSA.** (2023). Health Effects of Climate Change in the UK: State of the Evidence 2023. *HM Gov.* (publishing.service.gov.uk).
39. **UK HSA.** (2024). Heat Mortality Monitoring Report: 2023. [Online]. Available at: Heat mortality monitoring report: 2023 - GOV.UK (www.gov.uk). (Accessed 20/07/2024).
40. **UK HSA.** (2024). Adverse Weather and Health Plan: Supporting Evidence. *HM Gov.* [Online]. Available at: Adverse Weather and Health Plan: Supporting evidence.