

GM Climate Change Adaptation Plan

2026 – 2031

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Executive Summary

The Greater Manchester (GM) Climate Change Adaptation Plan (CCAP) (2026-2031) sets out a system-wide approach to building the resilience of the healthcare system to the unavoidable impacts of climate change. National evidence published in May 2026 (A Well-Adapted UK, the Fourth Independent Assessment of UK Climate Risk), indicates that current levels of adaptation are insufficient to address the scale of climate risk, reinforcing the need for urgent action.

Climate change adaptation is a statutory requirement for the healthcare sector under the Climate Change Act 2008 and the Health and Care Act 2022 and forms a core component of National Health Service (NHS) Green Plans, which incorporate actions to reduce carbon emissions to limit future climate change as well as adapting to the impacts of climate change that are already locked in. The Climate Change Committee's (2025/26) 'A Well-Adapted UK' report identifies significant gaps in delivery across infrastructure and health.

This plan builds on the summary content in the NHS GM and Trust Green Plans and outlines the healthcare sectors contribution to national and Greater Manchester Combined Authority (GMCA) 5 Year Environment Plan climate change adaptation priorities. It will support delivery of the GM Climate Adaptation Strategy, which is currently in development.

The plan provides an evidence base and prioritises actions to build climate resilience across the GM healthcare system. It identifies risks and opportunities from the GM Climate Change Risk Assessment where the healthcare system needs to take action to respond, setting out measures to protect population health, maintain service continuity and strengthen resilience. National evidence identifies health systems and infrastructure as among highest residual climate risks.

Actions cover six categories:

- clinical services,
- estates,
- supply chain,
- supporting infrastructure,
- engagement and awareness,
- governance and finance.

For each action, the part of the healthcare system responsible for delivery is indicated. Climate change adaptation is an integrated agenda, with action required at all levels from globally through to locally.

Investment will be required to deliver against some of the action plan, and there will be opportunities to integrate physical measures into estate redevelopment and refurbishment, as well as considering climate change impacts and opportunities within clinical pathway redesign. Failure to adapt will result in significant financial and social costs, estimated at 2.5% of GM's GDP by the 2050's under current policies. Proactive adaptation, particularly when delivered alongside mitigating measures, will reduce associated financial and social costs, as well as reduce associated health inequalities and improve service resilience.

1. Introduction

Defined by the Met Office as a large-scale, long-term shift in global weather patterns, climate change presents a fundamental threat to human health, acting as a “threat multiplier” through the disruption of physical environments and socio-economic conditions.

Since the mid-1800’s, industrialisation has driven the release of carbon dioxide and other greenhouse gases, causing sustained warming and more frequent, severe weather events. These changes have direct and indirect health impacts, including risk of harm or death, risk of spread of infectious diseases and noncommunicable diseases.

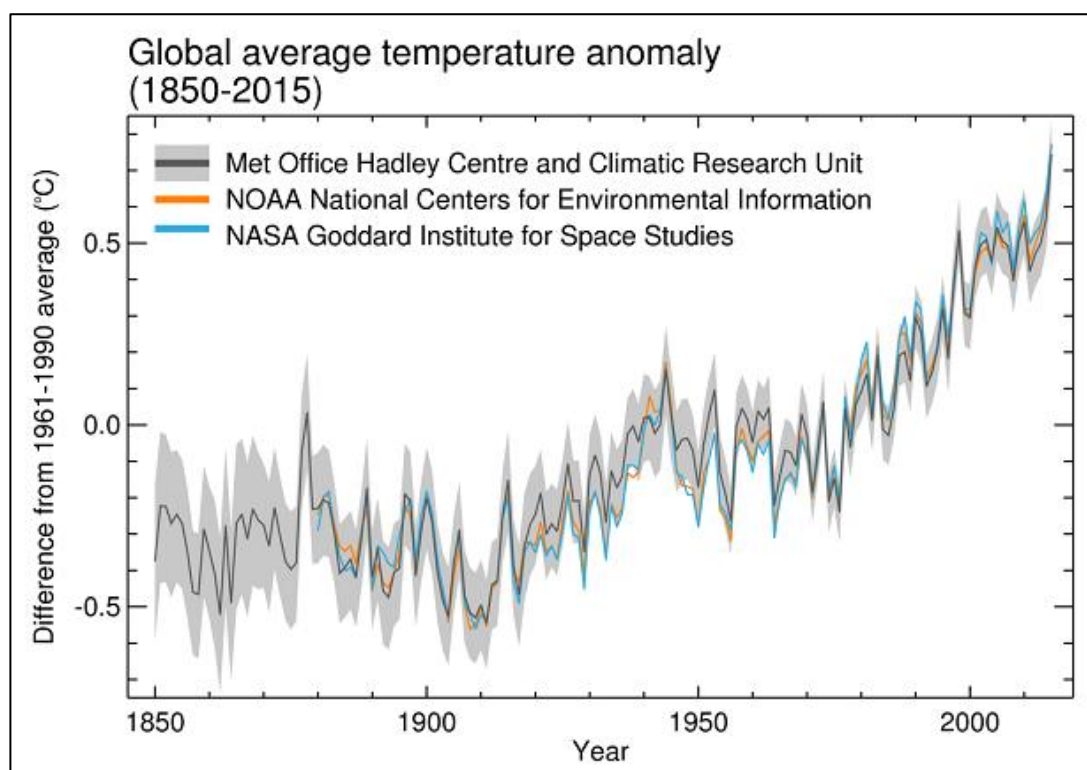


Figure 1: Global average temperature anomaly (1850- 2015). Source: [Global-average temperature records - Met Office](#)

Greater Manchester is already experiencing climate-related change, including extreme temperatures, flooding, wildfires, and disruptions to medicine supply chains.

In summer 2022, the UK recorded its first temperature above 40°C (37°C in GM), triggering the first ever red warning for extreme heat. Heavy rainstorms increasingly threaten safety and disrupt transport, homes, and businesses. On New Year’s Day 2025, significant flooding across multiple localities occurred.

These effects are unevenly distributed, with the most vulnerable and disadvantaged groups bearing the greatest burden. This includes ill health, displacement, loss of essential services, and damage to personal property and belongings.

1.1. Climate Adaptation

Climate adaptation encompasses proactive measures to manage the unavoidable impacts of climate change, while mitigation focuses on reducing the emissions that drive it.¹ Unlike emergency planning, adaptation seeks to prevent crises and lessen their consequences.

In health and social care, adaptation is essential to address the impacts of climate change on both the system and population health. This strengthens resilience, maintains quality care, and supports the implementation of strategies that reduce climate-related mortality and morbidity.

1.2. Why is Adaptation Necessary?

Adaptation is essential because climate change impacts are already unavoidable and escalating. 2024 marked the first-year where global warming exceeded 1.5°C, making it the hottest year on record.² Rising temperatures drive more frequent and severe weather extremes, and even with strong mitigation, significant impacts will persist affecting population health and wellbeing.³

Climate change attribution science links recent Greater Manchester⁴ events, such as the 2025 New Year's Day floods, July 2022 extreme heatwave, and 2015 Boxing Day floods to climate change.⁵ Failure to adapt will result in major economic and social costs.⁶ The London School of Economics estimates annual climate-related costs for GM at 2.5% of Gross Domestic Product (GDP) by 2050s under current policies, or 1.7% of GDP with stronger mitigation.⁷ Proactive adaptation delivers substantial economic and health benefits by reducing these unavoidable risks.⁸

1.3. Climate Resilient Health Systems

Climate resilient health systems are those able to anticipate, respond to, recover from, and adapt to climate-related shocks and stresses. The World Health Organisation (WHO) report, *Measuring the Climate Resilience of Health Systems*,⁹ calls on health leaders to proactively plan for climate risks.

The WHO Operational Framework for Building Climate Resilient Health Systems outlines 10 core health system functions for building climate resilience, structured around six building blocks of healthcare delivery.¹⁰

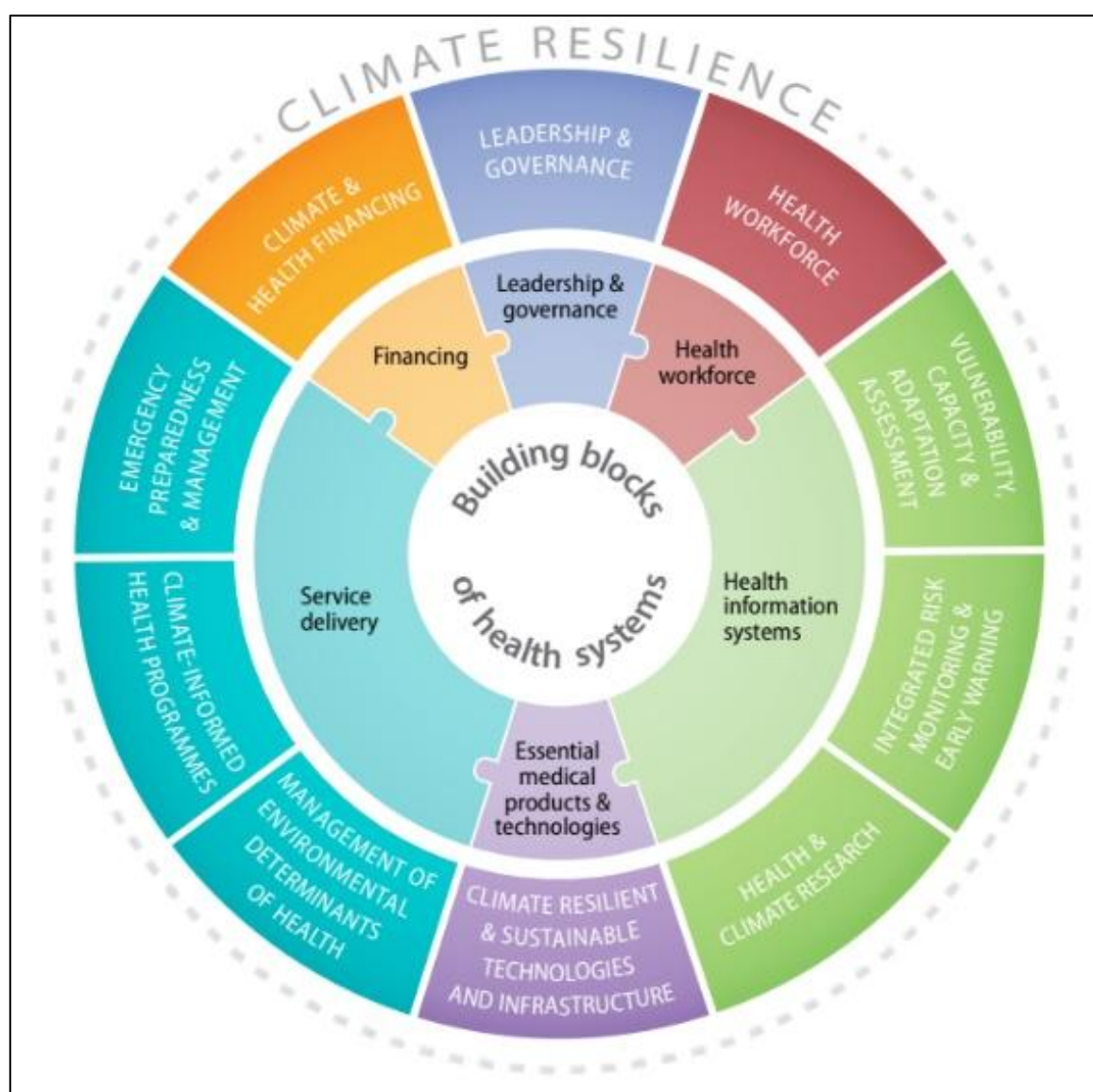


Figure 2: WHO Operational Framework for Building Climate Resilient Health Systems.

1.4. Purpose of the Climate Change Adaptation Plan

The plan provides an evidence base, priority actions, and adaptation measures to address identified climate change risks. Its aim is to help the GM healthcare system prepare, mitigate, and implement measures to cope with climate change. This detail underpins the high-level summary in the Green Plans.

1.5. Scope of the Climate Change Adaptation Plan

Adaptation cannot be viewed in isolation at a single organisation or sector; action is required at all levels – global, regional, GM-wide, locality, and neighbourhood. Collaboration across key stakeholders is essential to ensure a climate adapted health-system.

The plan covers actions required across the GM healthcare system, including NHS GM, Primary Care, and NHS Trusts. While some provider Trusts may develop standalone plans, the majority support a system-wide approach, with organisation specific appendices providing local context.

Key stakeholders include:

- Primary Care Networks
- NHS Property Services
- Community Health Partnerships
- GMCA
- Local Authorities
- NHS Provider Trusts
- Emergency Services
- NHS England/Department of Health and Social Care
- Suppliers
- Transport for Greater Manchester (TfGM)

A full list of system stakeholders is available in Appendix 5.

2. Legislative and Policy Drivers

A detailed summary of legislative and policy drivers is available in Appendix 2.

2.1. International

The UK adopted the Paris Agreement (COP 21, 2015) which mandates limiting global warming to well below 2°C and ideally 1.5°C above pre-industrial levels.¹¹

This aligns with the United Nations (UN) Sustainable Development Goals (SDGs):

- SDG3 (Health): build health system resilience and mitigate climate-related health impacts.¹²
- SDG13 (Climate Action): strengthen adaptive capacity and knowledge to address climate hazards.¹³
- SDG11 (Sustainable Cities): enhance urban resilience against natural disasters.¹⁴



Figure 3: UN Sustainable Development Goals.

2.2. National

The United Kingdom (UK) Climate Change Act 2008¹⁵ provides the legal framework for emissions reduction and climate adaptation, committing the UK to net zero carbon emissions and establishing the UK Climate Change Risk Assessment (CCRA) and the UK National Adaptation Programme (NAP). Development of policies regarding climate risks and opportunities is advised by the Climate Change Committee (CCC).

A Well-Adapted UK, and the UK's fourth CCRA were published by the CCC in May 2026, providing an independent assessment of UK adaptation progress and identifying significant gaps across infrastructure, health and governance.

Under the Health and Care Act 2022¹⁶, NHS commissioners and providers must:

- Comply with the UK net zero emissions target and environmental targets under the Environment Act 2021,
- Adapt to current or predicted impacts of climate change.

NHS Trusts and Integrated Care Boards (ICBs) are required to produce a Green Plan. Statutory Green Plan guidance¹⁷ requires a chapter on adaptation.

The Care Quality Commission (CQC) Assessment Framework (2023)¹⁸ includes climate adaptation within its Safe Environments and Governance quality statements and can formally assess organisational preparedness as part of inspections.

The Government's third National Adaptation Programme (NAP3)¹⁹ requires the NHS to review and update its standards for facilities resilience planning by 2025, requires Trusts and ICBs to incorporate climate adaptation within their Green Plans by 2027 and for adaptation measures to be included in the NHS Standard Contract.

2.3. Greater Manchester

The NHS GM Green Plan (2025-2028)²⁰ aims to deliver a sustainable healthcare system by achieving a net zero carbon footprint and carbon footprint plus. This is supported by embedding climate adaptation, supporting nature-based health activities, and reducing air pollution. It aligns with the GMCA 5 Year Environment Plan, ensuring NHS GM contributes to regional priorities within the national NHS context.

The NHS GM Green Plan contains three high-level priority actions related to climate change:

1. Deliver a health-focused Climate Change Adaptation Plan, based on the GMCA Climate Change Risk Assessment.
2. Support Trusts to develop and deliver climate change adaptation action plans.
3. Promote staff training, awareness, and effective dissemination of weather health alerts.

The NHS GM Green Plan and Trust Green Plans complement each other, with the ICB focusing on 'do once' actions which are best led at system level and the Trust plans focusing on organisational and operational priorities. All plans are underpinned by a risk assessment framework integrating climate risks into broader governance.

The GM NHS Climate Change Adaptation Plan will support delivery of the GM Climate Adaptation Strategy, which is currently in development.

3. Understanding Climate Change

3.1. Climate Change in the UK

The UK is already experiencing climate change impacts, with noticeable shifts in climate and weather patterns. The 'warming stripe' graphic (Figure 4) illustrates rising annual temperatures, with the greatest number of hottest years occurring in the last decade.²¹

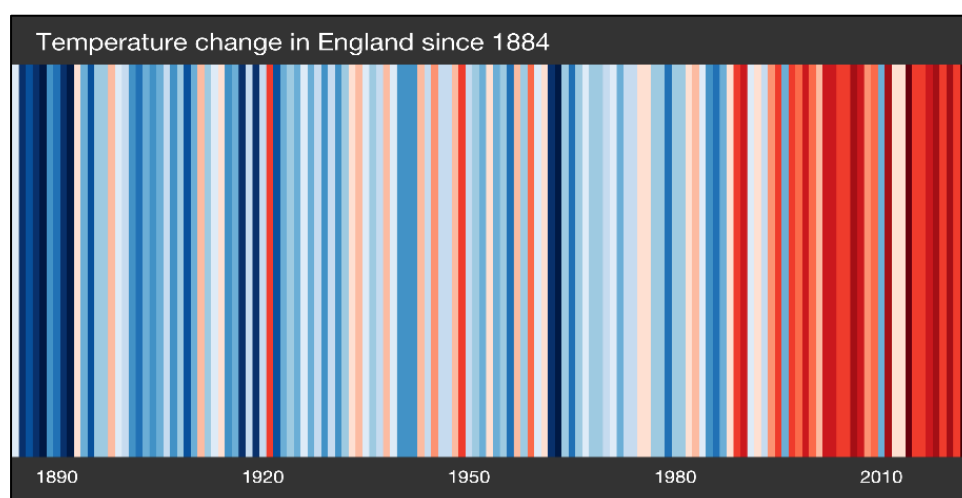
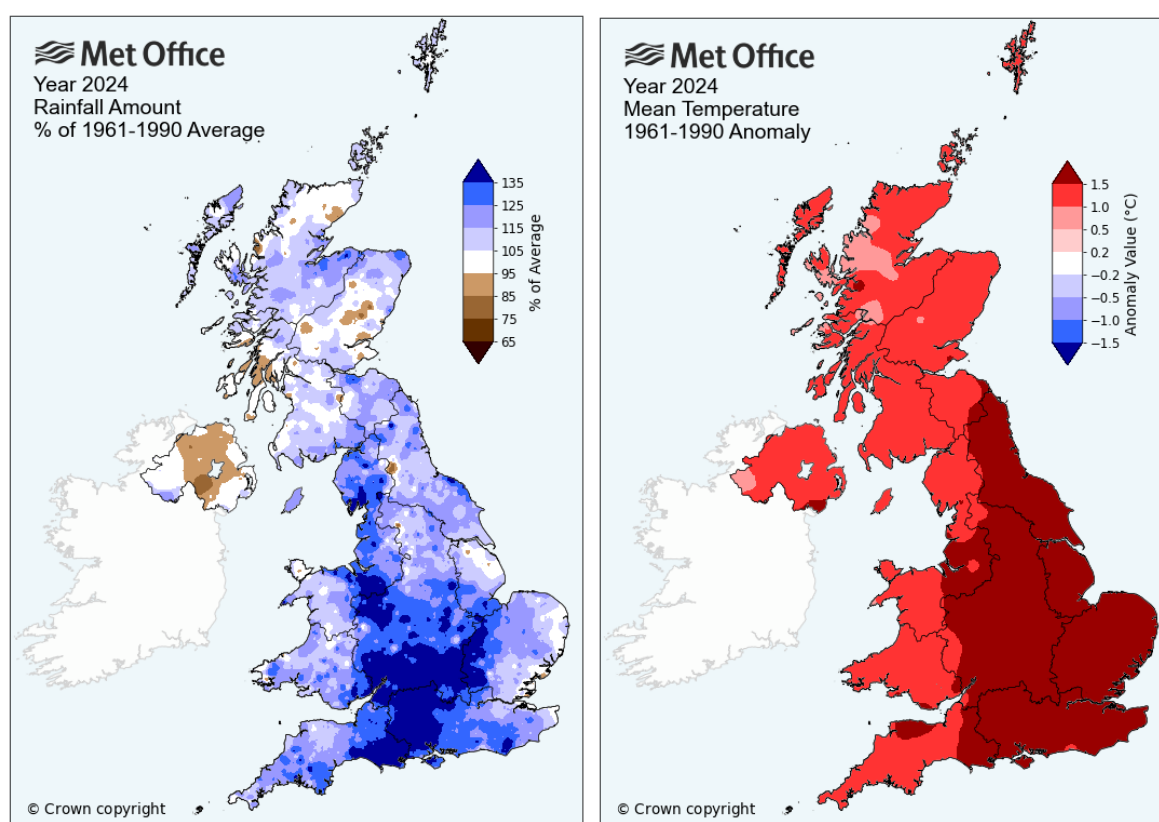


Figure 4:
Temperature
change in England
since 1884.

The Met Office predicts that in the UK in future we will see:

- Warmer and wetter winters
- Hotter and drier summers
- More frequent and intense weather extremes.²²

We are already seeing more frequent and intense flooding, storms, and heatwaves. These not only have severe impacts on health but also to buildings and infrastructure. Figures 5 & 6 show changes in rainfall (left) and temperature (right) from 2024 compared to a baseline period of 1961-1990. Some areas have become drier, many have become wetter, and all areas have temperature increases.²³



Figures 5 & 6: Changes in rainfall (5, left) and temperature (6, right) in the UK in 2024 compared to a baseline period of 1961-1990.

The Atlantic Meridional Overturning Circulation (AMOC)²⁴ – a key ocean current system influencing the UK's mild climate – is projected to weaken significantly by 2100, potentially causing regional warming and more intense storms. Whilst the [Intergovernmental Panel on Climate Change \(IPCC\) AR6 \(sixth assessment\) report](#) judged that a full collapse is unlikely, AMOC has been identified as a tipping point in the climate system. A full collapse could trigger drastic shifts to extreme cold winters and summer droughts as well as storm surge patterns.

3.2. Climate Change in Greater Manchester

Met Office Local Authority (LA) Climate Explorer projections show rising annual average temperatures in both summer and winter, with the greatest effect extreme temperatures. Summers are expected to become drier and winters wetter.²⁵

For three future Global Warming Levels (GWLs) (1.5, 2 and 4°C temperature rises), and three emission scenarios (lower, median and upper), projections indicate changes in average daily mean temperatures and winter precipitation relative to the 1981-2000 baseline.²⁶ Additional scenarios can be viewed via the Climate Data Portal.

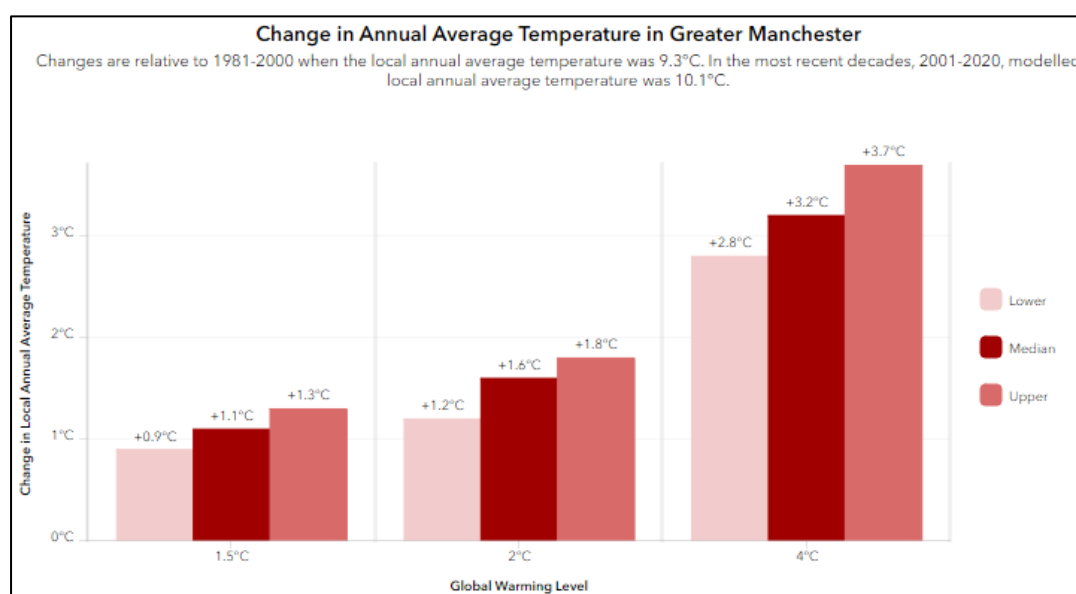


Figure 5:
Change in
Annual
Temperature in
Greater
Manchester.
Source:
[Explore the
Climate of your
Local Authority](#)

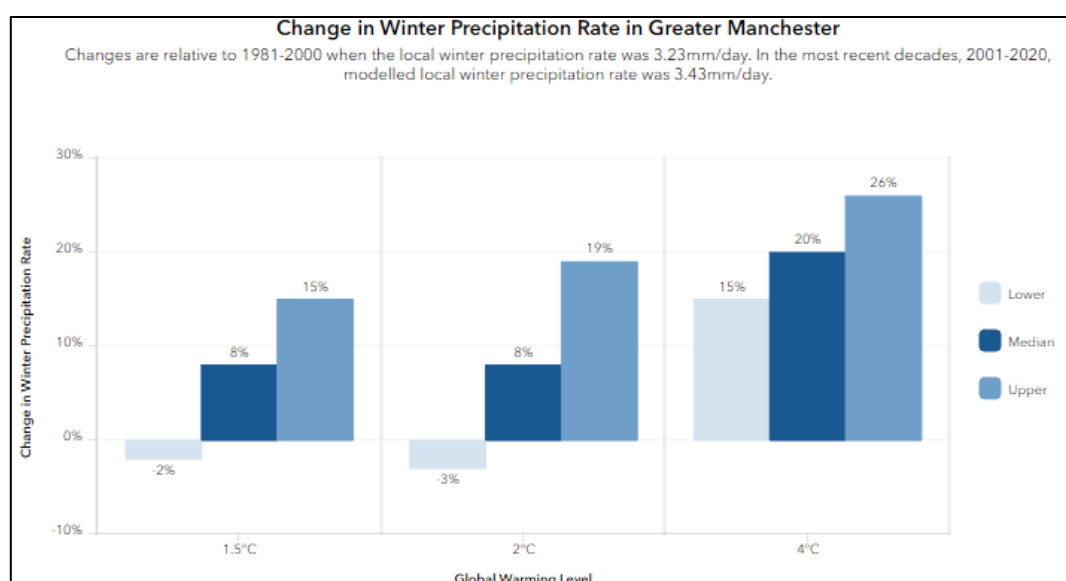


Figure 4:
Change in
Winter
Precipitation
Rate in Greater
Manchester.
Source:
[Explore the
Climate of your
Local Authority](#)

		0.6°C GWL Baseline 1981- 2000	1.0°C GWL Recent Past 2001-2020	1.5°C GWL Paris Agreement	2°C GWL Guidance: Prepare	4°C GWL Guidance: Assess risks
	TEMPERATURE	°C	°C	°C change	°C change	°C change
	Summer Maximum Temperature	27.9 27.4 to 28.3	29.7 28.8 to 30.6	+2.7 +0.8 to +3.5	+2.9 +2.0 to +4.9	+6.1 +4.9 to +8.4
	Summer Average Temperature	15.0 15.0 to 15.1	16.1 15.7 to 16.5	+1.3 +1.0 to +1.9	+1.9 +1.3 to +2.4	+4.0 +3.3 to +4.8
	Winter Average Temperature	4.1 4.1 to 4.1	4.8 4.5 to 5.3	+1.0 +0.6 to +1.4	+1.3 +0.6 to +1.8	+2.7 +1.7 to +3.4
	Winter Minimum Temperature	-6.4 -6.6 to -6.2	-4.9 -6.2 to -3.4	+2.5 +1.2 to +3.6	+2.9 +1.9 to +3.9	+4.9 +4.3 to +7.0
	Annual Average Temperature	9.3 9.3 to 9.3	10.1 10.0 to 10.3	+1.1 +0.9 to +1.3	+1.6 +1.2 to +1.8	+3.2 +2.8 to +3.7
	PRECIPITATION	mm/day	mm/day	% change	% change	% change
	Summer Precipitation Rate	2.57 2.57 to 2.58	2.53 2.22 to 2.64	-3 -20 to +7	-6 -22 to -2	-29 -42 to -18
	Winter Precipitation Rate	3.23 3.21 to 3.24	3.43 3.14 to 3.84	+8 -2 to +15	+8 -3 to +19	+20 +15 to +26

Figure 6: Changes in climate indicators in Greater Manchester as a change from the baseline period 1981-2000. Source: [Local Authority Climate Report | Greater Manchester | Report Builder for ArcGIS](#)

4. Impacts of Climate Change on our Health and Care System

The impacts of climate change on the health and care system are explored in this section, divided into clinical and non-clinical impacts. However, it should be considered that many impacts are cross-cutting and will impact on other areas of health and wellbeing and service delivery.

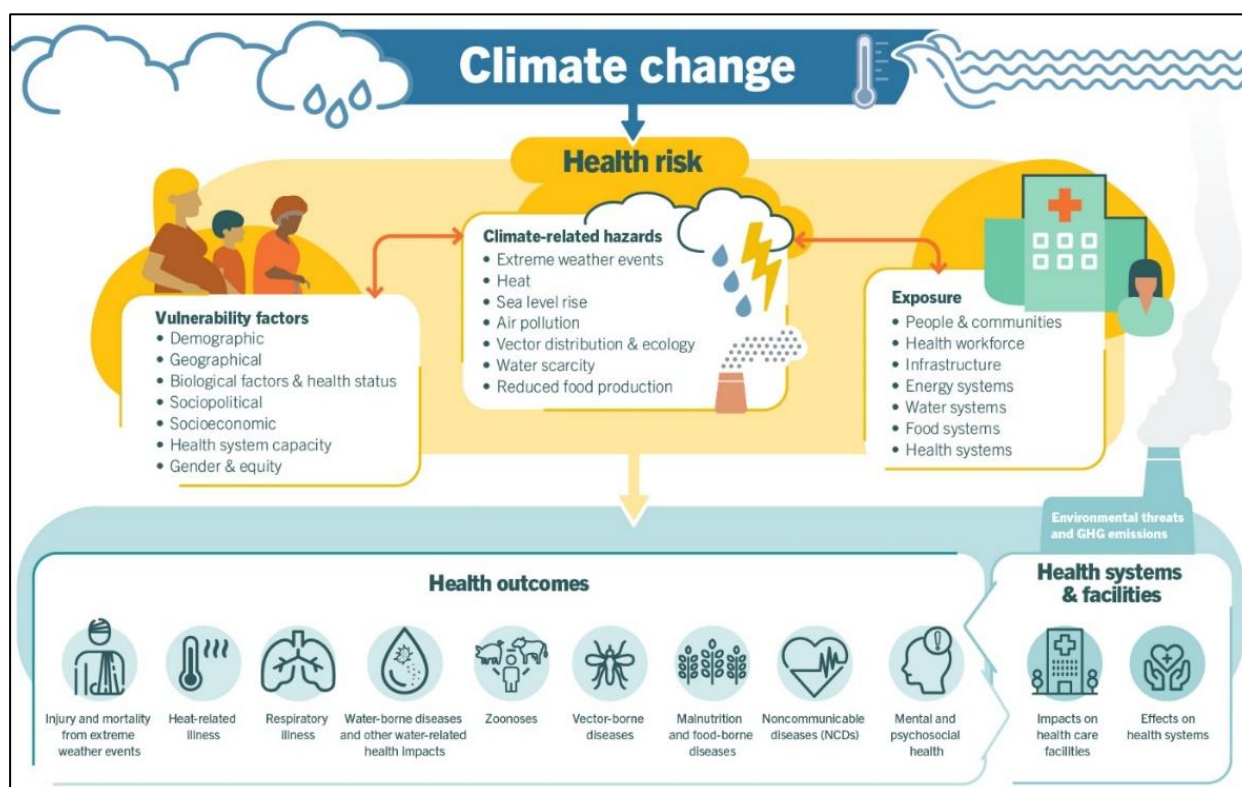


Figure 10: Diagram to show how climate sensitive health risks interact with vulnerability factors and exposure pathways.

4.1. Clinical

Climate change is already harming health by increasing illness and death from more frequent and severe climate events. It also disrupts key health determinants such as housing, infrastructure, and access to care, worsening health inequalities. Those most affected include people with existing health conditions, older adults, and those living in the most deprived neighbourhoods.

4.1.1. Heat Related Illness

Heatwaves in England are projected to become more frequent, hotter and longer. Climate projections indicate that average temperatures will increase, along with the duration and frequency of heatwaves, specifically increasing the number of days above 25°C and nights above 15°C.²⁷

Hot weather elevates the risk of cardiovascular and respiratory conditions, exacerbates chronic conditions²⁸ and can impair temperature regulation, particularly in older adults, young children, pregnant women and those with certain long-term conditions and or patients taking certain medications.²⁹ Heat waves also significantly impact neurological conditions.

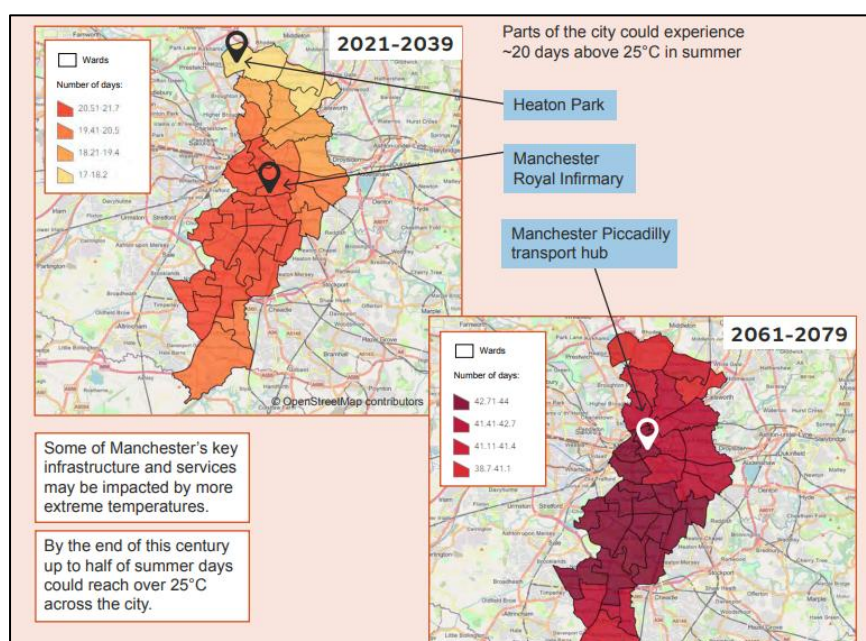
The summer 2022 heatwave was linked to 2,985 deaths, particularly affecting older age groups,³⁰ and in 2024 there were 1,311 heat-associated deaths in England³¹. Without adequate adaptation, heat-related deaths are projected to increase nearly sixfold from 1,602 per year (2007–2018 baseline) to 10,889 per year by the 2050s.³² The UK is experiencing an increase in the number of tropical nights, where the temperature does not fall below 20°C. These have a profound impact on human health and are linked to increased mortality as recovery processes are disrupted.

Evidence shows the direct effects of temperature increases on emergency hospital admissions and accident and emergency attendances for cardiac, respiratory, cerebrovascular, and psychiatric conditions³³. On extreme heat days with air temperatures exceeding 25 to 28 degrees Celsius, heat-related A&E attendances account for 6% of attendances, and 4% of emergency admissions.^{34 35} Average annual excess heat-related attendances and admissions could increase by over 200% by the 2050s.³⁶

Health impacts of heat are shaped by wider determinants of health such as housing and homelessness, urban living, occupation, education and migration status. Low-income areas face more heat exposure due to poorly insulated housing, raising illness and mortality risks as well as further worsening inequalities.³⁷

Impacts of heatwaves are not uniform, and vary by area, based on local factors such as the type and orientation of buildings, proximity to and quality of green spaces and size of nearby water bodies.

Manchester's urban heat island effect, where the city centre can be up to 8°C warmer than



surrounding rural areas on still, clear nights³⁸, compounds the risks from rising baseline temperatures. Many NHS sites across Greater Manchester sit within the warmest urban zones, meaning that during heatwaves, staff and patients in clinical settings may be exposed to temperatures significantly higher than regional averages suggest. This intensifies the already documented overheating risk: 90% of

UK hospital wards are estimated to be at risk of overheating³⁹, and the urban heat island effect is likely to accelerate that risk in GM's most densely built environments.

Figure 11: Shows Manchester locality as an example of the variation in the number of days above 25°C.

4.1.2. Cold Related Illness

Although climate projections show that winters are likely to be warmer, cold weather snaps and ground-lying snow still present a risk to health and wellbeing.

In the winter period of 2021-22 13,400 more deaths occurred compared to the average for non-winter periods in England and Wales.⁴⁰ 'Excess winter deaths' figures do not separate the impacts of cold from other seasonal impacts that could affect mortality, however evidence shows that cold related deaths will continue to represent the biggest weather-related cause of mortality even with climate change.⁴¹

Without adequate decarbonisation and adaptation measures, cold-related deaths are projected to increase by nearly 50% from 41,759 per year (2007–2018 baseline) to 61,287 per year by the 2050s.⁴²

The direct health effects of cold weather are an increased risk of cardiovascular disease, respiratory illness, influenza, falls and injuries and hypothermia.⁴³ Vulnerable groups are more at risk of health impacts of cold weather such as older people, young children, people with underlying health conditions, and people experiencing homelessness.

There are greater rates of hospital admissions due to falls in colder weather periods, which can increase the winter pressures on healthcare services, along with being associated with the mortality and morbidity due to cold weather.⁴⁴ Falls are estimated to cost the NHS more than £2.3 billion per year, with 30% of people older than 65 falling at least once a year.⁴⁵

Living in cold homes and in fuel poverty is also described as an indirect health impact of colder weather, with poorer mental health and social isolation experienced, alongside the effects of exposure to damp and mould.

Indirect effects on health are seen from disruption from snow and ice which may impact transport and access to health and social care services.

4.1.3. Respiratory Disease

Air pollution in the UK is a major public-health threat driven primarily by emissions of particulate matter (PM), nitrogen dioxide (NO₂) and ozone (O₃). These pollutants are linked to respiratory and cardiovascular disease and contribute to tens of thousands of deaths and large economic and health-system costs each year.

Higher temperatures are known to be associated with poorer air quality, as concentrations of O₃ and PM within the atmosphere may increase.⁴⁶ Both poorer indoor and outdoor air quality can exacerbate breathing problems such as asthma and Chronic Obstructive Pulmonary Disease (COPD).

Aeroallergens are particles within the air such as pollen or fungal spores that can cause or worsen allergic disorders.⁴⁷ Warmer temperatures and altered seasons increase pollen production and lengthen pollen seasons, raising allergy and asthma risks; pollution can amplify allergen potency.

Wildfires are also a significant cause of poorer air quality and can affect large numbers of people. The Saddleworth Moor wildfire in 2018 exposed 4.5 million people to harmful levels of PM2.5.⁴⁸

Within the city centre, street canyon effects, where tall buildings trap and concentrate pollutants, increase temperatures and reduce wind speed can compound exposure at ground level for patients, staff, and visitors to NHS facilities.⁴⁹

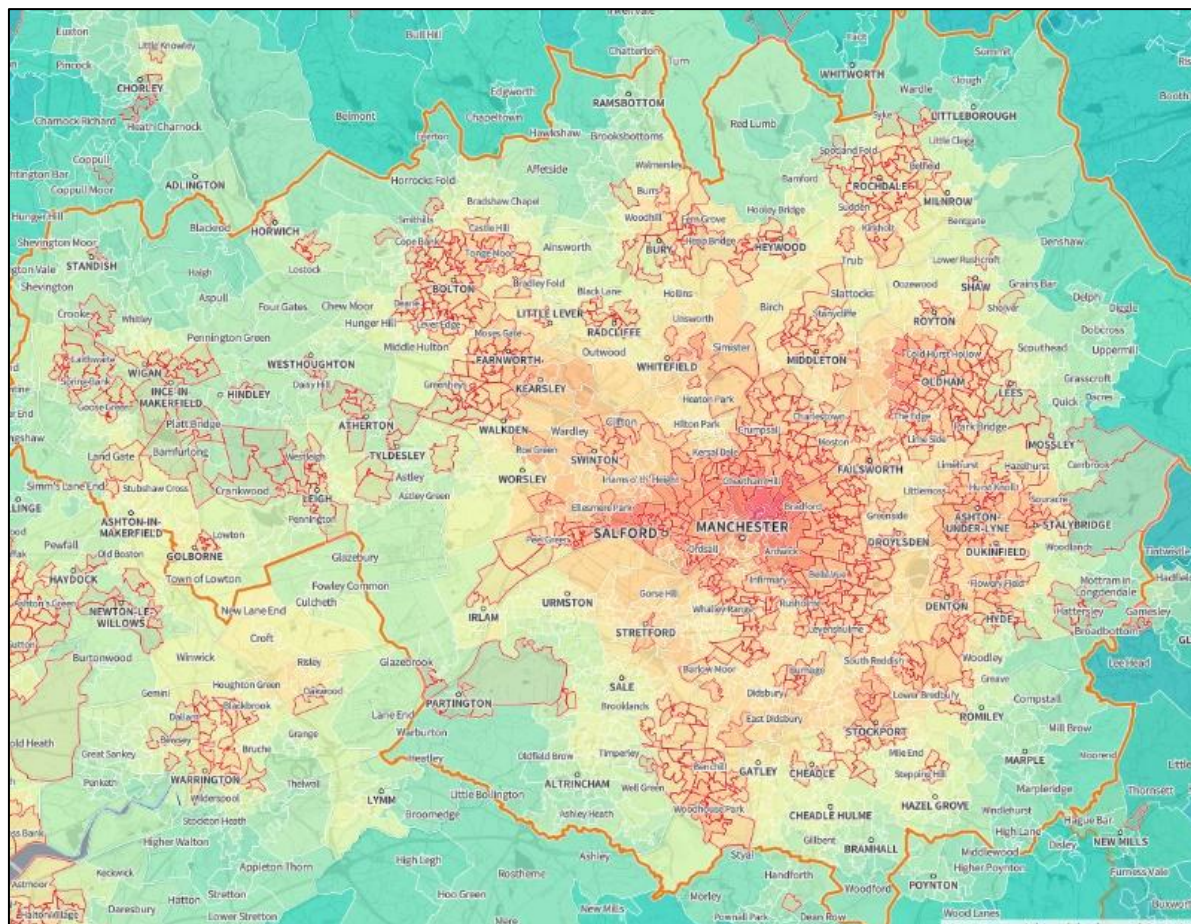


Figure 12: NO₂ levels across GM mapped against the 20% most deprived areas as identified by the national Index of Multiple deprivation (IMD), which tend to be central, urbanised areas with poorer air quality. Source: Consumer Data Centre: Access to Healthy Assets and Hazards (AHAH).

4.1.4. Mental Health

The weather conditions and events that are associated with climate change have the potential to be significant stressors and impact on mental health and wellbeing.

In relation to cold weather, there is evidence of an association between cold, damp homes and common mental health conditions such as depression and anxiety, and wellbeing in children.⁵⁰

In hotter temperatures, the risk of poorer mental health outcomes is evident, with the strongest evidence showing an increased risk of suicide, and links with poorer outcomes in other conditions such as bipolar, schizophrenia and dementia.⁵¹

Flooding is shown to have far reaching mental health impacts, including in people who may be affected by flooding without flooding in their own home. This is due to the wide disruption to daily activities, including significant stressors such as loss for gas, electric and water, and being unable to access health and social care services. Direct flooding can cause long term accommodation displacement exacerbating existing health issues and increasing stress, anxiety, and depression.

However, the risk is highest in those whose homes were flooded with this cohort being up to six times more likely to report probable Post Traumatic Stress Disorder (PTSD), and depression/anxiety compared to people who had not been flooded.⁵² Further stressors experienced are also financial and insurance concerns, loss of sentimental items, evacuation and maintaining relationships.

4.1.5. Vector, Food and Water Borne Diseases

In the UK we are facing an increased threat from vector-borne diseases, due to climate change alongside changes in land use, and increasing global trade and travel. As our climate becomes warmer and wetter some species of tick and mosquito that aren't native to the UK will find the UK climate more suitable for them to survive and reproduce.⁵³ Meaning we may experience new and emerging diseases not usually seen within the UK.

Examples of vector borne diseases are:⁵⁴

- Tick borne disease: Potential for warmer temperatures to increase the UK distribution of several tick species including those that transmit Lyme Disease and Tick-Borne Encephalitis (TBE). Lyme disease incidence is increasing in the UK and TBE risk is very low, however, a small number of detections have been found in the UK.
- Mosquito borne disease: Warming temperatures may lead to introduction of invasive mosquito species, particularly one that transmits multiple viruses of public health concern, dengue, chikungunya, and Zika. Climate change may also increase the risk of West Nile Virus in the UK, however, the risk that malaria may become established in the UK remains low.

Climate change will also have an impact on water and food borne diseases with hotter conditions allowing pathogens to grow more easily in food.

4.1.6. Injuries and Fatalities

Cold weather increases the likelihood of falls and injuries with snowy and icy conditions. Older and frail adults are at particular risk due to reduced strength and mobility in lower temperatures and the worsening of symptoms of arthritis and other chronic conditions.

Flooding and storms present risk of direct health impacts from physical injury and trauma, with additional increased risk of exposure to harmful environmental contaminants. These include contaminated flood waters, hazardous buildings that may have compromised structures, submerged hazards and debris, and risk of electrocution.

Peak rainfall intensity and peak river flows are projected to increase, which presents challenges with both surface water (pluvial) and river flooding (fluvial). Winters are projected to be wetter, and there may be more intense heavy summer rainfall events, potentially leading to more frequent and intense storms.

National Flood Risk Assessment 2 data (January 2025) states 6% of GM residential properties are at risk of fluvial flooding and 16% are at risk of pluvial flooding⁵⁵. Manchester and Salford have significantly high numbers of households with fluvial flood risk. Over 5% of properties in Stockport, Tameside, Bolton and Wigan are at high/medium risk of flooding.

4.1.7. Skin Cancers

A small amount of UV radiation is critical in the production of Vitamin D, however during hot weather UV radiation may cause harm to eyes and skin.⁵⁶ WHO has found that globally, the cases of malignant melanoma have doubled every 7-8 years over the last 40 years, mainly due to an increase of skin cancers in fair skinned populations.⁵⁷

4.1.8. Health Inequalities

We know that the effects of climate change are experienced differently across population groups. This is important to consider within any potential climate change adaptation actions, as the population needs within GM across multiple climate hazards vary greatly.

Those in the most deprived 20% are found to be at greatest risk of temperature related hospital attendance and mortality, and deprivation is also found to effect responses to higher temperatures in those with long term conditions.⁵⁸

Additionally, those living in deprived areas are known to be at greater risk from flooding and to be less likely to have insurance cover and other protection that would reduce the impact of flooding events.⁵⁹ The health and wellbeing impacts of flooding are experienced unequally across the population with the elderly particularly at risk. Flooding can restrict access to medical and social care, including medicines supply and home medical equipment. GM has a high proportion of areas with social vulnerability that also have a flood risk, which is projected to increase by 2050s.

Analysis also shows that up to 1 in 10 excess winter deaths may be due to fuel poverty and 21.5% due to living in cold homes.⁶⁰

4.2. Non-Clinical

Climate change is already causing disruption to the delivery of health and social care services because of heatwaves, flooding and extreme weather events. Alongside the

increased demand for these services during extreme weather events, indirect effects are also experienced due to infrastructure damage and disruption, including occupational impacts on staff.⁶¹ Wider disruption experienced across sectors also has compounding effects on NHS supply chains, including medicines.

4.2.1. Overheating

Overheating of NHS sites is already occurring, with recorded overheating events doubling between 2016/17 and 2023/2024, with a peak in 2022/23 likely reflecting the record 40-degree temperature in July 2022.^{62 63}

Existing guidance for temperatures in England recommends temperatures from 18°C to 28°C in general wards and 18°C to 25°C for more sensitive areas, such as birthing and recovery rooms.⁶⁴ Overheating is reported when temperatures exceed 26°C within clinical areas and therefore may impact vulnerable patients and staff.

Data is collected nationally via the Estates Return Information Collection (ERIC), with all NHS Trusts required to provide overheating data annually.⁶⁵ There were 27 overheating incidents in 2024/25 in GM, however, there are limitations to this data and inconsistencies in the reporting of heat incidents.

Traditionally, UK buildings were designed to retain heat and are not prepared to cope with the temperatures experienced in recent years, and conversely newer buildings with large amounts of glass in their construction also struggle to control temperatures. As heatwaves are predicted to become more frequent and intense it is likely that overheating incidents will become more disruptive to services.

Alongside the impacts of the health and wellbeing of patients, heatwaves can cause disruption of critical IT services, failure of cooling and refrigeration units, failure of medical equipment such as radiotherapy machines, dialysis machines and MRI scanners, disruption to laboratory services, and impact supply of medicines. Productivity and cognitive ability may also be impaired in exposure to extreme temperatures, demonstrating the occupational risk to staff. Staff may be unable to work due to school closures.

A study examining the impacts of the 2022 heatwaves found that elective operations were cancelled in a fifth of hospitals over a 4-day period, due to staff and bed shortages, and unsafe theatres.⁶⁶

4.2.2. Flooding

The GM Climate Change Risk Assessment describes flooding as one of the most important weather and climate change risks both now and in the future⁶⁷. In England there are currently more than 6,200 health care assets at risk of flooding, with the majority being at risk of surface water flooding.

The UK Health Alliance found that around 26% of the healthcare facilities in England (including care homes) are at risk of flooding and this is projected to rise to almost 32% by 2040-60.⁶⁸

The table below is taken from the Third UK Climate Change Risk Assessment Technical Report Summary for England⁶⁹ and shows the current and future flood risks for health and

social care assets. It indicates the flood risk in 2050s and 2080s against 2°C and 4°C global warming at 2100 and population changes. Significant increases in flood risk are projected.

	Present	2050s				2080s			
Population Proj		Low		High		Low		High	
Climate Future		2°C	4°C	2°C	4°C	2°C	4°C	2°C	4°C
Emergency Services (Possible range)	495	707 (659-729)	810 (757-835)	714 (665-735)	817 (763-842)	783 (721-841)	925 (858-985)	794 (732-854)	939 (871-1001)
GP surgeries (Possible range)	2474	3608 (3258-3662)	4140 (3773-4205)	3635 (3282-3690)	4171 (3800-4235)	3874 (3438-4243)	4677 (4205-5066)	3922 (3478-4299)	4739 (4256-5127)
Hospitals (Possible range)	1055	1329 (1266-1336)	1436 (1373-1451)	1343 (1280-1350)	1451 (1387-1466)	1390 (1289-1463)	1542 (1433-1617)	1416 (1312-1491)	1571 (1459-1649)
Care homes (Possible range)	2187	3259 (2995-3286)	3803 (3508-3864)	3288 (3019-3315)	3836 (3536-3879)	3614 (3536-3879)	4437 (4079-4745)	3667 (3341-3962)	4505 (4136-4823)
Total	6211	8903	10189	8980	10275	9661	11581	9799	11754

Figure 13: Current and future flood risks for health and social care assets in England. Source: [Technical report \(CCRA3-IA\) - UK Climate Risk](#)

In GM both fluvial and pluvial flooding present current challenges, and we know that peak rainfall intensity and peak river flows are projected to increase in future.

When examining flood risk by General Practitioner (GP) practice across GM, the risk of flooding from rivers and sea is Medium in seven practices and Low in ten practices.

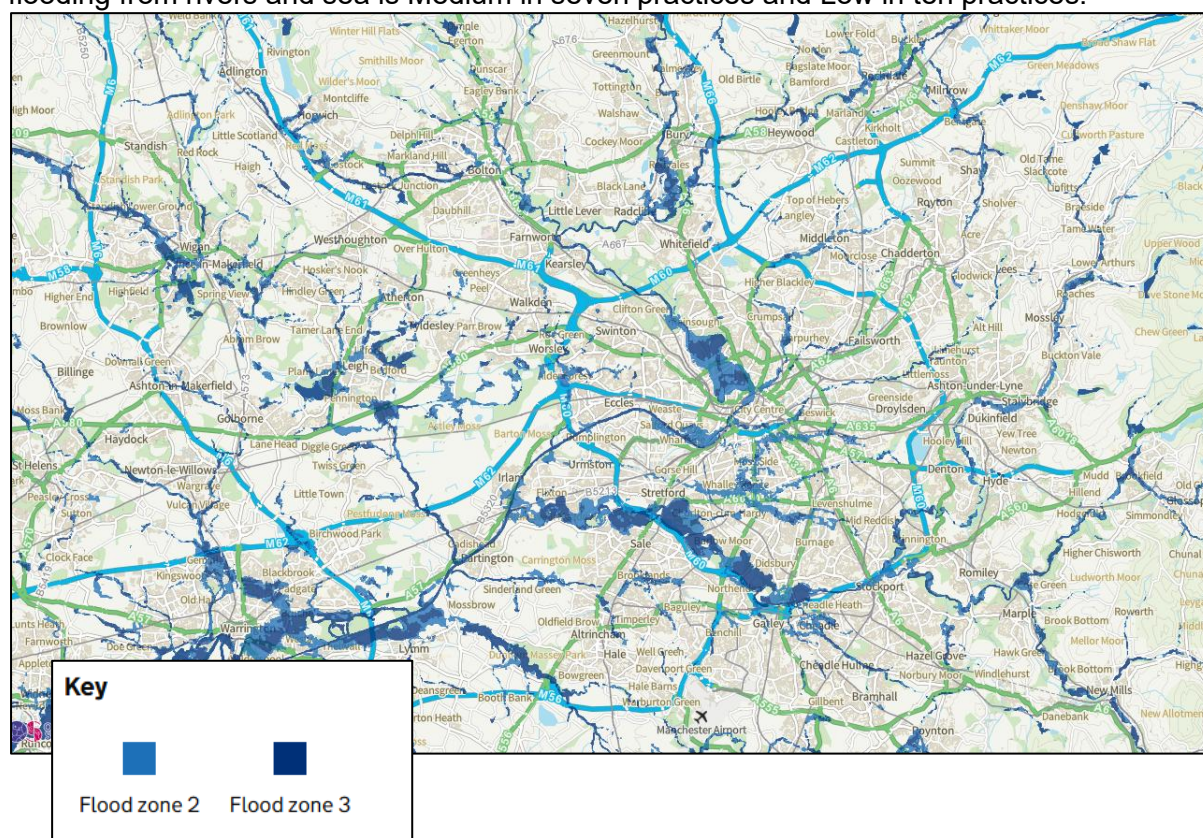


Figure 14: Map showing Flood zone 2 and 3 across GM. Source: [Map – Flood map for planning – GOV.UK](#)

GM does not include any coastal regions; however, it is projected that sea level across the UK will continue to rise across all emission scenarios.⁷⁰ GM may be impacted by the changes in sea levels in the long term due to relocating coastal communities, and potential disruptions to supply chains.⁷¹

4.2.3. IT Infrastructure

IT systems are critical to NHS service delivery and infrastructure and are relied on by the NHS for patient care and safety. IT systems are vulnerable to the effects of climate change through damage to critical infrastructure such as overheating or flood damage to data centres.

Case study: Guys and St Thomas' NHS Foundation Trust, July 2022.⁷²

During the heatwave the UK experienced in July 2022, cooling systems failed at two data centres supporting the Trust, requiring a switch to paper based operations and wide disruption to patient care due to critical IT outage. The incident report shows the outage cost the Trust £1.4 million and over 100 treatment delays were reported with significant reductions in overall service delivery. The report stated that the Trust must prepare to mitigate the risks posed by climate change and prepare for the expected increase in frequency of extreme weather events.

4.2.4. NHS Supply Chain

Health and Social Care services rely on complex global supply chains including multiple sectors, and areas of high climate vulnerability. The NHS Supply Chain produces 10 billion road miles annually, which is 3.5% of the total in the UK and is made up of a network of 80,000 suppliers, highlighting the vast logistics required to connect healthcare and communities.⁷³

Flooding and storms can disrupt the supply to, and operation of, healthcare facilities which is particularly relevant to Greater Manchester given the flood risk to road infrastructure. Disruptions to the supply chain across all sectors have already been experienced in extreme weather in the UK, with more action required to reduce weather related disruptions.⁵⁰

The Department of Health and Social Care's August 2025 guidance on medicines supply resilience explicitly identifies extreme weather events alongside geopolitical disruption as a growing cause of supply chain disruption.⁷⁴

A 2025 report by the Centre for Long-Term Resilience found that all seven dosage forms of the antibiotic gentamicin available to NHS England originate from two active pharmaceutical ingredient supplier factories in the same Chinese city. This means that any severe weather event disrupting that location could wipe out UK access to gentamicin entirely.⁷⁵

4.2.5. Energy Supply

Extreme weather can disrupt energy infrastructure in multiple ways, such as hotter temperatures reducing energy generation, line faults from snow and ice, and damage by debris during storms and power cuts. Wider risks in future are identified as influenced by

demand and supply profiles, with greater resilience required to cope with interruptions to energy supply.

GM is identified as a key hotspot area of critical infrastructure in the UK, with assets on moorlands that face wildfire risk, and increasing electrification and digitisation of sectors and assets, including transport.⁷⁶ The electrification of transport and NHS operations increases the demand on the grid and therefore dependency on energy supply continuity.

Case study: Storm Desmond, North Lancashire and Cumbria, December 2015.⁷⁷

Flooding in North Lancashire and Cumbria as a result of Storm Desmond, caused widespread disruption to power supply over a weekend, including in Lancaster. Electricity and phone services were down, and the main hospital relied on backup generators to continue operations. However, as access to primary care and 111 phonelines was not possible the Emergency Department became overwhelmed with people trying to access care and support. In addition, the hospital was used as a community centre where people took refuge.

Home medical equipment such as oxygen supply and dialysis were unable to function and this had large impacts on patients locally, including equipment for mobility such as stair lifts and personal care alarms. Community dispensing of medications was also disrupted, putting increased pressure on the local hospital.

4.2.6. Water Supply

Climate projections show an increased risk of water scarcity and droughts, which together with increasing demand on water from economic and population growth may disrupt water supply.

In GM, the North West (NW) water resource zone is projected to see a water supply surplus by 2050s depending on population growth and at an under 2°C global warming level.⁷⁸ However, this estimate is based on averages, and we know from the evidence that extreme weather events such as drought are likely to become more common. Therefore, although the NW zone is projected to be in water surplus by 2050s on average, this does not account for extreme weather events.

Growing NHS reliance on data centre infrastructure and the transition to low-carbon heating technologies both carry water demand implications that interact with projected water scarcity risk – particularly during drought conditions and extreme heat events when demand peaks and supply is most constrained.⁷⁹ A medium-sized 15-megawatt data centre consumes as much water annually as three average-sized hospitals.⁸⁰

Climate change also poses a risk to water supply quality due to flooding and increases in runoff water that may compromise current water treatment facilities. GM is predominantly on mains water supply however, private water supplies and those in more isolated locations are at the greatest risk of impacts to supply and water quality due to climate hazards. Flooding and wildfire risk are identified as the main hazards to water quality in GM.

NHS GM & Trust Green Plans estates decarbonisation focus areas promote the transition from gas boilers to low-carbon heating, including ground source and water source heat pumps. Ground source heat pumps draw on groundwater or the thermal mass of the ground,

and water source heat pumps draw directly from water bodies. In drought conditions or periods of low groundwater availability, both of which are projected to increase under climate change, these systems may face operational constraints.

4.2.7. Food Security

Disruptions in the supply chain due to extreme weather events and climate hazards may affect food security within the UK and internationally.⁸¹

It is known that climate change can potentially disrupt our food supplies, including those foods required for a healthy diet.⁸² Climate change threatens UK food supply by disrupting production, trade and prices. Heavy reliance on imports (currently 78% of fruit and vegetables) raises vulnerability as more sourcing comes from climate-sensitive countries.

Greater Manchester has a high number of residents living in poverty⁸³, with low-income households already spending a disproportionate share of income on food and having limited access to affordable healthy produce. Climate-driven food price increases will compound existing inequalities and increase the demand on health and care services.⁸⁴

Extreme weather events, and reduced ground and surface water affects crops and livestock, alongside affecting soil quality and contaminants. In the short to medium term crop yields may increase with warmer and drier conditions, however without climate adaptation measures crop yields will decrease in the long term with rising temperatures and have additional impacts on costs.

Additionally, projected changes to precipitations and temperatures experienced may impact the safety of our food supply due to the occurrence of bacteria, viruses and fungi, alongside side species that carry these pathogens within crops.⁸⁵

The NHS spends approximately £600 million annually on food and catering.⁸⁶ Climate-related disruption to supply chains and rising food prices will increase these costs directly, and periods of shortage may affect the nutritional quality of patient meals.

4.2.8. Medical and Pharmaceutical Supplies

Disruptions within the supply chain within the NHS may impact upon the availability of medicines through transportation and infrastructure disruption, alongside impacting the quality and safety of the medications for use.

Many medications used within healthcare settings require specific conditions for storage, such as staying within a specific temperature range. In periods of hot temperatures where overheating is experienced or with failure of equipment such as refrigeration, medicines supply may be compromised due to them being deemed unsafe for use.

If transportation or other sectors such as manufacturing are affected by extreme weather events, hospitals and GP practices may face supply shortages of equipment, which may lead to strains on acute services or operations.

5. Climate Change Risk Assessment

This section explores the severity of risks and potential opportunities that we face from our changing climate both nationally and within the GM city region. National evidence identifies health systems and infrastructure as among the highest residual climate risks.

5.1. Existing Risk Assessments Informing GM Integrated Care Partnership (ICP) CCAP

The UK produces a 5-yearly Climate Change Risk Assessment as required by the Climate Change Act 2008. The UK's Fourth Climate Change Risk Assessment (CCRA4)⁸⁷ was published in May 2026 and includes 41 risks and 2 opportunities. The report is based on the Independent Assessment of UK Climate Risk, who have provided nation summaries, as well as Sector Briefings and technical reports.

Risks and opportunities are assessed in the context of a 2°C and 4°C warming scenario and 3 key questions are posed to assess the urgency of action required. See figure 15 below.

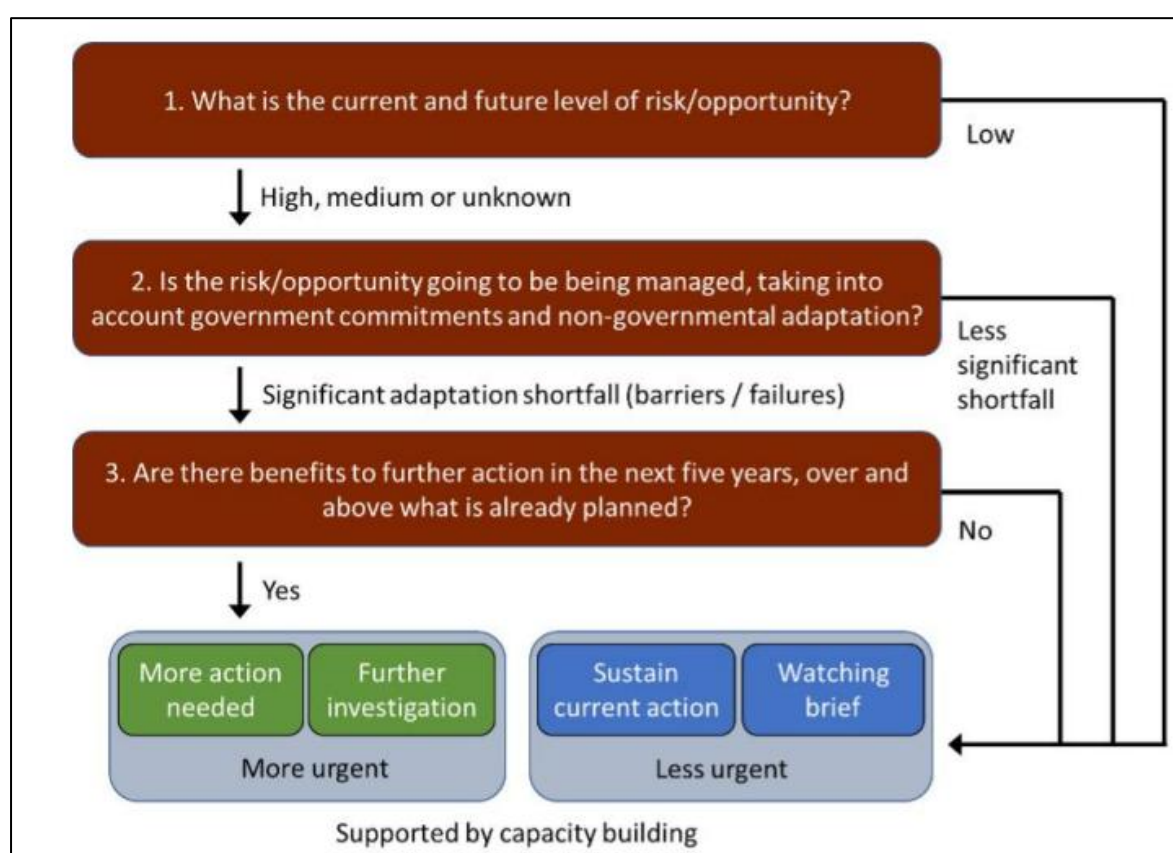


Figure 15: Diagram to show the assessment process of risks and opportunities in the UK CCRA.

Based on the previous version, the CCRA3, GMCA have produced a GM Climate Change Risk Assessment⁸⁸ comprising of 63 risks, which will inform their upcoming local Climate Change Adaptation Strategy and Action Plan. To produce a city region CCRA, they assessed the risks identified in the CCRA3, against GM specific climate projections, with stakeholder engagement and expert input. Two additional risks were identified: 'Risk H14: Risks to people, communities and built environment from wildfire', and 'Risk H15: Social inequalities exacerbated as a result of climate change, with disadvantaged and vulnerable groups facing disproportionate climate impacts'.

14 risks were classified as High or Very High Magnitude for GM at present day and 27 have been identified as High or Very High Magnitude by the 2050s following the GM CCRA

methodology, in Appendix A of the GM CCRA⁸⁹. Risk magnitude scores were identified after assessment with stakeholders and relevance evidence.

5.2. Risks & Opportunities Relevant to NHS Greater Manchester

Our health and social care systems are complex, and consist of people, buildings, infrastructure, networks, equipment and service provision across multiple providers. This CCRA acknowledges that all these components are vulnerable to climate hazards such as flooding, overheating and water scarcity which in turn can affect population health.⁹⁰

Risks identified in the GMCA CCRA, which are informed by GM specific data and stakeholders (stakeholders listed in Appendix 5), were assessed and risks and opportunities that affect health, either directly or indirectly were identified.

As such, the following table (Table 5.2) shows the risks/opportunities relevant to the healthcare system in GM. They are an amalgamation of:

- Any risks/opportunities where healthcare systems have a direct contribution to action,
- Any risks/opportunities where healthcare systems require provider-led adaptation measures because of potential cascading effects of the risks/opportunities.
- Any risks/opportunities where healthcare systems have an indirect contribution to action which were marked High or Very High magnitude in GM in 2050 (according to the GM CCRA),

There are additional risks identified in the GMCA CCRA which will have indirect effects on the healthcare system e.g. risks to ecosystems, which require action on a regional or national scale led by government, Local Authority partners and other sectors. As such, these risks have not been included within the NHS-focused risks and actions tables (table 5.2 and table 6.1).

The risk wording and risk code for the identified risks have been updated from the GMCA CCRA to align with the UK CCRA4 published in May 2026.

Table 5.2 Risks & Opportunities Relevant to NHS Greater Manchester

Theme (from UK CCRA4)	Risk Code (from UK CCRA4)	Risk or Opportunity with High or Very High applicability to the Greater Manchester Region	Present Day High Magnitude Risks & Opportunities Score - Greater Manchester Region	2050s High Magnitude Risks & Opportunities in GM - Greater Manchester Region	Healthcare contribution?	Health Impacts
Health and wellbeing	H1	Risks to people from heat	High Risk	Very High Risk	Yes - Direct Contribution	Heatwaves pose an immediate threat to health, and heat related deaths are projected to increase. Increased risk of heart attacks and strokes, lung problems and worsening of existing conditions.
Health and wellbeing	H2	Risk to people from extreme weather, excluding heat	High Risk	Very High Risk	Yes - Direct Contribution	Direct health impacts from physical injury and trauma, with additional increased risk of exposure to harmful environmental contaminants Large mental health impacts from flooding, including in people who may be affected by flooding without flooding in their own home. Reducing access to essential services (e.g. health and social care, food, utilities, internet)
Health and wellbeing	H3	Risk to people from changes in air quality	High Risk	Medium Risk	Yes - Direct Contribution	Both poorer indoor and outdoor air quality can exacerbate breathing problems such as asthma and COPD. Higher temperatures are known to be associated with poorer air quality, as concentrations of ozone and particulate matter within the atmosphere may increase, which are both linked to respiratory and cardiovascular diseases.

Health and wellbeing	H4	Risk to people from climate sensitive infectious diseases	Medium Risk	Medium Risk	Yes - Direct Contribution	Due to warmer temperatures, we may experience new and emerging diseases not usually seen within the UK.
Health and wellbeing	H5	Risk to food safety and nutrition	High Risk	High Risk	Yes - Direct Contribution	Potential to see changes in bacteria/viruses/parasites/ fungi in food and livestock with a changing climate, affecting food safety. Reduced food security due to supply chain disruption and changes to growing conditions.
Health and wellbeing	H6	Risk to health and social care delivery	Medium Risk	High Risk	Yes - Direct Contribution	Adverse weather events will lead to increased demand for services. Extreme weather has potential to disrupt transport and energy infrastructure, IT systems and disrupt NHS supply chains. High temperatures may lead to overheating events of sites and medicines storage.
Health and wellbeing	GM-H15 (GM CCRA)	Social inequalities exacerbated as a result of climate change, with disadvantaged and vulnerable groups facing disproportionate climate impacts	Medium Risk	High Risk	Yes - Direct Contribution	Those within the most vulnerable population groups are known to be at greater risk of the effects of climate change. Across GM some populations are more likely to experience flooding or heatwaves, and we are aware certain population groups are more vulnerable to the impacts of adverse weather events.
Economy	E3	Risk to domestic and international supply chains and resource inputs of UK business	Medium Risk	Unknown magnitude as difficult to quantify, but High Risk Priority due to potentially very large impacts	Indirect contribution	

Economy	E4	Risk to productivity and availability of labour in the UK	Low Risk	Medium Risk	Yes - Direct Contribution	Productivity and cognitive ability may be impaired. Infrastructure disruption may lead to staff shortages or reductions in service delivery.
Economy	E8	Opportunities to UK businesses and financial institutes from delivering adaptation goods and services	Low Risk	High Risk	Indirect contribution	
Built Environment	BE2	Risk to buildings from flooding	High Risk	High Risk	No direct contribution, but additional adaptation measures required	
Built Environment	BE4	Risk to buildings and communities, excluding from heat, flooding and coastal change	Low Risk	Medium Risk	Yes - Direct Contribution	Wildfires are a significant cause of poorer air quality and can affect large numbers of people.
Built Environment	BE9	Risk to households from changing energy demand	Low Risk	High Opportunity	Yes - Direct Contribution	Reductions in household energy demand in winter, with disproportionately larger benefits for households in fuel poverty. Potential increased cooling of households required. It is expected passive cooling will be sufficient for GM. However, those lower income households in poorer quality housing may be less able to afford measures in heat periods to maintain thermal comfort.
Infrastructure	I1	Risk to delivery of infrastructure services from interdependencies with other infrastructure services	High Risk	Very High Risk	No direct contribution, but additional adaptation measures required	

Infrastructure	I2	Risk to electrical generation	Low Risk	High Risk	Indirect contribution	
Infrastructure	I5	Risk to road transport systems	Medium Risk	High Risk	Indirect contribution	
Infrastructure	I8	Risk to digital and communication systems	Low Risk	High Risk	No direct contribution, but additional adaptation measures required	
Infrastructure	I9	Risk to water supply and wastewater systems	Medium Risk	Medium Risk	Yes - Direct Contribution	Increased storms and flooding may increase the risk of water supply contamination. In hotter and drier summers, we may experience water scarcity or drought conditions.

6. Climate Change Adaptation Action Plan

This section details the action plan. This contributes to the third overarching goal of the NHS GM Green Plan 2025-2028, and equivalent within Trust Green Plans:

“An NHS which is climate-adapted, actively supports nature and health related activities, and promotes interventions that reduce air pollution.”

6.1. NHS GM Climate Change Adaptation Plan Actions

The table (Table 6.1) in this section outlines specific actions, including the system level responsibility, list of partners/stakeholders, and timeline for completion. Actions have been divided into specific areas of operation, one of: Clinical Services, Estates, Supply Chain, Supporting Infrastructure, Engagement and Awareness, Governance and Report, Finance. Each action has been linked to the healthcare specific risks listed in Section 5, Table 5.2.

Each action has also been identified as a type of action: one that builds capacity (including creating the environment required for adaptation action, through producing data and research, governance structures and organisational partnerships) or that directly delivers adaptation actions (including actions which directly minimise climate change vulnerability or take advantage of potential opportunities). We recognise further research and insight is required to determine current progress and actions required to deliver the most population benefit.

We have identified the following outcomes as reflecting the purpose of the actions:

- Protecting population health in GM from the present and potential future impacts of climate change and utilise potential benefits.
- Creating a climate resilient healthcare system that is accessible and adaptable in a changing climate, with a robust supply chain with supportive infrastructure that are resilient to climate change.
- Ensuring communities across GM are equipped with the knowledge, skills and resources to adapt to climate change and extreme weather events.
- Provide quality and accessible healthcare during extreme weather, especially to the population groups most vulnerable effects of climate change.

Table 6.1 Climate Change Adaptation Action Plan

Action ID	Action	Further Detail	Responsibility	Partners	Timeline	Area of Operations	Relevant Risk Code	Type of Adaptation Action
CCA1	Build capability of the organisation to adapt and become resilient to the impacts of climate change.	Effective leadership and governance arrangements, and collaboration across teams and services is key to successful adaptation. The NHSE adaptation framework sets out four capabilities for every organisation, with four maturity stages for each of the capabilities. Organisations should assess themselves against the framework and undertake the recommended tasks to improve, as relevant to their context. Each organisation should set their own target for improvement. Some of the tasks will overlap with other areas of the action plan.	NHS GM, NHS Trusts		2027	Engagement & Awareness	H1, H2, H3, H4, I9, H6, GM-H15	Building Adaptive Capacity
CCA2	Strengthen partnerships and collaboration between organisations across the system.	A collaborative multi-stakeholder approach to climate adaptation is essential as no single organisation will hold all of the knowledge, resources and skills. This action involves all partners playing their part in community, locality, city-region and national action. Each organisation should consider the stakeholder landscape in which they operate and how they interface from a healthcare sector perspective to make the most efficient use of available resource and build capacity around adaptation solutions using coproduction principles.	System wide	VCFS Sector, 10GM, GMCA, LAs	Ongoing	Governance & Finance	H1, H2, H3, H4, H6, GM-H15, E3, E8	Building Adaptive Capacity
CCA3	Integrate climate vulnerability intelligence and improve understanding of climate risks within prevention activities and	This requires strengthening the understanding and ability of services and staff to respond to climate related health risks by utilising and embedding climate vulnerability data and building the understanding of staff that work with the most vulnerable groups. Climate vulnerability datasets can be incorporated into the GM Health and Care Intelligence Hub, prevention programmes can include climate related risk considerations, and	System wide	NHS GM, Trusts, Primary Care, Clinical teams, NHSE	2027	Clinical Services	H1, H2, H3, H6, GM-H15, BE9	Building Adaptive Capacity

	clinical services.	training and resources can be promoted to staff working with high-risk groups.						
CCA4	Monitor the impact of extreme weather events on the healthcare sector, utilising and improving existing information and metrics.	Whilst preparedness should take priority, logging details of specific events builds an evidence base of the consequences of climate change for the healthcare sector and helps build the business case for adaptation. Trusts already report overheating events through the ERIC data returns although there are inconsistencies. Monitoring hospital admissions and excess deaths from heatwaves provides additional context to specific events and flooding incidents can be reviewed for both direct and indirect consequences for the sector.	NHS GM Sustainability Team	Trusts, UKHSA, EPRR teams	Ongoing	Clinical Services	H1, H2, H6, GM-H15, E4	Building Adaptive Capacity
CCA5	Support research opportunities aimed to increase health system climate resilience and understanding of climate change impacts.	This requires proactively providing health sector input into transdisciplinary research and innovation from across the GM system and beyond around Climate Change Adaptation and Health System Resilience. This will include knowledge exchange, sharing of data and providing support for and input into specific programmes. This is essential to inform policy, shape action and address gaps in the understanding of climate issues. Where there is a significant time ask, this will require assessment of available capacity and priorities.	NHS GM, Trusts	GMCA, NIHR Research Hubs, Health Innovation Manchester, Universities	Ongoing	Clinical Services	H1, H2, H6, GM-H15, BE4, BE9	Building Adaptive Capacity
CCA6	Undertake flood risk assessments across the NHS estate, prioritising sites where there are known	Flooding is a key risk from climate change and greater assessment of the vulnerability of our estates is required to understand and mitigate this risk, to determine potential impacts on healthcare access and delivery. A wide range of spatial datasets are available to highlight geographical areas and social vulnerabilities where there is a higher risk of flooding which requires concerted	NHS Trusts NHS GM Sustainability Team (Primary Care).	GMCA, LAs, Environment Agency, NHSPS, CHP and Primary	2026	Estates	H1, H6, BE2, I9, E4	Building Adaptive Capacity

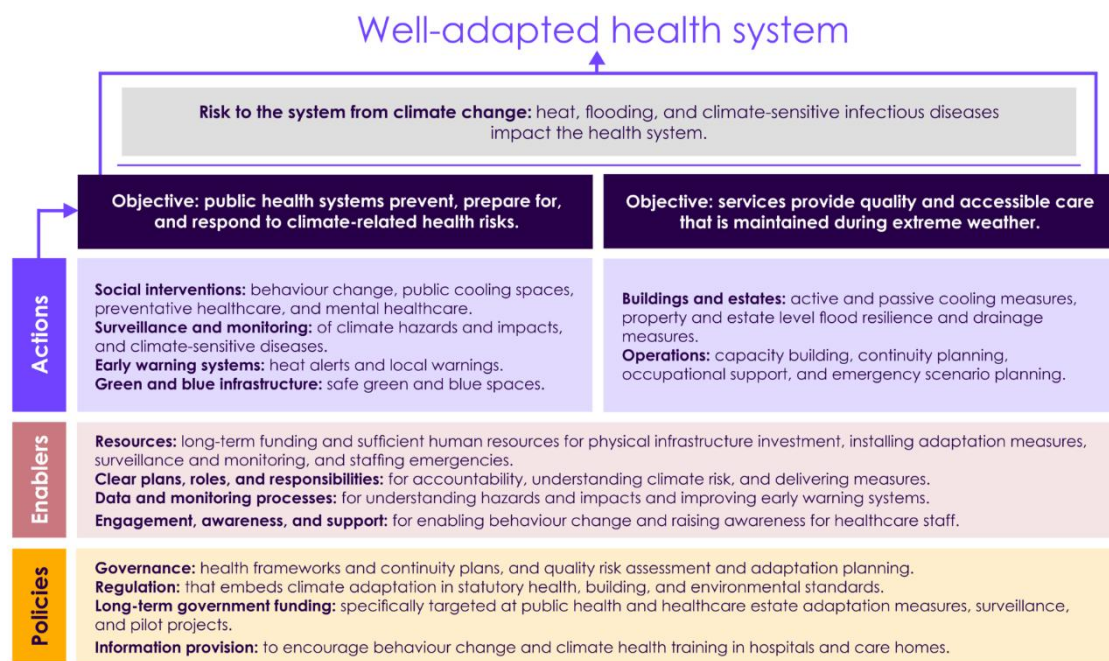
	vulnerabilities.	action to address. Delivery of measures to address identified issues will be required across a range of stakeholders.		Care Networks, Estates Teams				
CCA7	Identify and deliver nature-based solutions on high-risk healthcare sites to reduce vulnerability to the current and expected impacts of climate change.	Biodiversity Net Gain (BNG) is a statutory requirement and the GMCA Local Nature Recovery Strategy (LNRS) is the statutory strategy across all ten districts, with climate adaptation stated as one of its purposes. Nature based and SuDS solutions provide shading, cooling and water management functions to reduce vulnerability. They have broader co-benefits such as providing amenity spaces, sequestering carbon, reducing noise and supporting local biodiversity. This action applies to both planned enhancement of existing outdoor areas and new developments to provide functional green spaces that enhance resilience, moving from ornamental green spaces to those that provide a range of ecosystem services, as part of complying with statutory planning requirements.	NHS Trusts and Primary Care	GMCA, LAs	Ongoing	Estates	H1, H6, BE2, I9, E4	Delivering Adaptation Action
CCA8	Identify and deliver healthcare building adaptations to reduce vulnerability to the current and predicted impacts of climate change.	Building level interventions can help users cope with extreme weather events. For example, reflective surfaces and shading, improved insulation and passive cooling deliver both net zero and adaptation outcomes. Paved surfaces can be replaced with permeable to help manage stormwater. Measures should be considered as part of both building refurbishment and new developments (larger new developments will need to comply with the NHS Net Zero Building Standard). Measures can address particularly vulnerable areas – e.g. medicines storage facilities or whole buildings. Several Health Building Notes (HBN's) are relevant to this action e.g. HBN 00-07 which focuses on a resilient estate.	NHS Trusts and Primary Care	GMCA, LAs	2027	Estates	H1, H6, BE2, BE4, I9, E4	Building Adaptive Capacity
CCA9	Integrate climate adaptation into strategic	As the Strategic Commissioner, NHS GM has a role to play in considering climate adaptation in the commissioning of services and ensuring that	NHS GM	NHSE	2027	Clinical Services	H6, GM-H15, I1,	Building Adaptive

	commissioning process.	providers have taken steps to adapt to the current and predicted impacts and not just mitigate their emissions. This action requires considering the whole strategic commissioning cycle and working with commissioners to integrate adaptation considerations into the process. It is anticipated that this will be delivered in a phased manner, and there are interdependencies with national policy, frameworks and training.					BE2, I8	Capacity
CCA10	Improve understanding of climate-related supply chain disruptions and use to inform action.	Climate related supply chain disruption will increasingly impact the supply of raw materials, manufacturing and distribution of critical healthcare supplies, compounding existing geopolitical and economic risks. Whilst the assessment of risks and solutions will be led by other organisations, for example, NHS Supply Chain, climate risk should be integrated into local policy and processes. There is an interface with other Green Plan priorities – for example, adopting circular economy principles in relevant procurements reduces the vulnerability to disruptions to the supply of single use products.	GM NHS Procurement Team	NHSE, GMCA, TfGM, LAs	2026	Supply Chain & Supporting Infrastructure	H6, E3, I1, BE2, I8	Building Adaptive Capacity
CCA11	Improve understanding of financial support available for adaptation measures.	Whilst some climate adaptation actions require limited resources, others require substantial financial investment across the system. This action focuses on building the understanding of financing options available and promoting key opportunities.	NHS GM, System wide	GMCA	Ongoing	Governance & Finance	H1, H3, H4, H5, I9, GM-H15, I1, BE2, I2, I5	Building Adaptive Capacity

6.2. Adaptation Monitoring Framework

CCRA4 sets out the ambition for a well-adapted health system and the actions, enablers and policies required to deliver it⁹¹. The monitoring map for this framework will guide the delivery of the actions in this CCAP and is shown in figure 16 below.

A more detailed version of this figure is available in the Climate Change Committee's [Adaptation Monitoring Framework](#).



A more detailed version of this figure is available on the CCC website.

Figure 16: Monitoring map for the health system, CCRA4.

6.3. Governance and Reporting

This Climate Change Adaptation Plan falls under the governance of both the NHS GM Green Plan 2025-2028 as well as Trust Green Plan governance. Strong governance structures and partnerships across the system are required for its implementation.

To ensure the delivery of the adaptation plan, a Climate Change Adaptation Working Group has been established to oversee the GM-wide and shared actions and will report to the NHS GM Green Plan Oversight Group (GPOG). Regular updates and key decisions will be communicated to other relevant groups and within communications briefings. The adaptation plan will be updated in line with significant changes to guidance.

Other sub-groups to support the delivery of the Climate Change Adaptation Plan include:

- Operational Sustainability Leads Group, which includes Trust leads, representation from local authority climate leads and workstream specialists such as TfGM, GMCA and Natural England. The group is a forum for sharing good practice and ensuring a system-wide approach to delivery.
- Sustainability and Social Value Procurement Forum focuses on sustainable procurement within secondary care, and reports into the GM Procurement Forum.
- GM Pharmacy Sustainability Group focuses on the role of pharmacy within climate action and sustainability. Comprises of secondary care pharmacists supported by some Trust sustainability leads, and reports into the GM Provider Chief Pharmacists Collaborative.

6.4. Finance

It is important to recognise that some of the actions presented within this Climate Change Adaptation Plan will require financial resources for their implementation. Investment will be required within provider Trusts and Primary Care, in the form of staffing and costs of specific adaptation measures, including at system level to ensure the effective co-ordination and delivery of the Climate Change Adaptation Plan.

To successfully adapt to the present and future risks of climate change the NHS will need to leverage existing funding streams, working within financial envelope constraints, and explore innovative financing arrangements, including through research opportunities and other external funding opportunities. The integrated care system across GM, and the NHS nationally faces significant financial challenges, and more recently large-scale reform and restructuring.

In the face of these current challenges, investing in climate change adaptation is essential to ensure the resilience of our healthcare system and can lead to long-term financial benefits, with co-benefits for health and wellbeing. For example:

- Investing in energy efficient and climate resilient buildings will reduce operating and insurance costs and support better inpatient health and wellbeing. Investing in retrofitting existing healthcare facilities is likely to provide high net benefits, with a benefit-cost ratio of approximately 2:1 if patients are cooled in a hospital setting. In most areas of England and Wales, addressing the health impacts of heat by installing low-cost passive cooling for those buildings most at risk is estimated to be cost-effective within the next five years⁹²,
- Creating jobs for building adaptation and enhancing green infrastructure provides benefits for the local economy,

- Implementing sustainable adaptation measures at NHS sites may lead to long term cost savings. A GM 2018 business case by Water Resilient Cities presented the case of installing Sustainable Drainage Systems (SuDS), finding that within the programme 249 schools and NHS sites could make combined savings of more than £300,000/ year, alongside co-benefits of reducing flood risk, improving air quality, increasing green space and biodiversity,
- Extreme weather events can cause huge disruption and costs if healthcare delivery is impacted and sites are not resilient to climate change impacts. E.g. During 2022 July heatwaves, an IT outage cost one London Trust £1.4 million and over 100 treatment delays.
- Adaptation measures across the health and social care system and public health can also reduce extreme heat-related mortality and morbidity. In 2050 heat-related mortality could be reduced by almost 40% compared to projected levels with a cost-effective adaptation package. This cost-effective package has a 1.3:1 benefit-cost ratio from the present-day to 2050s.⁹³

Additionally, the UK government endorses the Task Force on Climate-related Financial Disclosure (TCFD) framework. Guidance has been produced for public sector organisations, including NHS, to encourage incorporating climate related disclosures into annual reports. The aim of this is to enable organisations to build resilience and strategic plans to show long term value in improving climate change risk management and response efforts.⁹⁴

Climate related risks and financial impacts are required to be disclosed under TCFD - for example, increased cost of NHS goods due to change in input prices (e.g. energy and water) and the cost of damage to property and assets.

Appendix 1: Organisation Specific Climate Change Adaptation Actions

This annex is designed to be used alongside the main climate change adaptation action plan to identify additional site-, organisation- or asset-specific climate risks and associated actions. For example:

- Vulnerability of a site to flooding due to physical and geographical factors, such as proximity to water bodies,
- On-site data centres or critical infrastructure such as an emergency generator that is particularly vulnerable to overheating or flooding,
- Localised flooding affecting key access routes to site,
- Pharmacy storage at risk of overheating in extreme heat,
- Proximity to areas where wildfires could break out resulting in impacts on respiratory admissions and ventilation requirements,
- Overheating of inpatient areas built pre-1990 affecting cardiac, maternity and stroke wards during summer peaks,
- Failure of air handling units during prolonged heat periods,
- Inability of roofing and/or guttering to handle high-intensity rainfall leading to water ingress.

This enables the climate change adaptation plan to be tailored to the needs of each individual healthcare organisation. The annex also includes a space for describing local governance arrangements for overseeing delivery of the action plan.

There are several tools and resources that can be used to undertake a local risk assessment. These should be used to develop an organisational overview of climate driven risks and mitigations, which are not covered under the more generalised sector specific risks included within the main climate change adaptation action plan. It is not intended to duplicate any local emergency plans, and the risk and action table should encompass any relevant activity that is already underway.

Tools and Resources Checklist (please note this is provided for guidance only and is not intended to be exhaustive)	Reviewed and applied Y/N
• GMCA climate change risk assessment and using GM vulnerability mapping Climate Risk and Vulnerability	
• LA climate change risk assessment and adaptation plan	
• NHSE Climate Change Risk Assessment (CCRA) tool and framework NHS England » Climate adaptation resources	
• Local estates and service risk assessments	
• Capability gap analysis e.g. utilising A climate adaptation framework for NHS organisations in England - weADAPT	
• Organisation risk registers	
• Consult local emergency planning (EPRR) teams	
• Gov.uk flood risk service - includes postcode check and datasets for different types of flooding risk	
• NHS Flood Risk Toolkit (Okta)	
• 6 Facet Survey	
• Met Office UKCP projections	
• Review critical clinical service dependencies e.g. pharmacy, pathology	
• Public Health climate vulnerability indicators to reflect socio-economic and demographic exposure	

Risk and Action Table

Number	Risk	Likelihood (1-5)	Impact (1-5)	Risk Score/25	How was the risk Identified?	Owner	Action	Timeline
<i>Example 1</i>	<i>Greenwood Building at risk of flooding from the Medway Brook.</i>	3	4	12	<i>GM Climate Risk Mapping</i>	<i>Estates Lead</i>	<i>Create buffer zone/SuDS at site perimeter to act as a barrier and slow down runoff</i>	<i>Sep 2028</i>
<i>Example 2</i>	<i>Greenwood Building prone to roof leaks in periods of intense rainfall, disrupting diagnostic testing capability</i>	4	4	16	<i>6 Facet Survey</i>	<i>Estates Lead</i>	<i>On capital plan for roof replacement in Autumn 2026</i>	<i>Dec 2026</i>

Actions can also be categorised, for example: low cost/no regrets, requires capital investment.

Local Governance Arrangements

The following list are example arrangements for local governance; however, these will differ by organisation.

Governance Measure	Detail (examples)
<i>A structured review timetable for Trust Appendix</i>	<i>This Appendix will be reviewed once annually in line with Green Plan review</i>
<i>Nominated senior sponsor and operational lead</i>	<i>Chief Finance Officer and Sustainability Manager/Head of EPRR</i>
<i>Adaptation oversight group</i>	<i>Suggested members from Estates, Operations, Sustainability, EPRR. Or incorporate into existing Trust Green Plan governance group.</i>
<i>Board oversight</i>	<i>The Board receive annual updates via the Green Plan annual performance report and formal Trust sustainability disclosure.</i>
<i>Reporting hierarchy diagram</i>	<i>Included within the Green Plan</i>
<i>Membership of external adaptation planning groups including LA climate forums.</i>	<i>XXX is the Trusts representative on the LA Climate Forum which meets monthly. XXX provides key updates to the Green Plan group.</i>

Appendix 2: Legislative and Policy Drivers

National	
NHS England Emergency preparedness, resilience and response: core standards.	NHS England » Emergency preparedness, resilience and response: core standards
NHS England. NHS Standard Contract	NHS Standard Contract
UK Legislation. Climate Change Act 2008	Climate Change Act 2008
UK Legislation. Health and Care Act 2022	Health and Care Act 2022
UK Government, Policy Paper, Third National Adaptation Programme (NAP3)	Third National Adaptation Programme (NAP3) - GOV.UK
NHS England. 4 th Health and Climate Adaptation Report.	NHS England » 4th Health and climate adaptation report
UK Climate Change Risk Assessment 2022 (CCRA3)	UK Climate Change Risk Assessment 2022
A Well-Adapted UK – UK Climate Change Risk Assessment 2026 (CCRA4)	A Well-Adapted UK - Climate Change Committee

Greater Manchester	
Greater Manchester Climate Change Risk Assessment	13B GM CCRA Report Final v2.pdf
Greater Manchester 5 Year Environment Plan 2025-2030	Greater Manchester Five-Year Environment Plan 2025–2030
NHS Green Plan 2025-2028	Green Plan Greater Manchester Integrated Care Partnership

International	
The Paris Agreement 2015	The Paris Agreement UNFCCC
United Nations Sustainable Development Goal 3	Goal 3 Department of Economic and Social Affairs
United Nations Sustainable Development Goal 13	Goal 13: Climate action - The Global Goals
WHO Measuring the Climate Resilience of Health Systems 2022	Measuring the Climate Resilience of Health Systems

Appendix 3: Abbreviations

AHAH	Access to Healthy Assets and Hazards	IT / ICT	Information Technology / Information Communication Technology
AMOC	Atlantic Meridional Overturning Circulation	LA	Local Authority
CCAP	Climate Change Adaptation Plan	MCR	Manchester Climate Ready
CCRA	Climate Change Risk Assessment	MECC	Making Every Contact Count
CCRA3	The UK's Third Climate Change Risk Assessment	NAP	National Adaptation Programme
CCRA4	The UK's Fourth Climate Change Risk Assessment	NHS	National Health Service
COP 21	2015 UN Climate Change Conference	NHSE	NHS England
COPD	Chronic Obstructive Pulmonary Disease	NHS GM	NHS Greater Manchester
CQC	Care Quality Commission	NHSPS	NHS Property Services
EPRR	Emergency Preparedness and Rapid Response	NIHR	National Institute for Health and Care Research
ERIC	Estates Return Information Collection	NO ₂	Nitrogen Oxide
GDP	Gross Domestic Product	NW	North West
GM	Greater Manchester	O ₃	Ozone
GM CCRA	Greater Manchester Climate Change Risk Assessment	PM	Particulate Matter
GMCA	Greater Manchester Combined Authority	PTSD	Post Traumatic Stress Disorder
GP	General Practitioner	SDGs	Sustainable Development Goals
GPOG	Green Plan Oversight Group	SuDS	Sustainable Drainage Systems
GWL	Global Warming Levels	TBE	Tick Borne Encephalitis
HECC	Health Effects of Climate Change	TCFD	Task Force on Climate-related Financial Disclosure
ICB	Integrated Care Board	TfGM	Transport for Greater Manchester
ICP	Integrated Care Partnership	UKHSA	UK Health Security Agency
IMD	Index of Multiple Deprivation	UV	Ultraviolet
IPCC	Intergovernmental Panel on Climate Change	UN	United Nations
		VCFSE	Voluntary, Community, Faith and Social Enterprise
		WHO	World Health Organisation

Appendix 4: Glossary

AMOC	An ocean current system called the Atlantic Meridional Overturning Circulation, which influences our climate.
Climate change	A long-term shift in global temperatures and weather patterns.
Climate change adaptation	Action to prepare for the current or expected impacts of climate change, in the short, medium, and long term.
ERIC	The Estates Return Information Collection collates information on the running costs of providing, maintaining and servicing the NHS Estate. To find out more visit the NHS Digital website on ERIC .
Green Infrastructure:	Planned natural or semi-natural areas which enhance the environment by improving water quality, air quality, climate change mitigation and adaptation, biodiversity, as well as providing space for recreation/leisure.
Greener NHS	A campaign to tackle the climate ‘health emergency’ including a national team to support the programmes of work which is currently part of NHSE. To find out more visit the Greener NHS website .
Integrated Care Board	The statutory body responsible for planning and funding NHS services in a geographical area.
Integrated Care Partnership	The statutory committee that brings together broad system partners including LAs, VCFSE, and NHS to develop a health and care strategy for a geographical area.
Integrated Care System	Partnerships between health organisations within a geographical area to collectively plan health and care services to meet the needs of their population and tackle health inequalities.
MECC	Making Every Contact Count is an approach to behaviour change that uses interactions with health and social care professionals to support positive changes in health and wellbeing.
SuDS	Sustainable Drainage Systems are a flood adaptation measures which is used to manage surface water in ways that are similar to how water is managed in nature.

Appendix 5: Stakeholder List

Those stakeholders included in the GM and Manchester Climate Ready CCRA risk identification workshops were:

- Greater Manchester Local Authorities and the Greater Manchester Combined Authority, including from:
 - Public Health
 - Planning
 - Housing
 - Emergency Response
 - Civil Contingencies
 - Education
 - Digital
 - Highways
 - Investment
 - Natural Environment
 - Business
 - Ageing
 - Neighbourhood and Community
 - Sustainability and Environment
- Greater Manchester NHS, including Emergency Preparedness, Resilience and Response, Public Health, and Environmental Sustainability
- Transport for Greater Manchester, including Resilience and Carbon Teams
- Greater Manchester Resilience Unit
- Natural England
- Environment Agency
- British Red Cross
- Greater Manchester Business Growth Company
- Greater Manchester Business Board
- Private Housing Developers
- Social Housing Providers
- National Farmers Union
- United Utilities (regional water company)
- Electricity North West (regional electricity company)
- Manchester Climate Ready (MCR)

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- ¹¹ [The Paris Agreement | UNFCCC](#)
- ¹² [Goal 3 | Department of Economic and Social Affairs](#)
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