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Climate Change in Wales: Health Impact Assessment

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Reference:

Edmonds, N., and Green, L. (2023) Climate Change in Wales: Health Impact Assessment, Public Health Wales NHS Trust.
https://phwwhocc.co.uk/resources/climate-change-in-wales-health-impact-assessment

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Executive summary

Climate change will have a major long-term impact on health, wellbeing and equity. These impacts are multifaceted, are not static and will affect the population of Wales in the immediate and long- term. Climate change is a major challenge across the world and it has been recognised as an inhibitor to wellbeing, society, the environment and economic development at a national and international level.

Setting the scene

Public Health Wales NHS Trust (PHW) recognises that climate change is one of the most significant threats of the century, endangering physical health, mental health and wellbeing. It threatens all areas of life that impact our ability to achieve and maintain good health. As a result PHW has made tackling the public health effects of climate change a priority in its Long Term Strategy from 2023 – 2035 and is committed to working with partner agencies to respond and facilitate action on climate adaptation and mitigation (Public Health Wales NHS Trust, 2023).

Background

The Health Impact Assessment was initiated by Public Health Wales following the declaration of a climate emergency by Welsh Government in 2019.

The work has been led by the Wales Health Impact Assessment Support Unit in Public Health Wales.

A Strategic Advisory Group was convened in 2019 including representatives from Welsh Government, Natural Resources Wales (NRW), local public health teams and the Welsh Local Government Association.

Work on the HIA was delayed due to the COVID 19 response.

Aims of the Climate Change Health Impact Assessment in Wales

- To identify the potential health and well-being impacts of climate change in Wales - whether physical, mental or social
- To identify how climate change will affect people's lives where they live, work, learn and play - what does it mean?
- Provide evidence for integration of health into adaptation planning and policy making
- To support organisations and decision and policy makers and inform plans, policies and programmes
- To inform Public Health Wales work programme and public bodies planning for the future

Scope

- Wales only; comprehensive / complex; participatory; assesses potential and actual impact.
- Negative (-) and positive impacts / opportunities (+) identified
- Focus on the impacts on the social determinants of health, population groups affected and inequalities
- Evidence based: Literature review; interviews, 2 stakeholder workshops; case studies

HIA Process

1. Screening
2. Scoping
3. Appraisal of three types evidence: Population, published, qualitative
4. Report and recommendations
5. Review and reflection including monitoring and evaluation

Evidence base

- Systematic literature review guided by a detailed protocol carried out by Bangor University
- Updated targeted literature review in 2021 – 2022
- Participatory stakeholder workshops x 2
- Interviews with key stakeholders x 19
- Population health profile

The evidence was triangulated, synthesised and analysed and impacts identified and characterised.

Descriptors used to characterise impacts

Type of impact		
Positive / opportunity Impacts that are considered to improve health status or provide an opportunity to do so		**Negative** Impacts that are considered to diminish health status
Likelihood of impact		
Confirmed	Strong direct evidence e.g. from a wide range of sources that an impact has already happened or will happen	Confirmed
Probable	More likely to happen than not. Direct evidence but from limited sources	Probable
Possible	May or may not happen. Plausible, but with limited evidence to support	Possible
Intensity / severity of impact		
Major	Significant in intensity, quality or extent. Significant or important enough to be worthy of attention, noteworthy	Major
Moderate	Average in intensity, quality or degree	Moderate
Minimal	Of a minimum amount, quantity or degree, negligible	Minimal
Duration of impact		
	S = Short term	Impact seen in 0 – 3 years
	M = Medium term	Impact seen in 3 – 10 years
	L = Long term	Impact seen in >10 years

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Key messages and summary

Our health and wellbeing is dependent on the health of the planet and its ecosystems

- Tackling climate change by reducing emissions has major co-benefits for health
- Climate change will have a major impact on health, wellbeing and equity in Wales, including quality and access in health and social care. We are already seeing these impacts.
- Some population groups are more vulnerable and / or exposed to impacts
- More action is urgently needed across Wales to adapt the environments in which people live, work, play and learn to protect health and wellbeing in the face of climate change.

- Action on adaptation needs to go beyond responses to individual episodes of extreme weather - long-term, preventative solutions are needed that adapt policy, housing, the living environment, and behaviour.

- Adaptation policy and decisions in other sectors will impact health outcomes. Health, wellbeing and equity need to be outcomes of adaptation policy across sectors

- Public participation and involvement in policy and planning for the future needs to be strengthened.

- More support is needed to build resilience and help communities to prepare, respond and recover from flooding, coastal erosion, and other environmental impacts.

"The severity of the risks we face must not be underestimated. These risks will not disappear as the world moves to Net Zero; many of them are already locked in. By better understanding and preparing for the coming changes, the UK can prosper, protecting its people, its economy, and its natural environment. A detailed, effective action plan that prepares the UK for climate change is now essential and needed urgently."

Baroness Brown, Chair of the CCC Adaptation Committee (CCC, 2021)

Summary of major impacts on the determinants of health and wellbeing

Negative impacts

- Food security and nutrition
- Flooding
- Higher temperatures and extreme heat
- Environmental factors such as water supply and quality
- Mental health and wellbeing
- Access to health and social care
- Infrastructure
- Population displacement
- Landslides
- Wildfires
- Working conditions
- Economic conditions

Opportunities

- Nature based solutions and increasing access to green, blue and natural environments
- Community led action, resilience and social capital
- Enhancing healthy eating via the adoption of a healthy and sustainable diet
- Creating climate resilient health and social care
- Greater investment in decarbonised public transport and active travel
- Increasing energy efficiency of homes
- New skills, industries and jobs created linked to a “green economy” / decarbonisation, and a “circular economy”
- Targeted education to empower and enable people to make choices and to take action on climate change as citizens

Summary: impacts on population groups

- Older adults
- Babies, children and young people
- Coastal communities
- Flood risk areas
- Industrial and ex industrial areas
- Rural areas
- Urban areas
- People with long term conditions and disabilities
- People who are displaced
- Occupational groups
- Low income groups
- People who are homeless
- Areas of multiple disadvantage
- Minority ethnic groups

Settings impacted

- Homes
- Schools and educational institutions
- Workplaces
- Hospitals and care homes
- Communities
- Prisons

Nature supports our health and wellbeing

Physical wellbeing

Keeping active in green and natural spaces like beaches, forests, parks and the countryside by walking, running, cycling, conservation work and playing

Health outcomes:

- General physical health
- Cardiovascular health
- Healthier immune systems
- Healthier weight
- Mental wellbeing

Cut down on waste

Reduce, repair, reuse and recycle

Reuse more | Wales Recycles

Switch to active travel

Walk or cycle for your short distance journeys instead of going by car. All local authorities in Wales are producing active travel maps to help people plan car free journeys

Taking care of yourself and others

Mental wellbeing

Peaceful places; keeping active; taking notice of nature; feeling connected to nature; appreciating beauty

Health outcomes of access to green and natural spaces:

For children and young people:

- Better emotional wellbeing
- Reduced stress and hyperactivity
- Improved resilience

For adults:

- Lower stress, depression and anxiety;
- Higher positive emotions and mental wellbeing

Social wellbeing

Places to meet with others; shared activities and experiences

Health outcomes:

- Reduce social isolation
- Sense of belonging
- Improved mental wellbeing

Essentials for life

Clean air | Water | Food

Taking care of nature

Reduce energy use

Save money on your bills at the same time as reducing your carbon footprint Nest Wales

Support nature and biodiversity

Make your garden wildlife friendly

Nature on your Doorstep – Wildlife-friendly Gardening | The RSPB

Volunteer for a local environmental charity

You could be food growing, fundraising, litter picking or conserving nature

I want to volunteer - WCVA

Work together

Find out how communities across Wales are tackling climate change and helping nature together

Renew Wales

In the UK, **40% of species are in decline,** and **25% of mammals are at risk of extinction**

World Health Organization Collaborating Centre on Investment for Health and Well-being

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Taken from: Health Impact Assessment of Climate Change in Wales (Public Health Wales, forthcoming). Public Health England (2020) Improving Access to Greenspace: a New Review for 2020. JNCC (2021) Nature Positive 2030.

Health and wellbeing impacts of climate change

Climate change means that extreme weather, flooding and heatwave events are likely to occur more often in Wales

Climate change affects all parts of Wales. Some examples of health impacts for specific groups are shown below

By the 2050s in Wales:

- Annual temperatures are projected to rise by 1.2˚C (+1.2˚C)
- Summer rainfall is expected to decrease by around 15% (−15%)
- Winter rainfall is projected to rise by 6% (+6%)
- Sea level is projected to rise by 22 cm (+22cm)

Climate change is happening in Wales

Children and young people

Extreme weather and flooding
- Disruption to education, outdoor sport and play
- Displacement from their homes, friends and community
- Stress and anxiety for themselves and their families

Increased heat
- Higher risk of heat related illness

Mental wellbeing
- Anxiety about how climate change will impact their future

Air quality
- More susceptible to poor air quality and wildfire smoke

Positives
- Have a positive role in reducing carbon emissions and adaptation to climate change
- Can be positive agents of change
- Practical and creative ideas to help communities recover from disasters

People on low income

Extreme weather and flooding
- Less resources to prepare, respond and recover from floods or other extreme weather
- Less likely to be fully insured

Air quality
- Air pollutant concentrations are currently higher in areas of socioeconomic disadvantage

Food and nutrition
- Potential for increase in food costs

Positives
- Potential in the long term for reduced heating costs

Climate change affects us all

Older adults

Extreme weather and flooding
- Disruption to access to health, social care and support services
- Displacement from their home and support networks
- More vulnerable in emergency situations such as flooding
- Increase in mental distress

Increased heat
- Higher risk of heat related illness and mortality
- Social isolation may increase during heat waves

Air quality
- Older adults are more susceptible to poor air quality and wildfire smoke

Positives
- Warmer winters are projected to decrease cold related deaths

People with disabilities and long-term health conditions

Extreme weather and flooding
- Disruption to access to health, social care and support services
- Increase in mental distress
- More vulnerable in emergency situations such as flooding

Increased heat
- Negative impacts on some conditions such as mental health problems, cardiovascular and respiratory disease, and diabetes
- Some medications can increase vulnerability to heat related illness
- Social isolation
- Sleep disturbance

Air quality
- Those with respiratory conditions are more susceptible to poor air quality and wildfire smoke

- Planning and preparing for climate change needs to include action across sectors to promote and protect the health and wellbeing of different population groups and places in Wales.

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Taken from: Health Impact Assessment of Climate Change in Wales (Public Health Wales, Forthcoming). Kovats, S. and Brisley, R. (2021) Health, Communities and the Built Environment. In: The Third UK Climate Change Risk Assessment Technical Report. Netherwood A. (2021) Third UK Climate Change Risk Assessment Technical Report: Summary for Wales.

Climate change impacts on access to healthy food

A healthy, nutritious diet is essential for:

Healthy growth and development in children

Good physical and mental health and wellbeing

Preventing obesity, cardiovascular disease and cancer

Changes to how we eat can promote health and help the planet:

Eating less meat and dairy products

Eating more fruit, vegetables and legumes

Cutting down on food waste

Food is essential for life

Our planet is essential for food

Healthy eating is already a public health priority in Wales because:

61% of adults are overweight or obese

27% of children aged 4 to 5 years are overweight or obese

25% of people eat the recommended five portions of fruit or vegetables a day

Poverty and the cost of food were already barriers to a healthy diet in Wales before 2020:

10% of households had low or very low food security and another 10% had weak food security

Families with children under 16 were less likely to have high food security

Low income families would have needed to spend **42% of their after-housing income** on food to meet the costs of healthy eating guidelines

42%

Climate change is likely to impact on access to healthy food in Wales in a number of ways:

Extreme weather can disrupt food production and supply in the UK and internationally, leading to food price spikes in the UK

Increased risk of pests, invasive species and diseases impact on crop yields and livestock health

Poorer soil quality and less water impact on crop yields

Higher water temperatures and ocean acidification impact on the availability of fish

More action is needed to develop resilient food systems to protect health in Wales in response to climate change

- More investigation and improved data are needed to plan for present and future climate risks to food systems to ensure vulnerable groups are protected and the impacts to health are minimised.
- Food security for health and wellbeing can only be achieved by a wide range of sectors including health, environment, government, civil society, farmers, trade and food producers / retailers working together.

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Taken from: Health Impact Assessment of Climate Change in Wales (Public Health Wales, forthcoming). Rising to the Triple Challenge of Brexit, COVID-19 and Climate Change for health, well-being and equity in Wales Spotlight on: Food Security (PHW, 2021). Kovats, S. and Brisley, R. (2021) Health, Communities and the Built Environment. In: The Third UK Climate Change Risk Assessment Technical Report.

Health and wellbeing impacts of increased heat

Climate change means that heatwave events are likely to occur more often in Wales.

By the 2050s annual temperatures are projected to rise by 1.2˚C in Wales

+1.2˚C

The 2021 Independent Assessment of UK Climate Risk says:

- **Heat risk in homes and buildings is a top priority for action in the next 2 years**
- **More action is needed to address risks to human health, wellbeing and productivity**

Cross sector action is needed

We need to plan and adapt

Schools and other educational settings:

- Heat related illness
- Loss of concentration
- Reduced ability to learn

Workplaces:

- Heat related illness
- Reduced productivity
- Decreased safety

Homes:

- Heat related illness
- Sleep disturbance
- Potential long term reduced heating costs

Hospitals and care homes:

- Thermal discomfort of patients/residents and staff
- Heat related illness of patients/residents and staff
- Sleep disturbance
- Negative impacts on conditions such as mental health problems, cardiovascular and respiratory diseases
- Failure of equipment and IT systems
- Disruption to laboratory equipment
- Damage to medicines

Factors affecting heat in buildings include:

- Building design and materials
- Type of building
- Location and positioning
- Room occupancy levels
- Insulation
- Ventilation
- Outdoor shade
- Type of activities
- IT and electrical equipment generating heat

More action is needed across sectors to plan for increased heat:

- New schools, homes, hospitals and care settings need to be designed to prevent health impacts from increased heat
- There is a need to increase incentives for retrofitting existing homes
- Well planned tree planting can provide shade to reduce exposure to heat in urban areas, care settings, homes, schools, and playgrounds

Extreme Weather Advice

- Public Health Wales Environmental Health Protection Team provide extreme weather advice for the public and organisations across Wales on how to protect health during extreme weather, heatwaves and flooding. Find out more at: Extreme Weather Events - Public Health Wales (nhs.wales)

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Taken from: Health Impact Assessment of Climate Change in Wales (Public Health Wales, forthcoming). Kovats, S. and Brisley, R. (2021) Health, Communities and the Built Environment. In: The Third UK Climate Change Risk Assessment Technical Report.

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Detailed findings

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Impacts on population groups

Population Groups who are more vulnerable and disproportionately impacted by the health and wellbeing impacts of climate change in Wales

P1.1 Babies, children and young people

Characterisation of impact on babies, children and young people

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
No evidence identified	?	S to M	✸✸✸	✓ / ✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact the health and wellbeing of babies, children and young people?

Positive impacts / opportunities

- Engagement in collective action to reduce carbon emissions and adaptation to climate change
- Building a sense of control, purpose and participation as positive agents of change
- Practical and creative ideas to help communities recover from disasters
- Education on climate change in schools and youth services
- Warmer weather may increase opportunities for outdoor activity

Negative impacts

- Disruption to education
- Disruption to physical activity, outdoor sport and play
- Displacement from their home, friendship and support networks arising from flooding and coastal erosion
- Stress and anxiety for themselves and their families arising from flooding
- Higher risk of heat related illness
- Increase in injuries
- More susceptible to poor air quality and wildfire smoke
- Anxiety about how climate change will impact the future
- Distress in response to extreme weather events /disasters
- More susceptible to disruption to nutrition and food security

P1.2 Older adults

Characterisation of impact on older adults

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
✸✸✸	✓?	M to L	✸✸✸	✓? / ✓✓	S to L

✓✓ Confirmed ✓? Probable ?? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact the health and wellbeing of older adults?

Positive impacts / opportunities

- Reduced cold related mortality and morbidity in the long term

Negative impacts

- More vulnerable to morbidity and mortality from heat related illness, cardiovascular and respiratory conditions linked to heatwaves and extreme heat
- Social isolation arising from extreme heat/ heatwaves
- More likely to be exposed to overheating in hospitals and care homes
- More susceptible to negative health outcomes from poor air quality
- More vulnerable in extreme weather events and flooding (e.g. may face barriers to safe evacuation, more vulnerable to shock and hypothermia)
- Disruption to access to health and social care services

P2.1 Women

Characterisation of impact on women

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
			No evidence identified		No evidence identified

Confirmed Probable Possible Major Moderate Minimal S Short term M Medium term L Long term

How does climate change impact the health and wellbeing of women?

Positive impacts / opportunities

- None identified

Negative impacts

- More vulnerable to a range of health impacts from climate change during pregnancy
- More exposed to domestic and sexual violence in extreme heat and post disaster scenarios
- Higher prevalence of post-traumatic stress disorder (PTSD) and other mental health disorders after flooding and disasters
- Evacuation during flooding may be more difficult for lone parent households
- Women are more exposed to occupational impacts such as heat in the health and social care and education sector
- More likely to be living on a lower income to prepare, respond and recover from extreme weather events

P2.2 Pregnant women

Characterisation of impact on women

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			✸✸	Probable	S to L

Confirmed · Probable · Possible · ✸✸✸ Major · ✸✸ Moderate · ✸ Minimal · S Short term · M Medium term · L Long term

How does climate change impact the health and wellbeing of pregnant women?

Positive impacts / opportunities

- None identified

Negative impacts

- More vulnerable to the health and wellbeing impacts of flooding e.g. mental health, evacuation
- Air pollution can lead to low birth weight
- Extreme heat can impact on birth outcomes
- Negative impacts on mental health and wellbeing following extreme weather events
- Disrupted access to routine ante and post-natal maternity care arising from extreme weather/flooding
- Increased sensitivity to disrupted access to food and nutrition

P2.3 Men

Characterisation of impact on men

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
No evidence identified	? / ✓	S to L	✸✸	? / ✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact the health and wellbeing of men?

Positive impacts / opportunities

- Currently more likely to have opportunities for employment and training in the "green economy"

Negative impacts

- Exposed to health impacts from extreme heat as a result of being more likely to work outdoors or in manufacturing
- Potential increased risk of mental health impacts arising from heatwaves and drought, particularly on rural males

P3.2 People with long-term health conditions and/or disabilities

Characterisation of impact on people with long-term health conditions and/or disabilities

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			Major to Moderate	Probable	S to L

Confirmed | Probable | Possible | Major | Moderate | Minimal | S Short term | M Medium term | L Long term

How does climate change impact the health and wellbeing of people with disabilities and long-term conditions?

Positive impacts / opportunities

- None identified

Negative impacts

- People with respiratory and cardiovascular more at risk of mortality in a heatwaves
- More vulnerable during heatwaves, drought, poor air quality and flooding
- Exposed to overheating in care homes and hospitals
- Worsening symptoms of some conditions and sleep disturbance
- May face barriers to accessing emergency and health protection information
- People with mobility difficulties are more vulnerable in evacuation situations
- Disruption to health and social care in extreme weather
- May have less access to the financial and material resources to prepare, respond and recover from climate related extreme

P3.3People who are homeless

Characterisation of impact on people who are homeless

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			✸✸✸	✓ / ✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact the health and wellbeing of people who are homeless?

Positive impacts / opportunities

- None identified

Negative impacts

- More vulnerable and exposed to heat related morbidity and mortality during higher temperatures and extreme heat/ heatwaves
- More exposed to all forms of extreme weather including cold, storms, wind and increased rainfall
- Have a number of social and health challenges which increase vulnerability to climate change

P3.4Minority ethnic groups

Characterisation of impact on minority ethnic groups

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			✸✸	✓ Probable	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How is the health and wellbeing of people from minority ethnic groups impacted by climate change?

Positive impacts / opportunities

- None identified

Negative impacts

- Less resources to adapt to climate change due to higher likelihood of low income and living in private rented accommodation
- More like to be exposed via occupation in health and social care
- People who do not speak English or Welsh may face barriers in access to information that is important for adaptation and protection from extreme weather and flooding
- More likely to be exposed to higher temperatures and heatwaves in an urban area

P3.5People who are new to an area

Characterisation of impact on people who are new to an area

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			✸✸	Probable	S to L

Confirmed · Probable · Possible · ✸✸✸ Major · ✸✸ Moderate · ✸ Minimal · S Short term · M Medium term · L Long term

How is the health and wellbeing of people who are new to an area impacted by climate change?

Positive impacts / opportunities

- None identified

Negative impacts

- More vulnerable in extreme weather due to lack of local knowledge and social networks
- May face language barriers in accessing guidance and emergency weather warnings

P4.1 People living on a low income

Characterisation of impact on people living on a low income

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
✸✸	?	L	✸✸✸	✓ / ✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How is the health and wellbeing of people who are living on a low income impacted by climate change?

Positive impacts / opportunities

- Possible reduced energy costs in the long term arising from higher temperatures
- New skills, industries and jobs created linked to a 'green economy' / decarbonisation

Negative impacts

- Increased food insecurity
- Less able to afford climate adaptations for homes
- Less able to afford insurance or repairs to homes following extreme weather or flooding
- Less access to resources to cope if evacuated after flooding
- Greater economic impacts from flooding
- Less access to a car or van in an emergency
- Transition to low carbon energy may incur higher energy costs in short to medium term

P6.1 Coastal communities

Characterisation of impact on coastal communities

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
No evidence identified	?	No evidence identified	✸✸✸	✓✓ in some areas	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact the health and wellbeing of coastal communities?

Positive impacts / opportunities

- Possible increase in outdoor recreation and tourism in Wales
- Community engagement with regards to development and implementation of Flood and Coastal Erosion Risk Management policies and plans

Negative impacts

- More exposed to the mental and physical health impacts of flooding
- Economic security for individuals and families
- Uncertainty and anxiety regarding the future
- Potential for negative impacts on coastal economies such as tourism and fishing

P6.3Former and current industrial areas

Characterisation of impact on former and current industrial areas

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
✸✸✸	?	S to L	✸✸ to ✸✸✸	?	S to L

Confirmed | Probable | Possible | ✸✸✸ Major | ✸✸ Moderate | ✸ Minimal | S Short term | M Medium term | L Long term

How does climate change impact the health and wellbeing of coastal communities?

Positive impacts / opportunities

- Action to decarbonise industry could improve air quality
- New skills, industries and jobs created linked to a “green economy” / decarbonisation

Negative impacts

- Risk of slope failures on coal tips
- Flooding linked to old mining infrastructure
- Pre-existing poor air quality may be impacted by climate change
- Potential for widening inequalities if benefits arising from decarbonising industry are not equitable

P6.4Urban areas

Characterisation of impact on urban areas

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
✸✸	?	S to L	✸✸✸	✓ / ✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact urban areas?

Positive impacts / opportunities

- Use of nature based solutions and green space to tackle flooding and urban heat island impacts
- Potential for investment in active travel leading to more use and better health outcomes

Negative impacts

- Increased vulnerability to impacts from higher temperatures and extreme heat
- Urban housing such as smaller homes, flats and overcrowded dwellings more vulnerable to overheating
- Increased vulnerability to changes in air quality
- Exposed to impacts from flooding

P6.5Rural areas

Characterisation of impact on rural communities

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
No evidence identified	?	S to L	✸✸✸	✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact the health and wellbeing of people living in rural communities?

Positive impacts / opportunities

- Possible growth of new crops or extended growing seasons
- New opportunities for sustainable land management

Negative impacts

- Flooding
- Wildfire
- Air quality
- Economic security
- Uncertainty and anxiety regarding the future of key sectors in the rural economy
- Disrupted access to services
- Water quality and supply

P6.6Areas of multiple disadvantage

Characterisation of impact on areas of multiple disadvantage

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			✸✸ to ✸✸✸	✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact areas facing multiple disadvantage?

Positive impacts / opportunities

- None identified

Negative impacts

- Increased vulnerability across multiple domains of disadvantage linked to physical and mental health, low income; housing quality, physical environment, access to services
- Increased vulnerability linked to levels of physical and mental health problems

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Impacts on the wider determinants of health

Determinants of Health impacted by climate change in Wales

* Sections labelled A1-A3 summarise evidence appraised on impacts on three social determinants of health that were identified as important by stakeholders and are highly relevant to population health in Wales. However, limited evidence was identified in the literature to enable assessment of the level of potential impact on Wales, therefore each of these areas are recommended areas for further research

D1 Food security and nutrition

Characterisation of impact on food security and nutrition

	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
	Positive impacts/opportunities			Negative impacts		
Food utilisation: healthy eating	No evidence identified	Possible	S to L			
Food availability: production and security	No evidence identified	Possible	S to L	Major	Probable	S to L
Food accessibility: cost of food				Major	Probable	S to L
Nutritional content of food	No evidence identified	Possible	No evidence identified	Major	Probable	S to L
Food-borne Disease				Moderate	Possible	Unknown

Confirmed | Probable | Possible | Major | Moderate | Minimal | S Short term | M Medium term | L Long term

How does climate change impact food and nutrition?

Positive impacts or opportunities

- Food utilisation: healthy eating via adoption of a more sustainable diet based on a higher intake of plant-based foods i.e. the Lancet EAT well diet
- Food availability: growth of new crops and / or new technological approaches to food production in Wale
- Food availability and biodiversity: development of sustainable food system
- Nutritional value of food

Negative impacts

- Food accessibility: cost of food and increasing food insecurity / poverty
- Food availability: supply and production
- Food safety and food-borne disease
- Nutritional value of food

D2.1 Physical and outdoor leisure activity

Characterisation of impact on physical and outdoor leisure activity

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
No evidence identified	?	S to L but may be greater in short-term	✸✸	? / ✓	S to M

Confirmed | Probable | Possible | ✸✸✸ Major | ✸✸ Moderate | ✸ Minimal | S Short term | M Medium term | L Long term

How does climate change impact physical and outdoor activity?

Positive impacts / opportunities

- Increased physical activity
- Increased active travel
- Increased outdoor activity
- Increased outdoor active play for children
- Increased time spent in natural environments

Negative impacts

- Decreased physical activity
- Decreased active travel
- Decreased outdoor active play for children
- Increased risk taking in outdoor activity, including increased risk of injury, drowning and swimming in unsafe conditions
- Increased risk of heat stress
- Increased exposure to UV radiation from sunlight
- Increased risk of tick-borne diseases
- Increased disruption to organised sport activities

D3.1 Community resilience and cohesion

Characterisation of impact on community resilience and cohesion

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
✸✸/✸✸✸	✓✓	S to L	✸✸/✸✸✸	? / ✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact on community resilience?

Positive impacts / opportunities

- Building on and sustaining the expansion of community-led action and mutual aid developed during the COVID-19 pandemic
- Community solidarity can benefit health and wellbeing and aid recovery from natural disasters
- Community-led action on climate change can build trust and social capital, and enhance a sense of control and resilience, which are protective factors for mental wellbeing
- Skills development linked to sustainable living and decarbonisation

Negative impacts

- Disruption and damage to community relationships and cohesion
- Loss or damage of community assets e.g. community meeting places and places of cultural or historic significance
- High temperatures can reduce social participation
- Divisions can arise in communities from how resources to tackle climate change are allocated
- Displacement due to flooding, or internal/ external migration may disrupt community relationships and cohesion

D3.2/P3.1 Population displacement, mobility and migration

Characterisation of impact on population displacement, mobility and migration

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacst/opportunities			Negative impacts		
No evidence identified	?	No evidence identified	for those affected	✓ / ✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible Major Moderate Minimal S Short term M Medium term L Long term

How does population displacement and mobility arising from climate change impact on health and wellbeing?

Positive impacts / opportunities

- When planned and supported, voluntary migration can be an adaptive response to climate change
- Migrants can bring human capital and skills benefitting the economy and communities

Negative impacts

- Loss of social support
- Economic impacts on incomes, livelihoods and employment
- Increased risk of anxiety, depression and Post-Traumatic Stress Disorder
- Disruption to education
- Loss of valued places leading to emotional distress (“solastalgia”)
- Negative impacts on housing quality and security
- Disrupted access to services
- Exposure to physical danger, injury, trauma and violence

D4 Mental health and wellbeing

Characterisation of impact on mental health and wellbeing

	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
	Positive impacts/opportunities			Negative impacts		
Mental wellbeing	No evidence identified	Possible	S to L	Major	Probable	S to L
Social isolation				No evidence identified	Possible	S to L
Mental disorder				Major	Confirmed (flooding) Probable (heat and other indirect impacts)	S to L
Suicide				No evidence for Wales identified	Possible	No evidence for Wales identified

Confirmed | Probable | Possible | Major | Moderate | Minimal | Short term | Medium term | Long term

How does climate change impact mental health and wellbeing?

Positive impacts / opportunities

- Enhancing control and participation by taking action to mitigate climate change
- Building community resilience and cohesion
- Volunteering and helping others in both taking action to tackle climate change and in the response to, and recovery from, extreme weather events
- Learning new skills
- Increased outdoor activity and connecting with the natural environment in green and blue spaces

Negative impacts

- Feelings of worry and anxiety about the uncertainty of the future
- Feelings of loss, distress and grief
- Social isolation
- Depression
- Post-Traumatic Stress Disorder after experiencing an extreme weather event i.e. flooding
- Anxiety disorders
- Worse symptoms of mental disorders and dementia in extreme heat

D5.1 Housing

Characterisation of impact on housing

How do climate change impacts on housing affect health and wellbeing?

Positive impacts / opportunities

- Reduced deaths and morbidity from cold weather in the long-term
- Improved energy efficiency
- Potential for reduced heating costs in the long term due to higher temperatures

Negative impacts

- Increase in damp and mould
- Negative impacts on respiratory health
- Increase in damage to houses from extreme weather and flooding
- Increase in costs for repairs and retrofitting
- Increase in overheating
- Worse indoor air quality
- Increased risk of subsidence
- Injury arising from extreme weather impacts on housing e.g. high winds
- Overheating in homes due to energy efficiency measures e.g. lack of ventilation

D5.2 Air Quality

Characterisation of impacts on health and wellbeing from changes to outdoor air quality

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
✸✸	?	S to L	✸✸	?	S to L

Confirmed Probable Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How do the impacts of climate change on outdoor air quality affect health and wellbeing?

Positive impacts / opportunities

- Decarbonisation of electricity generation and transport leading to reduced emissions of greenhouse gases and particulate fine matter resulting in improvements in air quality
- Greater investment in decarbonised public transport and active travel can lead to positive health outcomes via lower emissions, improved air quality, and increased physical activity

Negative impacts

- Mortality
- Respiratory morbidity
- Respiratory hospital admissions
- Allergenic responses to pollen
- Negative impacts on mental health
- Increased concentrations of ozone and other pollutants
- Increased pollutants from wildfire

D5.3/P6.2 Flooding

Characterisation of impact of flooding on health and wellbeing

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			✸✸✸ Major	✓✓ Confirmed	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How do climate change impacts on flooding affect health and wellbeing?

Positive impacts / opportunities

- Opportunity to build community resilience and cohesion
- Mutual aid
- Early warning systems
- Community engagement with regards to development and implementation of Flood and Coastal Erosion Risk Management policies and plans

Negative impacts

- Death or injury
- Long term and severe impacts on mental health and wellbeing including depression and Post-Traumatic Stress Disorder
- Economic impacts on incomes, livelihoods and employment
- Disruption to education
- Loss of valued places leading to emotional distress (“solastalgia”)
- Damage to homes
- Disruption to access to services
- Illness arising from contaminated water
- Loss of tourism, recreational and leisure amenity
- Damage to cultural and heritage sites
- Damage and disruption to transport and infrastructure
- Loss of and damage to possessions
- Disruption to social support
- Stress and disruption from temporary or permanent displacement (See Section D3.2)

D5.4 Higher temperatures and extreme heat

Characterisation of impacts of higher temperatures and extreme heat

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
✸✸	✓	M to L	✸✸✸	✓	S to L

Confirmed Probable Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How do increases in temperature and extreme heat arising from climate change impact on health and wellbeing?

Positive impacts / opportunities

- Reduced cold related morbidity and mortality in the long-term

Negative impacts

- Mortality from respiratory, cardiovascular, dementia related conditions, alcohol and substance misuse
- Dehydration
- Heat related illness
- Negative impacts on birth outcomes
- Increased injuries and accidents, including drowning
- Social isolation
- Worse symptoms of mental disorder
- Violence
- Suicide
- Food borne disease
- Increased demands on health services
- Reduced productivity
- Disruption and damage to infrastructure and transport

D5.5 Water supply and quality

Characterisation of impact on water supply and quality

	Positive impacts/opportunities			Negative impacts		
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Water Supply				✸✸ but ✸✸✸ for people dependent on private water supplies	Probable / Confirmed	S to L
Water Quality				✸✸ but ✸✸✸ during specific events, e.g., flood, wildfires, high rainfall etc.	Confirmed	S to L

Confirmed · Probable · Possible · ✸✸✸ Major · ✸✸ Moderate · ✸ Minimal · S Short term · M Medium term · L Long term

How does climate change impact water supply and quality?

Positive impacts / opportunities

- None identified

Negative impacts

- Increased rainfall and flooding leading to reduced water quality
- Exposure to contaminated drinking or bathing water can cause illness, infection and gastrointestinal issue
- Higher temperature and low water flow increasing the concentration of pollutants
- Increased likelihood of periods of drought/ water scarcity
- Stress and mental health impacts related to drought on a number of population groups

D5.6 Natural Environment and Biodiversity

Characterisation of impact on natural environments and biodiversity

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
✸✸	?	S to L	✸✸✸	✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How do the impacts of climate change on natural environments affect health and wellbeing?

Positive impacts / opportunities

- Nature based mitigation strategies can benefit health and wellbeing e.g. by the reduction of air pollutants, preventing floods, reducing heat impacts of climate change and increasing access to green and natural spaces

Negative impacts

- Loss, disruption or damage to ecosystem services such as clean air and water
- Disruption to food production, security and supply
- Loss or damage to access to valued natural environments that provide benefits to physical, mental and social wellbeing and tackling inequalities

D5.7 Landslides and coal tips

Characterisation of impact on:

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
			when/where they occur	Possible / Probable	S to L

Confirmed · Probable · Possible · Major · Moderate · Minimal · S Short term · M Medium term · L Long term

Impacts of landslides on health and wellbeing

Positive impacts / opportunities

- Sustainable land management

Negative impacts

- Injury
- Mortality
- Economic costs
- Disrupted access to services
- Mental wellbeing (increased anxiety)

D5.8 Wildfires

Characterisation of the impact of wildfires on health and wellbeing

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			✸✸✸ in affected areas	Probable	S to L

Confirmed · Probable · Possible · ✸✸✸ Major · ✸✸ Moderate · ✸ Minimal · S Short term · M Medium term · L Long term

How does the impact of climate change on wildfires affect health and wellbeing?

Positive impacts / opportunities

- None identified

Negative impacts

- Air pollution
- Contamination of water
- Negative impacts on respiratory and cardiovascular health
- Burns
- Negative impacts on mental health and wellbeing
- Mortality from wildfire smoke inhalation
- Eye irritation and reduced visibility

D5.9 Vector Borne Disease

Characterisation of impact of climate change on vector-borne disease

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
			short to medium term; in long term	Possible	S to L

Confirmed · Probable · Possible · Major · Moderate · Minimal · S Short term · M Medium term · L Long term

How does climate change impact vector-borne and zoonotic disease?

Positive impacts / opportunities

- None identified

Negative impacts

- Possible increase in Lyme disease via ticks
- Possible increase in mosquito and culex transmitted diseases

D6.1/P5 Working conditions

Key occupational groups impacted include:

- Outdoor workers: agriculture, forestry, fishing, utility, maintenance and construction
- Healthcare, social care and emergency service workers
- Manufacturing
- Transport
- Education
- Prisons

Characterisation of impact of climate change on working conditions

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
No evidence identified	?	No evidence identified	✸✸ to ✸✸✸ for high-risk workforces	✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

? How do the impacts of climate change on working conditions affect health and wellbeing?

Positive impacts / opportunities

- Possible decline in cold induced work-related injuries

Negative impacts

- Increased heat related illness and injuries
- Injury and mortality from extreme weather/ flooding
- Gastrointestinal illness from exposure to flooding
- Respiratory illness from exposure to wildfires and poor air quality
- Stress, sleep disturbance and mental health from exposure to increased emergencies/disasters
- Skin damage from increased ultra-violet B radiation
- Increased exposure to vector borne disease

D6.2 Economic development and skills

Characterisation of impact on economic development and skills

Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Positive impacts/opportunities			Negative impacts		
✸✸ to ✸✸✸	?	S to L	✸✸✸	✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How do climate change impacts on the economy and skills affect health and wellbeing?

Positive impacts / opportunities

- Expansion of tourism related opportunities
- New skills, industries and jobs created linked to a "green economy"/ decarbonisation
- Development of a "circular economy" and associated opportunities

Negative impacts

- Reduced productivity and impacts on staff health due to higher temperatures/extreme heat
- Negative impacts on economic conditions which affect individual and family incomes and economic security
- Disruption, reduced productivity and additional costs to business linked to combined and cumulative direct impacts from extreme weather, heatwaves, flooding, water scarcity, sea level rise and coastal erosion
- Disruption, reduced productivity and additional costs to business linked to indirect impacts such as infrastructure and transport damage
- Disruption to supply chains and distribution networks
- Cost and availability of finance, investment, and insurance
- Negative impacts on tourism due to environmental damage
- Widening inequalities if the benefits of decarbonisation and a "green economy" are not shared equally

D7.1 Health and social care: access and delivery

Characterisation of impact on health and social care

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
✸✸	?	S to L	✸✸ to ✸✸✸✸ in specified circumstances	✓ / ✓✓	S to L

✓✓ Confirmed ✓ Probable ? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How does climate change impact on access and delivery of health and social care services?

Positive impacts / opportunities

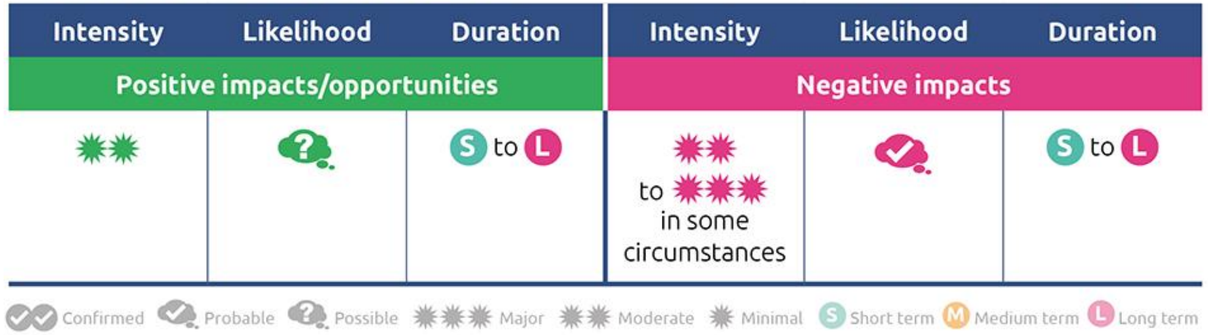
- Reduced cold related morbidity and mortality in the long term
- Developing new models of resilient care including digital/virtual delivery of services
- Decarbonisation of health and social care
- Increasing environmental sustainability of health and social care services

Negative impacts

- Disruption to access and delivery of services from extreme weather and flooding
- Overheating in hospitals and care settings
- Higher temperatures and heatwaves causing additional morbidity and mortality
- Higher temperatures and heatwaves impacting on IT infrastructure, equipment and medicines
- Impacts on workforce health and wellbeing including stress and heat related ill health
- Additional and new demands on services arising from cumulative impacts of climate change across the population

D7.2 Education

Characterisation of impact on education



How does climate change impact education?

Positive impacts / opportunities

- Education can provide knowledge, skills, behaviours and capabilities to support climate change adaptation, sustainability and resilience
- Education can empower and enable people to make choices and to take action on climate change as citizens

Negative impacts

- Disruption to education from extreme weather events, including flooding
- Damage to education infrastructure and service delivery
- Disruption to school transport
- Heat related illness and reduction in effective learning due to overheating in school buildings and residential facilities
- Impacts on educational outcomes and mental wellbeing from disruption to education

D8.1 Transport

Characterisation of impact on transport

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
✸✸	✓?	S to L	✸✸ to ✸✸✸	✓✓	S to L

✓✓ Confirmed ✓? Probable ?? Possible ✸✸✸ Major ✸✸ Moderate ✸ Minimal S Short term M Medium term L Long term

How do the impacts of climate change on transport affect health and wellbeing?

Positive impacts / opportunities

- Greater investment in decarbonised public transport and active travel can lead to positive health outcomes via lower emissions, improved air quality, and increased physical activity

Negative impacts

- Damage to transport infrastructure and networks
- Disruption and delays to travel
- Disruption to delivery of essential goods
- Disruption to access to services and education
- Disruption to social participation leading to social isolation
- Disruption to emergency services and health and social care delivery
- Economic impacts

D8.2 Infrastructure

Characterisation of impact on infrastructure

Positive impacts/opportunities			Negative impacts		
Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
			when extreme weather events occur		S to L

Confirmed | Probable | Possible | Major | Moderate | Minimal | S Short term | M Medium term | L Long term

How do the impacts of climate change on infrastructure affect health and wellbeing?

Positive impacts / opportunities

- Development of sustainable and resilient public infrastructure and assets

Negative impacts

- Increasing frequency and severity of damage and disruption to critical infrastructure including transport, internet, energy and water
- Economic impacts of repair
- Injuries and accidents arising from damage to infrastructure
- Disruption to transport affecting access to and delivery of critical goods, services, social contacts
- Disruption to energy supply, internet and telecommunications impacting the functioning of essential services
- Impacts on water or sewerage infrastructure caused by flooding could contaminate public water supplies and cause gastrointestinal illness

Other findings in the HIA

There are contextual factors that also influence health and wellbeing impacts including:

- Democracy, decision making and community engagement
- Psychosocial and behavioural factors
- Social media and communications (including risk communication)
- Sustainable development and decarbonisation

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Areas for Action

Area for action 1:
Take action on the health impacts identified in the HIA

The data and evidence on health and wellbeing impacts, and inequalities contained in the HIA can help inform cross sector action across the stages of the adaptation planning cycle (Welsh Government, 2013). For example:

- **Starting**: the evidence and findings in the HIA can support the framing of key messages on climate change and the scope for adaptation planning outcomes and interventions.
- **Investigating**: the evidence base in the HIA can inform investigation of key relevant impacts of climate change on people, places and organisations alongside local and sectoral expertise and insights.
- **Planning**: the HIA may support selection and prioritisation of impacts to be addressed in adaptation planning.
- **Monitoring and evaluating:** the HIA can be used to identify indicators to monitor impacts of climate change and outcomes of adaptive actions and interventions.

Examples of application could be:

- Local place-based climate risk assessments
- Adaptation planning for specific services or settings e.g., schools, workplaces, services working with older adults
- Population health and health inequalities strategies
- Climate adaptation and vulnerability assessments
- Public Services Boards' wellbeing assessments and plans
- Local Health Board Plans

Area for action 2:
Apply the evidence base on effective adaptation and mitigation measures and evaluate impacts

- Invest in action guided by enhanced, robust, routine public health surveillance and intelligence on the health, wellbeing and equity impacts of climate change and extreme weather events in Wales.
- Apply evidence-based actions where indicated on interventions to support climate change adaptation and co-benefits for health arising from climate change mitigation.

Area for action 3:
Enhance action on mitigation and adaptation via long-term investment in capacity building and preventive action

- Enhance investment in extreme weather responses – recognising that these will become more frequent and severe, including health and wellbeing behavioural interventions and settings-based guidance on heatwaves. Ensure that the needs of key vulnerable population groups are addressed for example, older adults, young children, people who are homeless.
- Enhance emergency and contingency planning for extreme weather and flooding, in order to maximise both prevention and mitigation of short, medium and long-term health and wellbeing impacts of incidents.
- Build adaptive capacity and capability across the NHS, other Public Bodies and sectors and ensure that health, wellbeing and equity are integrated into cross sector adaptation planning.
- Build the capacity of the current and future specialist and wider public health workforce to meet the challenges of the climate emergency for example, leadership on climate change, community engagement, risk communication, analysis and interpretation of integrated data on climate change and population health and wellbeing, implementing and evaluating adaption interventions and strategies. This is recognised in the Faculty of Public Health's Climate Change Strategy (Faculty of Public Health, 2023).

Area for action 3:
Enhance action on mitigation and adaptation via long-term investment in capacity building and preventive action

- Include climate change into key public sector (including NHS) job roles and consult with the workforce on the skills needed to be able to deliver consideration and adaptation behaviour into this.
- Enhance support, leadership development and peer learning networks for staff working on the climate change agenda, recognising the mental and emotional content of the work.
- Develop climate change and health adaptation tools and resources, with recommended and evidence-based adaptation interventions, which can be utilised by public bodies, PSBs and communities to consider how health and wellbeing can be positively maximised and unintended negative impact mitigated in adaptation and related plans.
- Utilise approaches such as HIA and MWIA to better understand the impacts of climate change adaptation policy and plans and emergency planning responses on health and wellbeing and vulnerable population groups.

Area for action 4:
Enhance prevention and public involvement via communications and education

- Efforts to encourage action to mitigate and adapt to climate change can be supported by applying behavioural science and the evidence base on risk communication. Evaluating the impact of public messaging is also essential.
- There is a need for clear and trusted information for the public and non-biased high quality teaching materials for schools on climate change, that address public concerns and support citizen and community-led action on climate change.
- Language is important and can impact on how people feel about climate change, and their likelihood of taking action. Public communications should avoid generating a sense of powerlessness and instead identify the effective actions people can take together. It is important to give a sense of hope and optimism via positive, but realistic, messages and there is an opportunity to encourage individuals to take control of their futures and shape their behaviour to help mitigate climate change.
- Empowering all citizens, especially young people, to engage in climate action is central to the UN Framework Convention on Climate Change “Action on Climate Empowerment”, and the Congress of Parties (COP) 27 agreed a four year action plan to empower all members of society to engage in climate action (UNFCCC, 2022). Stakeholders in Wales have the opportunity to work together to achieve this vision.

Area for action 5:
Enhancing public involvement and community resilience

- Enhance control, resilience and participation via democratic decision-making processes, governance, and community engagement in climate change policy and planning, for example, flood and coastal erosion policy.
- Enhance capability and capacity for effective community engagement practice and risk communication in adaptation planning, for example, flood and coastal erosion risk management.
- Create sustainable investment in community resilience, community led action on climate change and social support structures, for example, via mutual aid networks, community roles in emergency responses, reducing social isolation, community transport, environmental improvements, and other local driven adaptive and mitigation actions.
- Utilise HIA and MWIA as a vehicle to engage with communities.

Area for action 6:
Enhance integration and collaboration

- Strengthen the integration of health, wellbeing and equity impacts into climate change adaptation and mitigation policy development, to maximise opportunities for health and wellbeing, and prevent or mitigate unintended consequences, for example by application of HIA.
- Whilst plans for corporate adaptation and business continuity for public service are important, clear accountability and governance mechanisms are needed in order to plan for the cross-cutting and cumulative place based and population health impacts of climate change that transcend organisational boundaries.
- Understanding the local context is essential in developing adaptation strategies and interventions (Kovats and Brisley, 2021). Integrated place-based climate risk assessments, underpinned by a local cross-organisational governance structure can support delivery of local place and population-based adaptation.
- Businesses and employers need to plan for adapting to climate change impacts including for increased heat, flooding and disruption to infrastructure that may affect their operations and the health, wellbeing and productivity of their workforce.

Area for action 6:
Enhance integration and collaboration

- The impact of climate change should be considered in tandem with other major issues in Wales for example, the COVID-19 pandemic, Brexit and cost of living crisis, and the cumulative impacts which these multiple challenges will have.
- There are many synergies across policy areas which could facilitate health, wellbeing and mitigate the impact of climate change and promote sustainable development. This includes for example, improved digital ways of working and service delivery, modes of transport and land use planning.
- Climate change is an important issue of international and national importance and transcends all boundaries and jurisdictions. Stakeholders need to work collectively across the four nations and internationally.

Area for action 7:
Invest in co-benefits for health

- Ensure that climate change mitigation and decarbonisation policy and investments across sectors maximise co-benefits for health and prevent widening inequalities and negative impacts on health and wellbeing – the application of HIA can support this.
- Invest in climate resilient infrastructure in spatial planning, for example, to mitigate the impacts of heatwaves, enable the sustainability of outdoor physical activity, sports and active play.
- Invest in the development of practical skills and skill sharing mechanisms for sustainable living, for example, repair, local food growing.
- Invest in strategies to increase physical activity and mental health, for example, via social prescribing and volunteering, factoring in potential for enhanced opportunities for outdoor recreation and active travel due to climate change.

Area for action 8: Further research

- The existing evidence base on the health and wellbeing impacts of climate change contained in this HIA report and in the Climate Change Risk Assessments for Wales and the UK (Netherwood, 2021; Kovats and Brisley, 2021) should be utilised to inform the implementation and evaluation of adaptation policy and interventions to protect population health.
- Public Health Wales NHS Trust will use the findings of the HIA, and engagement with other stakeholders, to develop a research agenda on climate change and health in order to prioritise investment in research activity and action that maximises impacts on population health.
- Further investigation is needed to identify areas of potential changing and increasing health service demand arising from climate change, for example, mental health services, respiratory health, primary and unplanned care.
- Further investigation and investment in the development of capacity, skills, knowledge and tools for the application and interpretation of integrated spatial, health and demographic data to inform multi sector adaptation planning that takes account of multiple dimensions of both vulnerability, health and climate impacts.
- Climate science, climate change and the evidence base on health impacts is rapidly developing. In particular, with more investment in surveillance and research on observed health impacts in Wales, the evidence base on the health and wellbeing impacts of climate change will be constantly evolving. Therefore, it will be important that this HIA is reviewed regularly and updated in the future to remain a useful decision support tool.

Area for action 8: **Further research**

- The HIA has identified significant gaps in data and evidence on health impacts in Wales of extreme heat, drought and vector borne disease and implications for mental health, violence, alcohol and substance misuse and family and intergenerational relationships in Wales. Further evaluation of adaptation measures is also needed.

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Working together for a healthier Wales