

Wirral JSNA: Climate & Health

Summary

- The global climate is changing and this is most likely as a result of greenhouse gas pollution associated with human activities. Changes in the climate have profound implications for health and future health inequalities.
- Fourteen of the sixteen warmest years on record have occurred since 2000.
- Wirral's demographics suggest certain population groups could be more susceptible to climate change events and at greater risk of the subsequent impacts and negative outcomes on health and other aspects.
- Several population groups will be affected including; residents experiencing multiple deprivation, older people, young children, people suffering from Cardiovascular Disease (CVD) or respiratory illnesses, those at risk of thermal illness and residents with poor mental health.
- Wirral has:
 - An older (65+ and 85+) population that will increase by 2028.
 - More Wards in the most deprived quintile than the England average
 - 13.1% of the working age population are claiming out-of-work-benefits.
 - A higher prevalence of severe mental illness compared with the North West and England average which is the main reason for claiming Employment & Support Allowance (ESA).
 - Wirral is significantly higher than England for emergency admissions for asthma with an estimated undiagnosed population of approximately 9,000.
 - A higher incidence rate per 100,000 of malignant melanoma compared to the North West and England.
 - Significantly worse than expected prevalence of diagnosed Chronic Obstructive Pulmonary Disorder (COPD). There are approx 8,000 residents recorded as having COPD and potentially 6,500 undiagnosed sufferers.
 - Higher CVD mortality in Wirral's areas of deprivation.
- Warmer Winters will reduce the risk of cold related illnesses such as seasonal flu and respiratory illnesses.
- Hotter, drier summers will increase the risk of CVD, heat stroke, respiratory illness, and food poisoning and gastrointestinal diseases and may exacerbate mental health problems.
- Storms and flooding may lead to shocks within local food production, injuries, death, susceptibility to respiratory illnesses, gastro-intestinal illness, food poisoning, contaminated water and have a detrimental impact on mental health.
- There are a number of areas within Wirral that are at increased risk of flooding.
- National Government policy suggests increased adaptation will secure the most benefits for a range of vulnerable groups and places.
- The Joseph Rowntree Foundation recommends that Local Authorities should develop clearer local climate resilience strategies and actions, along with building community capacity and skills.
- A Wirral Council Section 19 Flood Investigation report recommended that communications and contingency planning need to be improved as does community resilience.
- The Severe Weather Impact Monitoring System from Climate UK has been recommended to Wirral Council, this measures the cost of severe weather events.

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What do we know?

Overview

The global climate is changing and this is most likely as a result of greenhouse gas pollution associated with human activities. The view of the Deputy Chief Medical Officer, David Walker, point to changes in the climate having profound implications for health. He suggests that changing weather patterns, more frequent extreme weather and rising temperatures have direct impact on population health and also pose challenges to the way in which the NHS, public health and social care system operates (Sustainable Development Unit, 2014a).

Current scientific evidence suggests that the consequences of climate change will be more severe without concerted international action to cut pollution (Intergovernmental Panel on Climate Change, 2014). Some changes are expected from the pollution already in the atmosphere. These unavoidable changes will have implications for the health and wellbeing of people in Wirral. Weather events already have implications for people's health locally. The nature and severity of local weather events is expected to change and is likely to have negative consequences for public health. Fourteen of the sixteen warmest years on record have occurred since 2000, with 2015 confirmed as the warmest year globally on record (Committee for Climate Change, 2016).

Climate change has become an important factor, affecting current and future environmental sustainability and contributing to increasing inequalities in health. The 2010 Marmot report states that tackling social inequalities in health and tackling climate change must go hand in hand. ([view here](#))

The Met Office, *State of the UK Climate 2015* report (2016) highlights that 2015 was the 16th warmest year for the UK in a series from 1910, 2015 was sunnier than the 1981-2010 average for the UK and 2015 was the seventh wettest year since 1910. A Met Office report concluded that the UK can expect more milder wetter winters, more hotter drier summers. Equally, as a consequence of natural fluctuations in the UK climate, that the UK should continue to plan, and be resilient to, wet summers and cold winters (Met Office Hadley Centre, 2014). A more recent Met Office report "Climate Risk An update on the science" states that although summers are expected to be drier by 2100 any summer downpours will be heavier due to climate change (Met Office, 2015).

Research Liverpool John Moores University, "*The impact of climate change upon health and health inequalities in the North West of England*" suggests that climate change is expected to result in regional changes in temperature, rainfall, sea levels and extreme weather events. These events could have direct and indirect impacts on health, disproportionately affecting vulnerable populations including children and the elderly (Liverpool John Moores University, 2012).

According to <https://www.gov.uk/government/publications/climate-change-health-effects-in-the-uk> heatwaves are likely to become more frequent in the future in the UK. At present, the health burden due to low temperature exceeds that of high temperature. However, heat-related mortality, which is currently around 2,000 premature deaths per year, is projected to increase steeply in the UK throughout the 21st century. Cold is still likely to contribute to the majority of temperature related health effects over the coming decades, although to a lesser extent than present day levels. The elderly are more vulnerable to extreme heat and cold than younger people, so future health burdens are likely to be amplified by an ageing population.

Facts, Figures and Trends (Global & Wirral)

Global

- The Paris Agreement is a significant step forward. 195 nations including the UK will “pursue efforts” to prevent more than a 1.5 °C increase in global temperatures. Current commitments to reduce emissions however, even if fully implemented, will lead to an estimated 2.7 °C rise (Committee on Climate Change, 2016).
- Average global temperature could rise between 2 °C and 5.5 °C by 2100 compared to the late 1800’s (Committee on Climate Change, 2015).
- The global mean temperature has increased by 0.8 °C since 1850. (Royal Society, 2010). Climate change has already at least doubled the chance of a severe heatwave in Europe (Committee for Climate Change, 2016).
- Scientists believe it is extremely likely (95%-100%) that human influence has been the cause of observed warming since the mid-20th Century (IPCC, 2013) and that the rise in global temperatures that is driving changes in the climate results from an increase in ‘greenhouse gases’ (GHGs) in the atmosphere associated with human activities.
- The rise in GHGs is associated with the burning of fossil fuels for heat, power and transportation; changes in land uses such as the clearance of forests; the production of concrete; the rearing of cattle for food; and the production and use of fertilisers in agriculture (Green Alliance, 2011).
- Carbon dioxide (CO₂) is an important GHG linked with human activities. Today the proportion of the volume of the atmosphere made up by CO₂ is about 0.039 per cent; in pre-industrial times it was only 0.028 per cent (Green Alliance, 2011).
- Even if GHG emissions are cut dramatically in the coming years some impact will be inevitable as a result of changes to the climate already set in motion (McMullen and Jabbour, 2009).
- Weather events already impact on people’s health in Wirral (Wirral Council, 2010).

The Committee for Climate Change (2016) have stated that the greatest climate change-related threats for the UK are:

- Large increases in flood risk
- Exposure to high temperatures and heatwave
- Shortages of water
- Substantial risk to UK wildlife and natural ecosystems
- Risk to domestic and international food production and trade
- New and emerging pests and diseases

Northwest (Wirral)

In North West England, looking ahead under a ‘medium’ GHG emissions scenario (Liverpool John Moores University, 2012) it is expected that by the 2080s:

- Winter temperature will increase by 2.6 °C;
- Summer temperature will increase by 3.7 °C;
- Summer mean daily maximum temperature will increase by 4.8 °C;
- There will be an increased frequency and duration of heat waves;
- Winter rainfall will increase 16%;
- Summer rainfall will reduce by 22%;
- Heavy rainfall and storm events will increase;
- Sea levels will rise by 30-32cm;
- There will be a potential for increased human exposure to UV radiation from more time

spent outside due to warmer temperatures although this is expected to be countered to some degree by reduced exposure as the stratospheric ozone layer recovers;

- There will be an increased risk of flooding events due to higher winter rainfall, the frequency of heavy rainfall events and rising sea levels; and
- Levels of some air pollutants will fall as emission reduction measures have an impact, although levels of ground level ozone are expected to increase.

The changing climate is likely to impact on patterns of mortality and morbidity. In North West England (Liverpool John Moores University, 2012), there is the potential for positive and negative impacts:

- Warmer Winters will reduce the risk of cold related illnesses such as seasonal flu and respiratory illnesses;
- Hotter Summers will increase the risk of CVD, heat stroke, respiratory illness, and food poisoning and gastrointestinal diseases;
- Extreme temperatures may exacerbate mental health problems
- With rising temperatures, people will spend more time outdoors which may result in more incidences of sun burn and skin cancer from exposure to UV radiation;
- Changes in pollen seasons may increase risk of allergies and asthma;
- Higher ground level ozone in the summer may result in a higher risk of respiratory diseases;
- Higher levels of air pollution may impact negatively on mood;
- A reduction in air pollution associated with the reduction in burning fossil fuels will decrease the risks of respiratory and cardiovascular diseases;
- Storms will result in injuries and deaths, damage to property, transport hazards and power supply problems that may disrupt access to services;
- Communities experiencing flooding will be more susceptible to respiratory illnesses and may experience a detrimental impact on mental health;
- Heavy rain and floods may increase the risk of food poisoning and contaminated water;
- There will be a rise in health problems associated with insect borne pathogens as a result of changes in temperature and precipitation;
- Food production and security could be more at risk with availability and access becoming more of an issue.

The overall impact on health in North West England, taking into account both positive and negative aspects, is expected to be 'overwhelmingly negative' (Liverpool John Moores University, 2012)

Wirral – Effects and Impacts

Research suggests there are a number of population groups, and/or issues that might be adversely affected by any ongoing or future climate change. These cover:

- Residents experiencing multiple deprivation
- Older people
- People suffering with respiratory illness including asthma and COPD
- Those with, or potential for, CVD
- Those at risk of thermal illness - young children and individuals with impaired thermoregulation, including the elderly and those on medications
- Those at higher risk of skin cancer
- Increasing gastro-intestinal illness including food poisoning and water-borne diseases
- Residents with poor mental health and wellbeing

- Those at most at risk to insect borne disease
- Access to healthcare
- Access to affordable food

Population Projections for Wirral

Using subnational population estimates for the Wirral Clinical Commissioning Group area Wirral's overall population is projected to increase by 2% between 2016 and 2028, from an estimated 321,837 in 2016 to 328,823 in 2028, however there are a number of significant changes within that increase - see table 1 below.

Table 1: Wirral Resident Population Projections by Age Group (Persons) Interim 2016 to 2028

Age band	2015	2020	2025	2030	2035	% Change (2015 -2035)
0 - 14	56	58.1	58.2	56.9	55.7	-1%
15 - 44	110	106.7	107.7	108.3	107.7	-2%
45 - 64	88.1	87.2	82.9	78	75.6	-17%
65 - 74	35.8	37.7	37.6	41.1	42.3	15%
75 +	31.3	34.6	41	45.3	49.7	37%
Total	321.2	324.3	327.4	329.6	331	3%

Source: [Office for National Statistics, 2014](#)

Notes: The latest subnational population projections are based on the 2012 mid-year population estimates and project forward the population from 2015 to 2035. ONS population estimates are presented in thousands and have been rounded to the nearest hundred for presentation purposes. Figures for individual age groups may not add up to the total figure due to rounding. The projections are trend-based projections, which mean assumptions for future levels of births, deaths and migration are based on observed levels mainly over the 2006 to 2010 period, as used in the 2010-based subnational population projections published at: www.ons.gov.uk/ons/rel/snpp/sub-national-population-projections/2010-basedprojections/index.html

- The population over 75 is projected to increase at the fastest rate from 31.3 in 2015 to 49.7 in 2035, which equates and increase of over 37% .
- The older population (aged 65-74 and 75+ years) are expected to increase substantially. By 2028 this population will total 83,226, compared to 68,232 in 2016 or 22% increase.
- The biggest decrease is in the 45-64 year age group, from 88.1 in 2015 to 75.6 in 2035 or 17% lower.

A report by BIOPICCC Research Team (2011) looked to map extreme weather risks and growth in older populations and it highlights the vulnerability of the North West and possibly Wirral population. It suggests within its maps that the area could be expected to have an increase in the number of heatwave events by 2030s as well as possible increase of coldwave events. With an increased older population there could be increased issues as a consequence.

Population Estimates by Wirral Ward

The ONS has provided estimated resident population figures at a lower geographical level for mid-2011 (based on the results of the 2011 Census). Figures are not guaranteed to be completely accurate at this level of detail but it provides an indication of which wards are more and less populated, see table 2.

Table 2: Estimated resident population by age group and Wirral ward (mid-2014)

Ward of Residence	0-14	15-44	45-64	65-75	75+	Total
Bebington	2751	5251	4347	1916	1444	15709
Bidston and St James	3379	6051	3732	1368	751	15281
Birkenhead and Tranmere	3553	7076	3926	1139	745	16439
Bromborough	2782	5885	4048	1590	1161	15466
Clatterbridge	2091	4191	4102	2393	1577	14354
Claughton	2366	4839	3936	1723	1279	14143
Eastham	2317	4591	3813	1908	1373	14002
Greasby, Frankby and Irby	1983	3982	4327	2074	1559	13925
Heswall	1951	3369	3890	2197	1857	13264
Hoylake and Meols	2019	4199	3952	1583	1603	13356
Leasowe and Moreton East	2904	5372	3808	1494	1071	14649
Liscard	2845	5811	4194	1658	1102	15610
Moreton West and Saughall Massie	2274	4776	4095	1804	1102	14051
New Brighton	2402	5448	4284	1579	1205	14918
Oxton	2159	5001	3780	1900	1132	13972
Pensby and Thingwall	1929	3770	3747	2007	1593	13046
Prenton	2500	5019	4249	1656	1209	14633
Rock Ferry	3046	5938	3552	1300	878	14714
Seacombe	3472	6437	3631	1276	785	15601
Upton	2914	5611	4333	1795	1601	16254
Wallasey	2166	4789	4613	1826	1463	14857
West Kirby and Thurstaston	2044	3451	3853	1859	1463	12670
Wirral	55847	110857	88212	38045	27953	320914

Source: [Office for National Statistics, 2014](#)

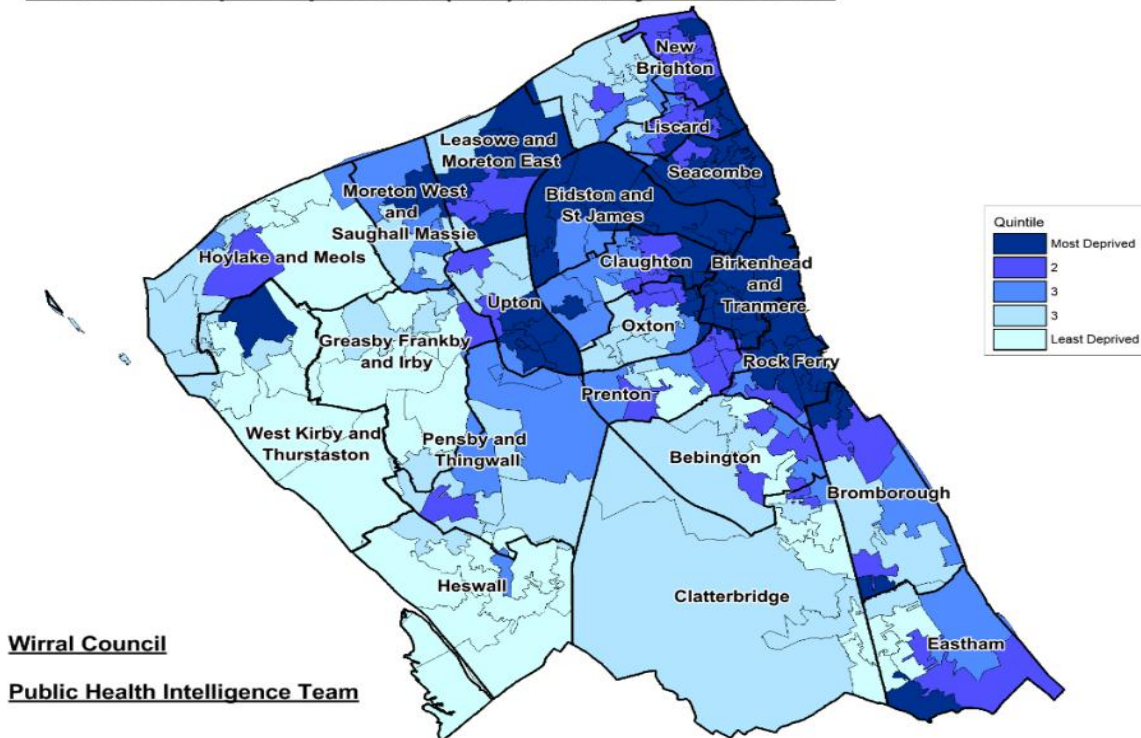
Notes: Figures released by ONS are for Population Estimates for UK, England and Wales, Scotland and Northern Ireland, Mid-2013. Estimates of the usual resident population for the UK as at 30 June of the reference year - provided by administrative area, single year of age and sex.

- Wards with the highest number of residents are Birkenhead & Tranmere, Upton and Bebington. The same as 2014.
- Bidston & St James, Birkenhead & Tranmere and Seacombe have a greater proportion of children (under 15's) residing in the ward. The same as 2014.
- Heswall, Pensby and Thingwall, Upton and Hoylake and Meols have the highest proportion of over 75's.

For more information on specific populations please see our JSNA chapters [link](#)

Map 1: Overview of Wirral – Indices of Multiple Deprivation, by Lower Super Output Area, 2015

Index of Multiple Deprivation (IMD), 2015, by Wirral LSOA



- Map 1 shows Wirral as a borough of contrast, both in its physical characteristics and demographics. Rural areas and urban and industrialised areas sit side by side in a compact peninsula of 60 square miles with around 30 miles of coastline.
- There is a lower proportion of younger adults in their twenties and thirties and a higher proportion of older people in Wirral compared to England and Wales
- The 65+ age group is expected to increase at a faster rate than any other age group over the next two decades. Between 2006 and 2031 it is estimated that this population group will have increased by 45% in Wirral
- [The Index of Multiple Deprivation \(IMD\) 2010](#), ranked Wirral for the first time as 66th so just outside the 20% most deprived local authorities nationally. The map (above) shows this differential in deprivation between the east and west of Wirral visually
- Women in Wirral have longer life expectancy than men and are also expected to have a longer period of healthy life; (62 years compared to 60 years). Despite this, women in Wirral are also likely to spend more years in poor health (21 years compared to 18 years). This means that almost one third of people's lives in Wirral are likely to be spent in poor health. When compared to the national healthy life expectancies, both males and females in Wirral are expected to spend an additional 2 years in poor health ([Marmot Indicators, 2015](#)).

Unemployment rates, out of work benefits and related areas of deprivation

Wirral Economic Profile, produced by Wirral Council Regeneration & Environment Department, provides a regular description of a range of key local economic factors. The latest profile can be accessed [here](#)

The [November 2015 Economic profile](#) suggests that Wirral currently has 25,530 people claiming out-of-work benefits (May 2015); this includes Job Seekers, Incapacity Benefit/ESA, Lone parents and other income related benefits. This is approximately 13.1% of the working age population. Of the 25,530 benefit claimants 50.2% are male and 49.8% female, with 46% of people also claiming over 5 years. This is mainly attributed to Incapacity Benefit/ESA claimants as this benefit type accounts for 73% of all claimants. This figure has increased since the introduction of Universal Credit in August 2014.

Population / community vulnerability to climate change effects

The report, [Climate change, justice and vulnerability \(2011\) by Joseph Rowntree Foundation](#) (JRF) suggests the existence of a number of key neighbourhoods and groups who are likely susceptible to the negative effects of climate change. The report suggests that extreme weather events make a variety of dimensions of well-being insecure. Measures of the impacts of climate events such as flooding and heatwaves on well-being tend to focus on loss of life, damage to physical health and the loss of income and property. While these are important, a focus on these alone seriously underestimates the losses in well-being involved. Impacts of floods include, for example, living in temporary accommodation, the disruption of children's education, the irreplaceable loss of memorabilia and the loss of control of daily routines. These do not just matter for their impacts on health and livelihood. They are important losses in central dimensions of well-being in themselves.

The results of the JRF work points to extremes in climate-related social vulnerability in the UK. They go on to describe that it is only where neighbourhoods with high socially deprived vulnerability have the potential to come into contact with hazards of a sufficiently large magnitude that climate disadvantage will occur. It is in climate-disadvantaged areas where adaptation efforts must be prioritised.

Most, but not all, extremely socially vulnerable neighbourhoods are in the UK's large urban centres and there is a notable coastal component. Many neighbourhoods have joint climate-related social vulnerability in relation to heat and flood and this includes parts of Wirral (see maps in JRF report). For the UK this is true for about two thirds of the most extremely socially vulnerable neighbourhoods. The North West and Yorkshire and The Humber regions have the highest proportions of extremely socially flood-vulnerable neighbourhoods.

A more recent report from the JRF "*Climate Justice: How did we get there*" claims that the poorest people suffer most from climate change and are often excluded from policy decision making. Climate justice links climate change and social justice and is an emerging global issue. The report highlights the importance of the United Nations climate change negotiations taking place in late 2015 where the drafting of post-2015 global sustainable development goals will take place (Joseph Rowntree Foundation, 2014).

In late 2015 the JRF published "*Community resilience to climate change: an evidence review*" that focuses on three key areas of action, flood risk management, food growing and community energy (<https://www.jrf.org.uk/report/community-resilience-climate-change>). The report defines community resilience as "the ability of communities to reduce exposure to, prepare for, cope with, recover better from, adapt and transform as needed to, the direct and

indirect effects of climate change, where these effects can be both shocks and stresses”. The report goes on to say that the most vulnerable communities are the least likely to be able to develop community-led resilience actions and lists key recommendations for local authorities:

- Develop clearer local climate resilience strategies and actions.
- Develop multi-stakeholder partnerships to secure funding for climate change resilience initiatives.
- Build community capacity, skills and networks.
- Identify people and places that face high social vulnerability to the consequences of climate change and facilitate partnerships to carry out actions to support them.

The JRF commissioned Paul Watkiss Associates to complete a study on “*Climate Change impacts on Future Cost of Living*” (Watkiss et al, 2016) [LINK](#) .

The report found that the household food bill of the average family could rise by 9% by 2050 which would impact lower income households the most. It also found that heating costs would fall, water costs would rise marginally and that increased flooding could lead to major life-changing impacts for low income households due to the lack of contents insurance. Overall the study concludes that there are likely to be relatively modest impacts on the costs of living and household budgets in the UK from climate change up to the middle of the century, though potentially large increases in household costs thereafter.

The Climate Just map tool shows geography of England’s vulnerability to climate change at a neighbourhood scale (2016) <http://www.climatejust.org.uk/map>

Flooding and Wirral Flood Risk Areas

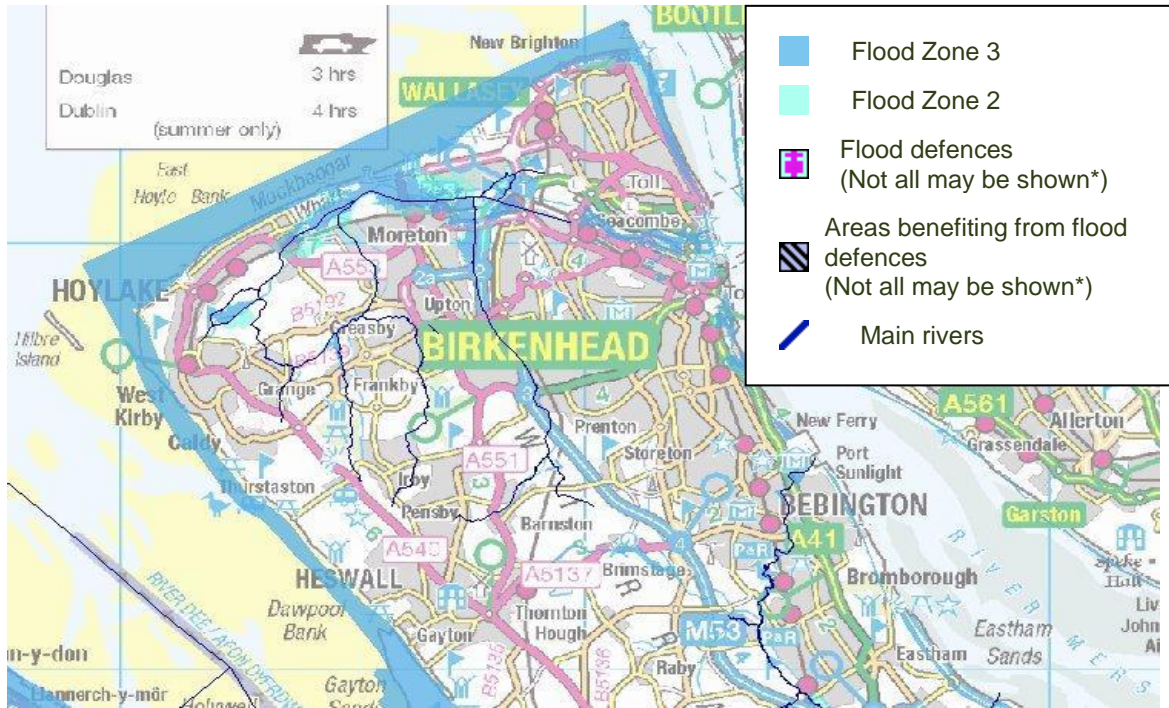
Damages from flooding and coastal change are already high, averaging an estimated £1 billion per year in the UK, Warming of 4°C or more implies inevitable increases in flood risk across all UK regions even in the most ambitious adaptation scenarios considered, (Committee for Climate Change, 2016). There are a limited number of flood areas across Wirral. These can be seen in Map 2 and Map 3 below. A wider range of Wirral Flood Maps and other key aspects can be viewed [here](#). However, there are other areas not highlighted on the maps below that may suffer from ground water flooding due to heavy rain.

Wirral Council commissioned a Section 19 Flood Investigation to look at the causes of flooding on 22nd August and 2nd September 2015. AECOM carried out the investigation into the intense rainfall across Wirral on the above dates where both internal and external flooding was reported that was caused by surface water, sewer, combination and river flooding. The report highlights some lessons learned:

- Communications and contingency planning need to be improved, including the development of a multi-agency severe weather contingency plan and better capacity within the council’s switchboard contact system.
- Community resilience needs to be improved as the results of a residents survey found that most of the affected residents are uncertain how to find out more information about flood risk, how to improve the resilience to flooding or how to obtain additional support if needed. The report suggests that establishing community flood groups, developing a flood toolkit and holding a flood fair for residents would help as would reviewing the council’s decision not to provide sandbags during floods.

The report recommended that an action plan be developed to work through the recommendations within it. The report can be found [here](#)

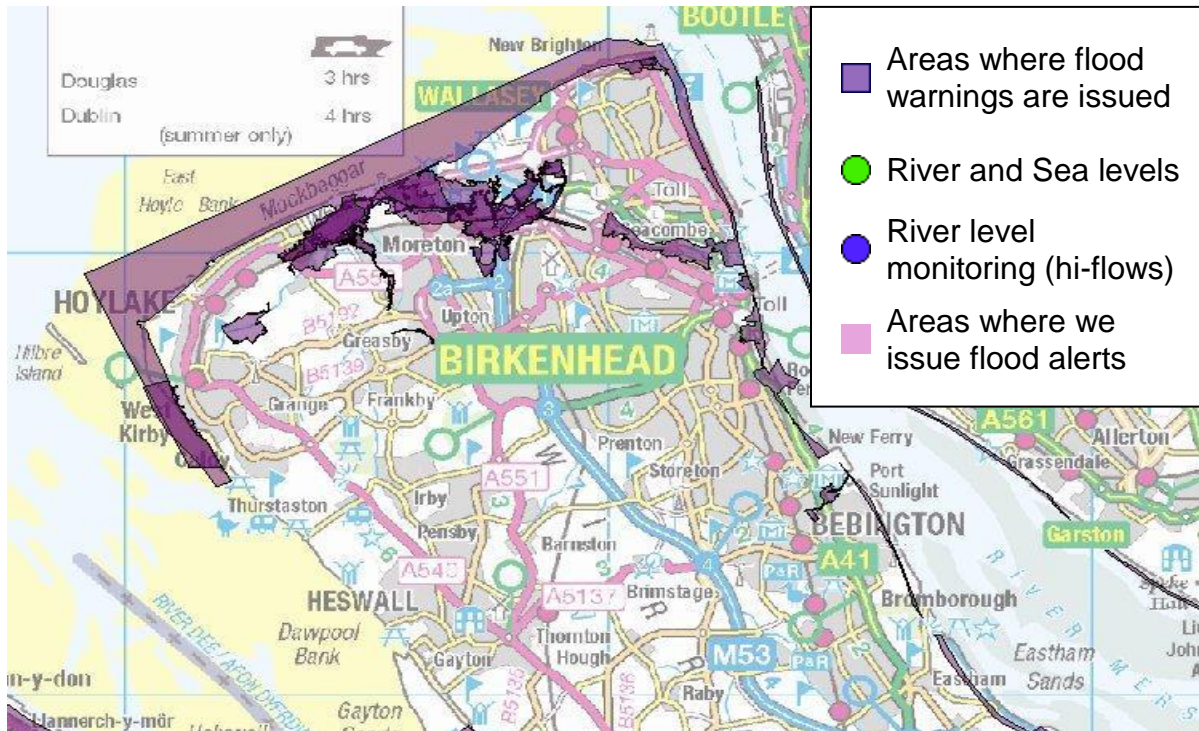
Map 2: Flood Map for Planning (Rivers & Sea) June 2015



Source: [Environment Agency, 2015](#)

Notes: The Environment Agency search engine allows the input of individual post codes in order to see if they would be affected by different types of flooding.

Map 3: Flood Warning Areas, June 2015



Source: [Environment Agency, 2015](#)

Food Insecurity

Food Security and Nutrition

A Met Office report (2012) "*Climate impacts on food security and nutrition*" states that one of the most significant impacts of climate change will be an increase in food insecurity and malnutrition due to extreme weather events with potential to destroy crops and infrastructure and long-term and gradual climate risks such as the rise in sea levels. Effects arising from the exacerbation of existing threats to food security could include the increased frequency and intensity of climate hazards, reduced agricultural yields and production, health and sanitation risks, water scarcity and conflicts over scarce resources (IPCC, 2007).

As a society we are increasingly distanced from our food – how it's grown, how it's produced and what's in it. The type of food we eat has a huge impact on our society for a number of reasons but one is the impact it has on the environment and climate change. Better Food Wirral looks to develop a good food culture so people understand how food is grown, learn about sustainability, make connections with health and the impact we make on the environment, and caring about what we eat and how it was produced or reared.

The more we understand about where our food comes from, how we farm and process it, how we cook and eat it, the more we can build a good food culture, and educate future generations to respect our food, our health and our wider environment. Better Food Wirral 2014: Launch Event & Conference Report [here](#); Research paper [here](#) and what other areas are doing about local food [here](#).

The Committee on Climate Change Risk Assessment 2017 synthesis report (2016) states that, access to safe, nutritious and affordable food in the UK is subject to domestic and international risks. Areas that need further action include:

- Weather related shocks to global food production: droughts can disrupt production within regions whilst other events such as flooding can cause supply chain problems. Longer-term, incremental climate change will shift the balance of global food production between regions. The changes will influence markets, trade and domestic prices and in turn impact UK businesses – especially farmers – and lower income households.
- Risks to soils and agricultural production from changes in rainfall: domestic agricultural production is likely to be constrained by reduced water availability and increased soil aridity and erosion. Conversely, a trend towards wetter winters is likely to increase problems such as soil compaction and erosion, unless good management practices are adopted.

Local health related issues

Key local health issues for Wirral that will be affected by climate change over coming years are discussed in the following section.

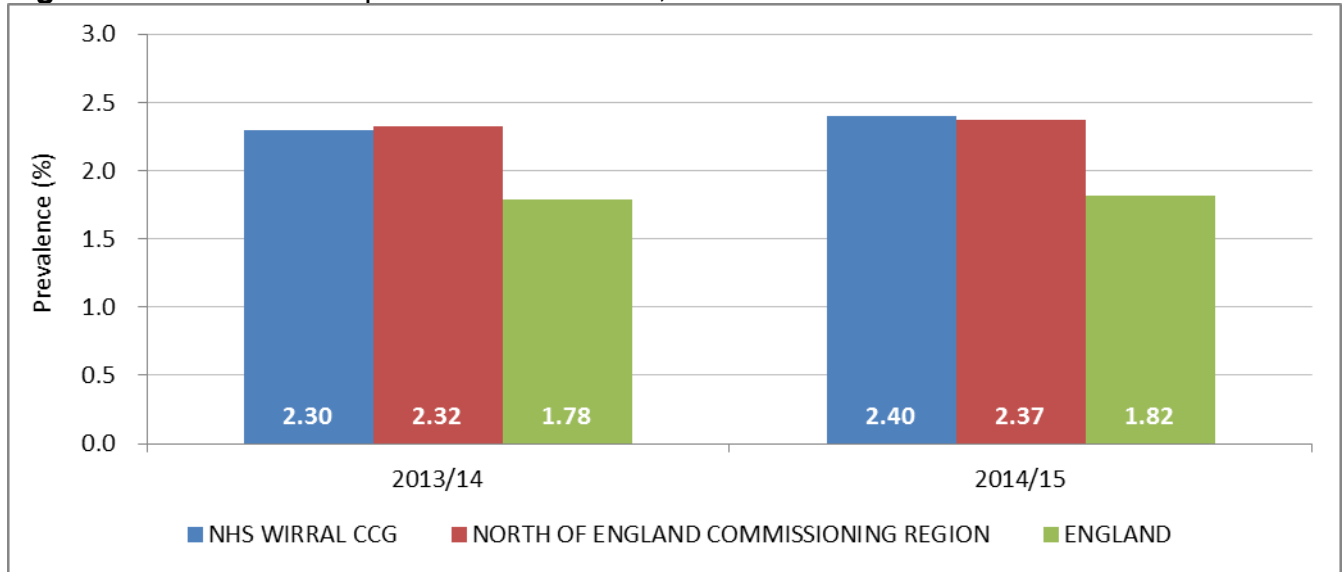
Previous studies show that current patterns of weather are associated with appreciable adverse health burdens in many cities and countries around the world (Basu, 2009; Basu and Samet, 2002; McMichael *et al.*, 2008). It is envisaged that very few climate change related deaths will arise as a direct result of hyperthermia or hypothermia, but rather from temperature effects on disease, especially cardiovascular and respiratory. These heat and cold related deaths pose a significant problem to public health.

As described earlier there are groups at higher risk from the effects of climate change and there are a range of health conditions that could be exacerbated by changes in winter and summer climate conditions in this and future decades. These are noted below.

Chronic Obstructive Pulmonary Disorder (COPD)

It is estimated that COPD affects around 3 million people in the UK. Conditions and symptoms include emphysema and chronic bronchitis.

Figure 1: QOF recorded prevalence of COPD, 2013/14 and 2014/15



Source: [National Cardiovascular Intelligence Network](#), 2014/15

Figure 1 shows that prevalence of COPD in Wirral in 2013/14 and 2014/15 (2.3% increasing to 2.4%) is similar to that recorded in the North of England Commissioning Region (NECR) (2.32% increasing to 2.37%). However, both Wirral and NECR have higher rates than the England average (1.78% increasing to 1.82%). The prevalence rate for Wirral of 2.4 (2014/15) equates to approximately 8,000 Wirral residents.

As well as the physical limitations of COPD, those diagnosed are more likely to suffer from mental health issues such as depression and anxiety. The Consultation on a Strategy for Services for COPD in England (Department of Health, 2010) sets out a number of recommendations stating that in addition to medication, people diagnosed with COPD should receive support from other agencies such as social care.

In addition to the impact on social care due to physical and emotional support needs, those diagnosed are also likely to be receiving care from a friend and/or family member. The Department of Health also recommends that specialist advice and information is accessible to carers of people with COPD.

Asthma

The [local asthma atlas for Wirral](#) provides information on the current issues, trends and outcomes for asthma. Wirral is significantly worse compared to England for admissions to hospital and emergency admissions to hospital (per 1,000 people) also recorded prevalence of asthma on GP registers.

The atlas goes onto suggest that for recorded asthmas Compared to England:

- Significantly worse than the England average.
- Ranked 161 of the 209 CCGs in England.

Compared to:

- Higher than the average for the North West .
- Ranked 18 out of 33 CCGs within this Region.

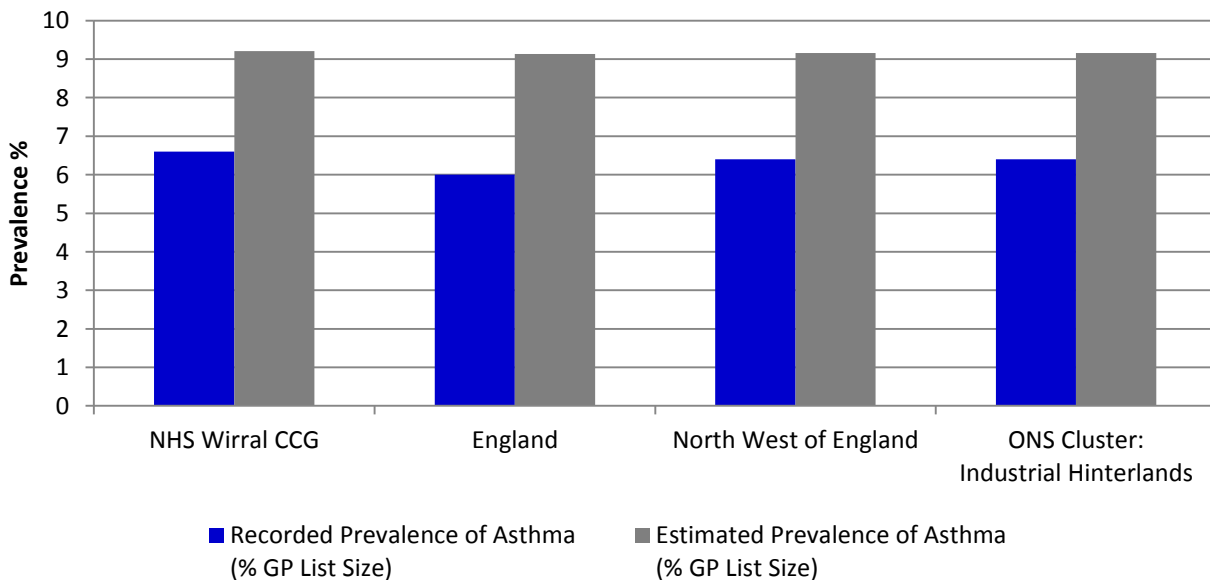
Compared to Peers within Office for National Statistics (ONS) looked a Cluster:

- Higher than average for the ONS Cluster: Industrial Hinterlands .
- Ranked 13 out of 16 amongst peers within the ONS Cluster.

The report highlights that Public Health modelling suggests that asthma prevalence may be higher than reported. There is considerable evidence that asthma is under-diagnosed and under-recorded. For this reason people have conducted studies to try and estimate the extent of under-diagnosis and developed statistical models which can be used to generate expected numbers of people with asthma based on population characteristics.

The gap between recorded and expected prevalence is a measure of the degree of under-diagnosis of asthma. Prevalence of asthma as reported via Quality Outcomes Framework (the number of people with a recorded diagnosis of asthma according to GP electronic records) is 21,822 (2015). However the expected count for NHS Wirral CCG is 30,503 (2008 last update). This can be seen as a percentage of both in figure 2 below.

Figure 2: Wirral: Recorded & Expected Prevalence of Asthma as a percentage, as at 2015



Source: Public Health England: Inhale - Interactive Health Atlas of Lung conditions in England

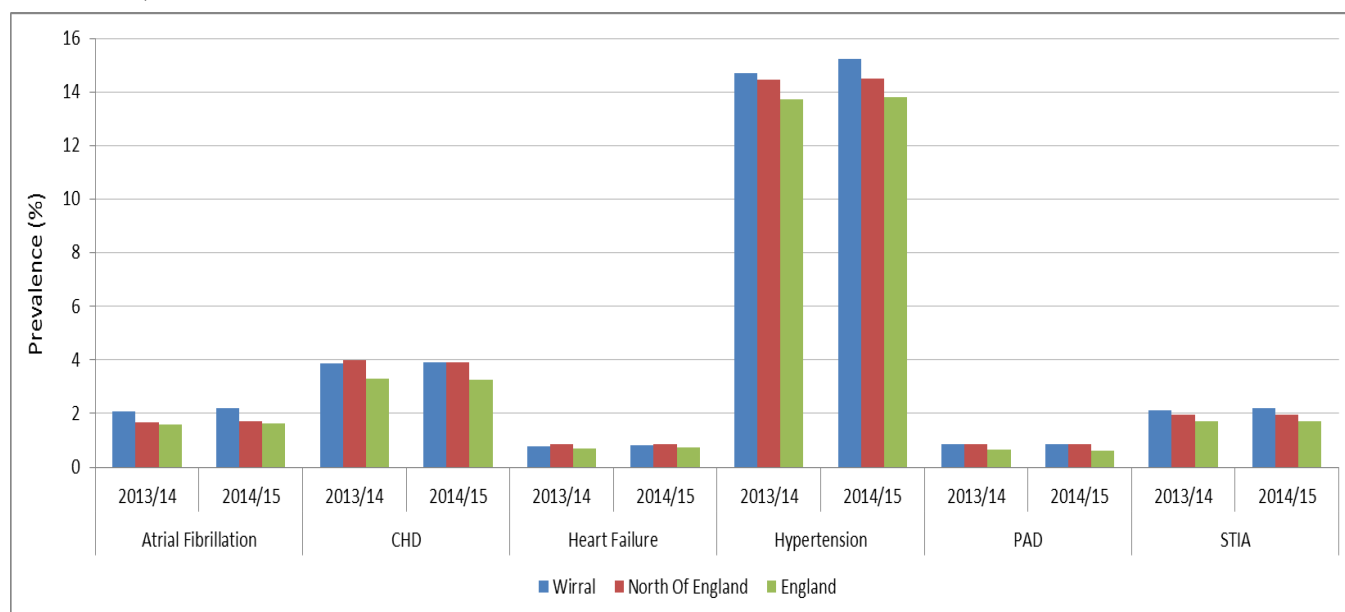
Cardiovascular disease (CVD)

In general cardiovascular disease continues to reduce across Wirral, and for males and females. This is a reduction of over 65% since 1995.

CVD is a general term that describes a disease of the heart and/or blood vessels. Types of CVD include;

- Coronary Heart Disease (CHD)
- Heart Failure
- Hypertension (high blood pressure)
- Peripheral Arterial Disease (PAD)
- Stroke and Transient Ischaemic Attack (STIA)
- Atrial Fibrillation

Figure 3: Quality and Outcomes Framework (QOF) recorded prevalence of Cardiovascular Diseases, 2013/14 and 2014/15

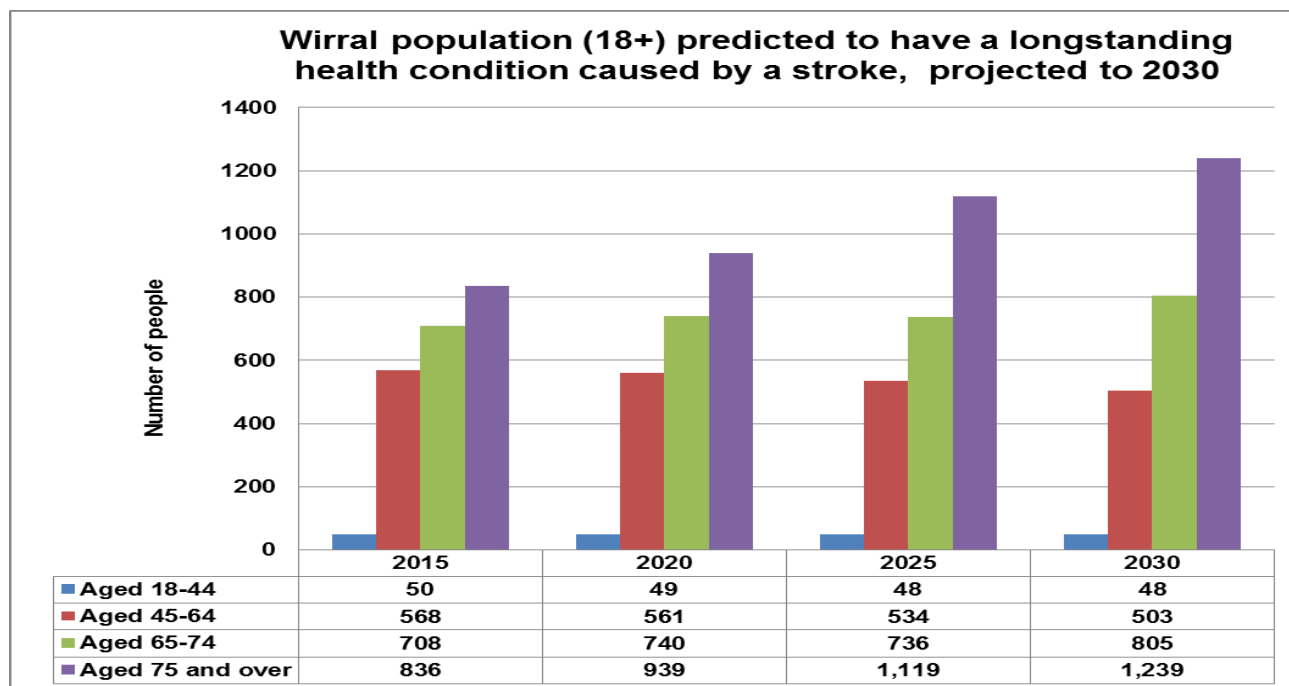


Source: [Health & Social Care Information Centre \(HSCIC\) 2015](#)

Figure 3 shows that Wirral had higher estimated prevalence rates for Atrial Fibrillation, Hypertension, PAD and STIA than both, the North of England and England in 2013/14 and 2014/15. Figure 53 also shows that prevalence of all types of CVD increased in Wirral between 2013/14 and 2014/15.

Different types of CVD will have different impacts on social care in Wirral. Figure 4 (below) predicts that currently over 2,200 residents, rising to over 2,500 by 2030, may have a longstanding health condition as a result of a stroke with the consequences that translate to increased needs for social care and the support it offers.

Figure 4: Wirral population, aged 65+ predicted to have a longstanding health condition caused by stroke, projected to 2030



Source: [PANSI 2016](#)

Further information around CVD, including profiles on individual types of CVD, can be found in the [Cardiovascular Disease](#) section of the Wirral JSNA.

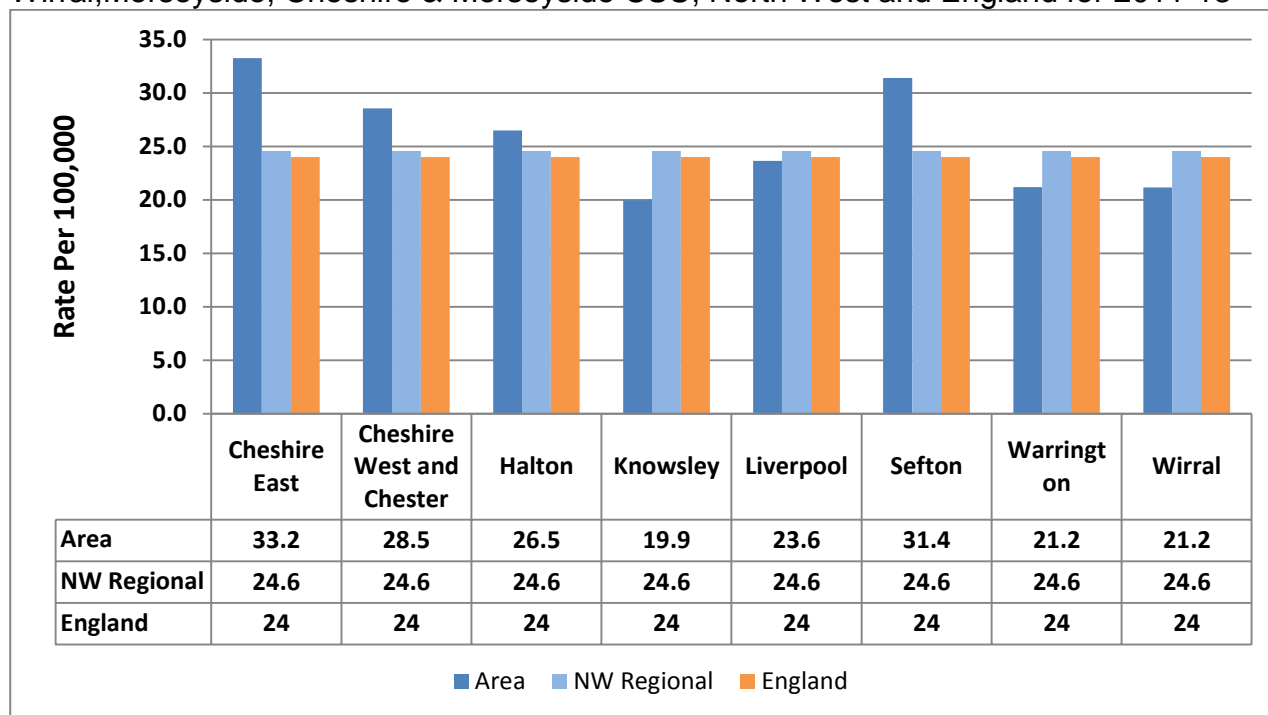
Further data can be found also on the National Cardiovascular Intelligence Network profiles <http://www.yhpho.org.uk/default.aspx?RID=203617>

Skin Cancer (Melanoma)

At the Public Health England Skin Cancer Hub, the Wirral specific atlas suggests that Wirral has a higher incidence rate per 100,000 of malignant melanoma compared to the North West and England as seen in figure 5 below. Information about Wirral from the Skin Cancer Hub provided by Public Health England can also be viewed in an atlas [here](#)

ONS released a [presentation on Skin Cancer in England](#): A look at melanoma skin cancer over 20 years in July 2016.

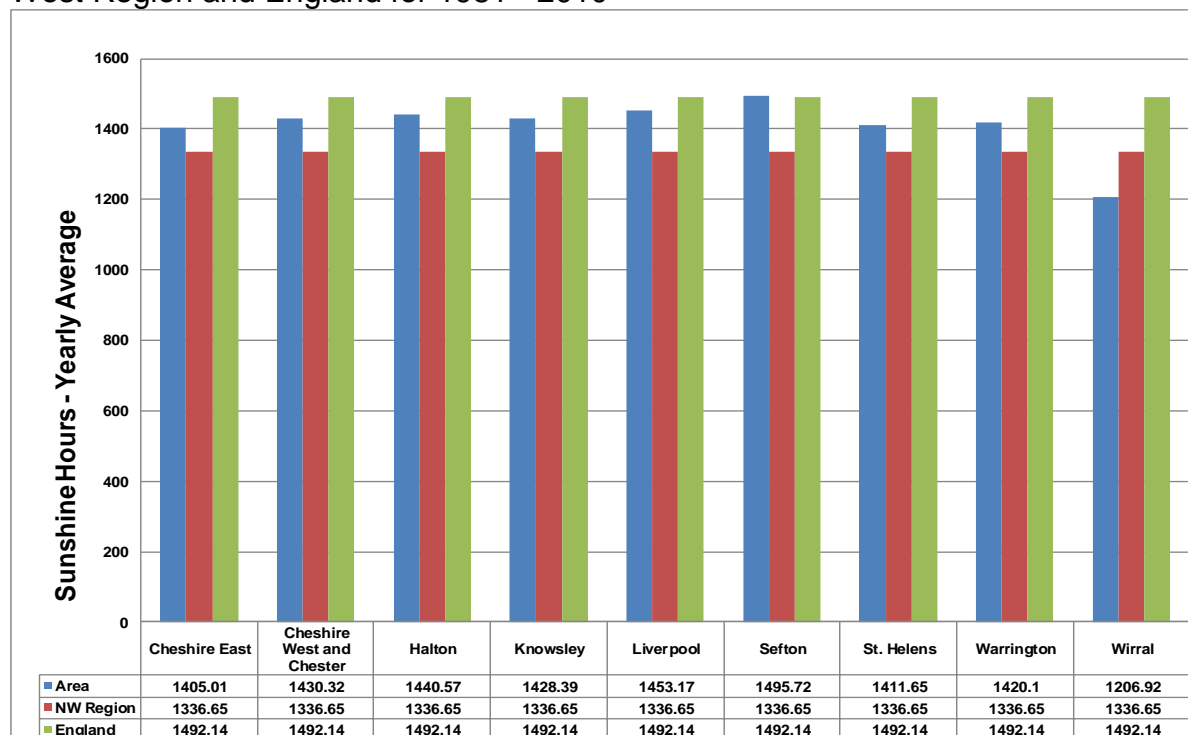
Figure 5: Malignant Melanoma: Incidence rate per 100,000 people, all age, comparison Wirral, Merseyside, Cheshire & Merseyside CSU, North West and England for 2011-13



Source: [Public Health England, Skin Cancer Hub, 2014](#)

However when comparing average yearly sunshine hours between 1981 and 2010 Wirral has the lowest average number of sunshine hours per annum compared to all other parts of Cheshire, Merseyside North West and England as described in figure 6 below.

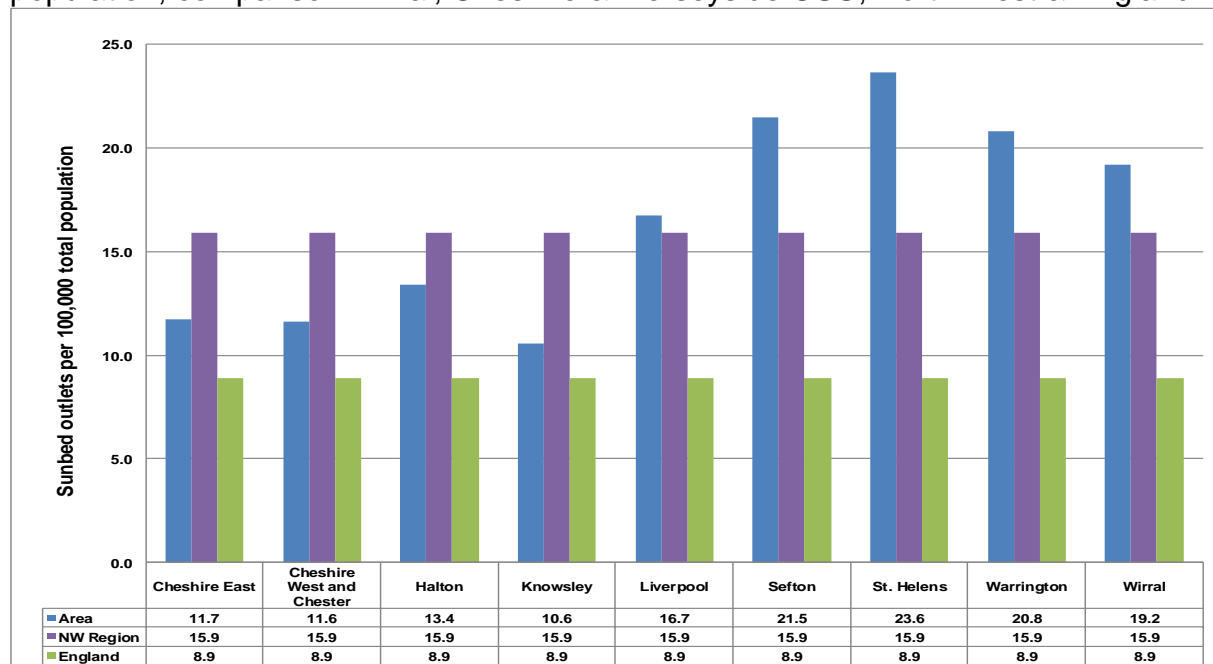
Figure 6: Sunshine Hours, Yearly Average, Comparison Wirral, Cheshire & Merseyside, North West Region and England for 1981 - 2010



Source: [Public Health England, Skin Cancer Hub, 2014](#)

Figure 7 shows the sunbed density (number of outlets per 100,000 people) for a number of areas and England. Wirral has a higher density than all but Warrington, St. Helens and Sefton and is higher than both North West and England.

Figure 7: Sunbed Outlet Density (Total Population), Sunbed outlets per 100,000 total population, comparison Wirral, Cheshire & Merseyside CSU, North West & England 2005



Source: [Public Health England, Skin Cancer Hub, 2014](#) Notes: Last produced by ONS and Public Health England in 2005

Mental Health

Please see Mental Health Chapter [here](#)

Key aspects related to Climate & Health are:

- National data suggests that people with a mental health problem are more likely to be on a lower income, be on welfare benefits, and live in debt. Mental health is also the most commonly reported reason for claiming incapacity benefits, both nationally and locally.
- In Wirral it is estimated that there is a higher prevalence of severe mental illness compared with the England average (QOF, 2014/15)
- Hospital admissions data for mental health indicates a strong association between deprivation and increased admissions. Admissions for self harm and prevalence of a common mental illness show a similar pattern. This indicates a greater need for mental health interventions in areas with higher levels of deprivation

See Wirral Flood Maps [here](#)

See Wirral Council's "Local Climate Change Impact Profile Media Trawl" (2005 - 2014) [here](#)

Potential health related future impacts

Latest research “*The impact of climate change upon health and health inequalities in the north west of England*”, suggests that climate change is expected to result in regional changes in temperature, rainfall, sea levels and extreme weather events. These events could have direct and indirect impacts on health, disproportionately affecting vulnerable populations including children and the elderly (Liverpool John Moores University, 2012).

A new report by the Royal College of Physicians (2016) “*Every breath we take: the lifelong impact of air pollution*”, focuses on air pollution, stating that, air pollution plays a role in many of the major health challenges of our day, and has been linked to cancer, asthma, stroke and heart disease, diabetes, obesity, and changes linked to dementia. The report can be found at: <https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution>
For a Wirral perspective see JSNA chapter “*Environmental Health – Air Quality*” [link](#)

Respiratory diseases including asthma

High levels of air pollution and periods of hotter than average temperatures are associated with increased risk of respiratory illnesses, (Liverpool John Moores University, 2012). Incidence of asthma and other respiratory allergies increase with exposure to air pollutants. Populations experiencing flooding are at higher risk of respiratory illnesses.

High levels of air pollution contribute to the risk of respiratory illnesses including asthma. It is believed that children who reside in areas of low socioeconomic status may be at an increased risk of developing asthma. Diagnosis of asthma, cases of severe asthma and hospitalisation for asthma are all associated with individual and area-based indicators of social disadvantage (Cesaroni et al, 2003)

Temperature

Studies suggest that incidence of respiratory illness may increase during or immediately following periods of high temperature, with estimated increases of mortality varying from 12%-80% during and following heat waves in the UK, Europe and USA (D’Ippoliti et al, 2010; Huynen et al., 2001; Revich and Shaposhnikov, 2008; Rooney et al., 1998). Increased respiratory illness has been identified as the greatest contributor to increased mortality during extreme heat events (Revich and Shaposhnikov, 2008; Huynen et al., 2001).

Additionally, the risk of respiratory illness may increase in the days and weeks following a period of colder temperature (Hajat et al., 2002). It is suggested that cold weather is likely to increase rates of mortality from flu and flu-like conditions (Kunst et al., 1993), and therefore the predicted warmer average temperatures in the coming century may have a positive impact by reducing cases of flu and other respiratory illnesses during the winter months. Please consider “*Wirral Excess Winter Deaths*” report [here](#).

Respiratory illness has a strong effect on increasing mortality risk during periods of high temperatures, particularly for elderly people over the age of 85. Respiratory-related deaths also increase during times of cold weather in both the over 85 years and the 0-64 years populations. Individuals living in nursing and residential homes are identified as being particularly at risk from respiratory illnesses during both hot and cold weather and their needs must be considered, Hajat et al (2007).

Flooding

Studies from the UK suggest that individuals who have experienced flooding may be at risk of respiratory diseases. In the days following flooding residents in flooded areas are susceptible to cold like symptoms including sore throats and coughs and in the following weeks and

months may experience respiratory and chest illnesses (Reacher et al., 2004; Tapsell and Tunstall, 2008; Tunstall et al., 2006). These effects are attributed to the cold flood waters and the stress of cleaning up and having to live in cold and damp conditions. Exposure to fungal spores in damp housing is believed to relate to respiratory conditions including asthma (Cecchi et al., 2010)

Precipitation

An association between thunderstorms and hospital admissions related to asthma is well established and therefore increasing incidence of storms this century may result in higher numbers of cases of asthma attacks (Cecchi et al., 2010).

Cardiovascular disease (CVD)

CVD, particularly coronary heart disease (CHD) and stroke, is the leading cause of death in the UK and accounts for approximately 200,000 deaths per year (Scarborough et al., 2010). Hot and cold temperatures and air pollution are associated with increased risk of CVD.

Temperature

Experiencing hot and cold temperatures can increase risk of cardiovascular problems by impacting upon a number of physiological factors including blood pressure, blood viscosity, blood cholesterol, thrombosis and hyperthermia. Studies of mortality rates during heat waves demonstrate that the risk of mortality and hospitalisations due to CVD, ischaemic heart disease and pulmonary disease may increase during periods of extreme higher temperatures (Braga et al., 2002; D'Ippoliti et al., 2010; Huynen et al., 2001; Revich and Shaposhnikov, 2008). A similar effect has been demonstrated during cold spells with higher incidence of cardiovascular-related illness and mortality during cold weather with the elderly particularly susceptible (Revich and Shaposhnikov, 2008; Huynen et al., 2001). Warmer average temperatures may therefore reduce the risk of CVD during future winters.

Air Quality

Short-and long-term exposure to pollutants including particulate matter, sulphur dioxide and carbon monoxide is associated with increased risk of cardiovascular-related mortality (Department of Health, 2006; Pope et al., 2004; Pope and Dockery, 2006). CVD may be particularly affected by exposure to high levels of particulate matter (Dennekamp and Carey, 2010; Dockery, 2001; Pope et al., 2004).

Changes to climate could contribute to increasing the risk of cardiovascular disease which may in turn impact upon residents in the most deprived areas in the North West, typically found in urban areas. The Health Survey for England 2011 reported that for men and women aged 35 and over, the prevalence of CVD varied by household income and the area level Index of Multiple Deprivation.

Lower numbers of residents with heart disease were in the highest fifth of the income distribution (5% in men, 2% in women) compared with higher number (11% and 5% respectively) with heart disease in each of the lowest two fifths for income distribution. Similarly, prevalence of heart disease increased from 6% of men and 3% of women in the least deprived areas to 11% and 7% respectively in the most deprived (The Health and Social Care Information Centre, 2011).

Although Wirral has a small ethnic minority population, (see BME JSNA chapter [here](#)), South Asian residents are considered to be at a higher risk of cardiovascular illnesses, with mortality rates for CHD and stroke considerably higher in Indian, Pakistani and Bangladeshi individuals compared to the general population in the UK (Fischbacker et al., 2007; Wild et al., 2007).

Skin Cancer

Increased exposure to UV radiation due to ozone layer depletion is associated with increased risk of skin cancers. Increasing temperatures in the North West in the 21st Century may increase time spent outdoors and consequently UV radiation exposure. Populations in the least deprived areas of the North West may be most at risk. Incidence of melanoma skin cancer in the North West has increased dramatically since the 1980s and is predicted to increase from approximately 1,000 new cases per year in 2003-2005 to over 2,500 new cases per year by 2018-2020 (Shack et al., 2007).

Air Quality

The relationship between ozone layer depletion and exposure to UV radiation is well established and increased exposure to UV radiation is associated with higher risk of skin cancer (van der Leun et al., 2008; Diffey, 2004; Norval et al., 2007; Rigel, 2008).

The Montreal Protocol is an international treaty which aims to reduce the emissions of substances that are believed to contribute to the depletion of the ozone layer. It is hoped that if the terms and amendments to the Montreal Protocol are followed, then UV radiation in the UK should return to pre-1980 levels in the second half of this century (Diffey, 2004).

Temperature

Risk of non-melanoma skin cancer in the USA has been associated with higher than average exposure to UV radiation and maximum average daily temperature (van der Leun et al., 2008). During periods of higher temperatures, individuals may be more likely to spend time outside and in the sun, increasing exposure to UV radiation. In the UK, risk of skin cancer may therefore be expected to increase as temperatures rise during the next century. It is predicted that in the first half of this century, before ozone levels are expected to recover, there will be an additional 5,000 cases of skin cancer per year in the UK (Diffey, 2004).

Precipitation

Less precipitation during the summer months suggests more hours of sunlight per day in the future. This is likely to encourage people to spend more time outdoors and increase risk of exposure to UV radiation.

Thermal Illness

In very hot conditions the body is unable to cool itself through sweating and heat-related illnesses can occur (Health Protection Agency, 2011a). Young children and individuals with impaired thermoregulation, including the elderly and those on medications, are believed to be particularly at risk during heat waves as their bodies are less able to regulate temperature and are therefore at risk of overheating, dehydration and heatstroke (Department of Health, 2011). Severe heatstroke can cause multiple organ damage and can quickly cause death within hours of onset (Kovats and Hajat, 2008).

Further examples of thermal illnesses include heat cramps, heat rash, heat syncope and heat exhaustion (Department of Health, 2011) and sunburn, which may be painful and is predicted to relate to the onset of skin cancer (Health Protection Agency, 2011b). The projected increase in summer temperatures and the frequency and intensity of heat waves in the UK during the 21st century is likely to increase the risk of heatstroke. Additionally, increased time spent outdoors in the sun due to higher temperatures and reduced cloud cover is likely to increase risk of sunburn in the UK.

Children under four years of age, and those who are overweight or on medication are particularly at risk during heat waves (Health Protection Agency, 2011a).

Gastro-intestinal illness including food poisoning and water-borne diseases

Rising temperatures, increased rainfall and flood events are predicted to increase the risk of gastrological illnesses during the 21st century. Contamination of food and water supplies due to higher temperatures and increased frequencies of heavy rainfall and flooding are predicted to increase the risk of food poisoning and intestinal illnesses.

Temperature

Rising temperatures may result in increased risk of food poisoning. Evidence indicates that cases of food poisoning, salmonellosis and other foodborne illness increases during periods of higher temperatures (Bentham and Langford, 1995; 2001; Kovats et al., 2004; Lake et al., 2009; D'Souza et al., 2004; Zhang et al., 2010). It is predicted that with a 1 °C rise in temperature, an extra 4.5% cases of food poisoning may occur and middling estimates predict an extra 10,000 reported cases in England and Wales per year (Department of Health, 2008). Generally, the effects on incidence of food poisoning have been shown to emerge between one and five weeks after a period of high temperature.

Precipitation and flooding

There is evidence in the UK that flooding is associated with increased risk of gastro-intestinal illnesses. In the weeks and months following floods in England and Wales, gastro-intestinal illnesses were the highest reported physical health effect experienced with between 10% and 73% of individuals in different towns being affected (Reacher et al., 2004; Tapsell and Tunstall, 2008; Tunstall et al., 2006). The range may be explained by the depth of flooding in towns, for example, with deeper flooding reported to have significantly increased the risk of gastroenteritis among residents in Lewes (Reacher et al., 2004).

Mental health and well-being

Experiencing flooding and natural disasters that cause damage to property, relocation and loss of possessions can have a detrimental effect upon mental health, including Post-Traumatic Stress Disorder (PTSD). High levels of air pollution and high temperatures may also impact negatively upon mood. Heat waves may increase risk of mortality and psychological problems among people with mental health problems.

Flooding and natural disasters

Floods have been associated with psychological distress including PTSD, anxiety and depression and studies indicate that effects can be long lasting (Mason et al., 2010; Reacher et al., 2004; Tunstall et al., 2006). Over a quarter (28%) of individuals who experienced flooding in Tewkesbury in 2007 met the criteria for PTSD and over a third (35%) met criteria for depression (Mason et al, 2010).

Following flooding in Lewes in 2000, nearly three quarters of persons taking part in a study reported experiencing negative psychological effects.

Flood Maps for all Wirral post codes can be found [here](#)

Temperature

Incidence of mental illness is thought to increase during periods of high temperatures and individuals with mental illness are particularly vulnerable (Hansen et al., 2008). On average, the North West has lower use of Mental Health Services compared to the rest of England. In the North West, use of services is highest in Merseyside and Greater Manchester and the north of Cumbria and these areas may be at higher risk from aspects of climate change predicted to impact upon mental health.

The North West Mental Wellbeing Survey 12/13 (Jones et al., 2013) has provided important information about the state of the North West population's mental wellbeing and the differences from the baseline survey conducted in 2009. Findings reveal that while overall mental wellbeing does not appear to have improved (mean WEMWBS score 27.66, compared with 27.70 in 2009), satisfaction with life has increased significantly.

Throughout the region lower levels of well-being were more likely amongst the following groups: 40-54 year olds, those living in the most deprived areas, white adults, individuals who are unemployed and individuals with few qualifications. It therefore appears likely that more deprived areas could be at higher risk from climate change impacting upon mental well-being.

Insect-borne diseases

Mosquitoes, flies, fleas, ticks and other biting insects cause great harm worldwide through the spread of diseases such as Plague, West Nile virus, Lyme disease (borreliosis) and malaria, which causes around one million deaths a year worldwide (World Health Organisation, 2010). It is believed that due to climate change, conditions may become more conducive in the UK for the spread of insect-borne diseases. Public Health England (PHE) is reminding people to be 'tick aware' by launching new leaflets advising the public on how to prevent tick bites and the risk of contracting Lyme disease ([here](#))

The UK climate may become more conducive to insect-borne disease, with rising summer temperatures and warmer winters more favourable for the spread of malaria and prolonged seasons of tick activity (Gray, 2008; Hunter, 2003). However It is believed that climate change is unlikely to impact on the incidence of malaria and similar diseases in the UK (Department of Health, 2008) due to the advanced medical facilities and public health strategies common to developed countries.

Recent research carried out by Medlock and Leach (2015) into vector borne diseases highlights that environmental changes such as the creation of wetlands and urban green space to mitigate climate change also affect the risk of vector-borne disease.

It goes on to say that current and future climate change will permit the territorial expansion of three species of mosquito's into the UK, particularly southern England. If this were to happen then the large numbers of imported dengue and chikungunya cases who travel to the UK would pose a source of infection to the established UK mosquitoes. The research also states that West Nile Virus is transmitted by several European mosquitoes, many of which are found in the UK and the predicted increase in summer temperatures promote their development and abundance.

Public Health England is currently developing guidelines for the Environment Agency and wetland managers on how risks can be mitigated during disease outbreak. The research also states that a study has predicted that by 2080 as far north as southern Scotland will be climatically suitable for Malaria although it is thought that the incidence will be low and availability of anti-malarials and the current health-care system should minimise malarial risk.

Medlock and Leach (2015) also discuss ticks and tick-borne disease stating that the Public Health England tick surveillance scheme has reported an increase in tick problems in urban areas which may be exacerbated by climate change adaptation strategies to promote urban green space. Urban cases of Lyme disease are being reported at an increasing rate in the UK. Local Authorities are being advised to develop plans to mitigate tick issues through environment and greenspace management and tick awareness strategies. The research goes on to say that changes in weather and extreme weather will affect tick activity and abundance.

Mild and wet winters will prolong winter tick activity as will warmer springs. Human behaviour change i.e spending more time outside will also have an affect.

The Committee for Climate Change (2016) state that the impacts of new and emerging pests and diseases are potentially high for otherwise healthy people, animals and plants. The warmer, wetter conditions expected with climate change will allow some pests and diseases to extend their range. It goes on to say that there is an urgent need for further research to inform government policy and operational measures, such as additional surveillance of emerging pathogens and monitoring of existing problem species.

Impact on the access to healthcare

Flooding and extreme weather events

Extreme weather events and flooding can be expected to increase the risk to health in many different ways, including acute health issues for residents in flooded areas and emergency services. According to Public Health England, *“The effects of flooding on health are extensive and significant, ranging from death from drowning and injuries from accident, to infectious diseases and mental health problems (short and long term)”* (Public Health England, 2014). Additionally, flooding has the potential to cause damage to infrastructure, as flooding events may pose a risk to buildings including healthcare facilities, water and electricity sources and roads and other transport facilities.

This could result in injury or illness and difficulty for the public in accessing healthcare or access for emergency services to those in need. A risk assessment of flooding in Greater Manchester concluded that types of infrastructure that could be at risk in the city include electricity substations, water storage/treatment plants and the city’s transport systems (Kazmierzak and Kenny, 2011).

Across England and Wales, the number of hospitals, GP surgeries, emergency service stations or care homes located in areas of significant flood risk are projected to increase by the 2050’s by between 3 and 24% under a 2 °C scenario, and between 27 and 110% under a 4 °C scenario (Committee on Climate Change, 2016).

See Wirral Flood Maps [here](#)

See Wirral Council’s *Local Climate Change Impact Profile Media Trawl (2005 - 2014)* [here](#)

Targets

Climate Change Act 2008

The [Climate Change Act 2008](#) establishes a legal framework for government action on climate change, both mitigation and adaptation. The current UK targets are to reduce GHG emissions by at least 34% by 2020 and at least 80% by 2050 from 1990 levels. The act establishes a system of binding five-year ‘carbon budgets’ to drive progress towards these targets.

With respect to adaptation, there is an obligation to produce a UK Climate Change Risk Assessment (CCRA) every 5 years (the first was published in January 2012 (Defra, 2012) and an associated National Adaptation Programme (Defra, 2013). The Committee on Climate Change has recently published a UK Climate Change Risk Assessment 2017 Synthesis report which will inform CCRA2 in 2017, (Committee on Climate Change, 2016).

The Act gives the Government the power to require public authorities and statutory undertakers (including utility companies) to report on how they have assessed the risks of climate change for their work, and what they are doing to address these risks.

Wirral Council seeks to demonstrate leadership in cutting carbon emissions and has set a target to reduce its own emissions by 60% by 2025 from a 2008/09 base year (Wirral Council, 2011). There are currently no local targets relating to adaptation to climate change.

Public Health Outcomes Framework 2016-2019 [here](#)

Improving the wider determinants of health

1.16 Utilisation of outdoor space for exercise/health reasons

Health Improvement

2.23 Self-reported wellbeing

Health Protection

3.1 Fraction of mortality attributable to particulate air pollution.

Healthcare public health and preventing premature mortality

4.4 Under 75 mortality rate from all cardiovascular diseases (including heart diseases and stroke) *(NHSOF 1.1)

4.7 Under 75 mortality rate from respiratory diseases *(NHSOF 1.2)

4.8 Mortality rate from a range of specified communicable diseases, including influenza

4.15 Excess winter deaths

NHS Outcomes Framework 2016/17: [link](#)

Preventing people from dying prematurely:

1.1 under 75 mortality rate from cardiovascular disease (PHOF 4.4)

1.2 under 75 mortality rate from respiratory disease (PHOF 4.7)

Adult Social Care Outcomes Framework 2015/16 [here](#)

Safeguarding adults whose circumstances make them vulnerable and protecting from avoidable harm 4A: The proportion of people who use services who feel safe

a) People are protected as far as possible from avoidable harm, disease and injuries

b) People are supported to plan ahead and have the freedom to manage risks the way that they wish

CCG Outcomes Indicator Set 2015/2016 [here](#)

Potential years of life lost from causes considered amenable to healthcare adults, children and young people (NHS OF 1a i. & ii)

Under 75 mortality from cardiovascular disease (NHS OF 1.1)

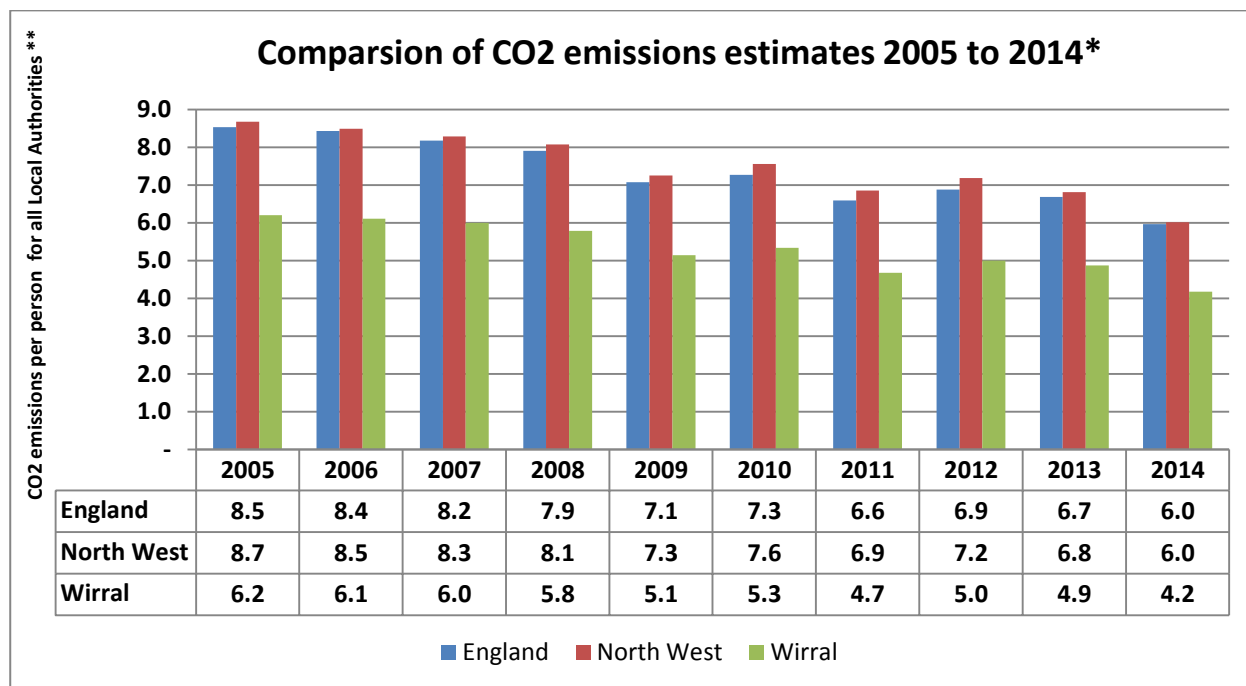
Under 75 mortality from respiratory disease (NHS OF 1.2)

Wirral Council Climate Change Performance

When the Local Authority emissions are aggregated, estimated total carbon dioxide emissions decreased by around 24 percent between 2005 (the earliest year for which data are available at Local Authority level) and 2014 – falling from 529.4 million tonnes to 403.8 million tonnes. Whilst emissions have decreased over time there have been some periods of fluctuation, with emissions increasing between 2009 and 2010 (largely due to relatively low emissions in 2009 as a consequence of economic factors) and between 2011 and 2012 (largely due to variations in temperature). For information on the drivers of trends at national level, see National Statistics on Final UK Greenhouse Gas Emissions. In Wirral, emissions (GHGs expressed as CO₂ equivalents) fell 33% between 2005 and 2014 ([DECC, 2015](#)).

Figure 8 below provides a comparison of per capita CO₂ emissions totals between 2005 and 2014 for England, North West and Wirral. This highlights Wirral being consistently lower than both North West and England over that period.

Figure 8: Comparison of per capita CO2 emissions totals between 2005 and 2014 for England, North West and Wirral



Source: [DECC \(2015\)](#)

Notes: *Per capita Local CO2 emission estimates 2005-2014 (t CO2 per person) ...**CO2 emissions per person in the Industrial & Commercial, Domestic and Transport sectors for all Local Authorities in the UK

Overview: <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2014>

Local Authority trends since 2005

There is more variation in trends at Local Authority level than at regional level. In particular, emissions for many Local Authorities are heavily influenced by activities at industrial sites, and changes at a single site can have a big impact on emissions trends. ([DECC,2016](#))

Out of 406 Local Authorities, 405 have shown a decrease in total emissions between 2005 and 2014. This reflects the decrease in overall emissions for the UK during this period driven mainly by reductions in emissions from power stations, industrial combustion and passenger cars. The reduction from power stations is driven by change in the fuel mix used for electricity generation with a reduction in the amount of coal which is a carbon intensive fuel. The reduction in industrial combustion is largely driven by the closure or reduced activity of industrial plants, a large portion of which occurred during 2009 likely due to economic factors.

As noted in Figure 8, and in line with the overall Wirral reduction, Wirral Councils (2015/16) own emissions are falling in line with the Council’s Carbon Budget targets. These figures are produced and reported annually by Wirral Council (Wirral Council, 2016).

<http://www.wirral.gov.uk/about-council/climate-change-and-sustainability/greenhouse-gas-emissions-reports>

What is this telling us?

The information considered so far highlights many potential issues, especially health, that face Wirral and its residents.

Risks

The most recent Committee on Climate Change UK, “*Climate Change Risk Assessment 2017 synthesis report*” (2016) has highlighted the key issues that will need more action in order to mitigate the risk over the next five years:

- Residual flood risks, even with current investment plans the residual risk of flooding will remain high across the UK.
- Urban water management: climate change is expected to lead to significant increases in heavy rainfall, with sewers in many urban areas already at over capacity.
- The evidence suggests that long term health and wellbeing impacts of flood events are considerable and more research is needed to assess and understand how best to manage these.
- Infrastructure: electricity sub-stations, road and rail networks, water treatments works, ports and airports and fixed line and mobile communications assets are all exposed to increasing flood risks. Further work is needed to assess and address vulnerabilities.
- Agricultural production: strategic choices need to be made about the value of protecting agricultural production in flood risk areas when this could further increase run-off rates, silt deposition in rivers and downstream flood risk.
- In the absence of adaptation, annual UK heat-related mortality is projected to increase by two-thirds by the 2020's, by 250% by the 2050's, and by more than 500% by the 2080's from a current baseline of 2,000 heat-related deaths per year. This is due to the effects of climate change and the growing, ageing population.
- UK planning strategies do not currently make specific recommendations for reducing the heat island effect such as through planning and urban design, beyond promoting urban green space.
- The current impacts and future risks of overheating in hospitals, care homes, schools and prisons across the UK are not known. Further research will be important to assess the level of risk in all types of building to determine the action necessary.
- Risks arising from water scarcity for England, Scotland and Wales. A number of separate but related water scarcity risks will arise due to changes in rainfall, increases in potential evaporation and soil aridity, coupled with projections of continuing population growth. Without additional action, Great Britain overall is projected to be in deficit by 800 to 3,000 megalitres per day by the 2050's.

According to the Health Protection Agency report (2012), “*Health Effects of Climate Change in the UK 2012*”, it would appear our most vulnerable groups could be most susceptible to a changing climate and any negative impacts. Heat risk may be heightened in those with renal disease, diabetes, and neurological disorders (Hajat *et al.*, 2010). In general, illnesses that compromise thermoregulation, mobility, awareness, and behaviour (including dementia and Parkinson's disease) increase the risk of heat related death (Kovats and Hajat, 2008).

People with depression, cardiovascular and cerebrovascular conditions, renal disease and diabetes all need to take extra care in hot weather (Hajat *et al.*, 2010). Physiological changes in renal function which develop with increasing age could be related to the excess mortality observed in older age population groups during extremely hot weather periods. Older people have a lower threshold for the development of renal failure, and diminished renal conservation of sodium and water during periods of dehydration (Flynn *et al.*, 2005).

Strategies and plans that can begin to mitigate the impacts and consequences could minimise potential harm and enhance any positive effects wherever possible. The national agenda for adaptation could provide a key impetus to meet these future challenges.

The HPA report also highlights previous studies by Basu and Samet, 2002; Vandentorren *et al.*, 2006; and Wilkinson *et al.*, 2004 that have identified, in low-income settings, people with pre-existing respiratory and cardiovascular problems may be particularly vulnerable to temperature-related mortality and morbidity.

Intergovernmental Panel on Climate Change (2014)

The fifth report of the IPCC Working Group was published in March 2014. It continues to highlight the potential negative outcomes that the planet may experience as a consequence of climate change. In the report the panel also suggest that:

- There is a need for comprehensive assessment of climate change policies that goes beyond a focus on mitigation and adaptation to go onto examine the range of related aspects pathways and other determinants.
- Agencies, governments and populations will only achieve effective mitigation if working together and not independently.
- Some countries will be more able to meet these global challenges and the value they place on any change will need to be considered in any effective collaboration to mitigate/adapt.
- Societal goals and climate policy have common and different links but all should be considered to ensure best outcomes.
- A person or country's perception to risk, and to climate change will affect the approach to mitigation and adaptation.

Opportunities

The Committee on Climate Change UK "*Climate Change Risk Assessment 2017 synthesis report*" (2016) has also highlighted climate change opportunities:

- A warmer climate will extend the growing season and improve the viability of some high value crops (for example tomatoes, olives and grapes), but only if natural resources are conserved such as fertile soil and water.
- Milder winters should diminish the need to heat homes and other buildings in winter, and potentially reduce the impact and burden of fuel poverty across the UK. However, especially when the growing, ageing population is factored in, cold is expected to remain the largest climate-related contributor to death in the UK by some margin.
- Warmer temperatures may encourage more active transport (such as cycling and walking) and increased numbers of visitors to the UK's national parks, beaches and open spaces.

An aspect of the above IPCC considerations that might be taken forward locally could be to consider and develop any potential co-benefits for health from different interventions across local partners. For example, "COOL - Wirral Climate Change Strategy 2014-2019" ([link](#)) promotes more active travel (walking and cycling) to cut pollution and this will have benefits for physical health too; it also promotes development of green and blue infrastructure to ameliorate the impacts of climate change that will have co-benefits for health e.g. access to open space good for mental health and physical activity. Similarly, insulation of homes limits climate pollution, it also improves properties, tackles fuel poverty and so on. These co-benefits, as described in Sir Michael Marmots work on inequalities, can often be looked at in isolation rather than as part of a coherent and collective response to an issue, in this case climate change.

Adaptation

The combination of the warming that has already occurred, together with at least some further warming that is inevitable, means further adaptation to climate change will be required (Committee for Climate Change, 2016).

[Sustainable Development Unit \(2014\) has produced 'Under the Weather': Improving health, wellbeing and resilience in a changing climate](#), which puts the case for adaptation as the upmost importance and it suggests a local focus on adaptation measures. Version 2 of this report was published in March 2015 and states that Health and Wellbeing Boards are in a unique position to provide leadership for climate change adaptation to increase the health and wellbeing of local communities (Sustainable Development Unit, 2015). Equally the World Health Organisation (WHO) (2016) highlight climate change in its publication, [Climate change and health Fact Sheet \(2016\) http://www.who.int/mediacentre/factsheets/fs266/en/](#) stating that it affects the social and environmental determinants of health, clean air, safe drinking water, sufficient food and secure shelter, and is expected to cause 250,000 additional deaths per year between 2030 and 2050 due to heat exposure, diarrhoea, malaria and childhood undernutrition.

Adapting to climate change is necessary as the world's climate and weather patterns are changing, suggest Department for Environment, Farming & Rural Affairs (DEFRA) (2013). Global temperatures are rising, causing more extreme weather events, like flooding and heatwaves. 'Adaptation' involves changing the way we do things to prepare for the potential impacts of climate change. This means we will be better protected against negative impacts like flooding. It also means we'll be better prepared for new opportunities, like the chance to grow different crops. The earlier that plans are made for adaptation, the lower the cost and the better equipped populations will be to cope with potential changes.

Health Protection Agency (2012) analysis points to uncertainty as to how we as a population might adapt to future climate changes. A study (Donaldson and Keatinge, 2008) concluded that mean annual heat-related mortality did not rise as summers warmed from 1971 to 2003, implying an increase in population tolerance to heat, while annual cold-related mortality fell by more than 33% over the same period.

Although the rate at which temperatures are expected to rise in the coming decades and the increased weather variability makes it unclear how extensive future societal adaptation to hot weather will be, it is likely that populations will adapt to some extent to future warming, both in terms of physiology, and also behavioural changes and technological measures such as increased use of air-conditioning. Ongoing climate change and extreme weather conditions may require a different approach to local population resilience.

National Government response has been through the [National Adaptation Programme \(NAP\)](#). This contains a register of actions that include all the actions agreed in the programme so far. It also aligns risks identified in the Climate Change Risk Assessment to actions being undertaken or to be undertaken and the timescales according to the six themes including healthy and resilient communities.

The updated (version 2, March 2015) [Sustainable Development Unit toolkit](#) looks to support this approach to adaptation and in doing so assist local Health and Wellbeing Boards (HWBs) in integrating climate change adaptation (i.e. measures to reduce negative impacts) into the local health economy.

Public Health England and NHS England have recognised that “*Climate change could have significant implications for the health and wellbeing of the UK population. There are implications for public health, the continuity of health and social care services, the resilience of local emergency services and the impacts on the most socially vulnerable*” and has provided planning guidance around adaptation to climate change for health and social care organisations (Sustainable Development Unit, 2014b).

In February 2014 Joseph Rowntree Foundation (JRF) published their commissioned evidence review on climate change and social justice. They say that the social justice implications of climate change are not well understood in the UK context. The [review](#) drew together current research and thinking in this emerging field. It makes recommendations which include mainstreaming climate change into agencies that work to reduce social exclusions or address health issues. The Local Government Information Unit (LGIU), [in their response](#) to the report, also recommend that local authorities develop localised maps that show vulnerability which can then be used to target local energy efficiency approaches to ensure adaptation policy is made more just.

More recently the Local Government Association Councillor briefing pack “*Ensuring your community is resilient to the impacts of extreme weather*” (2015) states that adapting to local climate risks is a critical element of effective planning for the future safety, health and prosperity of our communities. Adaptation the briefing says will make councils and the communities they serve more resilient to extreme weather in the future and will also lead to cost savings in the longer term (Local Government Association, 2015). A further report, “*Climate Ready Councils: The business case for managing the impacts of severe weather and a changing climate*” (Maiden and Monaghan, 2015) highlights ways that councils across England can develop ways to deal with the impacts of climate change such as flooding and severe cold weather.

The Committee on Climate Change (2015) report “*Reducing emissions and preparing for climate change: 2015 Progress Report to Parliament – Summary and recommendations*” introduces 5 main recommendations. The recommendations include; Buildings: develop plans and policies that deliver low-carbon heat and energy efficiency whilst also addressing the increasing risks of heat stress and flooding and Infrastructure: make decisions that help reduce emissions and improve the resilience of infrastructure networks and services during periods of extreme weather. The report also covers the progress made against the 2050 Climate Change Act target.

Local views

The latest [Climate Change Strategy for Wirral](#), otherwise known as ‘Cool’ has involved a series of local public consultation activities to allow the public to share their views on various climate change issues which included:

- An online [Public survey on cutting carbon emissions in Wirral \(July – August 2012\)](#) was undertaken and there were 663 respondents with findings as follows:

Survey results point to relatively strong support for actions from each main theme:

- Measures to improve energy efficiency.
- Use of solar energy as a means to advance renewable energy.
- Public transport improvements and new facilities for walking and cycling as means to advance more sustainable patterns of transport.
- Waste reduction and the promotion of local and seasonal produce as means to reduce indirect pollution.

Across themes some common elements also emerge:

- A strong belief in the role of education, awareness raising and behaviour change interventions – with the notion of a need for ‘culture change’.
 - The importance of local leadership. Wirral Council is expected to take a lead, but so are community institutions such as schools and churches.
 - Linked with leadership, the importance of promoting tangible ‘real world’ examples of the things that need to happen more commonly.
 - The importance of policy and regulation particularly land use planning – and the need for coherence in the implementation of policies in different areas.
 - The importance of incentives, particularly financial ones, to encourage preferred actions and the role of deterrents to limit damaging ones.
- A [Public workshop on cutting climate pollution in Wirral \(27th November 2012\)](#) saw 44 participants take part including members of the public, representatives from businesses, voluntary and community groups, and partner organisations from the Wirral Climate Change Group, findings were as follows:
 - Strengths included partnership and existing legislation.
 - Weakness included a lack of awareness and information, limited finance, and a perceived lack of commitment.
 - Opportunities were seen to exist in relation to education, creating employment, exploiting new funding mechanisms and developing links with the health agenda.
 - Threats perceived related to the impact of spending cuts and inconsistencies between policies.
 - Identifying priorities for future action:
 - For *ways to improve energy efficiency*, education and awareness and planning/building control featured as priorities.
 - For *ways to increase renewable energy*, energy from waste, business opportunities, communications and awareness raising and leadership from the public sector leadership were the top themes.
 - For *ways to encourage sustainable travel*, measures to encourage cycling and regulate use of highways and the introduction of low energy street lighting were popular.
 - For *ways to reduce indirect impacts*, local food and procurement specifications were the themes that attracted most ‘votes’.
 - Several common ideas emerged across the different topic discussions:
 - Leadership – particularly public sector leadership;
 - Raising awareness and educating;
 - Local business opportunities; and
 - Stronger planning requirements.

The creation of exemplar eco houses was popular in discussions of both energy efficiency and renewable energy.

- An online survey on [Ways to adapt to unavoidable climate change in Wirral \(October - December 2012\)](#) was undertaken and there were 576 respondents with findings as follows. The results of the survey point to some support for actions to adapt Wirral to expected changes in the local climate. Responses to the different weather events envisaged include several common elements:
 - The role of education and awareness raising efforts to bring about changes in behaviour – sometimes general and sometimes very specific
 - The role of planning and regulation improving resilience of future buildings and to prevent future spatial patterns of development exacerbating negative impacts

- Concerns about impacts on the health of vulnerable groups
 - Recognition of a shorter term emergency response – being prepared for and able to react to conditions on the ground as they develop - and longer term proactive response through which steps are taken to mitigate impacts in advance
 - The role of the green infrastructure – green and open spaces, trees, water courses etc. in ameliorating impacts
- A [Public workshop on adapting to climate change in Wirral \(18th April 2013\)](#) saw 53 participants take part including members of the public, representatives from voluntary and community groups, and partner organisations from the Wirral Climate Change Group, findings were as follows:
 - Strengths included existing partnerships, Wirral's relative physical advantages and its early preparation of related plans
 - Weaknesses included a lack of information and awareness; fragmentation and contradiction in policy; and a lack of funding
 - Opportunities were seen to exist in: education and awareness work; links with the economy; the development of sustainable energy infrastructure; and the renovation and refurbishment of the built environment
 - Threat was the impact of budget cuts and the economic down turn limiting both the scope and capacity for action

Areas for future action

- Common issues raised around building capacity in communities and organisations including: awareness, education, community development, networking, planning processes and role of volunteers in emergency responses.
- Common issues raised around health, well-being and adaption including: impacts of particular weather extremes; education, awareness and behaviour change; emergency preparedness and the value of investment in green infrastructure.
- Discussions around green spaces and adaptation highlighted a number of issues including: community engagement; education and awareness and the need for the creation, protection and management of green spaces.
- Common issues were raised around adapting buildings and physical infrastructure including: assessing risk to critical infrastructure; water management; stronger regulation; the incorporation of adaptation issues into design standards; and education awareness and community engagement.
- A copy of the then draft Wirral Climate Change strategy was made available for public comment between December 2013 and February 2014 with the online link to the final strategy [here](#).

National and local strategies

Local

Wirral's latest [climate change strategy otherwise known as 'Cool'](#) is designed to encourage and co-ordinate widespread local climate-related action and so boost its impact. It was developed by Wirral's Climate Change Group, in consultation with the public, and covers the period 2014 to 2019. The new strategy provides a framework for partners to guide action with respect to mitigation and adaption for the period 2014-2019.

Also any local implications of the **UK Climate Change Risk Assessment 2012** need to be considered across local agencies to inform and provide a local adaptive response. The government commissioned an evidence report to inform the second Climate Change Risk Assessment (CCRA2) due in January 2017.

Wirral Council has an "All Hazards Emergency Plan – 2011" in place to deal with a variety of emergencies in Wirral. The document is not publically available but includes information on duty officer mobilisation, emergency management centre and temporary accommodation.

Merseyside Local Resilience Forum (MRF) is a local forum whose aim is to set out the response arrangements of agencies who are Category 1 and 2 Responders, as defined in the Civil Contingencies Act 2004 (CCA), to an emergency or other incident that requires multi-agency co-ordination at any one or any combination of Operational, Tactical and Strategic levels. Wirral Council is a category 1 responder. The MRF has several plans in place locally to deal with emergencies, these plans are listed below but are not available to the public;

- Merseyside Emergency Response Manual
- Merseyside Multi-Agency response to a flooding event
- Severe Weather Activation Guidance

The **Environment Agency** has in place a "Greater Manchester, Merseyside and Cheshire Drought Plan", again this is not available to the public.

National

Nationally, mitigation action is coordinated through a series of 'carbon budgets'. A national adaptation programme is also legally required by the Climate Change Act 2008.

<http://www.legislation.gov.uk/ukpga/2008/27/contents>

National Government response has been through the [National Adaptation Programme \(NAP\)](#). This contains a register of actions that include all the actions agreed in the programme so far. It also aligns risks identified in the Climate Change Risk Assessment to actions being undertaken or to be undertaken and the timescales according to the 6 themes including Healthy and resilient communities.

For the NHS, Public Health and the social care system "*Sustainable, Resilient, Healthy People and Places – A Sustainable development Strategy for the NHS, Public Health and Social Care System 2014*" includes a goal to ensure communities and services are resilient for the changing times and climates (Sustainable Development Unit, 2014c), ([link](#)).

The **Cabinet Office** has released several pieces of public guidance around emergencies and these include;

- Identifying people who are vulnerable in a crisis ([link](#))
- Emergency Response and Recovery ([link](#))

The **Local Government Association** has produced "A guide for communicating during extreme weather" ([link](#)).

Public Health England (PHE) Heatwave Plan for England 2015 was not updated for 2016 and will remain in place until further notice, however there are new resources that can be found at: <https://www.gov.uk/government/publications/heatwave-plan-for-england>

The Heatwave Plan for England (PHE, 2015) is a plan intended to protect the population from heat-related harm to health. It aims to prepare for, alert people to, and prevent, the major avoidable effects on health during periods of severe heat in England.

It recommends a series of steps to reduce the risks to health from prolonged exposure to severe heat for:

- The NHS, local authorities, social care, and other public agencies
- Professionals working with people at risk
- Individuals, local communities and voluntary groups

The Heatwave Plan for England (2015) can be viewed [here](#). Alongside this latest Heatwave Plan there is [Making the Case: the impact of heat on health – now and in the future](#) which outlines the evidence base about the risks to health from excess heat.

Public Health England (PHE) Cold Weather for England Plan 2015
<https://www.gov.uk/government/publications/cold-weather-plan-cwp-for-england>

The Cold Weather Plan for England is a framework intended to protect the population from harm to health from cold weather. It aims to prevent the major avoidable effects on health during periods of cold weather in England by alerting people to the negative health effects of cold weather, and enabling them to prepare and respond appropriately (PHE, 2015).

The Cold Weather Plan includes some key public health messages for the public which include Get your flu jab if you are aged 65 or older and heat your home to the right temperature: of 18°C (65°F) if you have an existing health condition then heating the home slightly higher than this may be beneficial to health (PHE, 2015)

The Cold Weather Plan for England (2015) can be viewed [here](#)
(2015 Plan is valid from October 2015 until further notice)

Current activity and services

Wirral Climate Change Group provides a mechanism for the co-ordination of action and exchange of information relating to climate change between local partner organisations. It worked to develop the latest Wirral climate change strategy [here](#). This strategy is a framework to guide local action

The Wirral Emergency Volunteer (WEV) scheme [link](#) has been created and is made up of volunteers recruited from various communities, agencies, organisations and the general public. All WEV's have been given induction training and the opportunity to attend additional specialised training such as flood warden. The WEVs will be called upon to help the Council assist in the response to emergencies whenever they happen – day or night.

A practical guide for small businesses has been adapted and published by CLASP for the Liverpool City Region (CLASP, 2016). It covers areas such as insurance and premises and people preparedness for severe weather and can be accessed here: [link](#)

A tool that has been recommended to Wirral Council is the Severe Weather Impact Monitoring System by Climate UK, ([link](#)) which is a web-based tool that enables local authorities throughout the UK and their partners to measure the cost of severe weather events. It helps identify the impact of severe weather on services, communities, reputation and the environment.

Key inequalities

Changes in the climate are likely to have different impacts for different groups. This might cover such aspects as: people on low incomes are more likely to live in homes without adequate insurance against property damage from weather events. The Marmot report (2010) into health inequalities in England argues that tackling social inequalities in health and tackling climate change must go hand in hand. Marmot highlighted that many potential actions have co-benefits.

Milder winters should reduce the costs of heating homes and other buildings, helping to alleviate fuel poverty and reduce the number of winter deaths from cold. However, cold weather is expected to remain a significant cause of death and more action is needed to address the poor thermal performance of housing if this opportunity is to be realised, (Committee on Climate Change, 2016).

Potential inequalities

- Poor housing conditions have a negative impact on health, improving these conditions can increase energy efficiency, reduce fuel poverty and help cut GHG emissions.
- Promoting more active travel such as walking and cycling can cut emissions, increase physical activity and reduce air pollution.
- A lack of green space can harm the chance to reduce the urban 'heat island' and also effect and have a negative impact on mental and physical health.
- Building community resilience to weather events can reduce social isolation.
- Asthma, COPD and hayfever sufferers and inner-city residents are at particular risk to respiratory illness due to higher levels of ground level ozone in summer, a changing pollen season increasing risk of all allergies and asthma and periods of hotter than average temperatures. Populations experiencing flooding are also at higher risk of respiratory illness.
- Older people, people experiencing fuel poverty and inner-city residents are at risk of CVD due to exposure to warmer and cooler spells of temperature.
- People with pale skin, children, outdoor workers and those people susceptible to skin cancer for medical reasons are at risk of developing skin cancer due to the depletion of the ozone layer.

This increased exposure to UV radiation could result in an increased risk of skin cancer. However the ozone layer is now recovering so risk will gradually decrease and rising temperatures may increase time spent outdoors and consequently exposure to UV radiation and risk of sunburn.

- People whose bodies are unable to regulate temperature: young children, the elderly, disabled people, people using medication are more at risk of developing thermal illness due to more frequent hot days and heatwaves which may increase risk of heat stroke and also rising temperatures may increase time spent outdoors and increase risk of sunburn.
- Those people who are Immune deficient will be more at risk of gastro-intestinal diseases due to rising temperatures increasing the risk of food poisoning.
- The mental health and wellbeing of those with low socioeconomic status, homeless, individuals with pre-existing conditions (including depression, anxiety), those living in low lying areas and river valleys, inner-city residents may be affected by high levels of air pollution which may impact negatively upon mood, extreme temperatures may exacerbate mental health problems and experiencing flooding can have a detrimental effect upon mental health.
- People that work with animals, outdoor or rural workers, tourists and those enjoying the countryside in a recreational capacity will be more at risk of insect-borne diseases as

warmer winters and higher summer temperatures may make conditions more conducive to this along with the risk of insect-borne disease potentially increasing in regions experiencing a rise in precipitation.

- Residents of low-lying areas, disabled people and others may experience reduced access to health care as storms resulting in structural damage, loss of power, driving hazards and floods.
- All populations are at risk of the health effects associated with flooding; however, poorer communities are at higher risk of coastal flooding in the UK, while higher income households tend to be at higher risk of river flooding. Limited evidence indicates that the elderly are most at risk of flood mortality in the UK.

Links

- **Climate Change Northwest** <http://climateuk.net/content/clasp-climate-support>
- **Cool Wirral** www.wirral.gov.uk/coolwirral
- **Environment Agency** <http://www.environment-agency.gov.uk/>
- **Department of Energy and Climate Change**
<https://www.gov.uk/government/organisations/department-of-energy-climate-change>
- **Environmental Change Institute** <http://www.eci.ox.ac.uk/>
- **Global Food Security** <http://www.foodsecurity.ac.uk/research/current/consumer-choice.html>
- **MetOffice** <http://www.metoffice.gov.uk/climate-guide/climate-change/impacts/food>
- **UK CIP** <http://www.ukcip.org.uk/>
- **Sustainable Development Unit (NHS and PHE)** <http://www.sduhealth.org.uk/>
- Carbon cost saving tool <https://trakeo.com/sduhealth/>
- **Climate Just** www.climatejust.org.uk

References

The references for this JSNA section can be accessed [here](#) (October 2016)

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