

**Manchester City Council
Report for Information**

Report to: Health Scrutiny Committee – 9 February 2022

Subject: An Introduction to the Impact of Climate Change on Health and Healthcare in Manchester

Report of: Director of Public Health

Summary

There is a growing body of evidence that demonstrates that climate change is one of the biggest public health threats and challenges we face. Health and climate change are intricately connected and it is clear that the effects of climate change, such as extreme weather events, poor air quality and impact on food will directly negatively impact health. We are already seeing the impacts of climate change in Manchester’s population and it is predicted that these impacts will worsen over time. Undertaking action to both reduce carbon emissions and adapt to the impacts of climate change is essential both for the immediate future and the longer-term.

The purpose of this report is to provide an introduction to climate change in Manchester and the city’s ambitions and activities to date. The report provides an overview of the impact that climate change is having, and is predicted to have in the future, on the health of Manchester’s residents and the potential impacts on healthcare services and facilities in Manchester.

Recommendations

The Health Scrutiny Committee are invited to;

1. Note the content of the report and in particular the strong link between climate vulnerability and health inequality.
 2. Consider how the content of this report could inform the future work planning of the Health Scrutiny Committee.
 3. Note the establishment of the Health and Wellbeing Climate Change Advisory Group.
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Wards Affected: All

Environmental Impact Assessment - the impact of the issues addressed in this report on achieving the zero-carbon target for the city

Climate change and health and are intricately connected. Evidence demonstrates that the effects of climate change such as extreme weather events, air quality and food will directly negatively impact health. We are already seeing the impacts of climate change
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in Manchester’s population, and it is predicted that these impacts will worsen over time. Undertaking action to both reduce carbon emissions and adapt to the impacts of climate change is essential both for the immediate future and for the longer-term. In addition, the city may be impacted by longer-term international events such as waves of new migration resulting from people being forced to move from areas most prone to climate change impacts.

Our Manchester Strategy outcomes	Summary of how this report aligns to the OMS
A thriving and sustainable city: supporting a diverse and distinctive economy that creates jobs and opportunities	Healthy and resilient residents and communities’ will be able to thrive in employment and opportunities which will support the local economy.
A highly skilled city: world class and home grown talent sustaining the city’s economic success	A healthy population living in a zero-carbon environment is essential for the city’s future economic success. In addition, providing people with the skills to obtain jobs in the zero-carbon sector will be important.
A progressive and equitable city: making a positive contribution by unlocking the potential of our communities	There is strong evidence to suggest that climate change and social inequality are linked with disadvantaged groups suffering disproportionately from the adverse effects of climate change. Supporting communities to be both healthy and resilient and adaptable to climate change will ensure that they are able to make a positive contribution and reach their full potential.
A liveable and low carbon city: a destination of choice to live, visit, work	Climate change has a negative impact on the city’s liveability with the most acute issues being flooding and heat stress.
A connected city: world class infrastructure and connectivity to drive growth	Zero carbon transport will enable Manchester resident to live healthy lives and significantly reduce the negative impact of poor air quality in the city.

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Background documents (available for public inspection):

The following documents disclose important facts on which the report is based and have been relied upon in preparing the report. Copies of the background documents are available up to 4 years after the date of the meeting. If you would like a copy please contact one of the contact officers above.

[MCC Climate Change Action Plan 2020-25](#)

[Manchester Climate Change Framework 2020-25](#)

[Manchester Climate Change Agency 2021 Annual Report](#)

[Approaches to Flood Prevention and Management](#), Environment and Climate Change Scrutiny Committee, 11 November 2021

[Build Back Fairer – COVID-19 Marmot Review: Housing, Unemployment and Transport](#), Economy Scrutiny Committee, 14 October 2021

[Building Back Fairer in Manchester](#), Health Scrutiny Committee, 13 October 2021

[Manchester Food Board Report](#), Environment and Climate Change Scrutiny Committee, 13 January 2022

[Manchester's climate risk: a framework for understanding hazards & vulnerability](#)

[A Breath of Fresh Air: Tackling the issue of poor air quality in Manchester](#),

Manchester Public Health Annual Report 2018

1.0 Introduction

- 1.1 There is a growing body of evidence that demonstrates that climate change is one of the biggest public health threats and challenges we face. The World Health Organisation (WHO) recognises that the climate crisis is upon us and that the consequences of this for our health are real and often devastating. WHO state that the climate crisis threatens to undo the last fifty years of progress in development, global health, and poverty reduction, and to further widen existing health inequalities between and within populations.
- 1.2 Climate change is already impacting health in a myriad of ways, including by leading to death and illness from increasingly frequent extreme weather events, such as heatwaves, storms and floods, the disruption of food systems, increases in zoonoses (diseases transmitted from animals to humans) and food, water and vector-borne diseases (parasites, bacteria, viruses), and mental health issues. In addition to this, climate change is undermining many of the social determinants for good health, such as livelihoods, equality and access to health care and social support structures. These climate-sensitive health risks are disproportionately felt by the most vulnerable and disadvantaged, including women, children, ethnic minorities, lower income communities, migrants or displaced persons, older populations, and those with underlying health conditions.
- 1.3 In 2021, many global records relating to extreme heat, floods, droughts, wildfires and hurricanes were broken and these weather impacts are part of a growing trend e.g., the hottest years on record have all been in this century. We are already seeing the impacts of climate change on Manchester's population, and it is predicted that these impacts will worsen over time. As such, undertaking action to both reduce carbon emissions and adapt to the impacts of climate change is essential both for the immediate future and for the longer-term.
- 1.4 The Paris Agreement is a legally binding international treaty on climate change adopted by 196 Parties at COP21 (Conference of the Parties) in Paris in 2015. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius (°C), compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions (GHG) as soon as possible to achieve a climate neutral world by mid-century. The recent COP26 conference in Glasgow marked a step forward in global efforts to address climate change, including a material increase in ambitions to reduce emissions across the world. If all the ambition is delivered an expected warming of just under 2°C might be achieved. However, current climate policies would not deliver close to these targets and consequently the world is currently on track to an expected temperature rise of approximately 2.7°C.
- 1.5 Even at 1.5°C warming essential systems will be affected, such as housing, transport, healthcare, food and water supplies, with more significant effects on already vulnerable communities. Climate adaptation and resilience measures today will help ensure the continued safety, security and prosperity of our

communities and industries. This requires direct action to reduce our emissions and support our communities to cope with the impacts of climate change¹. This will require a full system change and wide collaboration across all sectors.

- 1.6 In the short to medium-term, the health impacts of climate change will be determined mainly by the vulnerability of populations, their resilience to the current rate of climate change and the extent and pace of adaptation. In the longer-term, the effects will increasingly depend on the extent to which transformational action is taken now to reduce emissions and avoid the breaching of dangerous temperature thresholds and potential irreversible tipping points².
- 1.7 The purpose of this report is to provide a brief introduction and overview of the impact of climate change on health. The report focuses on the key areas impacted; extreme weather events, air quality, food, mental health and health services and facilities. It also provides an overview of activity being carried out in Manchester to reduce the impact of climate change in these areas.

2.0 Background

2.1 Climate Change in Manchester

- 2.1.1 In July 2019, Manchester City Council declared a Climate Emergency which recognised the need for the Council, and the city as a whole, to do more to reduce carbon dioxide (CO₂) emissions and mitigate the negative impacts of climate change. It also demonstrated the Council's commitment to be at the forefront of the global response to climate change and to lead by example. The Council had already adopted a science-based carbon budget for Manchester of 15 million tonnes of CO₂ between 2018 and 2100 following analysis by the Tyndall Centre for Climate Change Research. This also committed the city to become zero-carbon by 2038 at the latest.
- 2.1.2 In 2020, the Council's Climate Change Action Plan 2020-25 was developed to ensure that all aspects of the Climate Emergency Declaration were converted into clear actions with tonnes of CO₂ savings included where applicable. The Plan builds on over a decade of previous activity which has seen the Council's direct CO₂ emissions reduce by 54.7% between 2009/10 and 2019/20.
- 2.1.3 Since declaring a Climate Emergency, the Council has set about transforming the way it works to ensure that climate change is at the heart of the organisation and our work with partners, residents and with our young people. Our Corporate Plan priorities have been refreshed for 2020-21 to reflect the city's zero carbon ambitions, resulting in the inclusion of a new 'Zero Carbon Manchester' priority.
- 2.1.4 The Our Manchester Strategy sets out the commitment that '*Manchester will play its full part in limiting the impacts of climate change*'. The responsibility for

¹ [Statement by International Senior Scientific Advisers ahead of COP26 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/statement-by-international-senior-scientific-advisers-ahead-of-cop26)

² [COP26 Special Report on Climate Change and Health \(who.int\)](https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health)

developing and facilitating the delivery of the citywide strategy to fulfil this commitment is devolved to the Manchester Climate Change Partnership (MCCP) and Manchester Climate Change Agency (MCCA).

2.1.5 The Manchester Climate Change Framework 2020-25 (1.0) was published in February 2020 by the MCCA, following its approval by the MCCP. The Framework is the city's high-level climate change strategy for 2020-25 and states that:

'Manchester will play its full part in limiting the impacts of climate change and create a healthy, green, socially just city where everyone can thrive.'

2.1.6 The Framework has four headline objectives which are:

- Staying within our carbon budgets
- Climate adaptation and resilience
- Health and wellbeing
- Inclusive, zero carbon and climate resilient economy

2.1.7 The MCCA are currently working on 'version 2.0' of the Manchester Climate Change Framework 2020-25. This work will set out localised evidence-based targets for the six action areas of the Framework (buildings, transport, energy, food, what we buy and what we throw away, and nature-based solutions), renewed actions for residents and businesses, a detailed 2022-25 strategy for taking these actions forward and a reporting framework. It will also contain a more detailed plan for implementing adaptation and resilience action plans across the city. Public consultations are planned during spring 2022, and the final version is scheduled to be published in June 2022.

2.1.8 As part of the development of Framework 2.0, the Health and Wellbeing Board has recently approved the establishment of a Health and Wellbeing Advisory Group to the MCCA. The Advisory Groups role will support the development of Framework 2.0 by ensuring that the narrative at around climate, health and wellbeing is up to date and that progress is tracked against shared objectives. The first meeting of the new Advisory Group is due to take place in February 2022.

2.2 Health and Climate Change Overview

2.2.1 Climate change can impact health in two main ways: health outcomes and the health system and facilities. Some of these outcomes will have a greater effect on Manchester's residents than others but are listed below for completeness. The impact on health outcomes includes:

- Injury / death from extreme weather events
- Heat related illnesses
- Respiratory illnesses
- Water borne diseases
- Zoonoses (diseases transmitted from animals to humans)
- Vector borne diseases (parasites, bacteria, viruses)

- Malnutrition
- Non-communicable diseases
- Mental and psychological health impacts

The impact on health systems and facilities includes:

- Pressures on health care facilities with population growth and the movement of people

2.2.2 There have been a number of reports published recently that have emphasised the link between climate change and its impact on health. Several of these reports are referenced in this report and are suggested reading should the Committee members wish to delve further into this topic. These are:

2.2.3 **UK Health Expert Advisory Group** - the Expert Advisory Group was formed by the Committee on Climate Change (CCC) in 2020 to advise on developing an approach to assessing the health impacts of setting the sixth carbon budget covering 2033-2037, which will set a new path towards the target date of net-zero carbon emissions by 2050³. The key conclusion was that climate change is already damaging the health of populations in the UK and globally and has the potential to increase health inequalities. Actions to combat climate change, done in the right way, could improve health and health equity and that actions to improve health and health equity have the potential to reduce GHG emissions. The overarching actions proposed in the report are:

- Support a just energy transition that minimises air pollution from all sources
- Design and retrofit homes to be energy efficient, climate resilient and healthy
- Build a sustainable, resilient, and healthy food system
- Develop a transport system that promotes active travel and road safety which minimises pollution.

2.2.4 **World Health Organisation: Health & Climate Change**⁴ - Climate change has the ability to seriously alter public health and has already begun to do so. The WHO estimates that between 2030 and 2050 approximately 250,000 people will die annually as a direct result of climate change with at-risk population groups, such as infants and the elderly, to be particularly affected, but that if climate change continues unabated, other population groups will also be affected. Children, in particular those living in poorer communities, are among the most vulnerable to the resulting health risks and will be exposed longer to the health consequences. The health effects are also expected to be more severe for elderly people and people with infirmities or pre-existing medical conditions.

Although climate change may bring some localised benefits, such as fewer winter deaths in temperate climates and increased food production in certain

³ <https://www.theccc.org.uk/publication/ucl-sustainable-health-equity-achieving-a-net-zero-uk/>

⁴ [Climate change and health \(who.int\)](https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health)

areas, the overall health effects of a changing climate are overwhelmingly negative. Climate change affects many of the social and environmental determinants of health – clean air, safe drinking water, sufficient food and secure shelter.

2.2.5 Marmot Build Back Fairer in Greater Manchester: Health Equality and Dignified Lives⁵: The unfairness of economic and social arrangements, ethnic disadvantage and racism and the extent of health inequalities have been exposed and public and political appetite to remedy these has been increased. Key points relating to climate change highlighted in the report include:

- Direct and indirect impacts of climate change are a threat to health and health inequalities in Greater Manchester
- Immediate action to reduce Green House Gas (GHG) emissions can improve health and reduce existing health inequalities.
- The direct impacts of climate change on physical and mental health include: greater exposure to extreme heat/cold and UV radiation, more pollen, emerging infections, flooding and associated water-borne diseases, and impacts of extreme weather. Action to reduce air pollution, by reducing the burning of fossil fuels, will not only have immediate health benefits, but will also contribute to achieving net-zero greenhouse gas emissions.
- The indirect impacts of climate change on health and inequalities include increases in the price of food, water and domestic energy and increased poverty, unemployment and anxiety.

2.2.6 COP26 Special Report on Climate Change and Health⁶: The report details 10 recommendations which propose a set of priority actions from the global health community to governments and policy makers, calling on them to act with urgency on the current climate and health crises. The report highlights that the next few years present a crucial window for governments to integrate health and climate policies in their COVID-19 recovery packages. The health benefits from climate actions are well documented and offer strong arguments for transformative change – and this is true across many priority areas for action: adaptation and resilience, the energy transition, clean transport and active mobility, nature, food systems and finance. The health sector and health community are a trusted and influential, but often overlooked, climate actor that can enable transformational change to protect people and planet.

2.3 Vulnerability

2.3.1 As outlined in the ‘Manchester Climate Risk: A Framework for Understanding Hazards and Vulnerabilities’ report, we must consider vulnerability as well as hazard and exposure to climate change if we are able to gain a full appreciation of the risk. Vulnerability refers to the extent to which entities are at risk of being harmed by a hazard. The term is very broad and can include physical assets, the delivery of services and government economic, cultural and societal factors. As such when facing a climate hazard, people and

⁵ [Build Back Fairer in Greater Manchester: Health Equity and Dignified Lives - IHE \(instituteofhealththequity.org\)](https://www.instituteofhealththequity.org/)

⁶ [COP26 Special Report on Climate Change and Health \(who.int\)](https://www.who.int/)

infrastructure are exposed to the same potential losses but are not vulnerable in the same way. Vulnerability can therefore be quantified by both the degree of loss and the capacity to recover⁷.

- 2.3.2 The evidence shows that there is a clear and strong link between climate vulnerability and health inequality. Whilst this is evident in the impact that we are seeing in the city today, future vulnerabilities and inequalities are predicted to be much worse having a potentially devastating impact on the lives of our communities. Climate change will drive new health impacts as well as exacerbating existing health disparities. Action to tackle these vulnerabilities and inequalities is now time critical if we are to minimise future risk and impacts to health.
- 2.3.3 While no one is safe from the risks of climate change, the people whose health is being harmed first and worst by the climate crisis are the people who contribute least to its causes, and who are least able to protect themselves and their families against it; people in low-income and disadvantaged countries and communities. Despite historically being the least likely to contribute to climate change, people living in poverty are often the worst affected. Those already vulnerable in the city (living in poverty, living in low income areas, children and the elderly) will be disproportionately negatively impacted by climate change and as such we need to ensure that the transition to a low carbon future is just and equitable.
- 2.3.4 Despite these impacts, it is recognised that the public health benefits from implementing ambitious climate actions far outweigh the costs and strengthening health resilience and building adaptive capacity will protect vulnerable populations from health shocks and promote social equity. In addition to this, the health co-benefits from climate actions are well evidenced and offer strong arguments for transformative change. A large body of evidence now shows that climate action aligned with Paris Agreement targets would save millions of lives due to improvements in air quality, diet, and physical activity, among other benefits.
- 2.3.5 Health professionals need to be involved in climate decision-making processes at all levels, to ensure health and equity considerations are well understood and accounted for when developing climate policies. Currently, many climate decision-making process do not account for health co-benefits and their economic valuation.

3.0 Extreme Weather Events

3.1 Overview

- 3.1.1 Climate change is predicted to increase the frequency and intensity of extreme weather events demonstrated with the past decade seeing warmer and wetter weather than previous decades. It is projected that the number of heat related

⁷ [Manchester Climate Risk: A Framework For Understanding Hazards & Vulnerability | Manchester Climate Change](#)

deaths will triple by 2050, with the hottest summers on record that we have observed in recent years, becoming simply “normal” summers. Climate change predictions in the UK by 2050 are as follows:⁸

- Hotter, drier summers with +5.6°C summer mean daily maximum temperature
- Warmer wetter winters with +28% winter mean precipitation
- More frequent and intense weather extremes

3.1.2 An emerging consensus is that as the planet warms, Manchester, like the rest of the United Kingdom, will experience long-term, persistent climate change as well as climate instability and variability. These forces will drive potentially significant climate stresses and climate shocks for the city. In short, weather events once considered to be outliers in terms of their extremity or rarity could become our new normal, underlining the necessity of work to embolden the city’s climate change adaptation and resilience policy and practice⁹.

3.1.3 There is evidence to suggest that we have already started to experience the effects of climate change in Manchester. Meteorological observations demonstrate that there has been an overall warming in the city’s year-round climate. As we progress through the century, Manchester, like everywhere else in the UK, is projected to see a gradual creeping upwards in temperature. This warming will be more pronounced in summer than in winter. In terms of headline weather hazards, flooding is Manchester’s most prominent extreme weather and climate change risk. Although currently relatively rare, droughts, heatwaves and wildfires will also occur more frequently and will need to be given much more attention. Storms and high winds will also present a further risk. Recently there has been a series of significant weather events across the city which are possible indicators of future weather extremes that the city might face more frequently.

3.1.4 The adverse direct impacts of climate change, particularly from flooding and higher summer temperatures/ heatwaves, on human health could be considerable. They will involve both exacerbating existing health inequalities and the introduction of new health risks for people. The human health impacts of climate change may disproportionately affect those who are already vulnerable. For example, heatwaves and air pollution exacerbated by climate conditions or moorland fires can cause death and serious illness, particularly in the elderly, children and those with pre-existing respiratory illness and cardio-vascular disease.

3.1.5 Flood water poses a (relatively small) risk of drowning and may harbour disease. Households that flood, but for whatever reason are unable to relocate either during the flood event or the process of reconstruction, report ill-health from living in damp homes. In addition to this, the experience of flooding can generate severe mental health and emotional impacts that may outlast the immediate impacts of events. Flooding can have impacts on health and wellbeing, with research showing that there are long term negative impacts on

⁸ [Greater Manchester Resilience Strategy 2020 - 2030 \(greatermanchester-ca.gov.uk\)](https://www.greatermanchester-ca.gov.uk/greatermanchester-resilience-strategy-2020-2030)

⁹ [Climate vulnerability framework.pdf \(manchesterclimate.com\)](https://www.manchesterclimate.com/climate-vulnerability-framework.pdf)

the mental health of people whose homes are flooded, or lives affected by flooding. In the longer-term, climate change could increase the risk of new pathogens and diseases borne by invasive insect species.

- 3.1.6 In January 2021, storm Christoph posed significant risk of flooding for the Didsbury and Northenden areas adjacent to the River Mersey. A Severe Flood Warning was issued, and an evacuation took place prioritising clinically extremely vulnerable, COVID positive, self-isolating and those people who were vulnerable and required assistance to evacuate. Although on this occasion the flood waters did not breach the flood basin, they did come within millimetres of doing so. This would have had a devastating impact across South Manchester and is clear evidence that the city may become more prone to more severe flooding in the future.
- 3.1.7 Climate projections suggest that Manchester will face warmer summers in the future. Associated with this there is an increased likelihood that we will face very intense hot spells (heatwaves). This could be a particular problem in the city centre where buildings retain their heat overnight and could cause an increased frequency and intensity of convectional rainfall. This could have significant impacts on the health of Manchester residents including an increased death rate for the elderly, very young and those with underlying health conditions. Thermal comfort will be negatively impacted producing consequences for people's ability to rest and sleep impacting health and productivity. There is an increased likelihood of moorland fires beyond the city with implications for air quality and residents' health.
- 3.1.8 Despite the negative impacts of climate change, it is possible that warmer summers and milder winters will encourage greater use of the outdoors and greenspace, potentially bringing benefits to physical and mental health.¹⁰ Increase and improving the natural environment also provides a place for exercise, with many health benefits including lowering the risk of cardiovascular diseases and other chronic diseases. Green and blue spaces can improve wellbeing and mental health, connect people and communities, and, with equitable access, help to reduce health inequalities. However, there will need to be constant monitoring of the balance of risks and benefits.
- 3.1.9 The first step to tackling current and future extreme weather events is to establish a comprehensive understanding of the specific climate risks in Manchester and the impacts that these will have on our residents and communities. Adaptation measure to mitigate the impact of extreme weather events include:
- Nature based solutions such as vegetation cover to provide cooling and shading, clean the air, and prevent flooding via natural drainage
 - Flood prevention and management
 - Increasing awareness, preparedness and resilience in communities
 - Ensuring buildings and infrastructure (both current and future developments) are resilient to the future impact of climate change including

¹⁰ [Climate vulnerability framework.pdf \(manchesterclimate.com\)](#)

access to sustainable, affordable fuel supply to mitigate against fuel poverty, allowing for natural cooling and protected from flooding.

3.2 Activity in Manchester

3.2.1 There is no single body responsible for managing flood risk in the UK and responsibility is shared across a number of bodies including DEFRA, the Environment Agency (EA), Local Authorities, Highway Authorities and United Utilities. As rivers and other watercourses flow through different local authority areas investment in flood risk management projects is at a regional rather than very local area with some of these are delivered by Local authorities and some by the Environment Agency.

3.2.2 Strategies to reduce flooding in Manchester include:

- Restoration of ordinary watercourses
- Improvements to trash screens
- EA activities on specific watercourses such as the River Mersey Strategy, Cringle Brook and Sinderland Brook Strategy.

3.2.3 For further information on flood prevention and management please see the report presented to [Environment and Climate Change Scrutiny Committee](#).

3.2.4 Delivery of the Manchester Green and Blue Infrastructure Implementation Plan directly supports the city to adapt to climate change. Specific actions that support this are the:

- Manchester Tree Action Plan
- Horizon 2020 GrowGreen project which includes the delivery of the West
- Gorton Community Park
- Tree opportunity mapping commission
- £1million tree planting programme

3.2.5 Manchester Climate Change Framework includes the high-level objective *'to adapt the city's buildings, infrastructure and natural environment to the changing climate and increase the climate resilience of our residents and organisation'*. As part of this work Dr Paul O'Hare was seconded from MMU to MCCA and has developed a 'Framework for Understanding Hazards and Vulnerability in Manchester'. As part of this work, it is recommended that a comprehensive city-wide risk assessment is undertaken. This work, and work to develop a vision, principles and actions for creating a more climate resilient Manchester, will be expanded upon in Framework 2.0.

4.0 Air Quality

4.1 Overview

4.1.1 Air pollution is a significant public health problem. Long term exposure (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular, respiratory diseases and lung cancer, but it is also linked to dementia,

cognitive decline and early life effects. Many people will also feel short term effects due to episodes of higher levels of air pollution, with effects on lung function, exacerbation of asthma and we also see increases in respiratory and cardiovascular hospital admissions.

- 4.1.2 Climate change and air quality are intrinsically linked. There is now a greater understanding that climate change mitigation can help to reduce air pollution and clean air measures can help to reduce greenhouse gas emissions. Levels of air pollution are driven primarily by emissions such as those from vehicles or industry, which contribute to climate change. This is a vicious circle as many experts note that more frequent and intense heatwaves could lead to more episodes of high ozone and particulate matter (PM) which could harm health¹¹.
- 4.1.3 NO₂ is primarily caused by the combustion of fossil fuels, particularly diesel, in transport. Particulate matter (PM₁₀ and PM_{2.5}) are also linked to the combustion of fossil fuels, including from domestic burning, as well as from the wear and tear of machinery associated with transport, and dust from construction work. Many of the sources of NO₂ are also sources of PM, and therefore measures to address NO₂ are likely to have some impact on PM levels. Overall, the effect that man-made air pollution in the UK has on mortality is estimated to be in the range of 28,000 to 36,000 deaths annually. In Greater Manchester, it is estimated that air pollution contributes to around 1,200 deaths each year¹².
- 4.1.4 Everybody is at risk of the negative impacts of air pollution but the most vulnerable people in society are hardest hit. Those most at risk include:
- *Unborn babies and children* - Air pollution has been linked to premature births, low birthweight, and miscarriage. Children are more vulnerable as their organs and immune systems are still developing. It can lead to childhood asthma, aggravate asthma attacks, lung damage and a lifetime of health problems.
 - *Elderly and those with health conditions* - Air pollution can really worsen some health conditions, leading to flare ups and triggering heart attacks and strokes. There is now research showing that air pollution potentially increases the risk of getting dementia.
 - *Adults, especially in cities, and drivers* - People who spend more time in areas with a high concentration of air pollution are most affected. That includes some drivers and people who spend a lot of time in cities.
- 4.1.5 In 2008, the Government passed the European Ambient Air Quality Directive into UK law which sets legally binding limits for concentrations of major air pollutants, including NO₂ and PM₁₀ and PM_{2.5}.
- 4.1.6 COVID-19 lockdowns have affected local air quality to varying extents. During the first national lockdown there were marked reductions in NO₂ levels at

¹¹ [Understanding the health effects of climate change - UK Health Security Agency \(blog.gov.uk\)](https://www.blog.gov.uk/2019/07/23/understanding-the-health-effects-of-climate-change/)

¹² GMCA 2020 Air Quality Annual Status Report [05 - ASR Greater Manchester 2021 \(ctfassets.net\)](https://www.ctfassets.net/05-ASR-Greater-Manchester-2021/)

urban and roadside automatic monitoring locations in Manchester due to lower volumes of traffic. As such Manchester met the national legal limits for all its air pollutants in 2020. Despite long-term monitoring trends indicating that there has been an improvement in air quality across the city, it is likely that during business-as-usual circumstances parts of Manchester will remain above the annual limit for NO₂.

4.2 Activity in Manchester

4.2.1 In order to tackle poor air quality the Greater Manchester Combined Authority (GMCA) published an [Air Quality Action Plan 2016 -21](#) (AQAP) in December 2016. The plan is structured around three themes:

- Reducing traffic by encouraging alternative travel modes
- Increasing efficiency by making the most appropriate use of roads and vehicles for different tasks
- Improving vehicles by encouraging fewer polluting vehicles to be used.

4.2.2 In July 2017 the Secretary of State issued a Direction under the Environment Act 1995 requiring seven Greater Manchester local authorities, including Manchester City Council to produce a feasibility study to identify the option which will deliver compliance with the requirement to meet legal limits for nitrogen dioxide in the shortest possible time.

4.2.3 With road transport responsible for approximately 80% of NO₂ concentrations at the roadside, and with so many parts of the conurbation having been identified by the Government Plan, the Greater Manchester local authorities recognised that solutions within local authority boundaries would result in a confused and uncoordinated approach to managing improvements in air quality.

4.2.4 As a result, GM has adopted a conurbation-wide approach to producing a [Clean Air Plan](#) informed by local modelling that identified that roadside NO₂ on 152 road links across all Greater Manchester authorities were forecast to exceed the legal Limit Value (40 µg/m³) beyond 2020. This has enabled one coherent set of effective measures, and associated mitigations and funds to be developed for the benefits of residents and businesses across the whole city-region; and it minimises the risk of unintended consequences, such as displacing existing, elevated NO₂ concentrations to other locations within Greater Manchester.

4.2.5 However, in developing GM's approach and in meeting the legal duty that Government has placed upon us, the Greater Manchester authorities have also been clear from the outset of the need to understand and address the economic consequences of the changes that the National Plan will bring for places and the businesses that operate within them.

- 4.2.6 GM has continued throughout to aim to develop a Clean Air Plan to maximise air quality benefits for all people living and working in GM, and minimise the negative impacts. The prescribed nature of the approach that GM must follow – the implementation of Clean Air Zones (CAZ) with specific categories determined nationally, shaped by legal action and national policy, mean that GM has had to push Government and its policy framework at each stage of the Plan’s development.
- 4.2.7 As directed by the Government in March 2020, the ten GM local authorities remain under a legal government direction to introduce a category C Clean Air Zone to achieve compliance with legal limits for NO₂ as soon as possible and by 2024 at the latest. Some vehicles, mainly commercial, that do not meet emission standards will pay a daily charge to travel into and around the Zone. Private cars, motorbikes and mopeds are not included. The Clean Air Zone is designed to improve air quality by encouraging upgrades to cleaner vehicles. It is not the same as a Congestion Charge Zone, where all or most vehicles are charged to drive.
- 4.2.8 The Zone is currently being introduced in two phases:
- **Phase 1 (30 May 2022):** non-compliant HGVs, coaches (can apply for a temporary exemption to 1 June 2023) and buses (including registered within GM or outside) and taxi and private hire vehicles not licensed in GM.
 - **Phase 2 (1 June 2023):** non-compliant vans, minibuses (including registered within GM and outside) and GM licensed taxi and private hire vehicles. GM coach operators and people with a compliant vehicle on order will be able to apply for an exemption to June 2023.
- 4.2.9 In developing the CAP, the ten GM authorities recognised from the outset that the introduction of a Clean Air Zone would be a major challenge for many individuals and businesses and must be accompanied by a fair package of financial support. The current plan includes £120m of government funding to support eligible GM businesses, organisations and people move to cleaner, compliant vehicles (through upgrades or retrofit) that meet emissions standards. A requested £10m Hardship Fund was not granted, however GM subsequently secured government’s agreement to an assessment mechanism to allow Clean Air Funds to be adapted as required based on evidence.
- 4.2.10 Since the GM CAP was consulted upon in late 2020 and agreed by GM authorities in July 2021 (subject to ongoing review with government), emerging evidence from businesses, trade and a commissioned report has highlighted significant challenges related to supply chain issues and price inflation. Based on this evidence, there is a fundamental concern that these global and national factors may impact on the ability of businesses and individuals to upgrade their vehicles – and whether the current financial support package agreed with government is sufficient. This could impact GM’s ability to meet air quality targets and protect people’s health.
- 4.2.11 The Greater Manchester Air Quality Administration Committee met on 20 January 2022 to consider this emerging evidence. The Committee agreed

to seek permission from the Secretary of State – as required by the legal direction – to pause the opening of phase two Clean Air Funds. These funds were due to open at the end of January 2022 for eligible vans, coaches, GM licensed taxis and private hire vehicles. GM Leaders have written to government to ask for an urgent joint policy review of the supply chain issues, to understand what this could mean for the GM CAP. This would seek to ensure that the funding and policy arrangements can be reviewed quickly to better reflect the additional costs and vehicle availability problems that businesses are facing, having heard the concerns of local businesses and traders impacted by the Clean Air Zone.

4.2.12 The Committee also confirmed that preparations to launch the first phase of the Clean Air Zone from 30 May 2022 will continue. The Greater Manchester Financial Support Scheme is currently open for applications from eligible bus and HGV owners, with further funding for the next tranche of businesses to help upgrade non-complaint HGVs, to be opened as soon as possible. The Committee also requested that those vehicles owners who had already placed orders pending funding opening at the end of January should be able to contact Clean Air GM for advice to ensure they are not detrimentally impacted by the decision to pause the opening of the funds, and that awards can be made where appropriate. In addressing some of the supply chain issues also impacting HGVs, a temporary exemption is in place for vehicle owners who can demonstrate they have placed an order for a compliant upgraded vehicle but are waiting on its delivery.

4.2.13 Other activity carried out in Manchester to improve air quality includes:

- **Electric Vehicles (EVs)** - Working with Transport for Greater Manchester (TfGM) and other GM districts to produce the EV Charging Infrastructure Strategy launched in October 2021 and install charge points in Manchester. The Council's waste contractor, Biffa, has replaced almost half of the city's diesel refuse-collection vehicles with emission-free electric alternatives. Working with TfGM to implement the eHubs programme in Ancoats, Chorlton and Whalley Range, co-locating electric car club vehicles with e-cargo bikes to provide alternatives to private car travel. In addition to this, from 2030 the UK Government will ban the sale of diesel and petrol vehicles. As such local authorities are working to increase the EV charging infrastructure to support a growing number of EVs.
- **Taxis** - Work has continued to improve taxi emissions. Further details are available in the GM Licensing Network's September 2020 report '[Greater Manchester Minimum Licensing Standards](#)'.
- **Planning** - Continuing with planning-development requirements, including air-quality impact and exposure assessments, and mitigation, such as EVC points, boiler-emission standards, and travel plans. The Council will be publishing an online guidance document for developers.
- **Domestic stoves and fireplaces** – In autumn 2021, the MCC-led domestic stoves and fireplaces campaign was launched to educate Greater Manchester residents of smoke-control rules covering the district, the impact of such appliances on indoor and outdoor air quality, and how to reduce these impacts.

- **City Centre Transport Strategy** – In March 2021, a refreshed [City Centre Transport Strategy](#) was published which prioritises walking as the main way of moving around the city centre and aims for 90% of morning peak journeys to the city centre to be made by sustainable modes by 2040.
- **Active Travel** - In 2017, a detailed GM-wide walking and cycling infrastructure plan known as the [Bee Network](#) was produced with £160million of funding made available through the Mayor’s Challenge Fund (MCF). Manchester has secured funding of approximately £79million of projects. During 2020/21, TfGM and Living Streets worked with 113 primary schools in GM to encourage walking to school. Fifteen of the schools were located in Manchester and saw an increase in active journeys. Walk to School and Walking Buses Routes is a TfGM and Living Streets programme promoted to all schools by Neighbourhood Teams. A total of 8,430 pupils from 20 Manchester schools have signed up to take part in the programme and established ‘walking bus’ groups. In the Government’s 2021 Budget £1.07bn of funding was allocated to Greater Manchester under the City Region Sustainable Transport Settlement following the GM bid submitted in September 2021.

5.0 Food

5.1 Overview

- 5.1.1 In the UK food system emissions represent 23% of total GHG emissions. Agriculture is a significant source of air pollution. One estimate suggests that in Europe a 50% reduction in agricultural emissions could result in a 19% reduction in air pollution mortality from PM.¹⁰⁰ These emissions are projected to increase in response to population growth and shifting to higher meat and dairy dietary intakes¹³.
- 5.1.2 Climate change is already having a negative impact on food and nutritional security, mainly through disrupted food production around the world. This is leading to considerable health burdens, especially in poorer parts of the world. These impacts also pose risks to the UK food system. Whilst foods like cereals, potatoes, dairy and eggs are predominantly produced in the UK, we are more dependent on imports for our supply of fruits, legumes and vegetables.
- 5.1.3 More work is needed to fully understand the effects that changes to our food supplies will have in the ability to have equal and equitable access to healthy and sustainable diets, and in turn the impacts this has on the health of the whole population.
- 5.1.4 The relationship between food and climate is complex, and warmer summers, milder winters and higher rainfall may influence the spread or transmission of foodborne pathogens (bacteria or viruses) and potential occurrence of illness and outbreaks of food poisoning. The impacts of climate on risks to our food will need to be monitored closely in the years ahead.¹⁴

¹³ A healthy future – tackling climate change mitigation and human health together [11365167 \(acmedsci.ac.uk\)](https://www.acmedsci.ac.uk/11365167)

¹⁴ [Understanding the health effects of climate change - UK Health Security Agency \(blog.gov.uk\)](https://www.blog.gov.uk/2021/03/23/understanding-the-health-effects-of-climate-change/)

5.1.5 Impacts of climate change on food include:

- *Nutrition* – as food prices rise, healthier food often becomes more expensive. High density food (highly processed food high in sugar and fat) is often cheaper than its less energy dense counterparts, and less affected by price rises.¹⁵
- *Food security / choice* – price and availability of certain food. Climate change initiatives may lead to the production of food away from GHG intensive foods e.g., meat. Increases in the price of food may lead to people choosing lower cost foods.
- *Food production and food waste* - Food is responsible for 15-30% of UK GHG emissions. Most of these occur within agriculture (45%), food manufacture (12%) and transport (12%). Meat and dairy consumption is responsible for over 50% of the GHG emissions from typical diets. Meat and dairy foods, particularly beef, lamb, pork and cheese result in 3-13 times more GHG emissions than vegetables and pulses. Around 30% of all food bought in the UK is wasted; a large source of GHG emissions (5-10% of UK total)

5.1.6 The UK is facing a crisis of increasing diet-related disease, with over 60% of adults being overweight or obese. The rates of obesity have more than doubled over the past 25 years, and currently cost the NHS £6.1 billion each year (projected to rise to £9.7 billion by 2050). At the same time, undernutrition affects around 5% of the UK adult population and around 10% of children are reported to be living in food-insecure households¹⁶.

5.1.7 Actions needed to be undertaken include:

- Eating more plant-based foods and less meat
- Avoiding over consumption and ultra-processed foods
- Reducing food waste

5.2 Activity in Manchester

5.2.1 In Manchester the Manchester Food Board (MFB) is an independent body, with members from organisations across the city including the economic, health, environment, housing, farming, and social sectors. The objectives of the MFB are to develop a food strategy for Manchester that:

- Secures access to sustainable, appropriate, and nutritious food for all people
- Promotes a vibrant food culture and helps create a dynamic and robust hospitality sector
- Creates more resilient supply chains
- Reduces the environmental impacts of the food system
- Facilitates collaboration, research and innovation in the food system

¹⁵ Food and Climate change, Food Standards Agency [1 \(food.gov.uk\)](https://www.food.gov.uk)

¹⁶ A healthy future – tackling climate change mitigation and human health together, The Academy of Medical Sciences, 2021. [11365167 \(acmedsci.ac.uk\)](https://www.acmedsci.ac.uk/11365167)

5.2.2 Key aims of the MFB related to climate change include:

- A food economy that contributes to the health and food security of people across Manchester
- Sustainable and viable local wholesale food supply
- Development of strategies to tackle potential environmental and financial threats
- Reduction in carbon emissions associated with food waste
- Sustainable food anchored at council level
- Reduction of environmental impacts from food

5.2.3 In October 2021 Manchester City Council at COP 26 signed the [Glasgow Food and Climate Change Declaration](#); a commitment by to tackle the climate emergency through integrated food policies and a call on national governments to act.

5.2.4 In November 2021 launch workshops were held for Ward Climate Action Plans East Didsbury and West Didsbury. Residents found out more about sustainable food, reducing food waste, and what they could do in their wards to support climate action on food. In doing so, individuals were inspired to become more active 'food citizens'. More of these events are planned to take place across the city over the next year.

5.2.5 The EU-wide Food Wave programme supports young people in campaigning for sustainable approaches to food consumption and production, climate change mitigation, and climate adaptation efforts. As part of this, a Food Wave Policy Seminar was held in the city focusing on food-related policy-making. The workshop was attended by over 60 young people and help them to influence policy making and create meaningful change in the food system.

5.2.6 For further information please see [MFB Action Plan Summary \(sustainablefoodplaces.org\)](#) and the [Manchester Food Board Report](#).

6.0 Mental Health

6.1 Overview

6.1.1 Evidence shows that high temperatures and severe weather events are linked to mental health issues and that eco-anxiety (worry about the environment) can cause psychological distress. Conversely, actions to mitigate climate change can positively influence mental health.

6.1.2 However, evidence is limited on the relationship between climate change and mental health; but it is sufficient to indicate that climate change can negatively impact on mental health. Some of the strongest evidence exists on a link between high temperatures and negative mental health effects. High temperatures and heatwaves have been linked to an increased rate of suicide and an increase in violent crime – which may in turn negatively impact mental health. High temperatures can also lead to poorer sleep quality and reduced

ability to work, leading to economic losses, which in turn can negatively impact mental health.

- 6.1.3 The experience of extreme weather events such as flooding or storms has been linked to an increased prevalence of depression, post-traumatic stress disorder and other anxiety disorders. This has been observed internationally and within the UK. Extreme weather events can also have negative economic consequences, for example if someone's business is destroyed, which in turn threatens mental health.
- 6.1.4 The Lancet Global Health states that poor mental health was estimated to cost the world economy approximately \$2.5 trillion per year in poor health and reduced productivity in 2010, with a projected rise to \$6 trillion by 2030. In England, the wider economic costs of mental illness are approximately £100 billion per year. Worsening mental health due to climate change will bring huge additional costs; on the other hand, some of the solutions to mitigating climate change can also improve mental health¹⁷.
- 6.1.5 Conversely, individuals living in urban areas with greater amounts of green space display lower levels of mental distress and higher levels of wellbeing compared to those living in urban areas with less green space.

6.2 Activity in Manchester

- 6.2.1 Activity to date in Manchester has been limited but some anecdotal evidence has been gathered by the Climate Change Youth Board. These are detailed below.
- *"I think climate change has a massive impact on my mental health. It causes a lot of anxiety and stress about my future."*
 - *"I have a lot of eco-anxiety and feel like I always need to act in accordance with my values. At times, striving to be a perfect climate positive advocate can be a great inconvenience."*
 - *"I feel pressure and scrutinised by close friends/ family/ social media on the actions, and activist work I am doing as well as being questioned on others inaction or action. I've recognised that I need a break from my activism work from time to time and needing a balance of this amongst my day-to-day life and other work."*
 - *"My friends want to do more, but don't necessarily know where to start or feel like there is a space for them in the climate movement. However, seeing more momentum with COP26 and other climate organisations brings them to raise questions and have these conversations within their home."*

¹⁷ [Climate change and mental health | The Bartlett - UCL – University College London](#)

7.0 Health Care System and Services

7.1 Overview

- 7.1.1 The NHS creates a substantial amount of greenhouse gasses and has an impact on the environment via the services that it delivers, its staff, travel and transport and its assets. It is estimated that the NHS accounts for approximately 5-6% of the UK's total GHG emissions, with most of the emissions coming from the supply chain. The NHS has reduced total emissions by 26% since 1990 achieved while the provision of care has doubled, the population has increased by 17%, and healthcare spending has tripled¹⁸. In 2020, the National Health Service (NHS) England was the first national healthcare system to make a commitment to have net-zero direct emissions by 2040 (indirect emissions by 2045).
- 7.1.2 The NHS Net Zero Strategy plots an ambitious, and feasible set of actions to respond to climate change. It also commits to building resilience and adaptation into the heart of the net zero agenda, understanding that these two issues must be tackled as two sides of the same coin¹⁹.
- 7.1.3 As a trusted and highly visible organisation, the NHS can add significant social and economic value through its actions. There is the opportunity for the NHS to demonstrate a system-wide (beyond sector) delivering on environmental, economic, and social sustainability and is well placed to measure and demonstrate the importance of health and other co-benefits when taking significant steps towards climate change mitigation and adaptation. It can do this by:
- Reducing demand for health services and capitalising on co-benefits
 - Health and environmental improvements via green space
 - Designing healthy and net-zero healthcare facilities²⁰
- 7.1.4 In early 2020 the NHS launched its '[For a Greener NHS](#)' campaign committing the NHS and its staff to take action to tackle the climate "health emergency", helping to prevent illness, reducing pressure on A&Es, and saving tens of thousands of lives. The campaign recognises that the causes of air pollution and climate change are often the same, and that the campaign will help address both. The campaign will build on the work already underway to help trusts and staff to cut emissions, energy use and waste, including phasing out oil and coal boilers and increased use of LED lighting and electric vehicles.
- 7.1.5 The NHS Health and Adaptation Report (December 2021) builds on the WHO adaptation framework buildings blocks of health information systems, health workforce development and resourcing, and service delivery. The report

¹⁸ A healthy future – tackling climate change mitigation and human health together, The Academy of Medical Science, 2021 [11365167 \(acmedsci.ac.uk\)](#)

¹⁹ [NHS-third-health-and-care-adaptation-report-2021.pdf \(england.nhs.uk\)](#)

²⁰ A healthy future – tackling climate change mitigation and human health together, The Academy of Medical Sciences, 2021 [11365167 \(acmedsci.ac.uk\)](#)

highlights that climate change is a threat to the significant progress made in health and social care to date, impacting the sector's ability to deliver services and manage population health. It recognises that actions must be taken to build the health and care sector's climate resilience, so it can effectively respond to climate change impacts while maintaining core functions and identifying lessons learned to reorganise if required ²¹.

7.2 Activity in Manchester

- 7.2.1 In January 2022 Manchester University NHS Foundation Trust (MFT) launched its Green Plan 'Code Green: Delivering Net Zero CO₂ at MFT'. The plan outlines the Trust's achievements to date and future steps that will be implemented to reduce both emissions and the Trust's impact on climate change and commits the Trust to be net zero carbon by 2038.
- 7.2.2 The plan recognises that MFT must both prepare their services for increased future demand, and also limit their carbon contributions to reduce any further damage to the environment. The breadth of the plan goes beyond the traditional estates-based opportunities to reimagine how MFT will deliver care in a net zero carbon NHS. It envisages that decision making will become more holistic, acknowledging sustainability impacts whilst continuing to protect patient safety as a priority. MFT's 'Single Hospital Service' provides a unique opportunity to address this challenge at scale, using local knowledge and working collaboratively across teams, hospitals and specialist services, to innovate and lead in the field of sustainable healthcare.
- 7.2.3 Traditionally many carbon reduction measures within MFT have focused on estates-based opportunities and, since 2017/18, major energy efficiency and infrastructure projects have been implemented to reduce wastage and prepare for future low carbon technologies. These actions contributed to a 5% reduction in energy consumption over this period.
- 7.2.4 Other achievements to date include:
- £18m of funding secured to decarbonise hospital buildings
 - 45% of MFT fleet is now electric
 - 1,405 tonnes of waste recycled annually
 - 50 clinical services delivering virtual outpatient appointments, reducing patient travel footprint
 - Desflurane (a GHG is used as an anaesthetic gas) use reduced to just 3% of all volatile anaesthetic gases
- 7.2.5 Actions outlined within the Green Plan include:
- Updating the Climate Change Adaptation Plan (CCAP) in 2021. MFT recognise that adaptation requires a cohesive approach to future planning and is embedded within multiple MFT policies and procedures.

²¹ NHS Health and Care Adaptation Report, December 2021 [NHS-third-health-and-care-adaptation-report-2021.pdf \(england.nhs.uk\)](https://www.nhs.uk/health-and-care-adaptation-report-2021.pdf)

- MFT is committed to taking all the precautions possible to maintain a consistent high level of care, recognising the increasing frequency and likelihood of extreme weather events. This will ensure that the health of those Manchester communities which are most vulnerable to the impacts of climate change, such as the homeless, elderly and economically deprived, are not disproportionately affected in the quality of care they receive.
- Investments in targeted interventions, such as nature-based solutions (e.g. trees, green spaces and sustainable urban drainage) to absorb flooding runoff and excessive heat, will help shield MFT hospitals from reaching critical operational limits. In addition to this the Trust has rigorous business continuity planning to ensure they are prepared for the consequences of more frequent, local extreme weather events.
- The Trust purchases 2.2 million patient meals a year and intends to use their purchasing power to invest in a positive food system. They will work closely with the supply chain to integrate as much local, seasonal, low carbon (including plant-based) and responsibly sourced food as possible into meal design.

8.0 Conclusion

- 8.1 This report demonstrates that climate change is one of the biggest public health threats and challenges we face. Health and climate change are intricately connected and it is clear that the effects of climate change, such as extreme weather events, poor air quality and impact on food will directly negatively impact health. We are already seeing the impacts of climate change in Manchester's population and it is these will only worsen over time unless significant, immediate action is taken.
- 8.2 It is essential that health professionals are fully aware of the impact that climate change will have on both the services delivered by the NHS and Public Health and the impacts on population health more widely. It is imperative that they are part of the action that needs to be undertaken to ensure that the city meets its zero carbon commitments and is prepared and resilient for the inevitable challenge climate change poses. As such it is imperative that a holistic approach is taken across the city.
- 8.3 There is a wide range of positive activity already being carried out in the city by a range of organisations to reduce carbon emissions and to prepare for the future impacts of climate change.

9.0 Recommendations

- 9.1 The recommendations are to:
- Note the content of the report and, in particular, the strong link between climate vulnerability and health inequality.
 - Consider how the content of this report could inform the future work planning of the Health Scrutiny Committee.

- Note the establishment of the Health and Wellbeing Climate Change Advisory Group.