

Meeting: Environment Sub Committee

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Title: Climate Change and the Potential Health Impacts for North Tyneside Council and Partners.

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Service Areas:

Public Health, Environmental Health, Environmental Sustainability and Planning.

Wards affected: All

1. Purpose of Report

The Environment Sub Committee Members have indicated that they wish to consider whether a future scrutiny study into the health implications of climate change in North Tyneside would be valuable in strengthening the policies and actions of the Council and its partners.

In order to assess the scope and impacts of such a study, this briefing paper outlines key issues which are associated with the subject area in terms of:-

- Climate factors
- Identifying impacts of climate related changes on human health
- Identifying those groups in society who are more susceptible from climate impacts
- The current policy and plans in place to protect our communities from climate extremes.

This briefing paper has been jointly produced by the Councils Environmental Sustainability Team, Environmental Health and the Public Health Service.

2. Recommendations

The Environment Sub Committee Members consider this report and any required actions as a result.

3. Details

3.1 National Perspective on Risk associated with Climate Change

The Committee on Climate Change (CCC) is the statutory independent advisory body which advises central government and was established under the Climate Change Act of 2008. Every five years the CCC is required to publish a report detailing the risks and opportunities for the UK resulting from Climate Change. The current UK Climate Risk Assessment 2017 is now published and contains a specific section relating to risks associated with People and the Built Environment which covers the health impacts.

The report confirms that the global climate is changing with an average global surface temperature increase of 0.85 degrees centigrade since 1880. This is reflected in terms of the UK climate with warmer wetter winters and hotter summers being increasingly recorded. For example:-

- The annual average UK land temperature during 2005 – 2014 being 0.9° C higher when compared to 1961 – 1990.
- Rainfall is now presenting an upward trend with more heavy and prolonged events occurring during winter periods.

Research studies outline that climate change is now associated with the increased frequency in the UK of the following types of weather events. Each category has implications on human health:-

- Heat Waves
- Flooding
- Drought
- Cold Snaps

3.2 What are the Risks to Human Health in North Tyneside from Extreme Weather Events?

The correlation/implications between health impacts of climate change continue to be the focus of detailed and on-going research. There are however well understood associations between extreme weather events and their impacts on society. The list below identifies the most common events and effects.

a. Flooding

Flooding is a complex process and its impact on people cannot be reduced to simply the impacts on houses and businesses being inundated with (often dirty) water, dried out and restored. There are key health impacts some of which are physiological and others are not as tangible or obvious. They are:-

- Direct water related impacts i.e. death / drowning,
- Gastrointestinal
- Psychological distress
 - Anxiety and depression
 - Probable post traumatic stress disorder

Over the last five years North Tyneside has been subject to the following events:

- 28th June 2012 – Thunder Thursday - surface water flooding
- 26 Nov 2012 – surface water flooding
- 23-25 Sep 2012 – surface water flooding
- 05-06 Dec 2013 - Tidal Surge
- 11–13th of August 2014 – High tides
- 21st Nov 2016 - surface water flooding

There were no significant or critical impact on health and wellbeing as a result of the above events.

b. Heatwave

Public Health England has developed a national Heatwave Plan which is reviewed annually.

The Heatwave Plan outlines the actions required by NHS, public health, social care and other community and voluntary organisations to support people who have health, housing or economic circumstances that increase their vulnerability to heat. Examples of these are identified in the categories below:

- **older age**: especially over 75 years old, or those living on their own who are socially isolated, or in a care home
- **chronic and severe illness**: including heart conditions, diabetes, respiratory or renal insufficiency, Parkinson's disease or severe mental illness. Medications that potentially affect renal function, the body's ability to sweat, thermoregulation (e.g. psychiatric medications) or electrolyte balance (diuretics) can make this group more vulnerable to the effects of heat
- **infants** are vulnerable to heat due to immature thermoregulation, smaller body mass and blood volume, high dependency level, dehydration risk in case of diarrhoea
- **homeless people** (those who sleep in shelters as well as outdoors) may be at increased risk from heat waves. Higher rates of chronic disease (often poorly controlled), smoking, respiratory conditions, substance dependencies and mental illness are more frequent in homeless populations than in the general population.

These risk factors increase the risks of heat related morbidity and mortality, on top of social isolation, lack of air conditioning, cognitive impairment, living alone and being exposed to urban heat islands.

- **people with alcohol dependence and drug dependence** often have poorer overall health and increased social isolation which can increase their risk of heat stress
- **inability to adapt behaviour** to keep cool such as having Alzheimer's, a disability, being bed bound, drug and alcohol dependencies, babies and the very young
- **environmental factors and overexposure**: living in urban areas and south-facing top-floor flats, being homeless, activities or jobs that are in hot places or outdoors and include high levels of physical exertion, children and adults taking part in organised sports (particularly children and adolescents)

The National Heatwave Plan is based on a 5 level process (0-4). Level 0 – 1 outlines the all year planning required to prepare for excess heat waves and levels 2-3 are enacted when there is 60% risk of temperatures in the North East reaching a threshold daytime temperature of 28 degrees Celsius and a night-time temperature of 15 degrees Celsius are exceeded. Level 4 is reached when a heatwave is so severe and/or prolonged that its effects extend outside health and social care, such as power or water shortages, and/or where the integrity of health and social care systems is threatened.

The North Tyneside Heatwave Plan has been enacted infrequently in the past, as extreme high temperatures in the North East are not common, unlike the South of England.

c. Cold Snaps

Similar to heatwaves, Public Health England produces an annual Cold Weather Plan and alert service which again comprises five levels (Levels 0-4), from year-round planning for cold weather, through winter and severe cold weather action, to a major national emergency.

Each alert level aims to trigger a series of appropriate actions which are detailed in the plan. A level 2 alert for example is enacted when Mean temperatures of 2°C and/or widespread ice and heavy snow are predicted with 60% confidence.

The impact of cold weather on health is predictable and mostly preventable. Direct effects of winter weather include an increase in incidence of:

- heart attack
- stroke
- respiratory disease
- influenza
- falls and injuries
- hypothermia

Cold weather contributes to excess winter deaths; however the increase in deaths during the winter is also confounded by increased incidence of influenza.

Indirect effects of cold include mental health illnesses such as depression, and carbon monoxide poisoning from poorly maintained or poorly ventilated boilers, cooking and heating appliances and heating. Key groups considered to be particularly at-risk in the event of severe cold weather are summarised below:-

- older people (in particular those over 75 years old, otherwise frail, and or socially isolated)
- people with pre-existing chronic medical conditions such as heart disease, stroke or asthma, chronic obstructive pulmonary disease or diabetes
- people with mental ill-health that reduces individual's ability to self-care (including dementia)
- pregnant women (in view of potential impact of cold on foetus)
- children under the age of five
- people with learning difficulties
- people assessed as being at risk of, or having had, recurrent falls
- people who are housebound or otherwise low mobility
- people living in deprived circumstances
- people living in houses with mould
- people who are fuel poor
- homeless or people sleeping rough
- other marginalised or socially isolated individuals or groups

In North Tyneside cold weather alerts are enacted regularly based on MET office alerts as cold weather snaps in the North East of England are regularly experienced, however these cold weather periods are not prolonged. The last prolonged cold weather period was in the winter of 2009/10.

d. Drought

Droughts are complex mixtures of low rainfall depleting resources and hot, dry conditions that increase demand upon resources. These two types of event do not often occur simultaneously. In the UK it is the responsibility of regional water companies under the Water Industry Act 1991, as amended by the Water Act 2003, to prepare and maintain a drought plan on a 3 year basis. The Northumbria Water Drought Plan was published in 2013.

In terms of public water supplies, the UK currently has 10 per cent more water than needed to supply homes and businesses. However, this is for the UK as a whole and some modest deficits exist in some water resource zones that water companies are currently addressing.

The availability of water is projected to change as temperatures increase and the UK population grows. Increases in demand for water are expected to be accompanied by decreases in water availability due to climate change. Supply-demand deficits are projected to be widespread by the 2050s. The last significant drought event in the UK was between 2010 and 2012.

Drought impacts on human health are similar to those outlined in the section relating to heatwave. The vulnerable groups affected by drought situation are also the same as those identified under the heatwave section.

There have not been any periods of drought in North Tyneside in recent years.

3.3 What internal plans are in place for extreme weather events in North Tyneside?

- Cold Weather Plan 2016
- Operational Flood Plan 2016
- Heatwave Plan 2015

3.4 Air Quality

Air quality is a measure of how good our air is for our health. However air quality pollutants contribute to global warming which in turn increases the incidents of poor air quality.

The pollutants in the air are measured and their quantity compared with their effects on our health from both short term and long term exposure.

The main pollutants of concern in our air are nitrogen dioxide and particulates these are derived predominantly from road traffic emissions. Nitrogen dioxide and particulates also contribute to global warming.

Particulate matter (including soot) is emitted during the combustion of solid and liquid fuels, such as for power generation, domestic heating and in vehicle engines. Particulate matter varies in size (i.e. the diameter or width of the particle). PM_{2.5} are particles with a size (diameter) generally less than 2.5 micrometres (µm) and are known as fine particulate matter.

Air quality in North Tyneside is predominantly good. The majority of the borough has levels of air pollutants well below the national air quality objective levels.

The government set national air quality objective levels for particulates and nitrogen dioxide as shown in table below.

Pollutant	National Objective Level	Period
Nitrogen Dioxide	200 µg/m ³ not to be exceeded more than 18 times a year.	1 hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ not to be exceeded more than 35 times a year.	24 hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM _{2.5})	No safe limit, Local Authority to work towards reducing emission/concentration levels.	Annual mean

These two pollutants are monitored continuously within the borough, with real time monitors in two key locations, Wallsend town centre and East Howdon.

Monthly indicative nitrogen dioxide diffusion tube monitoring is carried out at 26 locations throughout the borough. An annual air quality status report is submitted to the Department for Environment Food and Rural Affairs (DEFRA), as Local Authorities have a duty to assess air quality within their areas having regard to the national air quality objectives and standards. The local air quality management regime was reviewed in 2016. A new onus was placed on Local Authorities to tackle particulates, specifically the fine particulates, less than 2.5µm in diameter. These particles are of particular concern because they are inhaled deeper into the respiratory system and are considered to cause the greatest adverse health effects. There is no safe limit for these particles. Local Authorities must implement measures to tackle PM_{2.5}. A working group comprising membership of all relevant partners including the Public Health team, Transport Planners, Planning, Environmental Sustainability and Environmental Health has been established to meet this new challenge.

Air quality can directly influence climate change effects. Black carbon will absorb radiation whilst other particles will reflect radiation thereby cooling the atmosphere. Nitrogen dioxide increases the quantity of low level ozone which traps heat and increases ill health.

Stable air systems, that accompany high pressure in the summer and winters, are predicted to increase in frequency and will result in more air pollution episodes. The effect of this will be greatest for those people with pre-existing respiratory and cardiovascular conditions.

Policies and measures to reduce air pollution will benefit climate change effects, however, some policies to address climate change can have a negative impact on air quality, e.g. use of biomass has been promoted as being carbon neutral when used to replace boilers that use fossil fuels, but the emissions of oxides of nitrogen and particulates from these boilers are often greater impacting on air quality levels for these pollutants. Any measures to address air quality and climate change must not be considered in isolation, but a more holistic approach is necessary.

Measures that will benefit both air quality and climate change include use of travel plans that encourage use of public transport, walking and cycling, traffic management schemes, use of energy efficiency and renewable energy measures, use of low emission schemes and strategies for the North Tyneside area. A low emission strategy would encourage use of cleaner-fuelled vehicles such as electric vehicles and hybrid vehicles for both commercial and residential usage; e.g. bus operators encouraged to use lower emission vehicles.

3.5 Vector, food and water borne diseases

Vector-borne diseases are influenced in complex ways by the climate, land use changes and human activities, and as such it is difficult to make quantitative predictions of future changes due to climate change. However, it is likely that the UK will see an increase in mosquitoes and ticks.

There are more than 25 common species of mosquito in the UK and each will respond slightly differently to climate change. Climate change is likely to increase the abundance of mosquitoes in the UK but may also increase the abundance of their predators.

Milder winters aid ticks to actively feed and continue their life cycles. A lack of harsh winters also reduces the mortality rate among host species.

There is also the potential for introduction of exotic species and pathogens. Potential drivers of these changes include milder winters and warmer summers.

Climate change can influence the incidence of certain water and food-borne diseases, which show seasonal variation. Climate change is also likely to affect the risk from water and food-borne disease through changes in human behaviour associated, for example, increased temperature will allow pathogens such as Salmonella to grow more readily in food.

There has not been any major outbreaks in North Tyneside attributable to the impact of climate change on vector, food and water borne diseases.

3.6. Emergency preparedness, business continuity and climate change

Public sector organisations, such as Local Authorities, NHS and Emergency Services are required to plan for, and respond to, a wide range of incidents and emergencies that could affect health or the delivery of services to the population. This includes extreme weather conditions and outbreak of an infectious disease. The Civil Contingencies Act (2004) requires public sector organisations, to show that they can deal with such incidents while maintaining services.

North Tyneside Council has well established internal mechanisms for preparing for and responding to severe weather and other incidents that pose a threat to the health of the residents of North Tyneside. North Tyneside Council is a member of the Northumbria Local Resilience Forum (NLRFF) which provides a strategic and operational framework for any multi-agency response to a major or critical incident. The NLRFF has a developed Community Risk Register that identifies risks to the area. Key risks include flooding and the impact of adverse weather

3.7 Summary of climate impacts on health (taken from Adaptation Report for the Health Care System, Public Health England / NHS England 2015)

The table below provides a useful summary of the climate related risks and how these impact on the health of the population and the potential increased demand upon services.

Climate related risks	Risks to the population	Risks to services	
		Service patterns	Infrastructure
Warmer summers and increased frequency and intensity of heat waves	Heat-related morbidity and mortality	Increase in heat related consultations, emergency department attendances and admissions	Overheating of buildings, and impact on infrastructure, supplies
Warmer summers	Summer air pollution	Increase in respiratory conditions and related attendances/admissions	N/A
Warmer summers	Skin cancer due to UV exposure	Possible increase in demand over time	N/A
Flooding	Deaths, injuries and mental health effects as a result of flooding	Increased mental health support needs	9.5% of buildings liable to flooding. Transport routes liable to flooding and resulting risks to business continuity
Cold weather events (although overall winters may be warmer)	Increased morbidity and mortality for vulnerable and elderly people	Increase in flu and cold related consultations and admissions	Transport route liable to icy and snowy conditions and impact on accessibility
Bio impacts	Increase in water, vector and food borne diseases	Increase in monitoring of and related diseases	Medical supply chains
Social impacts of climate change	Potential risks associated with changes in migration, vulnerable populations, infrastructure	Demographics Vulnerable populations Migration changes Cost increases to services	N/A

4. Summary

Trend data on global surface temperature indicates that there has been a continued and sustained increase in land temperature. Rainfall is also presenting an upward trend, with more prolonged events occurring during the winter. The forecast is that there will be warmer and wetter winters and hotter summers. There are known health risks associated with extreme increases and decreases in temperature, as well as flooding.

North Tyneside Council and partners have well established systems for emergency preparedness and response to severe weather related incidents and outbreaks of communicable diseases.

The planning process is an opportunity to embed interventions such as traffic planning, spatial planning and use of renewable energy sources that can contribute to improving air quality.

5. Background Information

The following documents have been used in the compilation of this report and may be inspected at the offices of the author.

Adaptation Report for the Health Care System, Public Health England / NHS England, 2015
<http://www.sduhealth.org.uk/areas-of-focus/community-resilience/adaptation-report.aspx>

Committee on Climate Change Climate Change Risk Assessment UK 2017, July 2016
<https://www.theccc.org.uk/publication/uk-climate-change-risk-assessment-2017/>

The Cold Weather Plan for England: Protecting health and reducing harm from cold weather, 2015
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/576152/Cold_weather_plan_2016.pdf

Heat wave plan for England – protecting health and reducing harm from severe heat and heat waves, 2016
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/429384/Heatwave_Main_Plan_2015.pdf

Northumbrian Water Drought Plan, 2013
<https://www.nwl.co.uk/your-home/environment/drought-plan.aspx>

Sotiris Vardoulakis, S and Heaviside C (2012) Health Effects of Climate Change in the UK 2012: Current evidence, recommendations and research gaps. Health Protection Agency. London. Available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/371103/Health_Effects_of_Climate_Change_in_the_UK_2012_V13_with_cover_accessible.pdf