

North Tyneside

Joint Strategic Needs Assessment

Climate Change

March 2025



North
Tyneside
Council

Introduction

This document summarises the potential impacts of climate change on the health and wellbeing of the population of North Tyneside. It identifies the potential negative health impacts of climate change and vulnerable populations most at risk.

It is predicted that North Tyneside will see drier, hotter summers and wetter, warmer winters by 2080. These altered weather conditions will see more frequent hazards, such as flooding and heatwaves, occurring.

Climate-related hazards will have direct health impacts on residents, as well as have the potential to disrupt the water, food, infrastructure, and supply systems we depend upon.

However, aligning health and climate change mitigation plans can produce health co-benefits for communities (such as improved air quality, more active travel options, and better insulated and/or ventilated homes). This document aims to show the importance of a connected climate and health strategy in building a healthier, greener, and thriving North Tyneside.

What is Climate Change?

The Earth's climate has been changing throughout its history, however it has recently been warming at an unprecedented rate.¹ Since the 1800s, climate change has been accelerated primarily by human activity.

Evidence of rapid climate change can be seen in global temperatures increasing, ice sheets shrinking, sea levels rising, and extreme weather events occurring more frequently. We are already seeing the impact of a changing climate on health and wellbeing globally.²

How will climate change impact North Tyneside?

The Met Office has produced climate scenario packs for each local authority area. These provide projections for climate change impacts, such as temperature, rainfall, and sea level rise. The figure below shows projections for North Tyneside, in which all modelled scenarios point to hotter, drier summers and warmer, wetter winters.

If local, national, and global mitigation measures are effective, a medium emissions scenario of 2°C global warming level could be achieved, meaning the risk of climate change impacts is reduced. However, if action is not taken to reduce carbon emissions, we could expect a high emissions scenario of 4°C which could result in more intense weather events.








		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	26.1 25.8 to 26.3	27.7 26.8 to 28.3	+1.8 +0.7 to +2.6	+2.5 +1.6 to +3.6	+5.5 +4.3 to +6.8
	Summer Average Temperature	14.6 14.6 to 14.6	15.5 15.2 to 15.9	+1.2 +0.8 to +1.7	+1.8 +1.2 to +2.2	+3.8 +3.2 to +4.3
	Winter Average Temperature	4.3 4.3 to 4.4	5.0 4.7 to 5.6	+1.0 +0.6 to +1.3	+1.3 +0.6 to +1.8	+2.7 +1.8 to +3.1
	Winter Minimum Temperature	-6.6 -6.8 to -6.4	-5.1 -6.3 to -4.3	+2.3 +1.7 to +3.4	+3.2 +1.7 to +4.3	+5.0 +4.2 to +6.2
	Annual Average Temperature	9.2 9.2 to 9.2	9.9 9.8 to 10.1	+1.0 +0.8 to +1.2	+1.6 +1.1 to +1.7	+3.1 +2.7 to +3.4
	PRECIPITATION	mm/day	mm/day	% change	% change	% change
	Summer Precipitation Rate	1.70 1.69 to 1.71	1.72 1.59 to 1.92	+6 -14 to +15	+2 -8 to +11	-16 -25 to 0
	Winter Precipitation Rate	1.56 1.55 to 1.57	1.55 1.47 to 1.76	+2 -8 to +7	0 -14 to +17	+7 -7 to +21

Figure 1: Local Climate Changes based on Global Warming Levels (GWL), Met Office Climate Report for North Tyneside, Generated 17th October 2024.

These changing climate conditions will pose the following hazards:**Error! Bookmark not defined.**

Heatwaves: Summers are predicted to become hotter and drier. The UK will experience longer, more frequent, and more severe heatwaves. Urban areas will be significantly hotter due to increased population and infrastructure density. This is known as the urban heat island effect.

Air Quality: Both indoor and outdoor air quality will be negatively impacted.

Outdoor: Higher temperatures can worsen air pollution, drought can increase the amount of dust particles, more wildfires can create smoke, and high winds can spread allergens like pollen and fungal spores.

Indoor: The energy efficiency of buildings, emissions from indoor sources such as cooking appliances, the presence of damp and mould, and external air quality can all impact on indoor air quality.

Flooding: Flooding is affected by landscape, flood management practices, soil type, river flow rates, building in flood risk locations, urban development, and drainage impact. It's predicted that warmer, wetter winters may lead to increased flooding. Whilst summers will be drier overall, more intense rainfall is expected to increase flooding risk.

Coastal erosion: Coastal erosion is increasing due to sea levels rising, increased storm activity, heavier rainfall, and the urbanisation of coastal environments. Increased erosion can lead to loss of natural or built coastal infrastructure and defences.

Wildfires: Combinations of lower humidity and low rainfall, higher temperatures and higher windspeeds may make wildfires more likely. The hotter, drier weather means the UK may see increased frequency, intensity, and scale of wildfires.

Below are the recent extreme weather events which have impacted the North East. The frequency of these weather events is increasing as a result of climate change and impacting residents, businesses, services, and infrastructure.

Weather Event	Date	Description
Storm Lilian	Aug 24	Strong winds up to 69mph across Northern England. Widespread power cuts.
Storms Isha & Jocelyn	Jan 24	A 99mph gust of wind is recorded in Northumberland.
Storm Babet	Oct 23	Sections of railings are destroyed at Sunderland's pier by large waves.
Flash Flood	Sep 23	Great North Run participants stranded due to disruption to the transport network.

Storm Otto	Feb 23	Strong winds across the North East.
Low Temperatures	Dec 22	The most significant spells of low temperatures the UK since December 2010.
Unprecedented Heatwave	Jul 22	Met Office issues first red warning for extreme heat. 37°C recorded in Newcastle.
Storms Dudley, Eunice, Franklin	Feb 22	Three storms hit the UK in the space of a week.
Storms Malik & Corrie	Jan 22	Widespread structural damage. The roof of a house is blown off in Gateshead.
Storm Arwen	Nov 21	The most powerful and destructive winter storm of the latest decade.
Storm Christoph	Jan 21	Blizzard conditions across the North East.

Figure 2: Past Weather Events, Met Office UK, available at <https://www.metoffice.gov.uk/weather/learn-about/past-uk-weather-events>

Key Issues

Data have been collated to identify the following key issues in North Tyneside:

- **Changing weather conditions** - Climate change will alter the average weather conditions seen in North Tyneside by 2080. North Tyneside will see drier, hotter summers and wetter, warmer winters.
- **Increasing climate-related hazards** - Altered weather conditions locally will result in an increase in hazards occurring (heatwaves, wildfires, poor air quality, flooding, coastal erosion). These hazards may threaten local and global water supplies, food production, local infrastructure, supply chains and our health and wellbeing.
- **Changing health impacts** - Climate-related hazards have the potential to impact residents' health, directly and indirectly in numerous ways. This JSNA outlines the health risks associated with climate change.

- **Importance of aligning health and climate** – There are potential co-benefits for residents' health if carbon net zero mitigation interventions are aligned to health plans.
- **Increased inequalities** – Both direct health impacts and potential co-benefits are unlikely to affect the population equally. There is the potential for existing health inequalities to be widened if there is not a greater understanding of how health intersects with climate change.

High Level Priorities

High level priorities are suggested below:

- Reduce the potential negative health impacts of climate change with particular focus on vulnerable groups.
- Ensure that the [UKHSA Adverse Weather and Health Plan](#) is adopted locally, with localised monitoring as recommended by the UKHSA.
- Local implementation of the [Hot weather and health guidance](#) and [Cold weather and health guidance](#).
- Ensure that all local adverse weather and hazard plans consider the full range of potential health impacts and vulnerable populations.
- Local implementation of the [DEFRA Air quality strategy](#) with regular reviews of Air Quality Action Plans and of the [local Air Quality Strategy](#).
- Consideration of how health co-benefits could be encouraged within climate change mitigation and adaptation plans, such as the Council's [Carbon Net Zero Action Plan](#).
- Highlight climate change benefits in related strategies, such as the physical activity strategy.

Those at Risk

Some communities are more vulnerable to the impacts of climate change than others. The extent of the impact of climate change on a group of people can be determined by:

- Sensitivity: the degree to which the individual is affected by a climate change exposure.
- Exposure: the contact between an individual and a climate-related hazard.
- Adaptive capacity: an individual or community's ability to cope with or evade exposure to a climate hazard.

Vulnerable groups include:

- Groups such as the elderly, children, pregnant people, certain occupational groups (for example those working outside), persons with disabilities, and those with chronic medical conditions are more adversely affected by climate hazards.
- Those living in areas of higher socioeconomic deprivation are more vulnerable and have greater exposure to climate hazards.
- Urban areas have disproportionate exposure to climate change impacts, especially among lower socioeconomic groups.^{3,4}
- Those living in socioeconomic disadvantage have the most to gain from some climate change mitigation measures which address health inequalities. These include improving access to green spaces and installing more efficient energy measures in homes.

The pre-existing conditions likely to become more prevalent with climate change could impact different population groups to different extents.

Asthma: More commonly diagnosed in children than adults.⁵ 11.6% of children aged 6–7 years old worldwide have a diagnosis of asthma.

Occupational asthma accounts for up to 15% of adult-onset asthma. Asthma accounts for 3% of primary care consultants in the UK.

COPD: Affects around 3 million people in the UK, 2 million of these are undiagnosed.⁶ The average age of diagnosis in the UK is 67 years. COPD is the second largest cause of emergency admissions and account for 1.4 million GP consultations per year.

Hypertension: 26% of the adults in England have hypertension.⁷ It's estimated that for every ten people diagnosed with hypertension another 7 remain undiagnosed and untreated. Prevalence increases with age, >60% of people aged >60 years old have a diagnosis.

Stroke: There are around 100,000 strokes every year in the UK.⁸ There are approximately 1.3 million people living with stroke. Strokes are occurring at an earlier age, age on onset in males in 68.2 years.

Coronary heart disease: 1.9 million people are living with coronary heart disease in England.⁹ 1 in 10 people die from coronary heart disease in England. It is the single biggest cause of premature death in 2019 and the leading cause of heart attacks. Incidence increases with age.

Diabetes: 3,919,505 people are diagnosed with diabetes in the UK, it's estimated this will be over 5 million by 2025.¹⁰ 1 million people with type 2 diabetes in the UK are undiagnosed. Although Type 2 diabetes occurs predominantly in all age groups, it's increasingly diagnosed in children.

Depression: The average age on onset in high-income countries in 25.7 years.¹¹ The average lifetime prevalence was 14.6% for adults in high-income countries.

Level of need: Climate change impacts on UK health

Climate change affects most health determinants by influencing the day-to-day weather conditions we experience. Climate change, both in the UK and abroad, can impact upon local health.

There are 3 main ways climate change can impact health:

1. Effects of extreme weather, such as heatwaves, flooding, wildfire, storms, and drought on physical and mental health (for example injuries and trauma, heat-related illness), as shown in Appendix 1.

Such events are expected to increase in frequency and severity in coming years.

2. Effects on the planet's life-support systems, such as rising sea levels and safe water availability, changing patterns of zoonotic and vector-borne disease (for example malaria, dengue fever), reduced pollination, and crop failure leading to food shortages.
3. Effects mediated by social systems, such as livelihood loss, rising prices of food and fuel, supply chain disruption, pressure on health and care services, conflict or forced migration.^{12,13}

Temperature changes

Older adults and those with chronic medical conditions are vulnerable to health harms from both hot and cold temperature extremes. Temperature-related deaths will primarily affect those aged 85+ years.²⁰

Hotter temperatures can increase cardiovascular risk factors, such as poorer glycaemic control, increased blood pressure, increased cholesterol, and reduced exercise. Heat related risks will increase substantially as shown in Figure 2, however the North East is predicted to have the lowest levels of heat-related deaths in the UK.

Cold-related deaths will be a greater concern for the region²⁰ as the risks are already present in England and will continue.

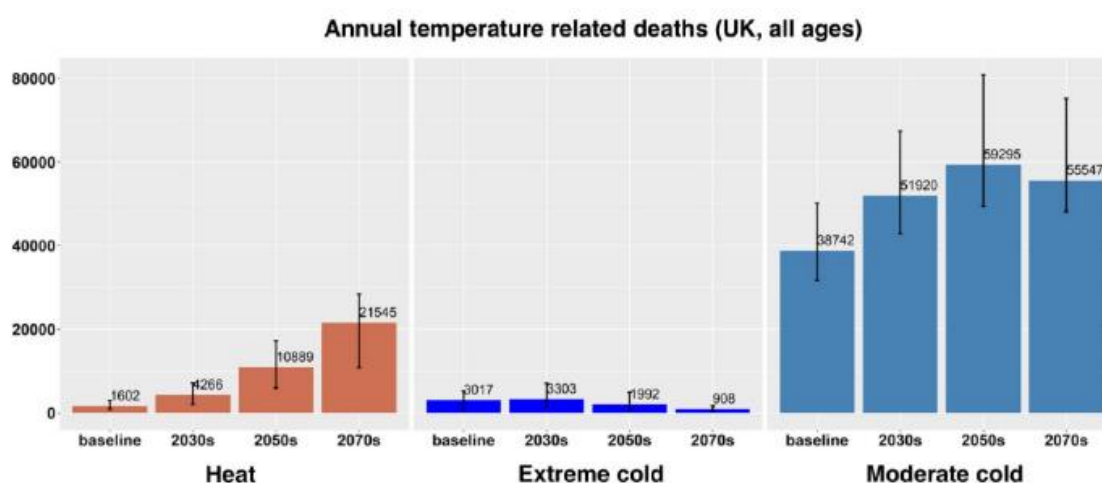


Figure 2 Project UK heat and cold deaths for all ages (Baseline= 2007-2018), UKHSA

Flooding

Flooding can pose multiple risks to health, such as deaths from drowning and physical injury through contact with flood waters or car accidents. Injuries can also occur from cleaning after a flood (including CO poisoning). Flooding increases the risk of hypothermia and infectious disease outbreaks, as well as exposure to industrial/agricultural chemicals. The risk of mental health impacts, such as PTSD, depression, and anxiety, is also increased following a flood.

There is predicted to be an increase nationwide of those at risk to flooding by 2080 as shown in **Error! Not a valid bookmark self-reference.3.**²⁰ Coastal communities are particularly at risk. Flooding does not impact populations equally, having very localised effects.

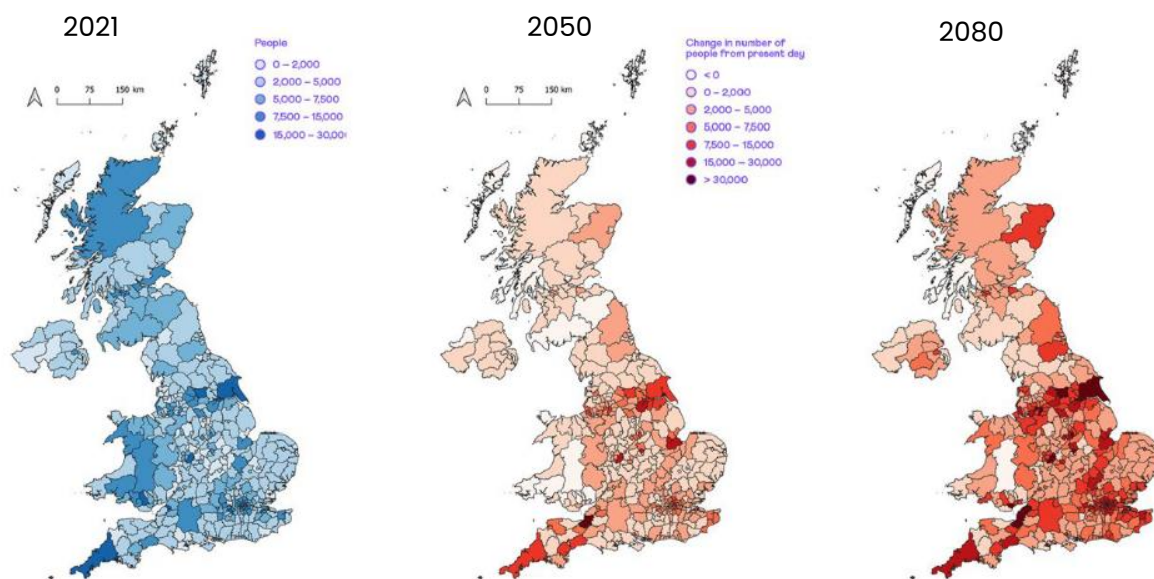


Figure 3: Change in the number of people at risk from flooding, UKHSA

Air pollution

Poor air quality can increase the risk of respiratory diseases, such as asthma and chronic obstructive pulmonary disease (COPD), and cardiovascular diseases, such as hypertension, heart attacks, and stroke. 0–19 year-olds can be susceptible to asthma due to particulate air pollution and some premature deaths in over 65's can be associated with particulate air

pollution. [The Chief Medical Officer’s Annual Report on Air Pollution](#) further summarises the health impacts of air pollution.¹⁴

The most common sources of air pollution are shown in Figure 4.¹⁵ Air pollution is affected by both local conditions as well as transboundary conditions. Contributions from transport in the Benelux region, large dust events from the Sahara, wildfires, and volcanic eruptions can all contribute to air pollution in the UK.

Communities who work or live close to major roads, such as the A1, A19, or Coast Road, will be more exposed to higher concentrations of air pollution. Low-income communities are often susceptible to the effects of air pollution.

The primary pollutants monitored in North Tyneside are NO₂, PM_{2.5}, and PM₁₀. These are primarily traffic related emissions. A 2023 report on air pollution within North Tyneside showed across all monitoring locations in the Borough, average NO₂ levels were recorded to be below the UK air quality objectives.¹⁶

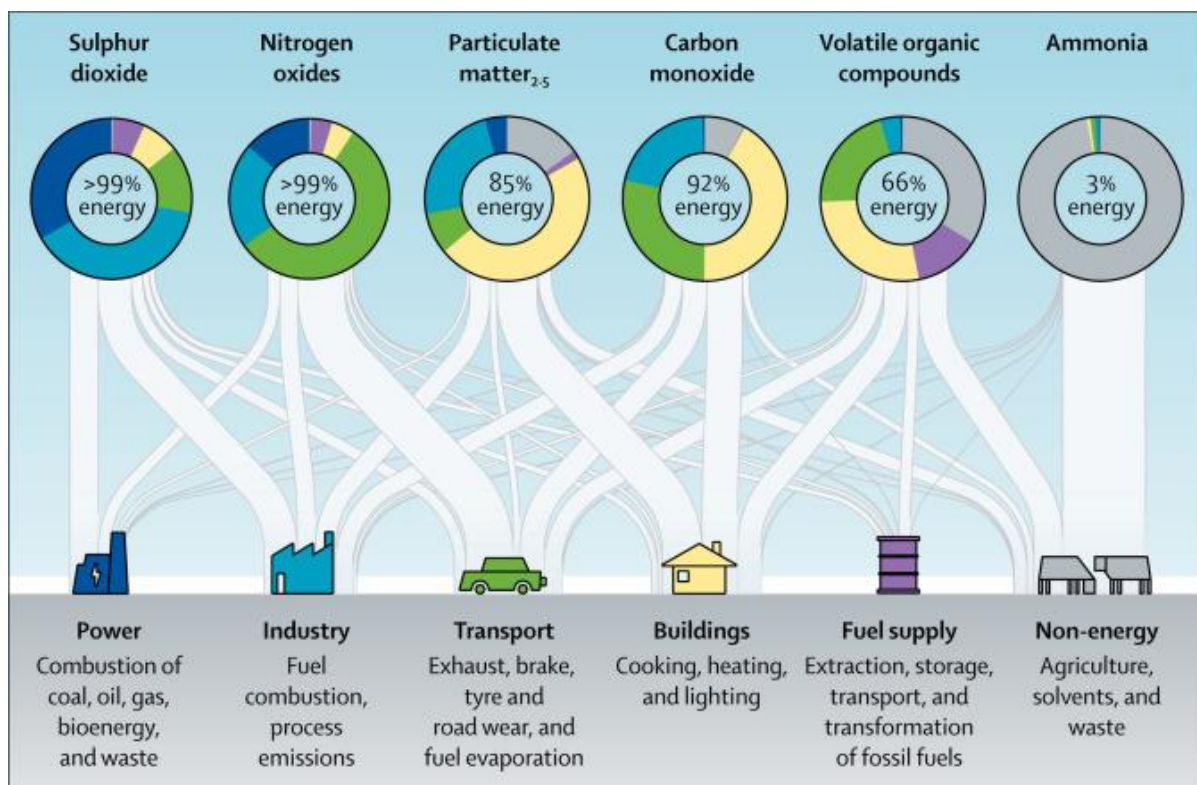


Figure 4: Sources of air pollution, Lancet, 2017

Outdoor airborne allergenic pollen and fungal spores

Aeroallergens are airborne particles that can cause or exacerbate allergic disorders, including pollen and fungal spores. Aeroallergens can trigger hay fever and exacerbate asthma which affects about 11% of the UK population.²⁰

Data remains limited, but there is suggestion of increased production of certain aeroallergens or longer seasons of exposure. Evidence suggests that there is likely to be a longer fungal spore season due to hotter summers with more intense periods of rainfall.²⁰

Infectious and vector borne diseases

Many infectious diseases are climate sensitive. Warmer temperatures can alter the geographical distribution of infectious diseases and extend the transmission periods of some diseases. Impacts of climate change on infectious diseases is unclear, but there is strong evidence that risk from *Salmonella*, *Campylobacter*, and *Vibrio spp* may increase in the future.²⁰ There is likely to be minimal change to influenza from climate change.²⁰

Tick and mosquito borne illnesses are likely to become more common in England, which may affect areas in the South of the UK first.²⁰ Tick numbers are already increasing in the UK with some increase in Lyme disease and tick-borne encephalitis seen.²⁰ There is concern that an invasive mosquito species may establish in the UK, with risk of dengue fever, chikungunya, Zika, and West Nile virus.²⁰

Food systems

The impact of climate change on food supply is shown in Figure 5.²⁰ Risk to food supplies will likely increase global food insecurity in the future. The key food groups that would particularly fall short in supply in England, as compared to recommended dietary guidelines, include fruit and vegetables, starchy root vegetables, legumes, and fish.²⁰ It is predicted that domestic supply may reduce over time, making England reliant on imports, some of which are from climate vulnerable countries.

The Lancet has vocalised concerns that low- and middle-income countries may see malnutrition due to crop failures and yield decline whilst high

income countries may see obesity due to rising due to costs of fresh fruits and vegetables.¹⁷

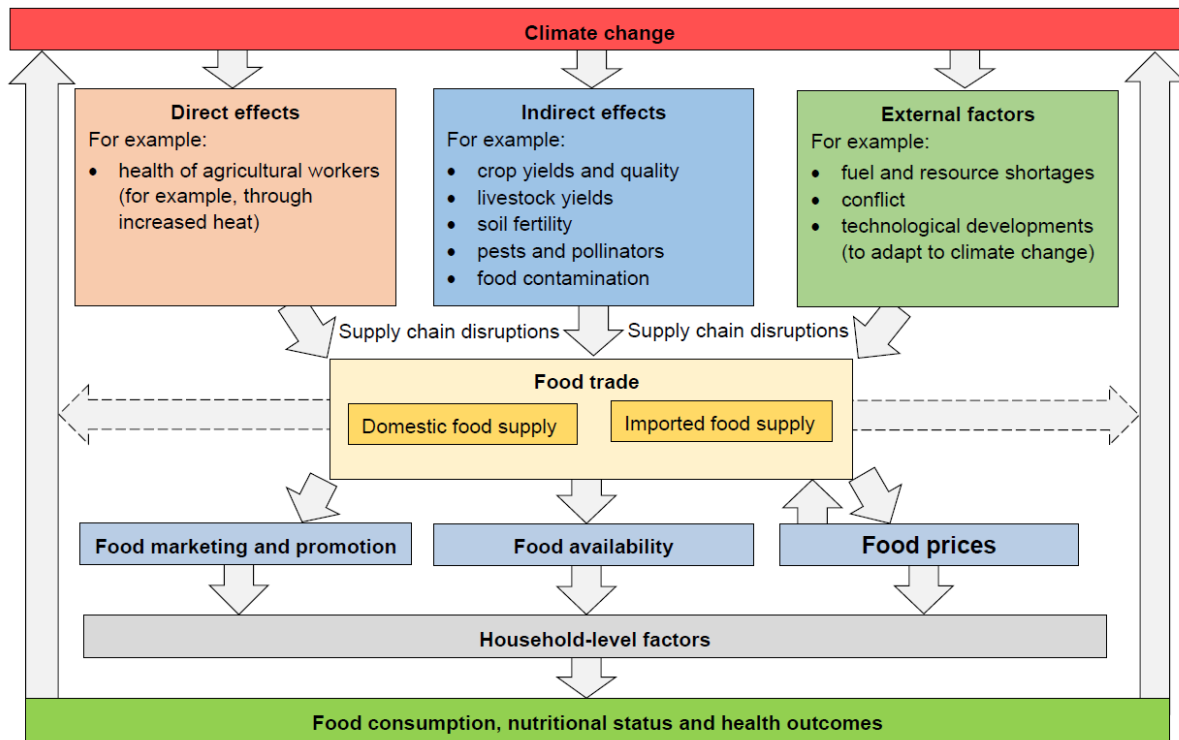


Figure 7: Simplified framework of climate change impacts on the UK food system, UKHSA.

Wildfires

Wildfires can present a range of hazards that can cause injury or death, including suffocation, burns, electrocution, and injuries caused by unstable infrastructure. People may be exposed to hazardous substances from building materials, as well as biological materials from soiled and water damaged constituents.

Droughts

Although still rare, drought occurrence is increasing in the UK. Droughts can impact health directly as they may affect water quality and quantity, and compromise crop yields, with implications for food supply and nutrition. Droughts also have indirect effects, for example on vector-borne diseases by influencing vector habitat, and have been linked to biodiversity loss,

wildfires, increased concentrations of certain allergens, and harmful mental health impacts.

Chemical exposure

Changes in temperature, precipitation, humidity, wind conditions, erosion, and extreme events due to climate change may affect the fate and behaviour of chemicals in the environment (atmosphere, water, soil, sediment). Climate change is likely to increase the release of chemicals, including contaminant discharge from polar ice and high-altitude glaciers, volatilised persistent organic pollutants (POPs) and pesticides into the atmosphere, increased agricultural related chemical exposure as well as soil and groundwater conditions due to changing crop yields, and increased exposure of industrial site chemicals from extreme weather.

Solar radiation

Sunlight exposure is needed for human health. It is needed for healthy bones, Vitamin D status, cardiovascular and metabolic health, melatonin regulation for quality sleep and serotonin regulation for improved mental health. Underexposure can result in Vitamin D deficiency, whilst overexposure can lead to skin cancers, sunburn, cataracts, premature skin ageing and altered immune response. Increasing UV radiation exposure could potentially have mixed health benefits.

Level of need: North Tyneside

Currently in North Tyneside:

The conditions whose prevalence could be increased by climate change are already common in the population. North Tyneside's rates are already above the national average for many of these conditions, as shown in e 6.¹⁸ With population health outcomes already behind that of the English average, North Tyneside's population could see worsening health outcomes and existing health inequalities widen.

Compared to 1990 there has been some change in climate change sensitive conditions. Diabetes prevalence increased in 2019 whilst asthma ranking

had fallen. Climate change will likely further increase diabetes prevalence and reverse the current trends seen in asthma burden falling.

In 2019 in North Tyneside, the disorders with highest prevalence are oral disorders, headache disorders, and gynaecological diseases.¹⁹ These are not conditions expected to be greatly influenced by climate change.

Condition	North Tyneside prevalence <i>Count, (%)</i>	English average prevalence
COPD	5,504 (2.5%)	1.8%
Asthma	15,749 (7.6%)	6.5%
Hypertension	36,400 (16.6%)	14.4%
Stroke	5,714 (2.6%)	1.8%
Coronary heart disease	8,561 (3.9%)	3.0%
Diabetes	14,599 (8.1%)	7.5%
Depression	26,603 (15.1%)	13.2

Figure 6: QOF calculated prevalence in North Tyneside, OHID.

Health projections for 2040:

The Health Foundations REAL Centre has created health predictions for England in 2040. These are primarily based on the ageing population rather than climate changes impact on health. It's predicted that:

- 1 in 5 adults in England will live with major illness. A potential increase of 2.5 million people living with major illness in 2040 compared to 2019, mainly as a result of an ageing population.
- People are likely to live longer with a major illness.
- The working age population is projected to grow by 4% whilst the those living with major illness will increase by 37%.
- It's projected that growth in demand will be highest for anxiety, depression, chronic pain, and diabetes, as shown in Figure 9. These conditions are primarily managed by primary care at present.

Climate change is likely to further influence the prevalence of some of these conditions (diabetes, mental health conditions, COPD, heart failure), further worsening the disease burden in the population.

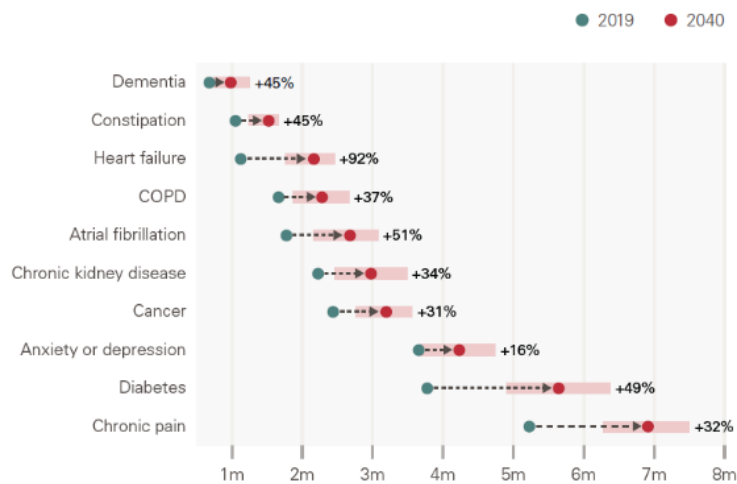


Figure 9: Projected total number of diagnosed cases for the 10 conditions with the highest impact on health care use and mortality among those aged 30 year and older, England, 2019 and 2040. Health Foundation

Unmet needs

More activity will be needed to mitigate negative climate impacts on residents' health, especially those more vulnerable to climate change. These impacts are likely to impact vulnerable and disadvantaged communities to a greater extent, potentially widening health inequalities.²⁰

The UKHSA has developed detailed analysis of the current evidence base of climate change impacts on health, as well as mitigation methods (Appendix 2). There are potential health benefits to be gained from climate change mitigation interventions. Examples include:

- Improved insulation in homes: Improved thermal comfort in homes can reduce cardiovascular and respiratory illness and improve mental health outcomes. Reduced damp within homes from improved insulation and ventilation may reduce **cancer rates** and improve respiratory conditions. Insulation can also reduce exposure to noise, improving mental wellbeing.

- Promote active transport: The use of active transport can directly improve obesity rates, reduce cardiovascular disease, and improve mental wellbeing. Reduced fossil fuel use can in turn improve air pollution, improving respiratory and cardiovascular health, and cancer rates. Reduced noise pollution from active transport can improve mental wellbeing.
- Reduce food from animal sources: Reduced animal product consumption can reduce cancer rates, improve cardiovascular health, and reduce obesity. Reduced demand for animal products can reduce animal livestock production and result in reduced greenhouse gas emissions.

Projected Need and Demand

Ageing population

The negative consequences of climate change are more likely to impact vulnerable groups, such as older adults. The older adult population in North Tyneside is estimated to increase by 3.5 times between 2000 and 2070. **Error! Bookmark not defined.**

Socioeconomic deprivation

Deprived communities may feel the effects of climate change more acutely. North Tyneside is ranked 128 out of 317 local authorities in England by deprivation level.²¹ There has been an increasing number of North Tyneside neighbourhoods within the 10 most deprived communities in England.²¹ 9.3% of North Tyneside residents live in neighbourhoods judged to be in the 10% most deprived in England.²¹

Community Assets and Services

The NHS

NHS England endeavours 'to deliver the world's first net zero health service and respond to climate change, improving the health now and for future generations.'²²

The NHS is responsible for 4% of the country's carbon emissions, **Error! Reference source not found.**¹⁰ shows the NHS carbon footprint.²³ [Delivering a new zero NHS report](#) outlines plan to reduce the emissions directly controlled by the service, as well as those they influence. In 2022, the NHS embedded net zero into the Health and Care Act 2022. In 2024, NHS England decommissioned the first medicine, desflurane (a general anaesthetic), on environmental grounds.²⁴

North Tyneside Council

The council declared a climate emergency in 2019. [The Carbon Net Zero 2030 Action Plan](#) details how the council plans to reach net zero ahead of the Government target of 2050. The plan, which is updated annually, addresses both council operation emissions and borough-wide emissions.

The council contributes 2% of the borough's overall carbon footprint and has reduced its carbon emissions by 59% since 2010/11. Key projects include increasing the energy efficiency of buildings (both council sites and social housing stock), the decarbonisation of travel and street lighting (transitioning to more energy efficient lighting and Ultra-low emission vehicles), as well as promoting carbon reduction and biodiversity across the borough through schemes such as the council's Green Homes Grant and the North East Community Forest.

In the last year, health professionals have made multiple calls for climate change mitigation and adaptation actions to protect public health. In order to embrace this in North Tyneside, Public Health were invited to sit on the Authority Net Zero 2030 Board as one of 12 Workstreams and to lead on a suite of actions with defined co- benefits.

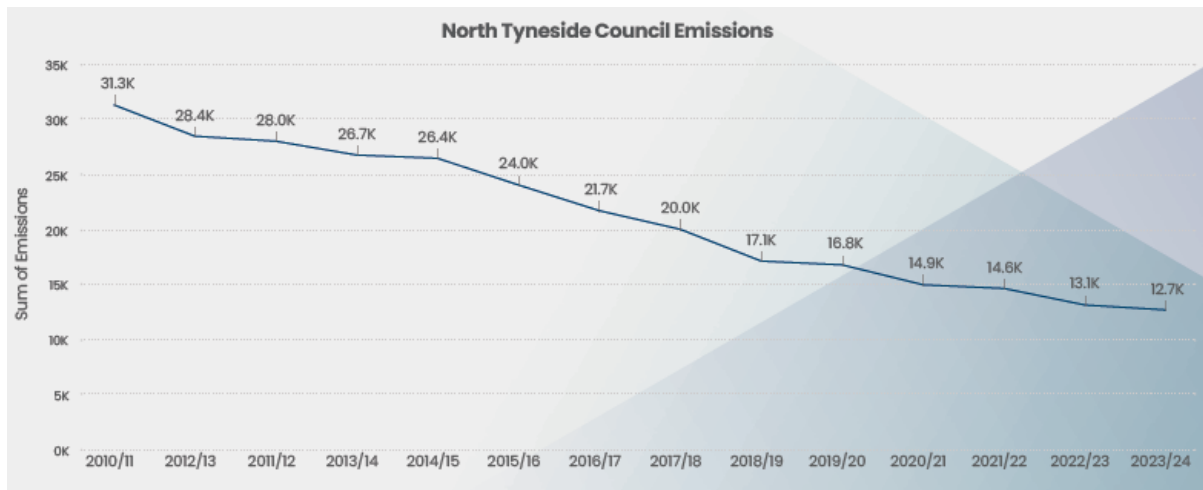


Figure 81: North Tyneside Borough Carbon Footprint, Carbon Net Zero 2030 Action Plan 23/24

North Tyneside Borough Climate Board

The North Tyneside Borough Climate Board has a focus on commercial and industrial related emissions and brings together senior representatives from the public and private sector who have a shared goal of decarbonising their operations and the Borough. The Board brings together senior representatives from the business and public sector who wish to work together to achieve carbon net zero targets.

Each representative organisation has embarked on a pathway to reduce carbon emissions and has agreed to work collaboratively where possible to:

- Mobilise individuals and organisations to work towards actions which will contribute to the council's borough-wide Carbon Net Zero Action Plan. This can include working with staff members, customers and the supply chain
- Support the development of projects which will contribute to the 2030 Action Plan
- Strategically monitor the progress of projects and emissions in the Borough

The Northumbria Local Resilience Forum

The Northumbria Local Resilience Forum have created a [Risk Register](#) of potential impacts of future risks on local communities. These include the impacts of climate change, as well as strategies to reduce adverse effects.²⁵

Additional Needs Assessment Required

Air quality

Key Contact

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Appendices

Appendix 1: Health impacts of extreme weather events

Heatwaves	<p>Increased cardiovascular risk factors: poorer glycaemic control, increased blood pressure, increased cholesterol and reduced exercise.²⁶</p> <p>Increased cardiovascular mortality, heart attacks.²⁶</p>
Air quality	<p>Main respiratory diseases of concern are asthma, rhinosinusitis, chronic obstructive pulmonary disease (COPD), respiratory tract infections.²⁷</p> <p>Main cardiovascular disease of concern is increased risk of type two diabetes (T2DM), hypertension, cardiovascular mortality, heart attacks, stroke, heart failure, arrhythmias.²⁶</p> <p>0-19 year olds susceptible to asthma due to particulate air pollution.</p> <p>Premature deaths in >65's due to particulate air pollution.</p>
Flooding	<p>Deaths from drowning and physical injury through contact with flood waters.</p> <p>Car accidents.</p> <p>Hypothermia.</p> <p>Injuries from cleaning after a flood (including CO poisoning).</p> <p>Mental health impacts (PTSD, depression, anxiety).</p> <p>Infectious disease outbreaks.</p> <p>Industrial/agricultural chemical exposure.</p> <p>Altered indoor environments (including mould exposure).</p>

Coastal erosion	<p>Acute flooding health effects.</p> <p>Displacement of communities has long term health impacts. Mental health impacts are greater for those displaced by flooding. Displacement acts as a stressor that triggers malnutrition, hypertension, and cardiac events.²⁸</p>
Wildfires	<p>Wildfires that burn near populated areas can have significant impact on the environment, property, livestock and human mortality and morbidity depending on the size, speed and proximity to the fire, and whether the population has advanced warning to evacuate.</p> <p>Direct impact, including long-term injuries and death, resulting from burns and inhalation of smoke during the fires.</p> <p>Indirect impact via air pollution and mental stress resulting.²⁹</p> <p>PM_{2.5} from wildfire smoke is associated with premature deaths in the general population, and can cause and exacerbate diseases of the lungs, heart, brain/nervous system, skin, gut, kidney, eyes, nose and liver. It has also been shown to lead to cognitive impairment and memory loss. Firefighters and emergency response workers are also greatly impacted by injuries, burns and smoke inhalation, particularly at high concentrations.³⁰</p>

Appendix 2: Climate change needs, UKHSA

Hazard	Need and mitigation
Temperature (heat and cold)	<p>Individual behavioural changes.</p> <p>National heat and cold alert systems.</p> <p>Built environment cold: insulation, triple glazing, draught reduction.</p> <p>Built environment hot: shading, external shutters on windows and ventilation, air conditioning.</p> <p>Alter reflectiveness of buildings and urban infrastructure.</p> <p>Increased greenspace- parks and gardens, trees in urban spaces for shade.</p> <p>Adaptive behaviours at key infrastructure (workplaces, hospitals, schools, care homes, and other health and care centres) - avoiding sun exposure, avoiding extreme physical exertion, ambient room temperatures, shade in sunny buildings, ventilating during cooler times at night, access to cool liquids.</p>
Flooding	<p>Planning policy to reduce assets in flood risk areas.</p> <p>High risk community relocation.</p>

	<p>Flood risk management- structural measures, natural flood management and sustainable drainage systems, property flood resilience.</p> <p>Flood insurance.</p> <p>Emergency preparedness, resilience and response.</p> <p>Health protection measures- support to address immediate physical and social needs including CO poisoning. Psychosocial support in the long term. Support from primary and specialist mental health services.</p>
Air pollution	<p>Low carbon and clean transportation.</p> <p>Clean energy sources.</p> <p>Low emission zones.</p> <p>Reduced air travel.</p> <p>Active travel.</p> <p>Less polluting, more frequent, affordable public transport.</p> <p>Pollution monitoring and alert systems.</p> <p>Improved building energy efficiency.</p> <p>Individual behaviour changes at home,</p> <p>Further research needed for the impact of lower indoor temperature environments on vulnerable groups.</p> <p>Increased greenspace.</p>
Airborne allergens	<p>Consideration in urban planning and green infrastructure plans.</p> <p>Allergen-specific localise health forecasts.</p> <p>Further research on health impacts.</p>
Infectious diseases	<p>The WHO have created Essential Public Health Operations that are pertinent to climate change and infectious diseases that public health bodies need to maintain. Public health should consider early infectious disease detection systems, outbreak reduction programmes, climate sensitive pathogen vaccination development, consideration of impacts around animal and human interaction.</p> <p>Local vector borne disease contingency plans.</p> <p>Habitat management plans.</p>
Food systems	<p>Adherence to UK dietary guidelines to promote sustainable and healthy diets.</p> <p>Reduced food waste.</p> <p>Increased domestic fruit and vegetable production.</p> <p>Lower GHG farming practices.</p> <p>Sustainable government food procurement standards.</p> <p>Diversifying buying power to resilient production systems.</p>

	Altered land use. Farmland will need to be repurposed for alternative uses to increase carbons sequestration and forest cover, producing bioenergy and peatland restoration.
Droughts	Public messaging in affected areas to ensure safe water use and efficiency. Multi organisation coordinated drought resilience planning.
Chemical exposure	Plans to mitigate climate-change associated risk in sites such as contaminated land, landfills and hazardous material containment cells. Plans to mitigate POP exposure. Circular economy and life cycle approach to product and process design. Wastewater system resilience.
Solar radiation	Sun exposure education for the public especially outdoor workers and earlier in the season. Sun safety guidelines. Consideration of messaging around sun exposure for ethnic minority populations. Outdoor space planning.

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