Healthier, Cleaner, Faster:

Climate Action for Health in Oxfordshire

Director of Public Health Annual Report on climate change and health

2023/24

OXFORDSHIRE COUNTY COUNCIL

Foreword
from Ansaf Azhar

Every year I use my Director of Public Health Annual Report as a vehicle to shine the spotlight on a significant issue that is relevant to Oxfordshire partners and public, with a view to creating a strong call to action.

My report last year focused on what is arguably one of the biggest lifestyle public health risks at a population level for Oxfordshire residents, the increasing prevalence of excess weight and physical inactivity. We talked about how addressing this issue is not simply limited to individual choice but largely governed by socioeconomic and environmental factors. In doing so, we talked about the role of healthy place-shaping in creating a place that promotes healthy behaviours in the first place. We also know these same interventions and place-shaping initiatives create a sustainable environment that is good for our climate.

Today, as I reflect on the biggest public health challenges to our population's wellbeing, climate change stands out as one of the most significant threats to our population both at global and local level, with strong tangible links to other public health threats we have previously discussed. Therefore, I want to use this year's annual report to focus on the health impacts of climate change, and the health and wellbeing benefits of positive climate action.

For too long, we have tended to focus on major challenges to our wellbeing in their individual silos. Their positive impacts have been seen as individual benefits in terms of improving the environment or health or helping with the cost of living crisis or tackling health inequalities. This silo thinking has caused polarisation of the debate, when in reality all the initiatives to tackle the above challenges, executed effectively, will complement each other and lead to a synergistic effect in their benefits to the population.

This is particularly evident in the interaction between our health and the environment. The adverse impacts of our deteriorating climate on the health and wellbeing of our residents are immediate. This came into sharp focus during the recent flooding in Oxfordshire, where the loss of livelihood and the consequent impact on our mental health and overall wellbeing was unprecedented. These events are going to be more common going forward.

We also know what we do to mitigate climate change also has immediate benefits to our health and wellbeing and these benefits are felt by individuals and communities, creating healthy places where healthy behaviours will be the norm. This approach is both nationally and internationally recognised, leading to the first declaration on climate and health at the COP 28.

This report seeks to help reframe the debate. To look through the lens of the positive co-benefits of climate action and enable our residents to see the individual benefits to their health and wellbeing. It celebrates the great work we have already done, but we urgently need to do more, and it recommends actions for all of us. We cannot do this alone, everyone and every organisation has an important role to play. It encourages individuals to make positive behaviour changes and system partners to prioritise actions that are good for wellbeing and the climate.

I believe it will bring our partners in Oxfordshire together under one key ambition to make Oxfordshire a healthier place for all of us. Our anchor institutions through our partnership network have a particularly important role in delivering this ambition. We must act now for the benefit of the health and wellbeing of our population.

I hope you enjoy this report, and it inspires you to join this exciting journey to make Oxfordshire a great place for all our residents.

Contents

Acknowledgements

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- Members of the DPHAR steering group
- OCC Climate Action Team
- OCC Emergency Planning Team
- South Central Ambulance Service

Introduction

Health is the untold story in the climate emergency.[1] This is staggering given the immediate and positive health benefits for individuals, families and communities which can be delivered through climate action.

Climate action means better health for everyone – whether we are talking about newborn babies, children, teenagers, working age adults or older people. Amidst mounting pressure in our NHS, tackling the impacts of the changing climate across Oxfordshire will save lives and money and conserve resources for those most in need. It will also benefit the building blocks of our health: providing homes which can be heated and cooled affordably, infrastructure for people to walk and cycle to keep communities active, connected, and healthy, and green spaces to boost mental health and store carbon.

To date there has been progress toward ambitious goals to mitigate and adapt to the changing climate in Oxfordshire. We are a national leader on climate action, with a countywide strategy and action plan that has already contributed to major reductions in emissions among residents, businesses and the transport sector.[2] Total emissions in the county fell by more than one third (34 per cent) between 2008 and 2021, whilst emissions per capita fell by 42 per cent.[3] Over the same period, there were reductions in greenhouse emissions across all sectors with a 70 per cent reduction from businesses, 35 per cent reduction from residents and their homes and 16 per cent reduction from transport sources.[3]

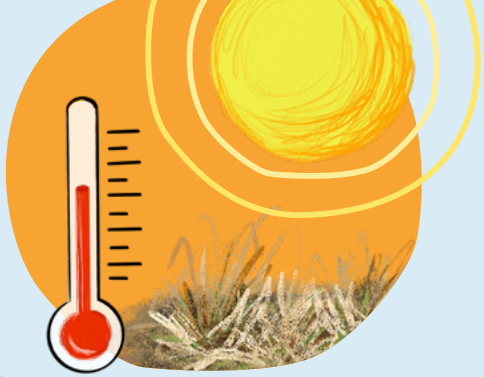
Despite some progress to reduce fossil fuel use and polluting greenhouse gas emissions, climate change is happening now in Oxfordshire, posing a real and current threat to health and wellbeing.[1] We are all experiencing the effects of the climate emergency with increased frequency and severity of adverse weather events. Since 2007, there have been 18 severe flood events, 10 named storms, eight severe cold snaps, four major heatwaves and three periods of drought (see figure 1 on next page).[4]

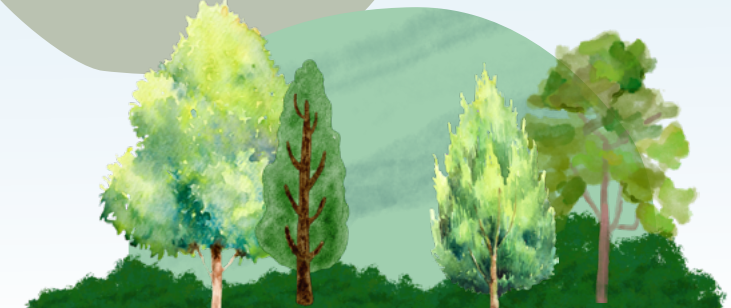
These events are having direct and harmful impacts on our health and wellbeing and will continue to lead to premature deaths and preventable suffering unless necessary climate action is taken. Of real concern, many infectious diseases are sensitive to the climate, and with warmer temperatures we can expect a greater risk of new and emerging infectious diseases on our doorstep.[5] The impact of climate change on individuals will vary, with the worst effects on disadvantaged and more vulnerable populations, and without necessary action this will further widen health inequalities.[5]

This report sets out just how important a connected health, wellbeing and climate strategy is in Oxfordshire. There is a clear link between healthier, happier communities and sustained climate action, and it is time we made the most of this opportunity. This report raises awareness of the immediate and longer-term health benefits of local climate action and aims to maximise these health benefits in every climate action, policy and strategy undertaken across the county.

Section 1:

Why the focus on the impact of climate change on health now?





1.0 Introduction

We all need to take urgent climate action in Oxfordshire to protect and improve our health. There are five key areas of the climate emergency with implications for our health: **temperature, air, water, food, and nature**. Current evidence describes the local health impacts of our changing climate across these five areas in Oxfordshire. The evidence is currently strongest for adverse impacts of climate on health due to heat and cold, flooding and vector-borne infectious diseases.[5]

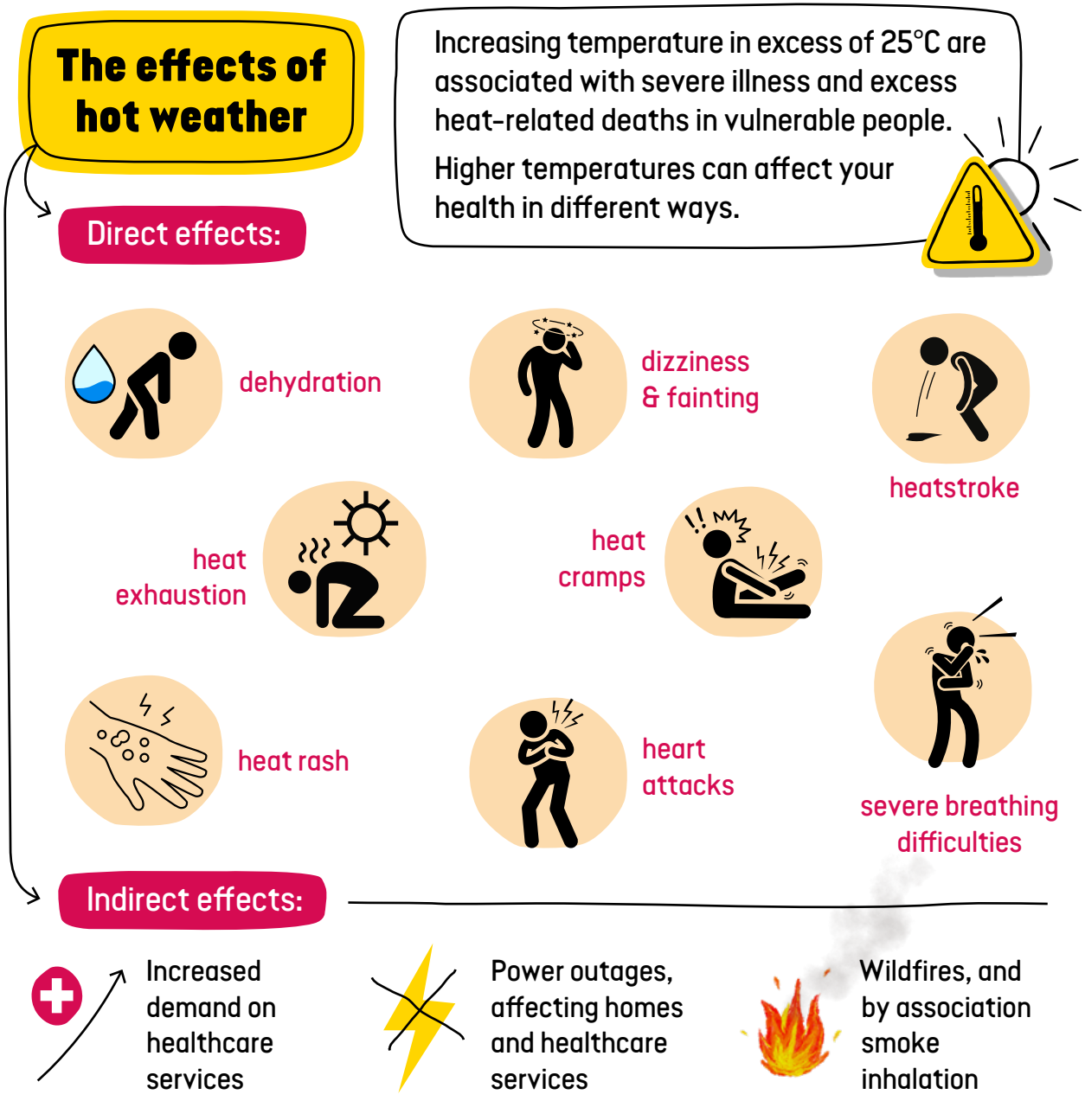
1.1 Temperature

Temperatures are increasing in Oxfordshire, the UK and globally. Hotter weather has also been accompanied by increasing numbers of adverse weather events, such as storms, freezing conditions and snow.[6] Hot weather and heatwaves now occur frequently in Oxfordshire, affecting the health, lives and livelihoods of people across the county.[7] The summers are drier and the rain that does fall is more likely to occur in heavy rainfall events.[5]

Although hot weather has positive connotations for many, in the absence of necessary climate adaptation, higher temperatures increase the risk of heart attacks, stroke, lung disease and severe mental illness.[5-6] Hot weather can also impact indirectly on health by increasing the transmission of food, vector and waterborne infectious diseases.[5-6]

There is robust evidence that as temperatures increase above a certain level the risk of death increases.[6]

In the summer of 2022 alone, there were 65 excess deaths during periods of higher temperature across Oxfordshire.[7]



Specific groups including babies and young children, older people, people experiencing homelessness, outdoor and manual workers and people with longer term medical conditions are especially at risk because they are more exposed to heat and/or less able to compensate under these conditions.[6]

For example, older adult social care users (living at home) are more likely to be living in deprived urban areas of Oxfordshire which are more likely to retain heat than surrounding rural areas during periods of hot weather, particularly at night.[8]

Average temperatures are increasing in Oxfordshire

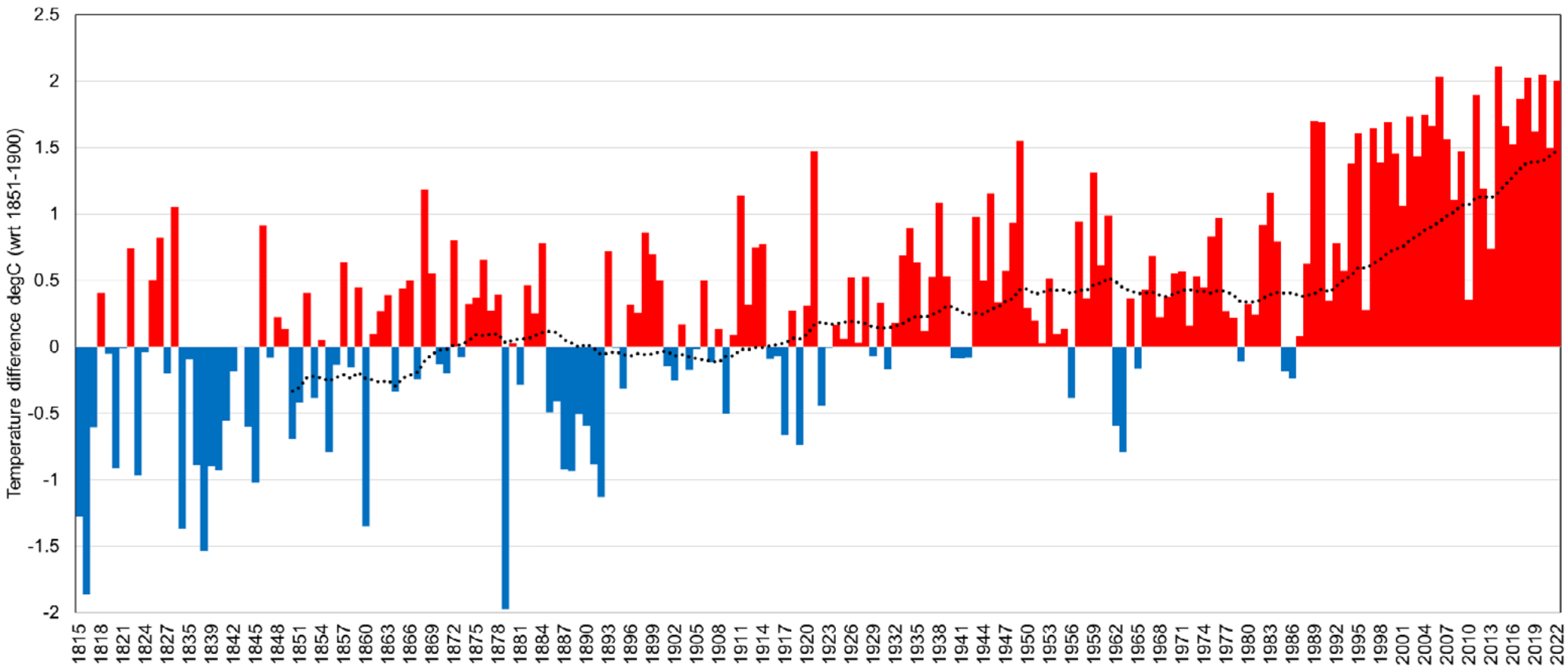
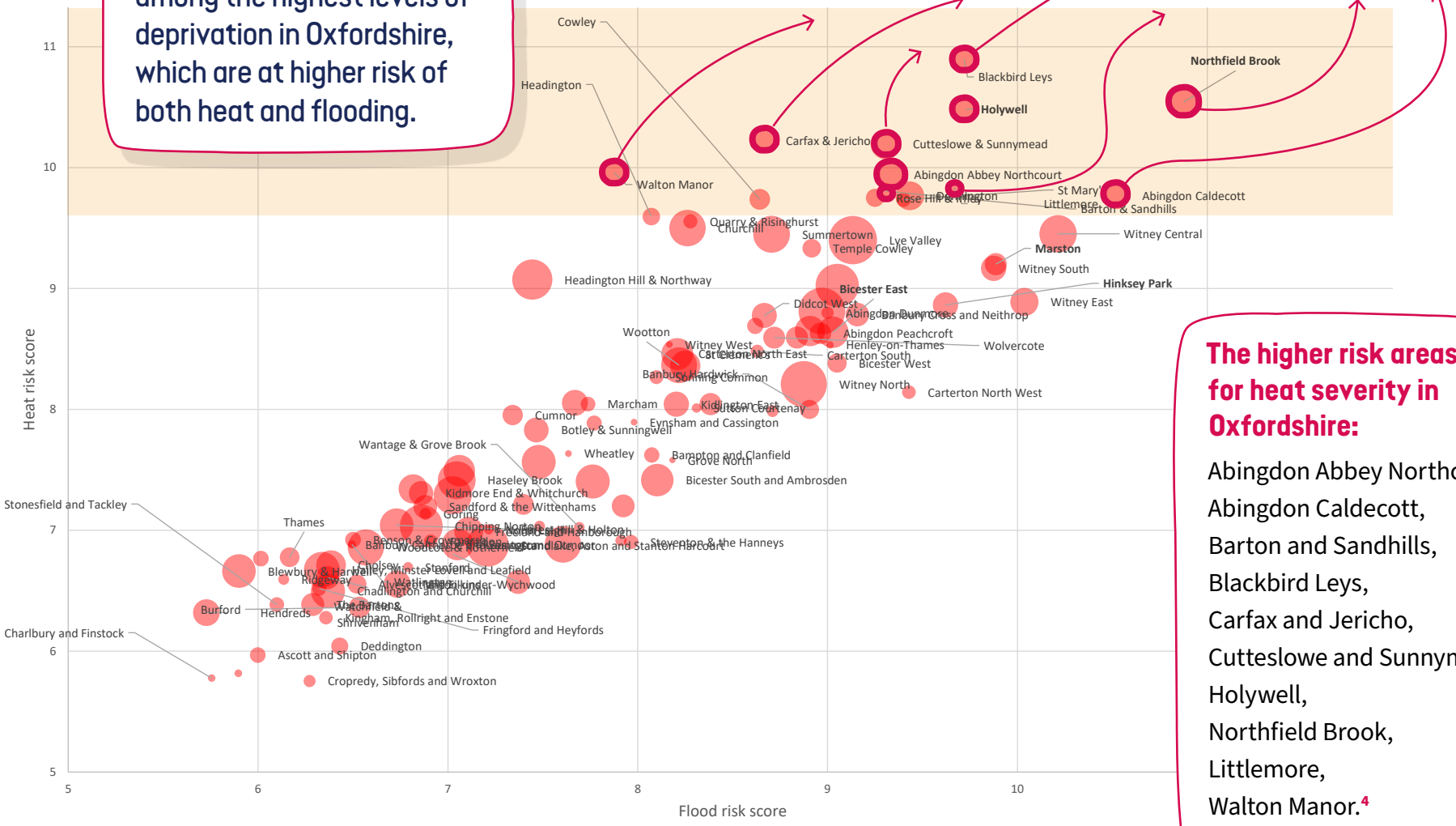


Figure 1 Average annual mean temperature anomalies for Oxford (top) and climate stripes (bottom) for Oxford and across Oxfordshire (OCC) relative to a pre-industrial 1851-1900 baseline (data from OUCE Radcliffe Observatory and Met Office HadUK).

Source: Oxford Weather and Climate since 1767 by Stephen Burt and Tim Burt, published by Oxford University Press, 2022.

There are particular areas, some of which experience among the highest levels of deprivation in Oxfordshire, which are at higher risk of both heat and flooding.

Higher risk areas for heat severity



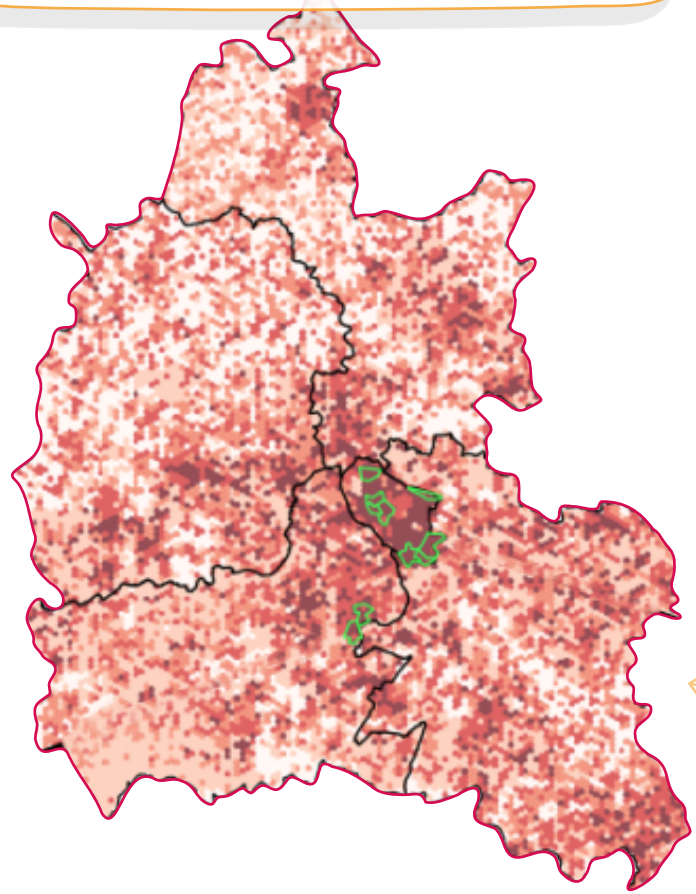
The higher risk areas for heat severity in Oxfordshire:

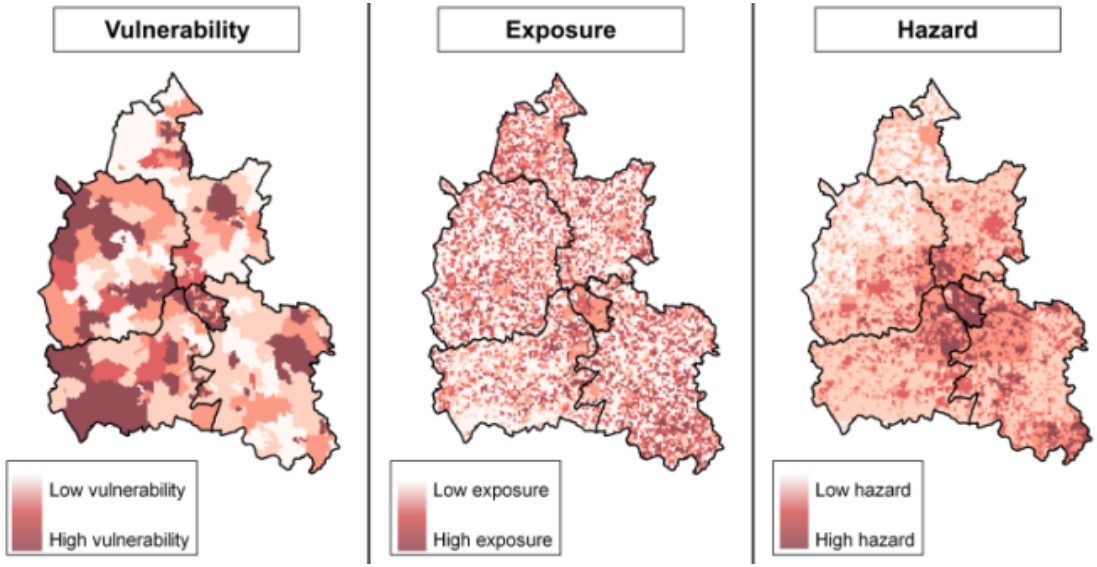
Abingdon Abbey Northcourt,
Abingdon Caldecott,
Barton and Sandhills,
Blackbird Leys,
Carfax and Jericho,
Cutteslowe and Sunnymead,
Holywell,
Northfield Brook,
Littlemore,
Walton Manor.[4]

Figure 2 Current heatwave and flooding risk score at a ward level with bubble size by combined risk score (size of bubble represents population size)

Source: Atkins Health Impact Assessment

There are particular areas, some of which experience among the highest levels of deprivation in Oxfordshire, which are at higher risk of adverse effects of heat.





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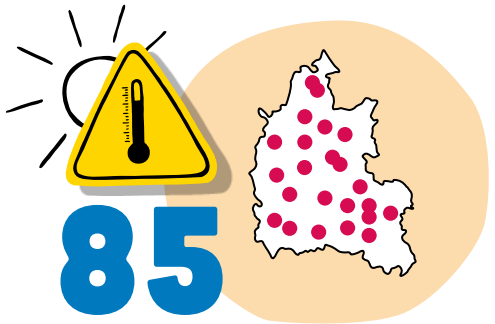
Littlemore,
Walton Manor.[4]

Figure 3 Current Heatwave risk in Oxfordshire and ten wards with the highest heatwave risk.

Source: Atkins Health Impact Assessment

Hot weather also impacts on health and social care services, and the health care system's ability to respond and provide routine care. Nine in 10 UK hospitals, including hospitals in Oxfordshire, are currently susceptible to overheating due to their architectural design, poor ventilation, and lack of cooling systems. This has doubled in the past five years.[9] Oxford University Hospitals NHS Foundation Trust reported the highest burden of overheating events across the southeast region in 2022 and was ranked sixth in England with 85 events across four sites.[9]

Across England, total costs of heat-related deaths from climate change and related socioeconomic change has been estimated at £6.8 billion per year in the 2020s, rising to £14.7 billion per year in the 2050s.[5]

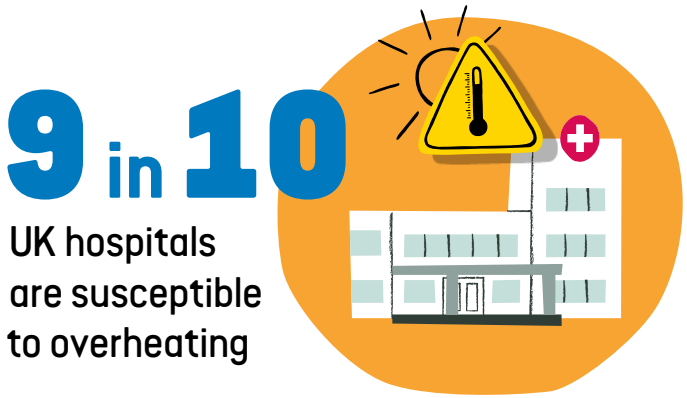


85

overheating occurences in Oxfordshire in 2022

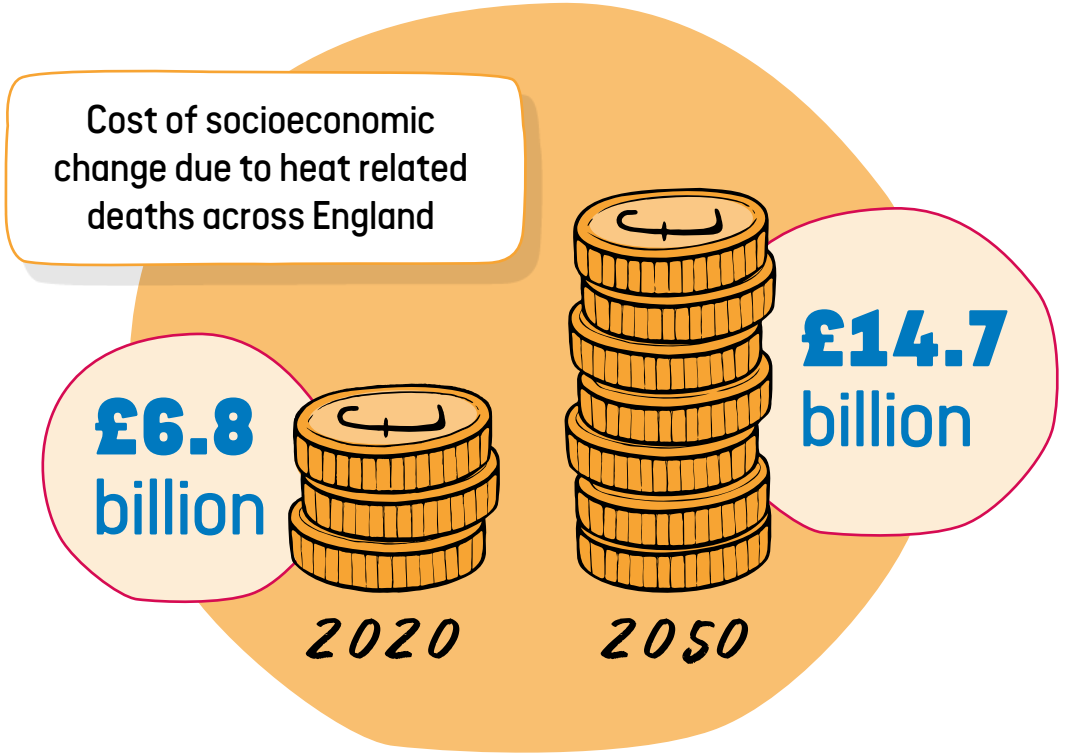
51

Oxfordshire care homes at risk of overheating



9 in 10

UK hospitals are susceptible to overheating



At least 51 care homes, four hospitals and 40 GP and healthcare facilities are located in areas of high current heat risk. In addition, at least 130 educational establishments are located in areas of high current heat risk.[4]

Figure 4 shows projected heat risks faced by care homes, GP practices and hospitals across Oxfordshire.[9]

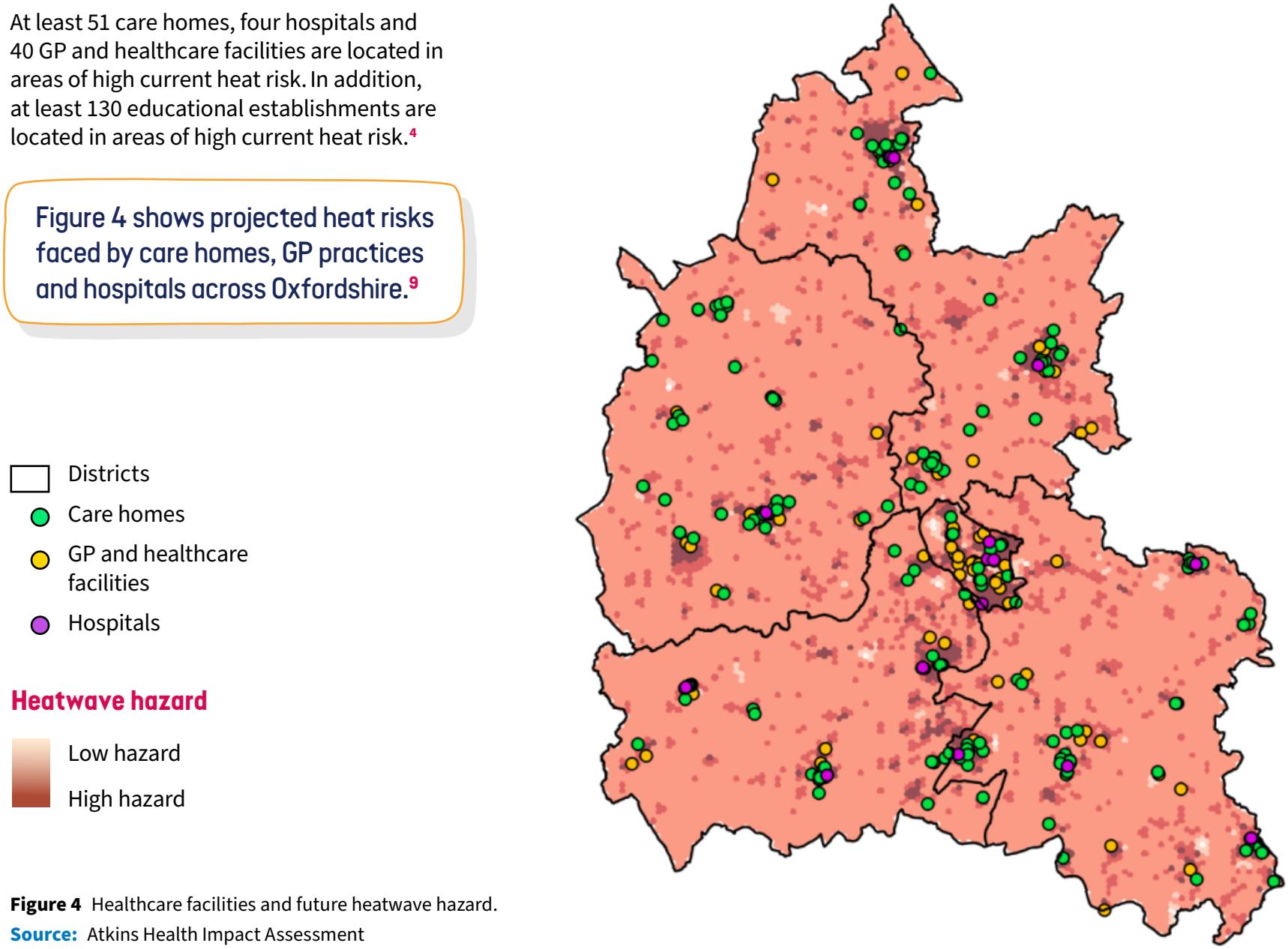


Figure 4 Healthcare facilities and future heatwave hazard.
Source: Atkins Health Impact Assessment

During the September 2023 heatwave, total ambulance demand across Oxfordshire increased by 8.6 per cent the week of the heatwave compared to the preceding 7 days – see figure 5.[10]

Patient acuity also increased with higher numbers of category 1 (life threatening) and 2 (emergency) calls, with a relative reduction in category 3 (urgent) calls.[10]

999 incidents demand – Oxfordshire CCG

Heatwave 4 - 10 September 2023

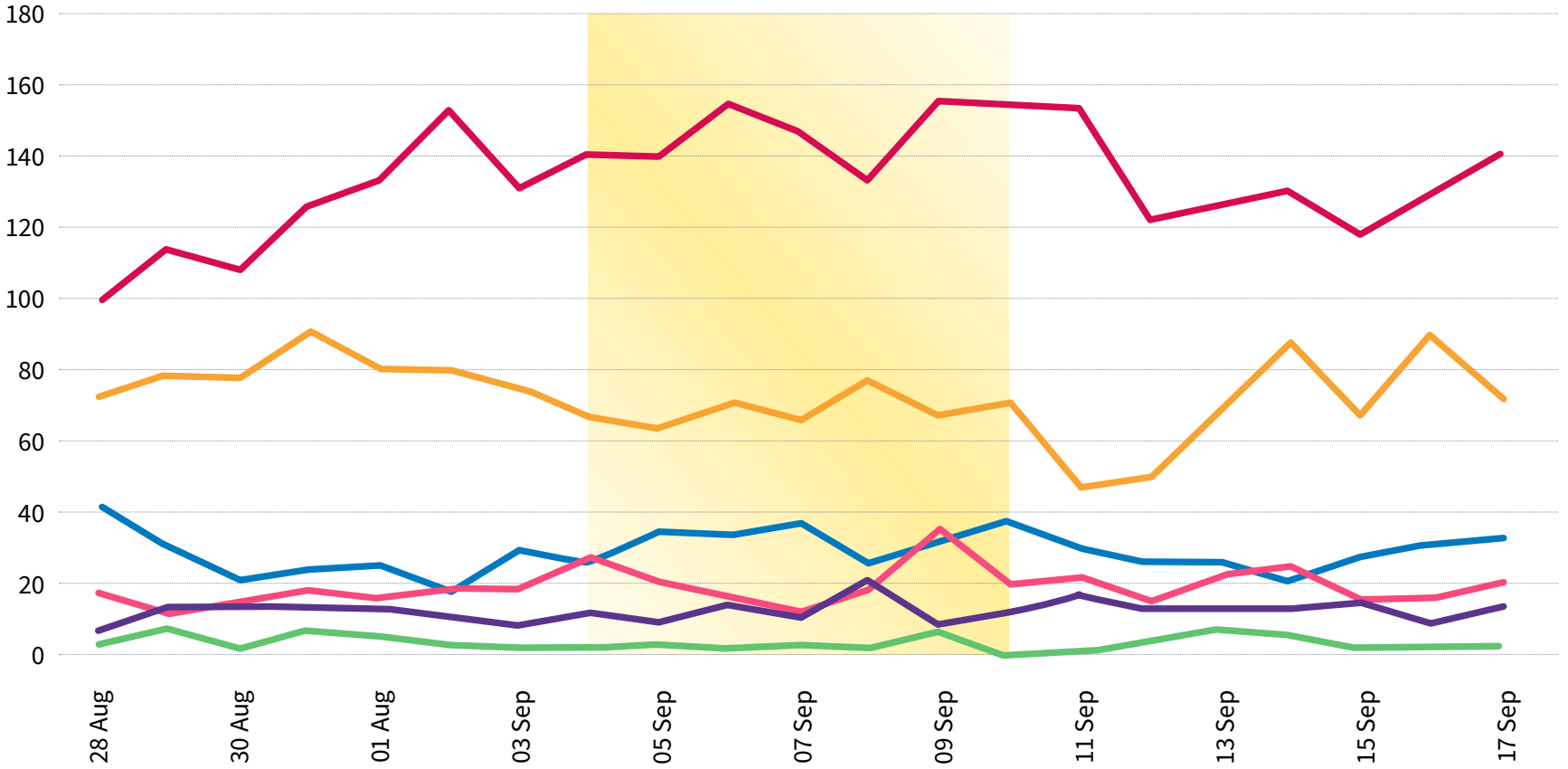


Figure 5
999 incidents demand by category of call during the September 2023 heatwave, Oxfordshire.

Source:
South-Central Ambulance Service

Category 1: calls from people with life-threatening illnesses or injuries

Category 2: emergency calls

Category 3: urgent calls

Category 4: less urgent calls

Category 5: hear and treat

HCP: healthcare professional ambulance response

During the unprecedented July 2022 heatwave, patient acuity also increased during the week of the heatwave, with higher numbers of category 1 and 2 calls – see figure 6.[10]

This pattern of more severe patient acuity persisted for one week following the heatwave.[10]

999 incidents demand

Unprecedented heatwave 16 - 19 July 2022

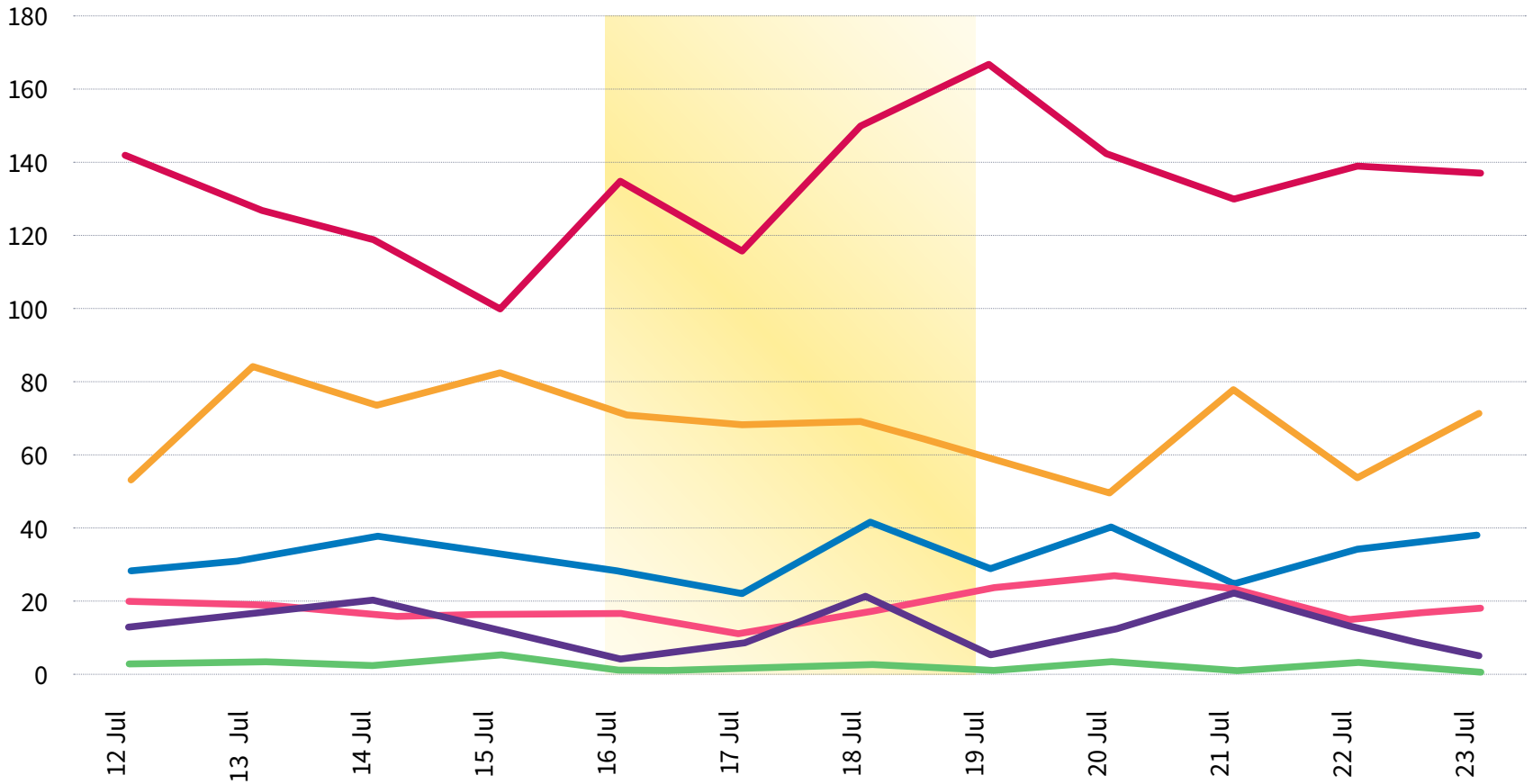


Figure 6
999 incidents demand by category of call during the July 2022 heatwave, Oxfordshire.

Source:
South-Central Ambulance Service

Category 1: calls from people with life-threatening illnesses or injuries

Category 2: emergency calls

Category 3: urgent calls

Category 4: less urgent calls

Category 5: hear and treat

HCP: healthcare professional ambulance response

Despite the effects of climate change, cold-related ill-health and premature deaths are still significant (although these are expected to decrease over time).[4-6] Cold-related deaths are currently linked in part to poor quality housing, fuel poverty, seasonal infections like flu and norovirus, physical hazards like snow and ice and underlying health inequalities.[6] Fuel poverty particularly impacts the ability to stay warm, well and healthy through the seasons.

Oxford City experiences significantly worse levels of fuel poverty (10 per cent of households) than the regional average (8.4 per cent) and in 2023, there were estimated to be 23,197 households in Oxfordshire experiencing fuel poverty. See figure 7.[8]

This is likely to be due to a combination of factors including the quality of local housing and financial pressures of the cost-of-living crisis. Better quality housing not only helps keep housing warm in the winter and cool in the summer, improving health and wellbeing and reducing household bills, but overall means that less energy is needed in the first place to run households, therefore reducing emissions.[5] **One study found that improved insulation may offer the greatest health benefit of all actions taken to reach net zero**, however in the absence of appropriate household ventilation this intervention could result in over 200,000 life-years lost by 2050 and over one million lost by 2100 due to indoor air pollution.[11]

The proportion of households in fuel poverty varies across Oxfordshire

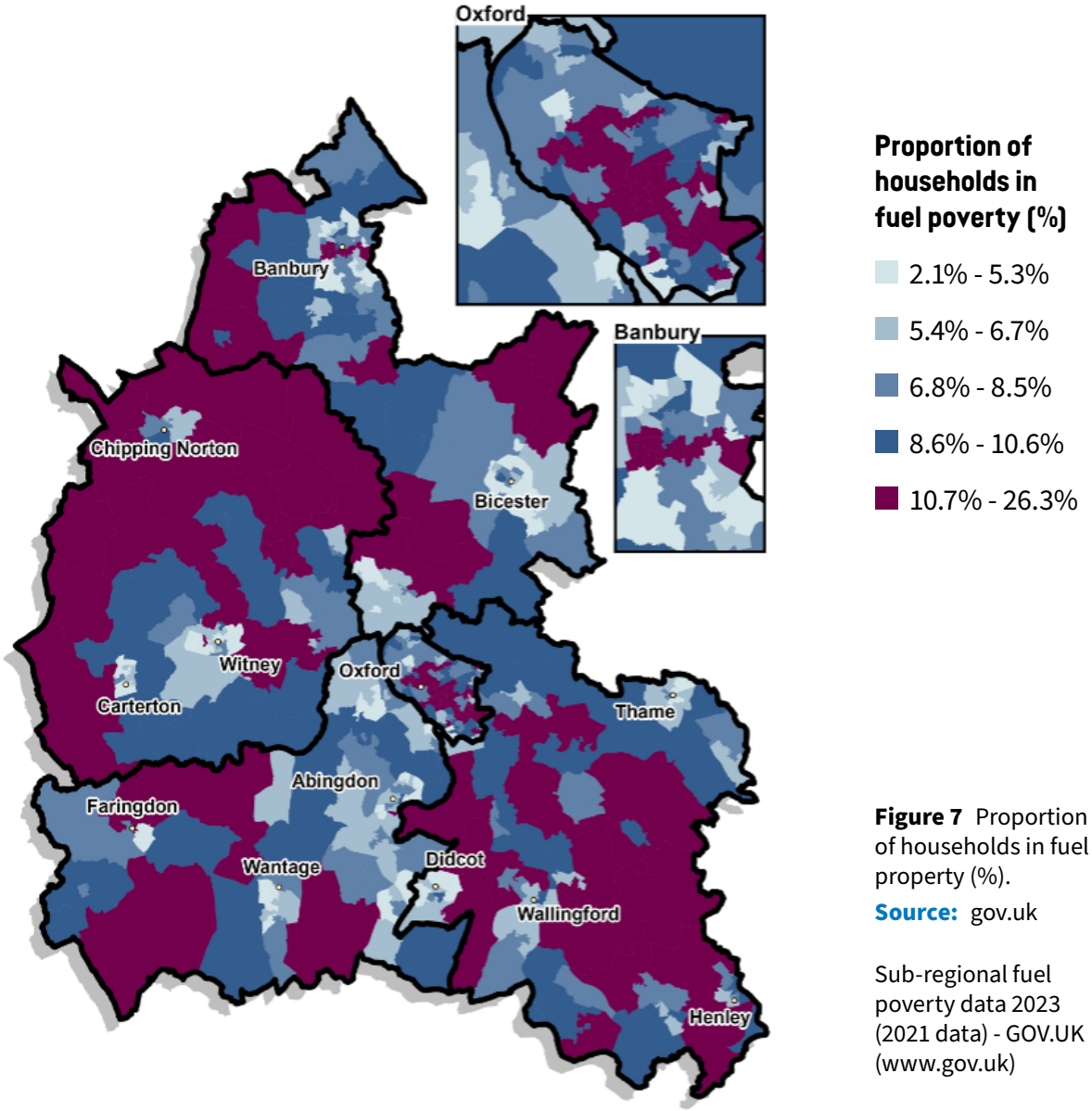


Figure 7 Proportion of households in fuel property (%).

Source: gov.uk

Sub-regional fuel poverty data 2023 (2021 data) - GOV.UK (www.gov.uk)

The direct effects of cold weather include heart attacks, stroke, lung disease, flu outbreaks, falls, injuries and hypothermia.[5-6] The indirect effects of cold weather include disruption to local infrastructure and healthcare services by snow and ice, the impacts of cold homes and fuel poverty on mental health, reduced educational attainment and success at work and carbon monoxide poisoning from poorly maintained or ventilated boilers and/or heating appliances with a combustion source.[6] People with dementia or cognitive impairment are more at risk, as they may not readily recognise that they are feeling cold.[6] Increases in cold related deaths may be observed for up to four weeks following the cold snap.[6]

Testimony on housing:

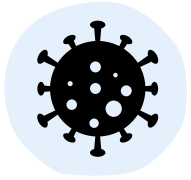
"Especially last winter when it was getting really cold, it was – our front door, I could see light, so I knew that [cold air] was coming in, but it was gaps everywhere and so that proved to be an issue, both in the winter and in the summer. In the summer, I've got to put sheets up on my windows to keep the heat out."

The direct and indirect health effects of winter weather

The human body responds in several different ways to exposure to cold weather, even at temperatures that might be considered relatively mild: **4 to 8°C**

Direct effects

heart attack



influenza

stroke

hypothermia

respiratory disease

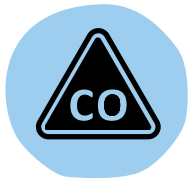
falls & injuries

Indirect effects

snow and ice may cause disruption to healthcare services

cold homes and fuel poverty are linked with poor mental health and social isolation

reduced education and employment success



carbon monoxide poisoning

Oxfordshire Fire and Rescue Service testimony:

"I've been in the service for twenty years. We are such an agricultural county, it is not uncommon to go to field fires, house fires, agricultural incidents – whether it's people knocking over telegraph poles while they are combine harvesting, refracted light through glass bottles, careless fire handling in fields, or malicious arson. That's not unusual for the fire service. Farmers understand a lot of this – they already do a lot to help themselves and keep things safe.

During the major heatwaves, we went to 8 wildfire incidents across the county – because they were out of control.

The danger with wildfires is they can travel unrestricted – we got close to that but managed to contain it.

I was sent down onto the M25 to deal with a grass fire. **We heard that there was a firefighter receiving an intravenous drip due to heat exhaustion. In field fires, you can experience heat exhaustion because you're chasing, you're running against the fire.** The effects of heat exhaustion and heat induced stroke really come to the forefront. You have all this kit on and you're chasing long distances. You have to be physically fit. If you're caught in the wrong wind direction, in a standing crop fire, it can have fatal consequences. It can be quite bad. Recently, there's been a lot of work about classifying firefighting as a carcinogenic employment – you're going from job to job because you want to be there, make a difference, help the general public – but suddenly you're covered with ash and sweat – there's a big knock-on effect on your health. That's a big health consideration. We haven't struck the balance right yet.

Every time there's a fire, it has the potential to make or break people. People are losing their yield, their crops – whether it's food or animals. And, if there are animals involved, that's traumatic. If machinery is burnt, people could lose their farm, they could lose everything. If the fields are flooded in the spring and then there's a large fire that takes multiple fields out – it might take years to recoup that money.

1.1.1 Fires

There were 477 total fires in 2023, 726 total fires in 2022 and 436 total fires in 2021 (Source: Fire and safety live reporting platform).

Between 2022-23, **1451 emergency incidents** attended were related to fire. Fire accounted for 22% of the total incidents the fire and safety service responded to (an increase from 17.86% compared to the year before). The extreme summer temperatures saw more outdoor fires than normal between 2022/23.

During the unprecedented heatwaves of 2022, fire services surrounding Oxfordshire declared major incidents after multiple fires broke out, including classified wildfires.

Oxfordshire Fire and Rescue Service have made some further improvements with the introduction of GENFO firefighting backpacks which hold 18 litres of water. These can be carried by firefighters to extinguish and damp down small pockets of fire and hot embers, preventing further ignition and reducing the chance of fire spread. The packs have been issued to all front-line appliances and to 4x4 vehicles. Oxfordshire Fire & Rescue Service have increased the number of fogging systems on 4x4 off-road vehicles. They have also made available a high volume pump and water carrier if access to water supplies becomes a challenge in more remote areas.

Most recently drought and high temperatures have contributed to fires. Figure 16 shows major wildfire incidents in Oxfordshire between April 2022 and September 2023.

23

wildfire incidents across Oxfordshire between April 2022 and September 2023

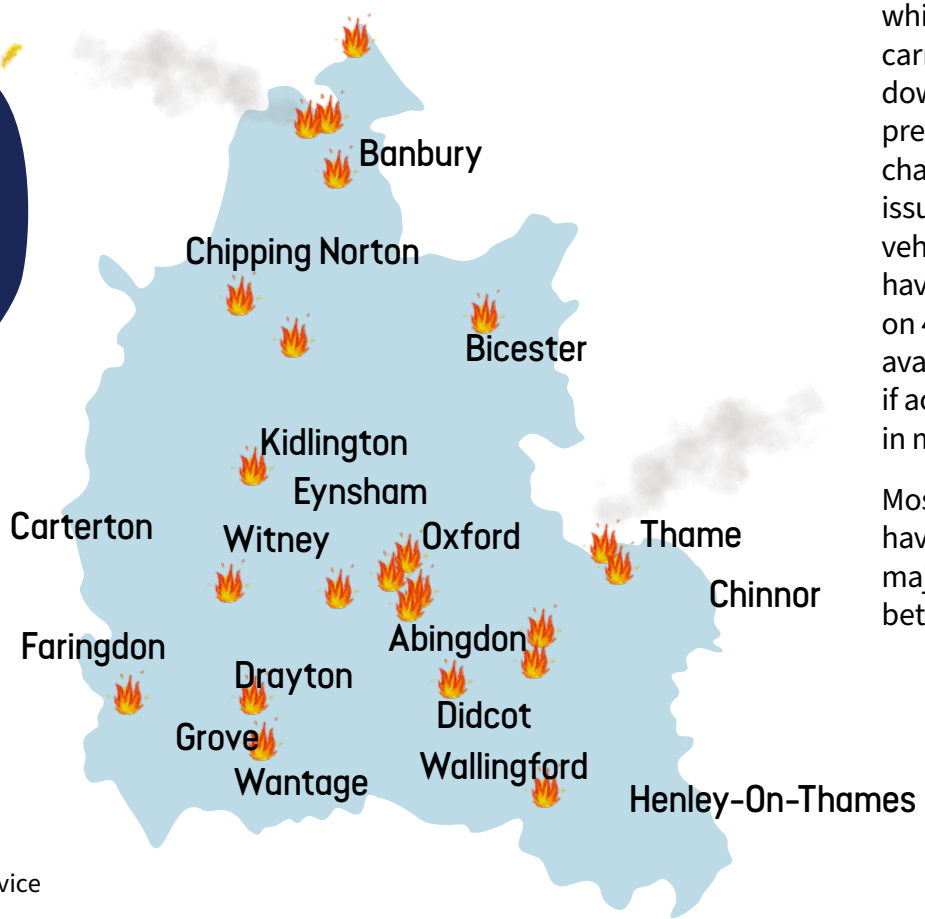


Figure 16 Map of fire incidents between April 2022 and September 2023.

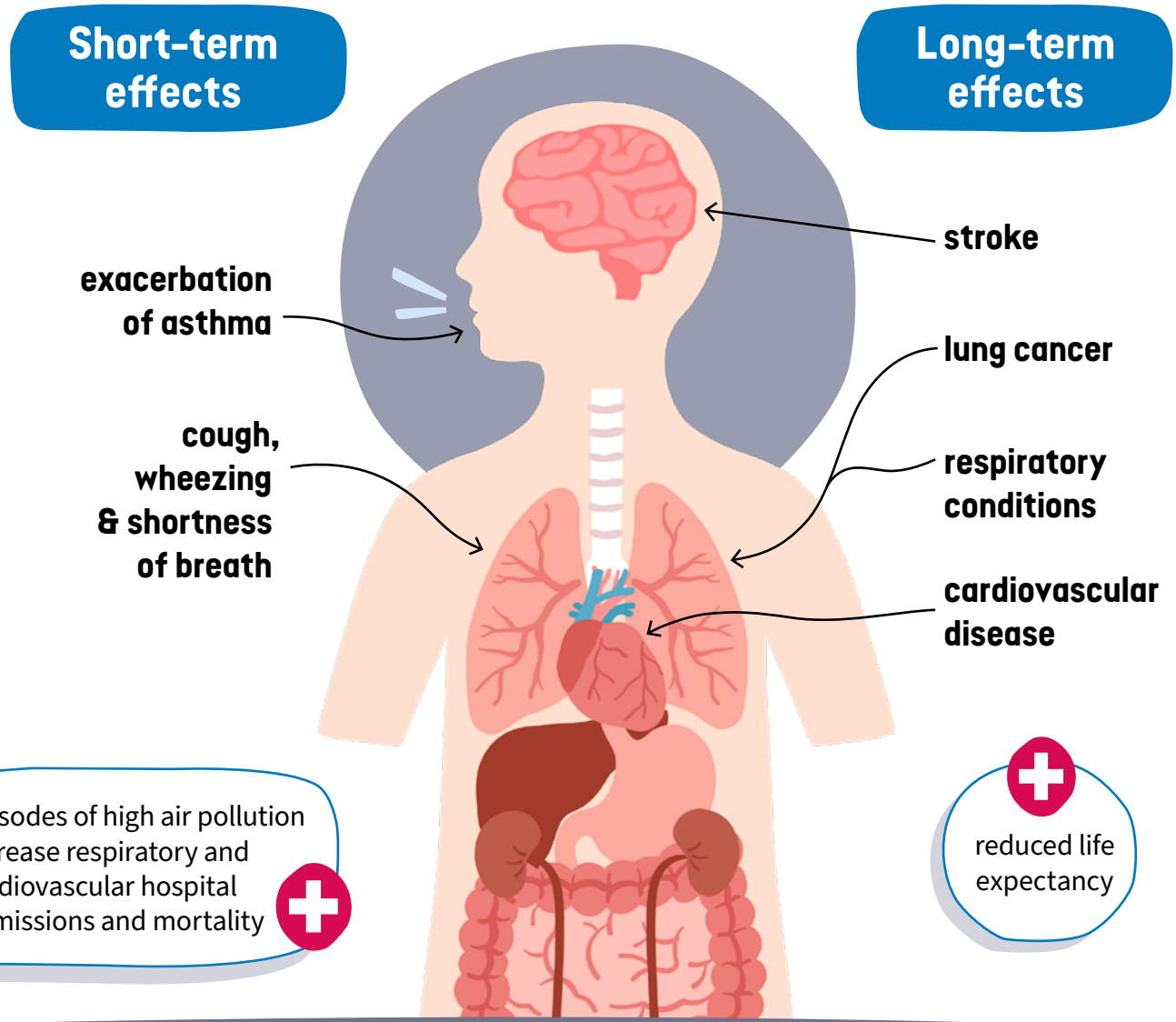
Source: Oxfordshire Fire and Rescue Service

1.2 Air

Poor indoor and outdoor air quality present a significant threat to public health in Oxfordshire, and the UK.[12] As well as human health, air pollution also threatens the natural environment and the economy.[13] It poses the greatest health risks for children, people with existing heart or lung conditions, pregnant women and older adults. People who live and work in more urban – and often deprived – areas next to busy roads are at particularly high risk of being exposed to higher levels of air pollution.[5-6,8,12]

Short term increases in air pollution can have immediate health impacts, including impaired lung function, exacerbation of asthma and increases in respiratory and cardiovascular hospital admissions and deaths.[6,8,12]

Health effects of air pollution



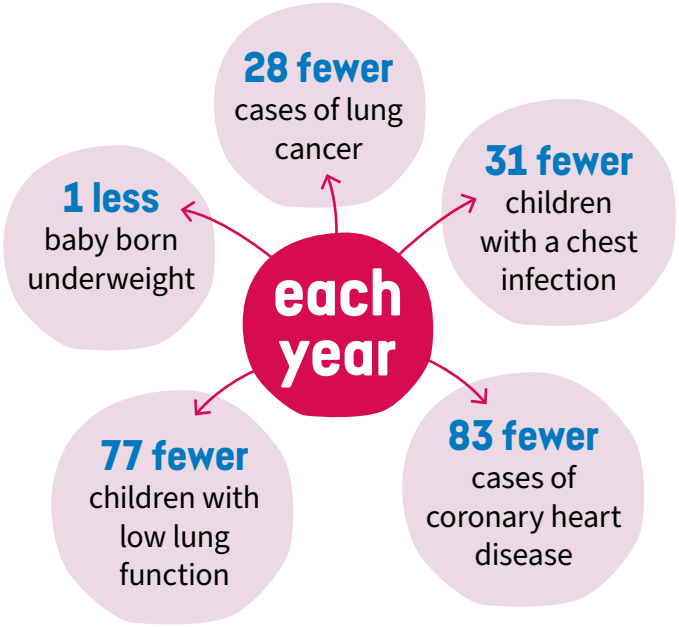
In Oxfordshire, there have been significant improvements in air quality over the past few decades, primarily due to reductions in coal burning which predate the COVID-19 pandemic – see figures 8-10 on page 22. However, indoor and outdoor air pollution remain dangerous to human health. It has been estimated that over 2,300 years of healthy life were lost due to ambient particulate matter (small toxic solid particles and liquid droplets which are not visible to the human eye which may be produced by burning fossil fuels, construction and waste products) in Oxford in 2019 alone.[8]

These premature deaths were mainly attributed to cardiovascular disease, diabetes, kidney disease and chronic respiratory disease.[8] Each year on average, higher air pollution days in Oxford are responsible for:

- six more cardiac arrests outside hospital,
- five more people admitted to hospital for cardiovascular disease and
- four more people admitted to hospital with a stroke, compared to low air pollution days.[14]

Air pollution also has economic implications – sustained reductions in NO_2 in Oxford, consistent with those observed in the first COVID-19 lockdown, could have prevented 48 lost life years with a total economic benefit of £1.83 million as compared to the 2019 baseline.[15]

Cutting air pollution in Oxford by a further 20 per cent may result in: [14]



Roadside air pollution in Oxford is estimated to stunt lung growth in children by

14.1 %

Pregnancy

- low birth weight

Children

- asthma
- slower development of lung function
- development problems
- more wheezing and coughs
- start of atherosclerosis

Adults

- asthma
- stroke
- lung cancer
- diabetes
- coronary heart disease
- chronic obstructive pulmonary disease (as chronic bronchitis)

Elderly

- asthma
- accelerated decline lung function
- lung cancer
- diabetes
- dementia
- heart attack, heart failure and strokes

Air quality testimony:

"Air quality was never good. When I first came back to Oxford, I suffered quite a lot from asthma that I didn't suffer from before. I was on Ventolin and Beclometasone inhalers. I'd never had respiratory problems before. That wasn't necessarily just to do with air pollution, but coming back to the Thames Valley where it's such a bowl of damp air. Pollen has definitely got worse too – I never had hay fever in the past – but now I experience hay fever in the summer. I think that's an indication of how loaded the air is.

"I dream about Oxford becoming like various places in Europe which have made radical changes to manage motorised traffic to make them pleasant environments for the inhabitants and for visitors too – it's an ancient city and it's just not working. We need to take radical steps to change things."

Over the years, I really noticed the build-up of traffic where I used to live before. It was unbelievable, I couldn't have the windows open at night – the traffic noise was terrible. It was made worse by the air direction. I really feel as though I have a haven where I am now. Even the windows are cleaner. It's ironic that I'm in the city, but this is a good spot to be. **I am aware of noise all the time though – it is very difficult to go on a country walk in Oxfordshire and not hear noise.**

I was aware of it [air pollution] when I had young children. I suppose with the girls it was trying to weigh up where we could live – I needed to be near with amenities, and sadly to be near amenities you had to put up with pollution. When they were teenagers, it was great, there was that bus service and it used to run almost twenty four hours a day. I know of people now who have grandchildren who encourage them not to visit because of the air quality.

It can be quite daunting to look at the local air quality, and if I were to look online and to see how bad it is, that's quite alarming. I really worry about it with Oxfordshire – I dream about Oxford becoming like various places in Europe which have made radical changes to manage motorised traffic to make them pleasant environments for the inhabitants and for visitors too – it's an ancient city and it's just not working. We need to take radical steps to change things. I wish there were more plans for a better public transport structure and for cycling and walking. I feel that Oxford is going to be choked."

Relative overall reduction in ambient **nitrogen dioxide** across Oxfordshire, as measured between 2010 and 2021

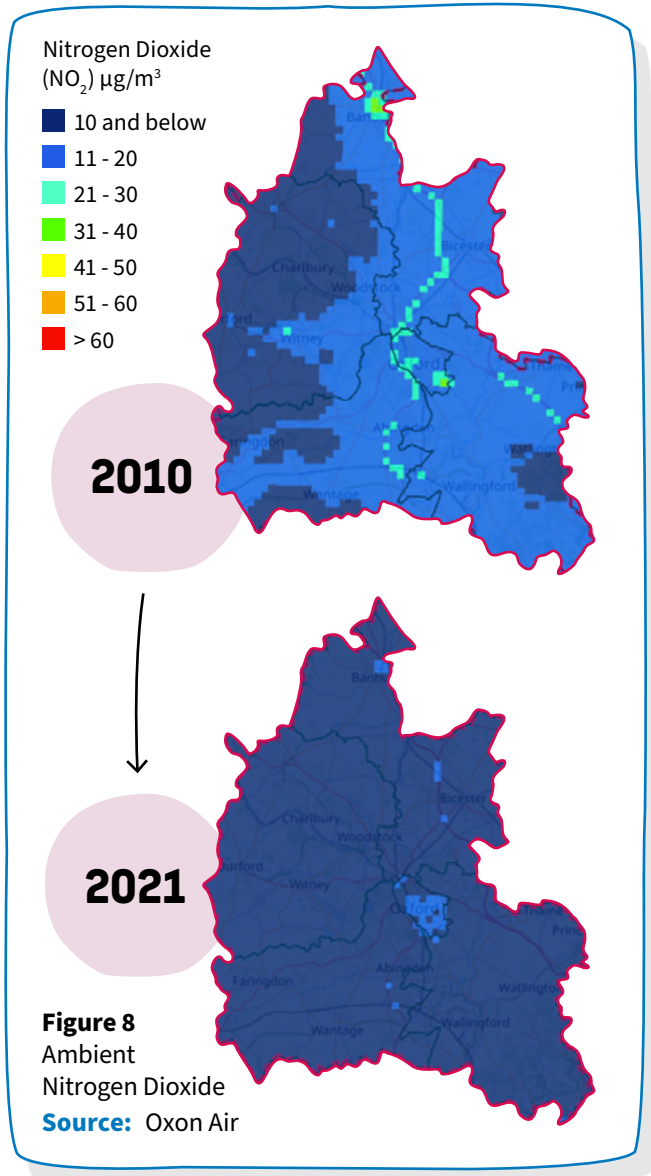


Figure 8
Ambient
Nitrogen Dioxide
Source: Oxon Air

Relative overall reductions in ambient **PM 10** across Oxfordshire, as measured between 2010 and 2021

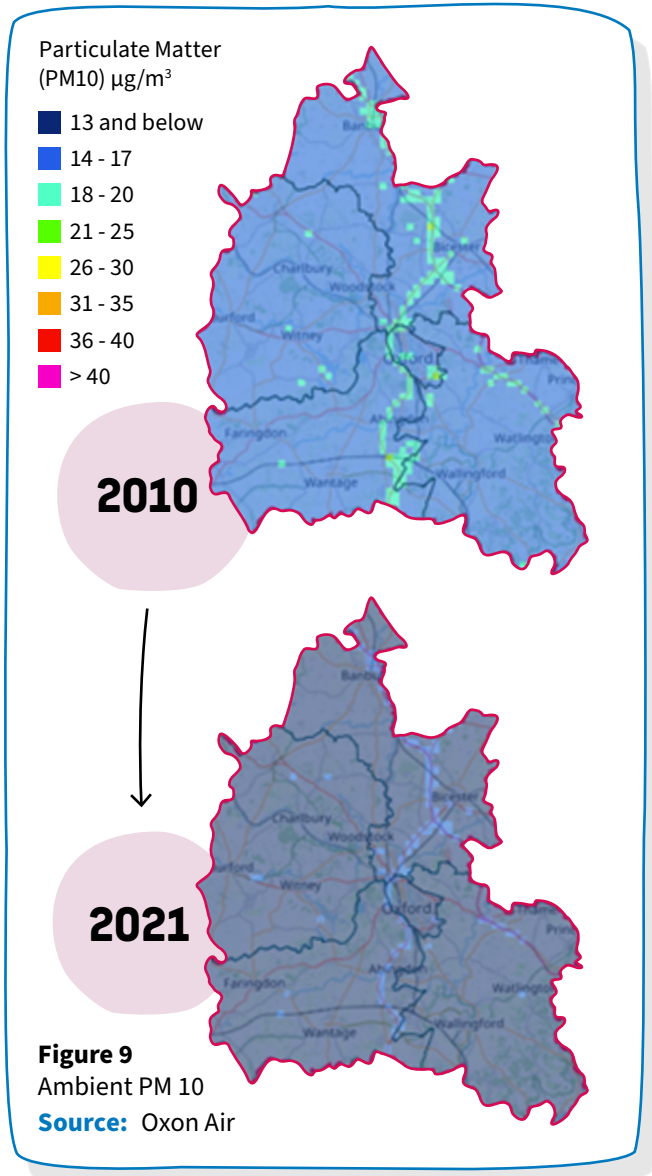


Figure 9
Ambient PM 10
Source: Oxon Air

Relative overall reductions in ambient **PM 2.5** across Oxfordshire, as measured between 2010 and 2021

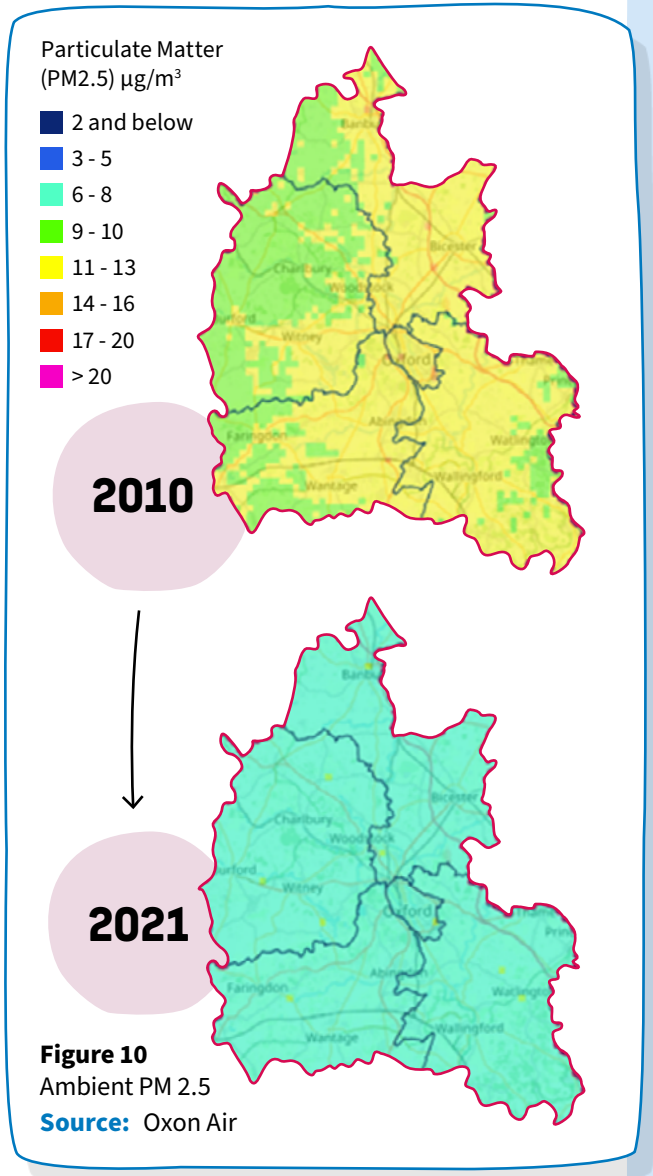


Figure 10
Ambient PM 2.5
Source: Oxon Air

Increasing air temperature, alongside higher levels of carbon dioxide in the atmosphere, may also impact on the severity of airborne allergens such as pollen.[16]

The health effects of higher pollen levels during summer months have already been seen in Oxfordshire.

Pollen may sound harmless, but it can be life threatening for people with underlying or undiagnosed respiratory conditions.[16] When it is dry and hot, with little wind, pollen is not dispersed as readily and can cause dangerous irritation to the eyes, throat, and lungs.

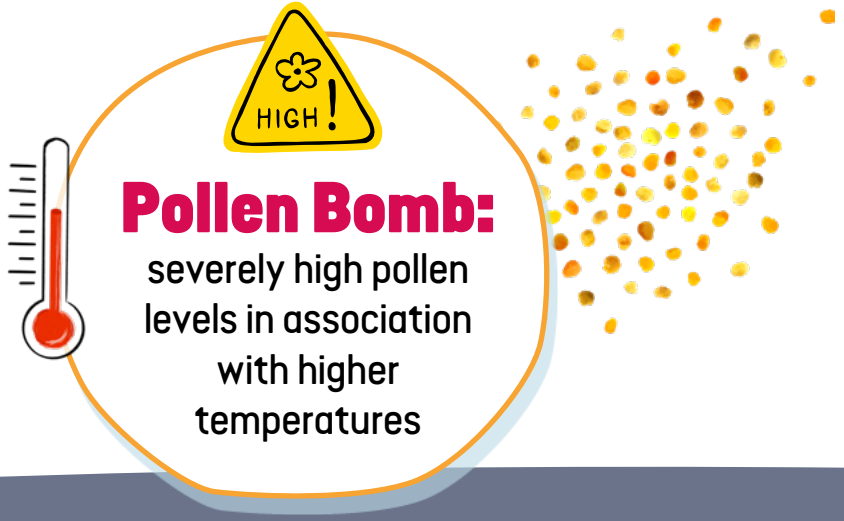
In June 2023, the Met Office and UKHSA issued warnings regarding severely high pollen levels in the region, in association with higher temperatures (described as the 'Pollen Bomb').[10]

When it is dry and hot, with little wind, pollen is not dispersed as readily and can cause dangerous irritation to:

eyes

lungs

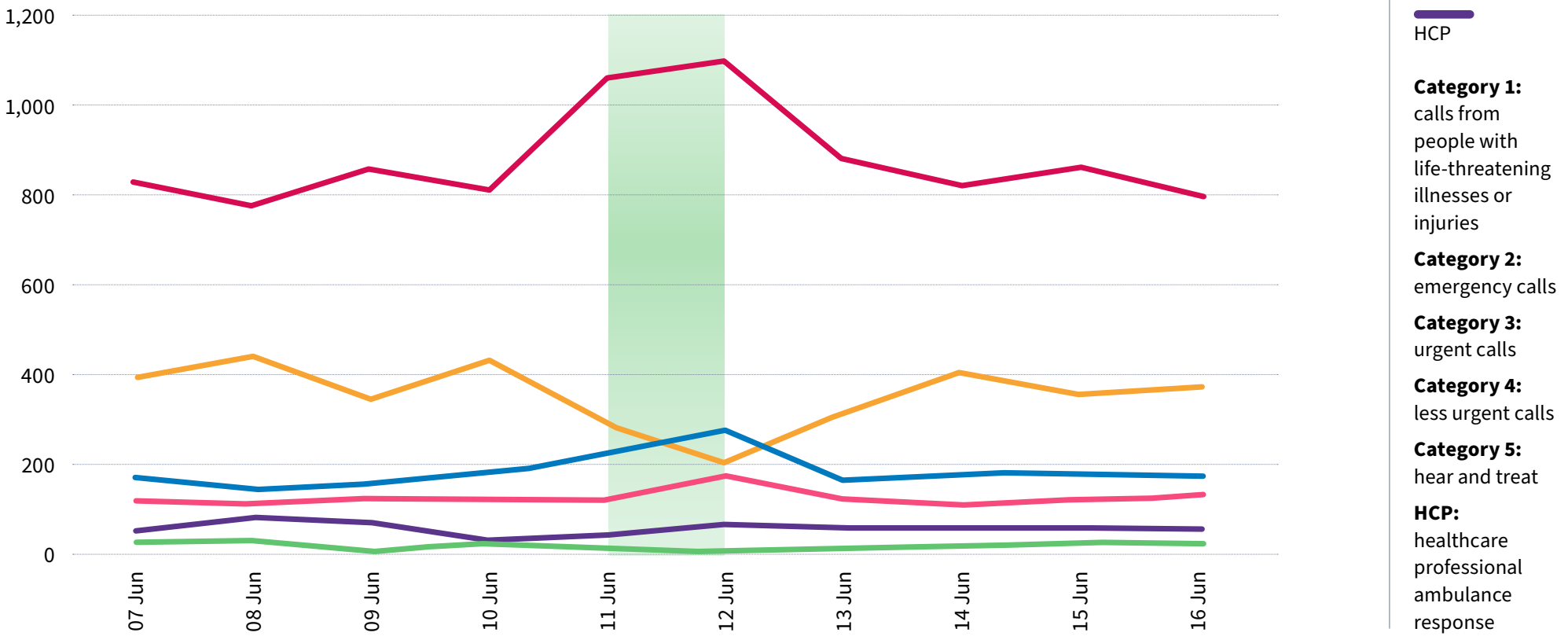
throat



In June 2023 at the time of the pollen bomb, there was an 31.7 per cent increase in category 1 (life-threatening) ambulance calls (from 41 to 54 calls) and 44.4 per cent increase in category 2 (emergency) ambulance calls (from 288 to 416 calls) – see figure 11.[10] A higher proportion of these calls were due to respiratory distress than usual.[10] This impacted on the local ambulance service's ability to respond in a timely way, in particular for category 2 and category 3 calls.[10]

Figure 11
999 incidents demand by category of call during the June 2023 Pollen Bomb, Oxfordshire.

Source: South-Central Ambulance Service



Category 1: calls from people with life-threatening illnesses or injuries

Category 2: emergency calls

Category 3: urgent calls

Category 4: less urgent calls

Category 5: hear and treat

HCP: healthcare professional ambulance response

1.3 Water

The changing climate in Oxfordshire has implications for our risk of flooding, in addition to the safety, quality and supply of local water.

1.3.1 Flooding

Flooding is becoming more common across Oxfordshire and the UK. In Oxfordshire, there have been 18 significant flood events since 2007, which have caused serious disruption to people's homes, lives and livelihoods.[4] In January 2024, there has been major flooding across the county with 170 properties flooded during storm Henk. Areas of specific higher flooding risk include Abingdon, Witney and parts of Oxford due to their locations on the Thames, Ock and Stert in Abingdon, and River Windrush in Witney – although this list is not exhaustive – see figures 2 and 12.[4,17-18]

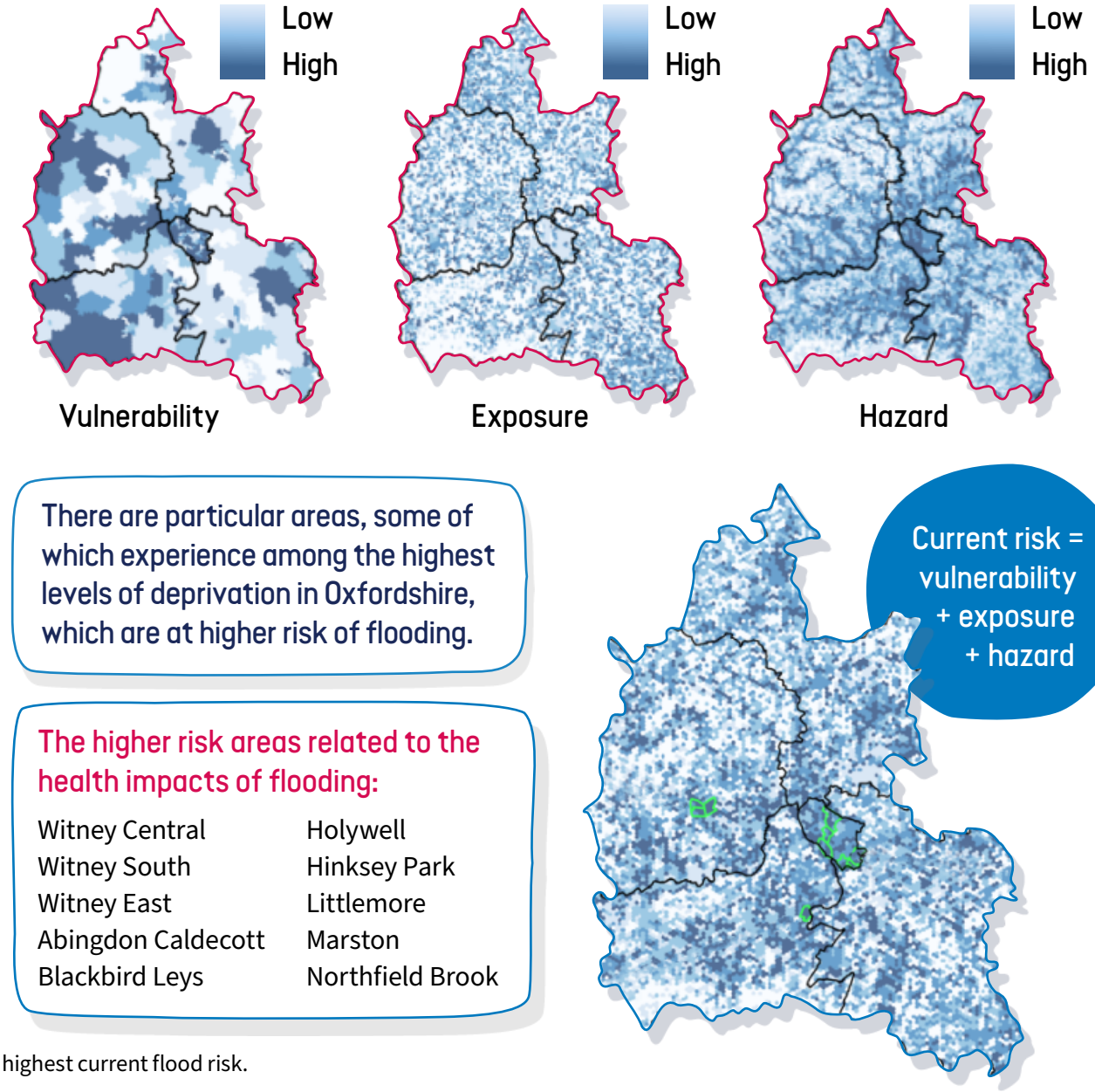
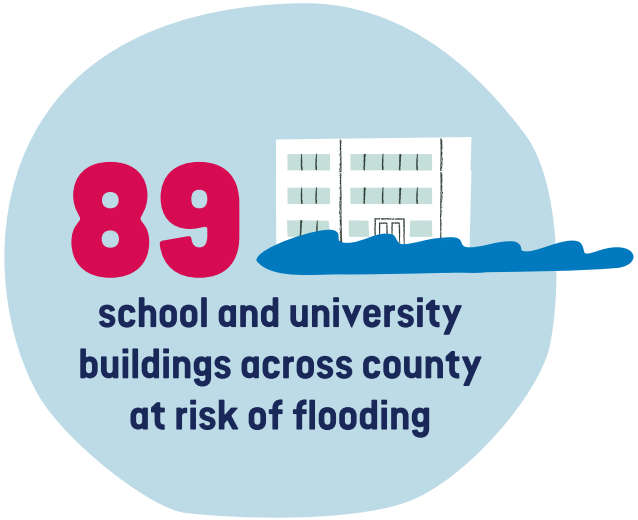


Figure 12 Current flood risk in Oxfordshire and ten wards with highest current flood risk.
Source: Atkins Health Impact Assessment

In the short term, flooding can lead to injuries, acute infections, exposure to chemical hazards and disruption to local health and social care services.[19] Longer term, flooding has significant impacts on mental health among those whose homes are flooded and the communities that surround them – see Figure 13.[19]

Evacuation and displacement, especially without warning, increase the risk of longer term anxiety and post-traumatic stress disorder.[19]

Recent estimates suggest that 19 per cent of the population are currently exposed to high flooding risks due to rivers and surface water.[4] This includes 89 school and university buildings across the county.[4]



Impacts of flooding are large, prolonged and extend beyond just those whose homes are flooded

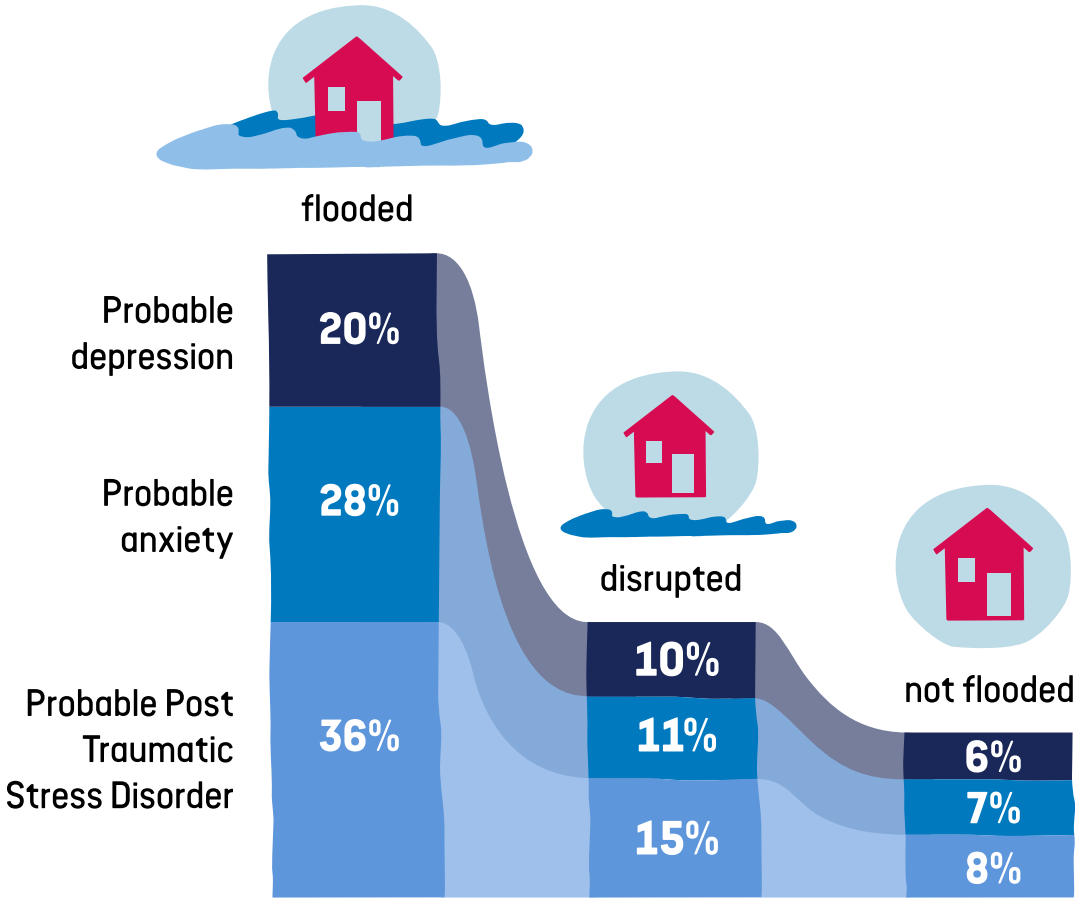


Figure 13a PHE Public Health Data Science Team, PHE Publications gateway number: 2016575

At least **63 care homes**, **seven hospitals** and **29 GP and healthcare facilities** are located in areas of higher current flood risk. In addition, **139 educational establishments** are located in areas of high current flood risk.

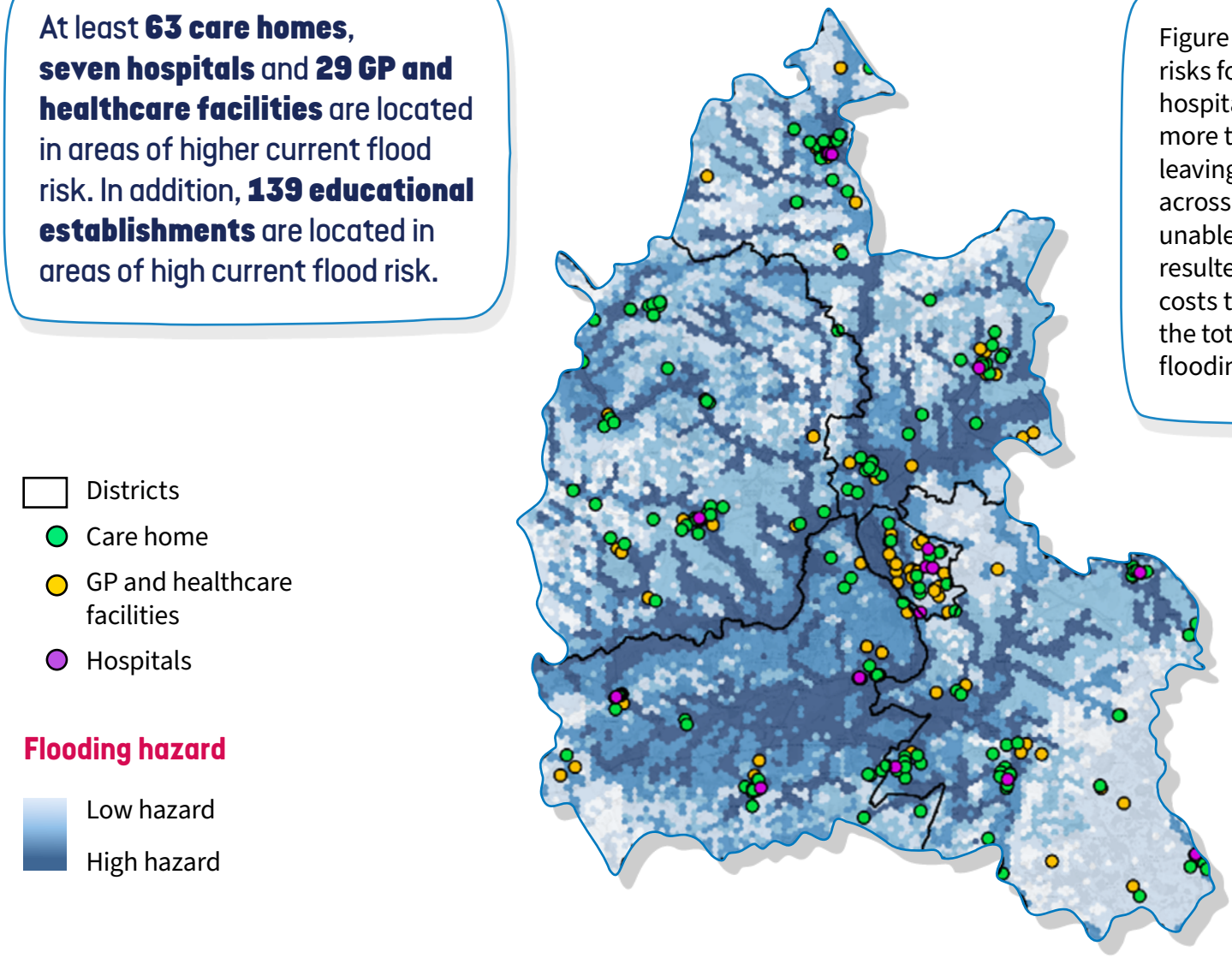


Figure 14 shows potential future flooding risks for care homes, GP practices and hospitals across the county. In July 2007, more than 50mm of rain fell in 24 hours leaving an estimated 1,600 homes flooded across the county with 200 families still unable to return home a year later.[17] This resulted in a cost of £4.5 million in direct costs to Oxfordshire County Council, but the total direct and indirect costs of the flooding were likely far greater.[4]

Figure 14 Healthcare facilities and future flood hazard.

Source: Atkins Health Impact Assessment

Flooding / contaminated water testimony #1:

"With the climate, we have seen a change. Last year, there was a heavy storm, and it caused several houses in our area to flood. The flooding in our house was exacerbated by having sewage in the house as well as dirty water. As a consequence, we will have been living in temporary accommodation for at least thirteen months. We're lucky we had good insurance and recently put flood prevention measures on the house to prevent a reoccurrence.

> "The flooding in the house has certainly affected my mental health. At first, I felt absolutely helpless, and just didn't know where to start."

At first, I felt absolutely helpless, and just didn't know where to start. Then there's also the long-term effect. We want to continue to live in the house, but we worry that we'll never be able to sell it and from a health point of view whenever we get heavy rain, we're going to wonder whether that's going to happen again.

There's that anxiety that you don't know whether all those things we have done will protect the house and us if it were to rain again. In the aftermath of the flood, everyone was remarkably nice. Neighbours that we hardly knew before have been so nice and supportive. They've offered for us to use the washing machine. There's a sense of camaraderie among the families affected by the flooding. We've formed much closer bonds with them because of that, and that's a real positive.

I had to rip out all my vegetables from my vegetable patch, and that was quite heartbreaking really. But when it's been contaminated with sewage you don't really fancy eating that lettuce. I can't say that it's affected me hugely, or particularly badly, I haven't shed a tear. **I've been frustrated, bordering on anger occasionally. I desperately want to be back in the house.**

In the scheme of what other people have to go through, it's nothing though. I've been reflecting on it – we love the house, and it's our home and that's different to anything else. The thing that really matters is people, our family, our sons, their wives. So, if I find anything harder, it's that bit. We can't have them over easily. It's just being able to say just come over for Sunday dinner."

1.3.2 Water quality

Water quality, flooding and climate change are all interconnected.[20] More frequent and severe weather events, such as storms and flooding, in the absence of necessary upgrades to the system, have the potential to overwhelm existing sewage systems and water treatment facilities. In turn, this can result in sewage overflow with contamination of water sources and water quality across Oxfordshire.[21]

The bacteria in raw sewage and animal slurry can cause infectious disease outbreaks and sickness in humans, with negative impacts on wellbeing and mental health too. Traditionally, the rivers of Oxfordshire offered a popular recreational space for swimming, rowing, punting, kayaking and angling – but these activities are now often undertaken with apprehension or avoided altogether due to unsafe levels of water pollution.[22]

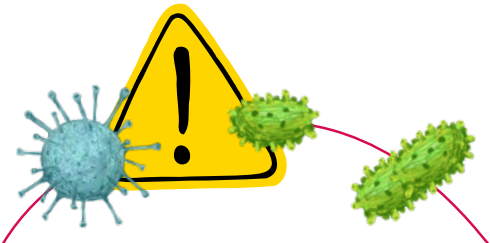
Past examples of climate change and harmful water pollution include an outbreak of the parasite cryptosporidium in Oxfordshire and Swindon. A combination of heavy rainfall, warmer weather, and increased local cattle grazing likely led to an unusually high level of the parasite entering the water treatment works in water originating from the Thames.[23]

Local wildlife may also be damaged by water pollution – agricultural fertilisers can lead to dangerous algal blooms[24] and fish kills may be seen in these areas of higher water pollution, amidst hotter temperatures and heavy rainfall.[4]

Pollution generated from sewage and contaminated water contributes to greenhouse gas emissions through the breakdown of faeces and other waste products, exacerbating global warming and climate change.[25]

Agricultural slurry leaks and run off from chemicals and fertiliser spread on the land may also negatively impact on water quality. Contaminated water worsens the broader effects of climate change as it harms biodiversity and agriculture.

In 2021, 18 river locations in Oxfordshire were sampled by the Oxford Rivers Project.[22] This assessment identified that only one of eight recreational sites had safe levels of bacteria to allow for swimming and bathing – see figure 15 for all sites surveyed.[22] The sources of these bacteria were likely sewage inputs, although some sites such as The Windrush, Cherwell and upper Thames sites were likely impacted by agricultural and other diffuse inputs.[22]



In 2020, over ten sewage works across Oxfordshire reported over 100 overflow events each – with some works discharging raw sewage into rivers for over 2,000 hours through the year.[26]

Water

Climate change impacts

Increase in number of warm days and nights = increased water consumption.
Increased frequency and intensity of heavy rainfall and droughts.

Wet season/ Rainfall events

Dry season/ Scarcity of water

Inactivation of pathogens

Increased run-off

Mixing of waste and surface water

Increased turbidity

Increased water table and subsurface saturation

Poor filtration capacity and poor retention

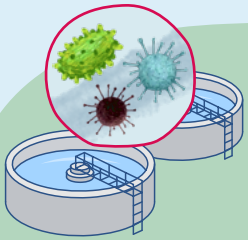
Increased floods

Increased diarrhoeal pathogens

Moderating factors

- Natural disasters
- Environmental pollution
- Urbanisation and road construction
- High density populations and population movement
- Lack of sanitation facilities and poor hygiene habits

- Land use changes/channelisation
- Poor sewage treatment infrastructure



- Destruction of riparian areas and changes in watershed characteristics
- Co-vulnerabilities (diseases, famines etc.)

Pathogen sources

Less water discharge

Increased concentration of pathogens

Short, heavy rainfall episodes

Mobilisation of pathogens

Increased consumption from the same water source and use of alternative water sources

Increased diarrhoeal pathogens

18 river locations in Oxfordshire, in and surrounding Oxford City were sampled over the period January – December 2021.

This figure shows the locations of these sites. Eight of the sample sites were situated at popular recreational locations (e.g. for wild swimming, rowing, punting, kayaking and angling), primarily within Oxford's city boundaries. 10 sample sites were situated on upstream locations, including on Thames tributaries Windrush (two sites), Evenlode (two sites) and Cherwell (four sites), as well as two further sites on the main River Thames.

Samples were taken approximately once a month April–December from 14 sample sites. Four central recreational locations (labelled J, M, P and Q on maps) were sampled weekly January-April 2021, and then monthly until December 2021, resulting in 23 samples at each. This arrangement was due to restrictions from the COVID-19 pandemic.

Samples were tested in an independently accredited microbiology lab using a standard culturing method for bacteria species E Coli and intestinal enterococci ('faecal indicator organisms' or FIOs). The results obtained were compared to the standards for bathing waters set out in the Bathing Waters Directive (2013)

This assessment identified that **only one of eight** recreational sites had safe levels of bacteria to allow for swimming and bathing

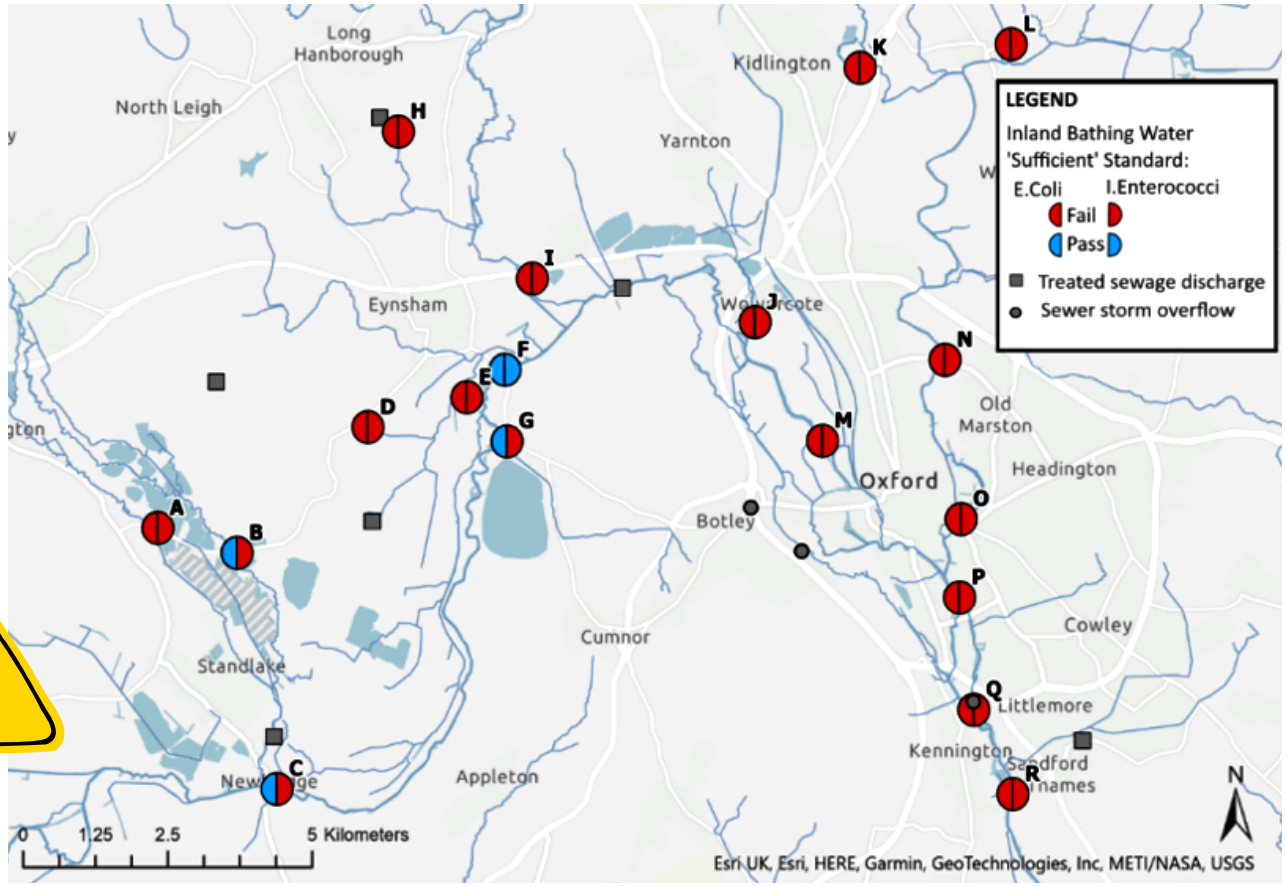


Figure 15
Sample sites map and bathing water quality assessment result in Jan-Dec 2021.

Source: Oxford Rivers Project

1.3.3 Water supply

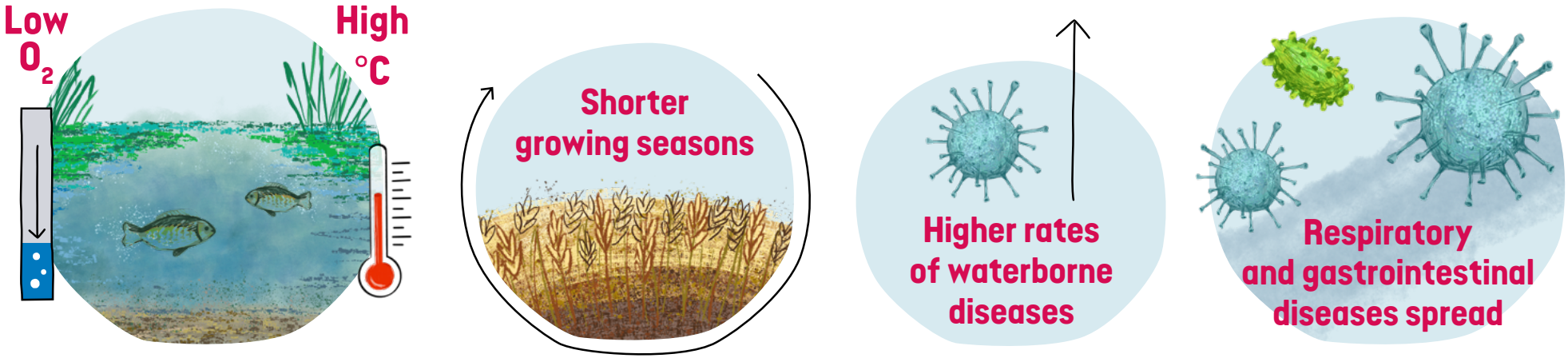
In Oxfordshire, there have been three major periods of drought (2012, 2018, 2022) since 2012.[4]

These have had impacts on residents and the surrounding natural environment. Drought can occur when a prolonged period of drier weather leads to low groundwater levels, low soil moisture levels and reduced river flow. This results in a significant reduction in the water available locally for human use. Droughts usually develop over longer intervals of time, during which there may be signs of increasing risk.[18] Droughts may also lead to wildfires which have complex physical and mental health impacts.

The South-East already faces significant challenges to water resources – most of the region already has insufficient water resources for local people's needs throughout the year.[27] Drought and hot weather may contribute to fires, including wildfire incidents. Droughts are dangerous for health – with impacts on nutrition, infectious disease outbreaks and mental health.[28]

- Reduced river flows may increase the levels of pollutants in water and cause stagnation, with higher water temperatures in lakes and reservoirs impacting on water oxygen levels and water quality.[28]
- Droughts can affect the length of the growing season for crops and lead to conditions which favour pests and infectious diseases.[28] Livestock raised for food may also be adversely affected by drought.
- There may also be higher rates of waterborne diseases due to warmer water temperatures which encourage the growth of dangerous pathogens.[28]
- Acute respiratory and gastrointestinal diseases may also spread more easily when handwashing is compromised by a perceived or real lack of clean water.[28]

The indirect health impacts of drought are not necessarily easy to anticipate or track, but affect people's health and wellbeing profoundly in the longer term.[28]



1.4 Food

In Oxfordshire, our food supply chains are complex and span continents – figure 17.

It has been recognised that climate change will make it more challenging to ensure the resilience of these food supply chains across the county. Adverse weather may destroy or damage crops, livestock, fish and farming infrastructure.[29] Farming equipment may also be damaged by adverse weather, impacting on productivity.[29] Lack of biodiversity will also harm the composition of soil which is needed to grow food.[29] Domestic food prices have the potential to become more volatile as a result.[29]

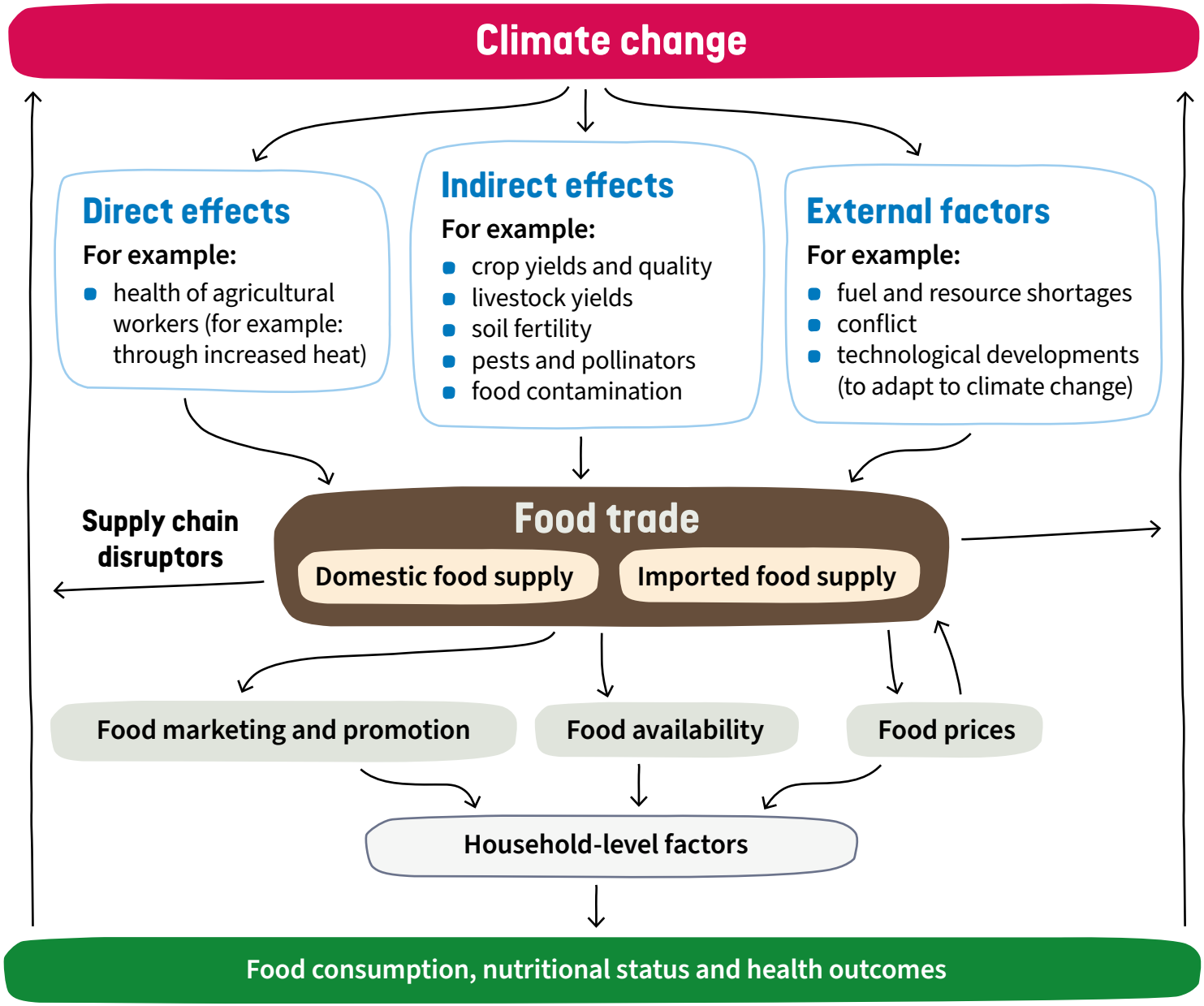


Figure 17
Simplified framework of climate change impacts on the food system.

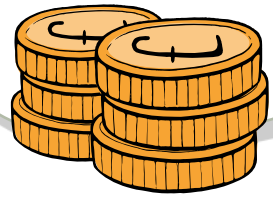
Source:
Redrawn from UKHSA Health Effects of Climate Change Report

Globally, food prices are projected to increase by 20 per cent on average by 2050 in the absence of necessary climate adaptation.[29]

When food becomes more expensive, it exacerbates food insecurity and malnutrition, especially among more deprived populations who may experience limited access to affordable and nutritious diets. This can also lead to other trade-offs in household budgets, meaning that individuals compromise on necessities like housing, heating and use of electricity. The mental health impacts of uncertainty around food availability and affordability should not be underestimated – especially for young children and vulnerable adults.[30-31]

Many aspects of healthy diets are more sustainable for the planet.[5,32] Balanced diets can have positive impacts on all aspects of health, in particular the burden of obesity, type 2 diabetes, cardiovascular disease, some cancers, and premature mortality. Examples of foods which are both healthy and sustainable include wholegrains, legumes, nuts, fruit, and vegetables.

Reducing food loss and waste can also have a significant environmental benefit and may save the average family up to **£700** per year.[33]



The potential interactions of rising CO_2 and climate change on food safety and nutrition

Temperature and precipitation extremes (like flooding) can increase pathogen load.

Climate can also alter weed, insect, and fungal populations and increase pesticide use.

Rising carbon dioxide can directly influence nutritional content of foods.

Warmer temperatures can result in greater food spoilage.

Extreme climate events can disrupt food distribution.

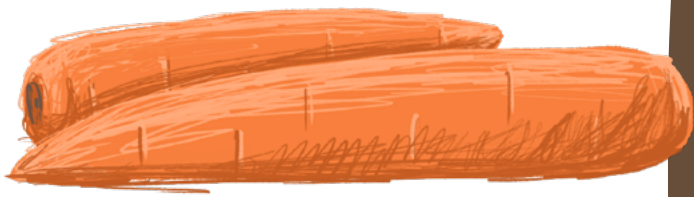
Oxfordshire food testimony #1:

"I worked with M for years at a local school in an art club. She'd been talking about this larder and saying you should come along. I instantly liked the idea of it. In some ways, I volunteer there more for my own benefit than the benefit for others – because I enjoy being in contact with such a variety of people who are there. There is a sense of belonging to a community – you pay a weekly fee for £3.50. That gets you 10 items. They do refills from large tubs. It reduces packaging. The point about the £3.50 is you get a lot of food.

We have a café and serve hot/cold drinks and a lot of hot food and cakes. That's for people while they're waiting to come in. Lots of people take the food as they're waiting to come in. It's all stuff that's made in the kitchen. Lots of it is made from produce that's donated to the kitchen. When school comes out at 3pm, we serve the kids hot food and a hot drink. It's good food. The chefs work really hard, and it's a good team. There's a level of respect that people are showing to those who are coming to get the food. There's a great sense of camaraderie. We're volunteering and pulling together, in somewhat difficult circumstances.

During the summer, the local allotment also donates surplus goods. The food we grow on our allotment is as local as can be. We are in control of the environment – we get some manure, but no fertilisers, no pesticides. It's a lot more labour, but there's a connection to it and the place. Understanding what it means to hand pick something, I'm bent over and trying to pick something that I've grown. It makes you think who are the people doing this day to day for the food in the supermarket? How does anybody make a living growing food? Food is not just about subsistence, it's about pleasure. I really hate food waste. I'm notorious for refusing to throw food out. Part of it comes from my parents. This is a totally different generation. Food was inherently local then and my parents hated wasting food. Leftovers and using leftovers were a part of growing up in my family. I read things in the newspaper about the vast amounts of food waste – and there is a culture of food waste. One of the things that I like about the allotment, is the food scraps that we can't eat goes back round [into the compost]."

"During the summer, the local allotment also donates surplus goods. The food we grow on our allotment is as local as can be. We are in control of the environment – we get some manure, but no fertilisers, no pesticides. It's a lot more labour, but there's a connection to it and the place."



Oxfordshire food testimony #2:

"When I think about the food and environment, I think it's probably primarily the supply chains, and the cost of transporting food and the carbon footprint of the supply chains and how it's been transported. Whether you've flown in mangos or are eating greens from Oxfordshire.

What you're eating matters too – the calorie/energy cost is different – the kind of meat you're eating as compared to eating vegetables or grains. You need less land and water resources to get one or the other. I imagine that flooding impacts farming too, and droughts.

It's been very noticeable that the food prices [in Oxfordshire] have increased, and I think what's particularly difficult living in Oxford – if you don't have a car you can only really access express shops or small shops. The prices that you get there are still more expensive than if you're able to go to big shops. I'm lucky because I've got a car so I can go and do a big shop. I get a vegetable box delivered, and that is advertised as being more local.

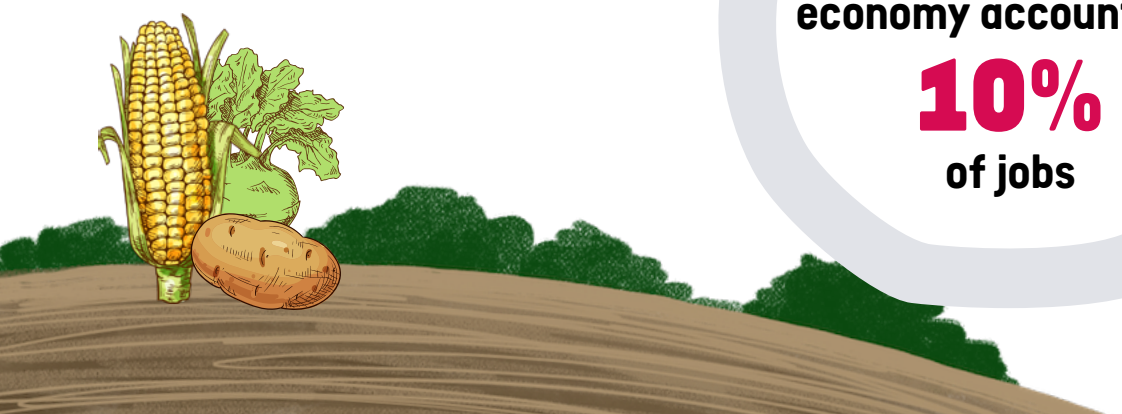
If you asked me where is a local market I wouldn't know. I don't think I have seen anything that's marketed as being locally sourced recently, or that I've been able to identify. Lots of the food in the supermarkets doesn't even appear to be seasonal – you can get anything all year round."

"It's been very noticeable that the food prices [in Oxfordshire] have increased, and I think what's particularly difficult living in Oxford – if you don't have a car you can only really access express shops or small shops. The prices that you get there are still more expensive than if you're able to go to big shops."

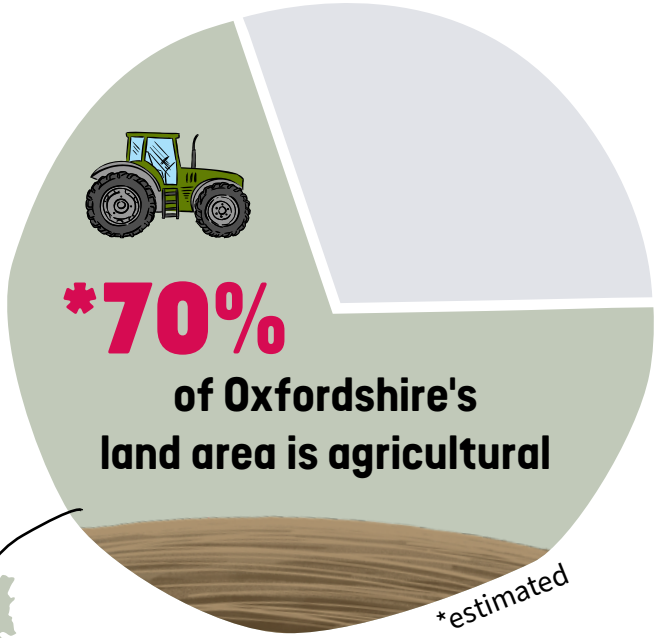
Oxfordshire's food economy accounts for 10 per cent of jobs, and in 2020 the sector generated a turnover of £2.2 billion or 10 per cent of the local economy.[34] It is estimated that 70 per cent of Oxfordshire's land area is agricultural (43 per cent of land used for arable farming and 27 per cent for improved grassland).[33]

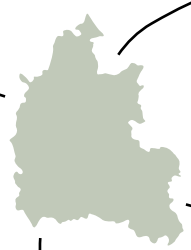
However, between 9-14 per cent of households across the county currently experience food insecurity.[34] With current diets, there is only enough farmland in the county to produce the hypothetical equivalent of 74 per cent of our food requirements.[33]

Based on the most recent statistics from 2013, half of Oxford City's food came from the UK, a third came from the EU, and 15 per cent was imported from further afield. Less than 1 per cent was sourced directly from the region.[34]



9-14%
of households experience food poverty





Oxfordshire's food economy accounts for 10% of jobs

In 2020, the food sector generated £2.2 billion 10% of local economy

1.5 Nature

Nature is essential to our health and wellbeing. The positive effects of the natural world may be enhanced by access to green space and clean waterways for all.[35-36]

Potential benefits include:

- improved mental health,
- reduced social isolation,
- boosted physical activity and
- improved cardiovascular and physical health.

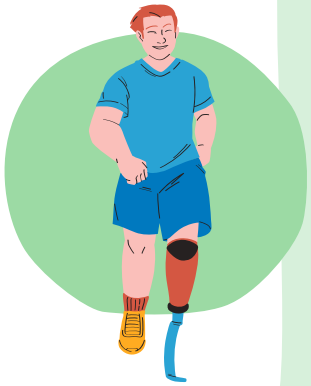
There is evidence that greener neighbourhoods and more exposure to green space correspond to:

- better self-assessed general and mental health;
- reduced all-cause and cardiovascular mortality;
- reduced stress;
- reduced incidence of low-birth weight;
- maintaining a healthier weight.[5]

Yet access to nature and associated health benefits is currently unfairly distributed, with specific groups consistently missing out.[38-39]

These include people living in areas of high deprivation, those on low incomes or unemployed, older people, black and minority ethnic groups and people with a long-term health condition or disability. It is not a coincidence that many of these groups also experience significant health inequality. Barriers to accessing and engaging with green-space and nature are associated with a range of physical, practical, and sociocultural factors.[40]

Green social prescribing – a practice that involves prescribing nature-based interventions or activities as part of a patient's treatment plan – is one specific method to enable individuals and communities to access nature-based interventions and activities which benefit their physical and mental health and wellbeing.[37]



Additionally, around half of emissions produced from greenhouse gases may be absorbed by land and water ecosystems, providing nature-based solutions to our changing climate.[41] Whether land acts as a 'source' or 'sink' of greenhouse gas emissions depends on how it is managed.

Currently land in Oxfordshire is predominantly used for intensive farming, with only 7.5 per cent for green space and gardens, see figures 18-19.[33] Arable land is typically a source of carbon emissions due to 'carbon loss' as soils are disturbed during cultivation.[33] Across the county there is 9.0 per cent woodland, which is below the UK average of 13.0 per cent.[33]

Currently land in Oxfordshire is predominantly used for intensive farming, with only **7.5 per cent for green space and gardens**

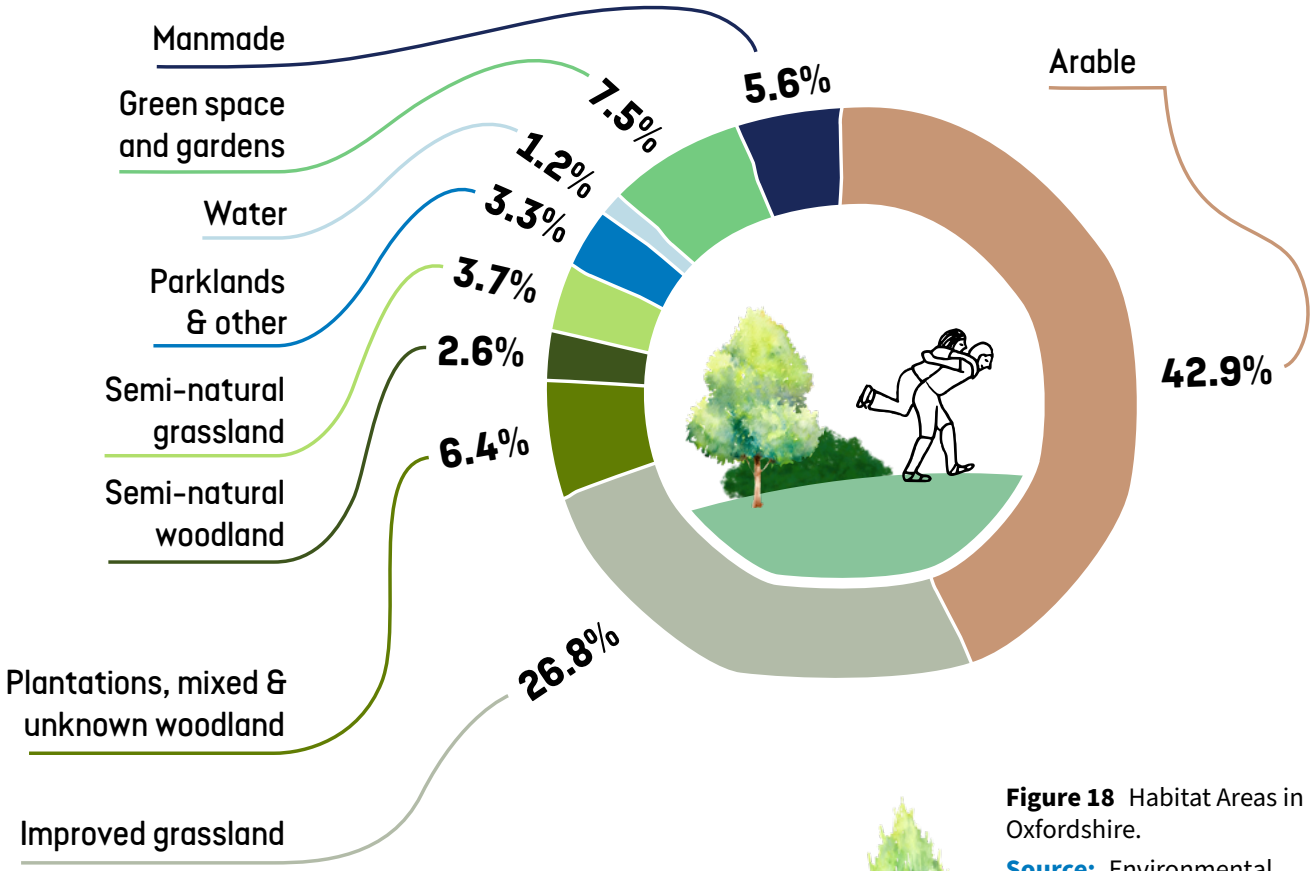
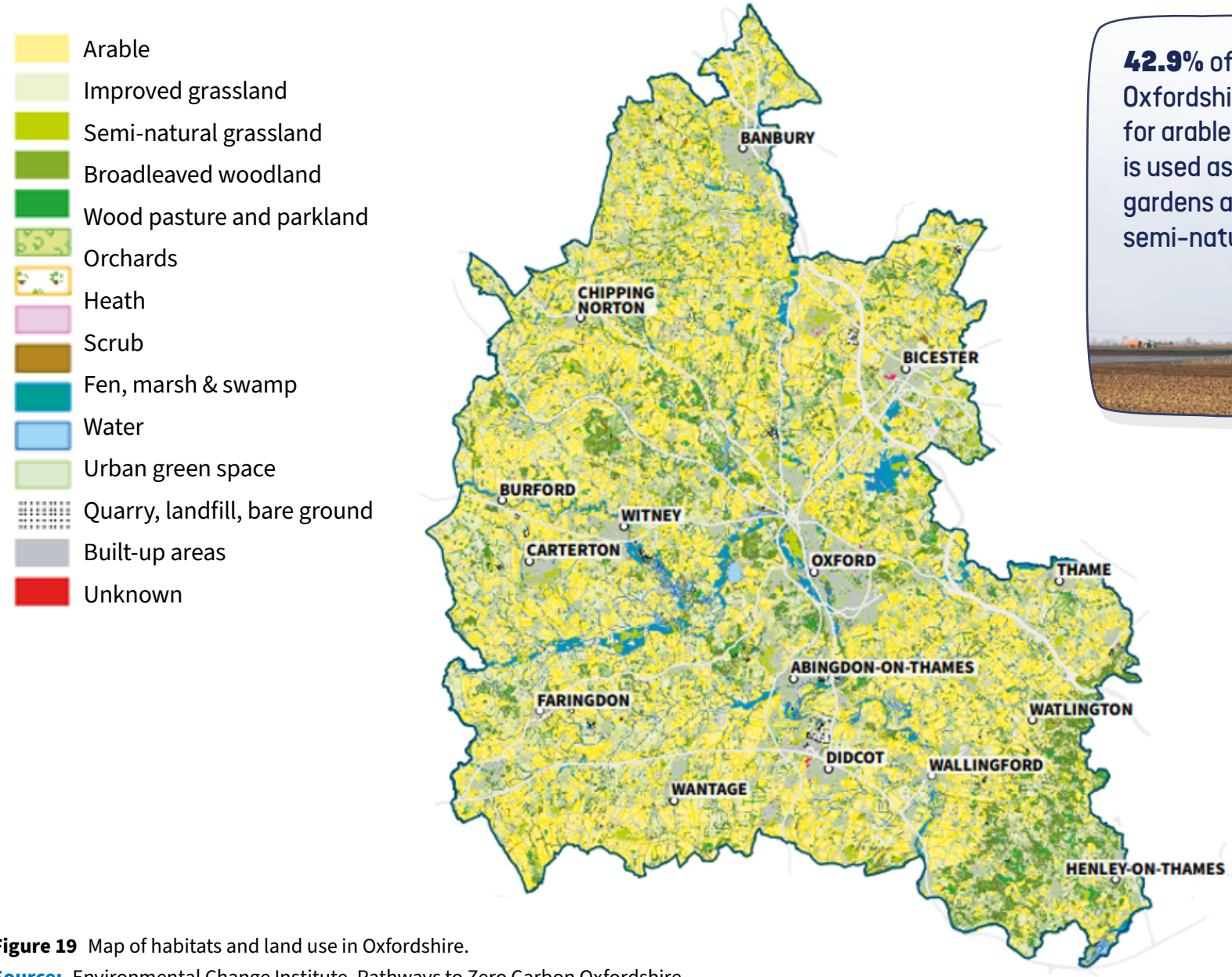


Figure 18 Habitat Areas in Oxfordshire.

Source: Environmental Change Institute, Pathways to Zero Carbon Oxfordshire

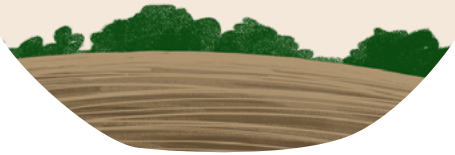


42.9% of the land in Oxfordshire is currently used for arable farming; only 7.5% is used as green space and gardens and 2.6% is used as semi-natural woodland

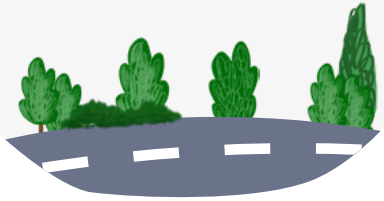
Figure 19 Map of habitats and land use in Oxfordshire.

Source: Environmental Change Institute, Pathways to Zero Carbon Oxfordshire

17,000
kilometres of hedgerows and trees along field boundaries



800,000
trees situated on or beside public highways



23 million tonnes
of carbon are currently stored in Oxfordshire's soil and vegetation

There are, however, already natural assets in Oxfordshire which store and sequester significant amounts of carbon and simultaneously provide opportunities to improve our health and wellbeing. Green spaces may provide shade and cooling, improve flood management, expand opportunities for active travel and improve biodiversity.[5]
The natural world therefore forms an integral part of our county's effective climate mitigation and adaptation strategy.[33,41]

However, careful consideration should be taken when implementing green infrastructure to ensure that it does not inadvertently reduce air flow in urban streets, therefore leading to pollution build-up at a pedestrian level.[5]

Additionally, increasing the density of trees in urban places without consideration of tree species may lead to increased levels of pollen, with consequences for health.[5]

There are 17,000 kilometres of hedgerows and trees along field boundaries in Oxfordshire and as many as 800,000 trees situated on or beside public highways in Oxfordshire.[33] It is estimated that 23 million tonnes of carbon are currently stored in Oxfordshire's soil and vegetation, with an additional 115,000 tonnes sequestered each year – see figure 20.[33] By contrast, emission sources in Oxfordshire accounted for 4,309,600 tonnes of carbon in 2021, equivalent to 5.9 tonnes of carbon per person.[3]

The woodland areas stand out for their role in carbon storage. The higher levels of carbon storage for grassland compared to arable land can also be seen. Arable land is a source of emissions due to carbon loss as soils are disturbed during cultivation. It is offset by sequestration, primarily by woodlands and hedgerows (from PAZCO).

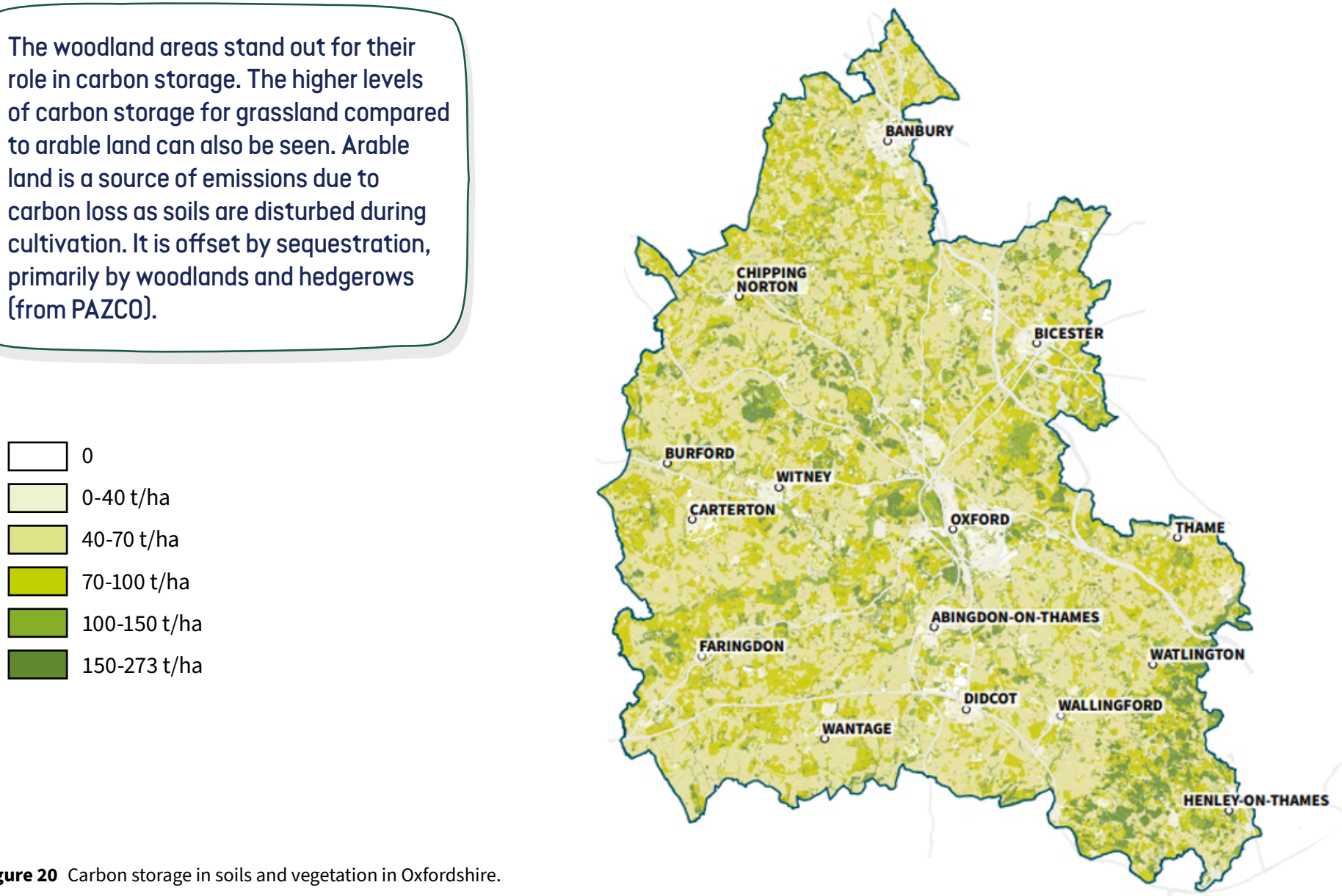


Figure 20 Carbon storage in soils and vegetation in Oxfordshire.

Source: Environmental Change Institute, Pathways to Zero Carbon Oxfordshire (PAZCO).

Nature testimony:

"Bridewell Gardens – a community garden in Oxfordshire – offers a supportive environment and green space for many. One local resident joined Bridewell with very high levels of anxiety. For their first months they did not join others to eat and did not feel able to speak with their support worker. However, by working in the gardens and with the support of staff and volunteers, this all started to change. This resident has gone on to offer their gardening services to neighbours, as well as transforming their initial garden to grow vegetables and flowers. They have continued to pursue work in the outdoors and to maintain friendships with people they met at Bridewell."

"Bridewell gave me time and peace. Here everything grows and I grew. My favourite job was potting on, which stopped the chaos in my head and felt like I was nurturing something. I've learned not to suffer in silence but to speak out. I've still got a long way to go but I've found out how far I've come and I'm glad I am where I am."

"Bridewell gave me time and peace."

"Here everything grows and I grew."

Section 2:

What are we doing now?

2.0 Introduction

This section explains what Oxfordshire County Council, local anchor institutions[43], system partners and community action groups are currently doing to address our changing climate – with immediate and longer-term positive benefits for health and wellbeing.

The national evidence base is currently strongest for benefits from nature-based solutions, mainstreaming climate-health considerations across sectors, interventions targeted for vulnerable populations and priority settings, undertaking early planning and action, enhancing community resilience by addressing existing inequalities, promoting adaptative behaviours and embedding climate education into health, care, and public health practice.[5] Many of these actions work towards promoting a robust, local circular economy.

In this report, there are five themes on which climate initiatives with positive health benefits focus, including:

Energy efficient healthy homes and buildings

Green health and social care

Healthy and sustainable diets

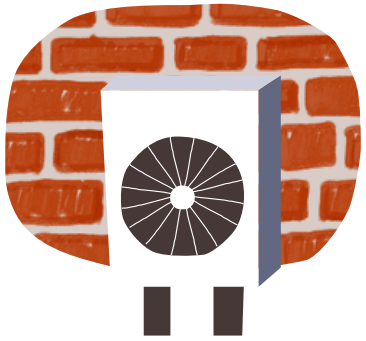
Sustainable travel and clean air

Accessible green spaces, clean water and nature

2.1 Energy efficient healthy homes and buildings

How we heat and cool our homes has an impact on our health, financial wellbeing and local climate. From a health perspective, more energy efficient and environmentally friendly heating and approaches to cooling can improve indoor and outdoor air quality, reduce exposure to toxic pollutants such as carbon monoxide, better regulate household temperatures for health and reduce pressures on local health services by doing so. These same principles apply to core local facilities, such as hospitals, prisons, GP practices, schools and libraries.

Through the climate action framework, Oxfordshire County Council has committed to prioritising action on climate change across the council's corporate estate and to reducing emissions from all its areas of influence.



What are we doing with homes in Oxfordshire?

- **Better Housing Better Health**. The Better Housing Better Health (BHBH) service is a longstanding initiative commissioned by Oxfordshire County Council and the five district and city councils across Oxfordshire. The programme's objective is to support residents, those with health conditions and lower incomes and those in receipt of care, to stay warm, well and independent in their homes. New support also includes 'cooling' packs during summer months to support residents on short-term strategies to keep cool during periods of hot weather.

Examples of support include:

- understanding and accessing financial support to help pay for energy
- understanding energy bills, tariffs and heating controls
- accessing grants and funding for home improvements and heating system upgrades
- free home energy visits which offer personalised energy advice and support with bills and referrals
- signposting to local organisations to access additional support.

What are we doing with schools in Oxfordshire?

- The schools energy efficiency loan. Oxfordshire County Council has set aside a budget of £800,000 over two years to establish an **energy efficiency recycling fund**. The fund will provide schools maintained by the county council with an interest free loan to finance up to £70,000 for LED lighting and/or solar panels depending on the school's specific needs and priorities. Battery storage is also available with advice and support for the whole scheme available from Action on Carbon & Energy in Schools (ACES), an energy efficiency support service.

What are we doing with our communities in Oxfordshire?

- **Project LEO smart and fair neighbourhood trials.** Project LEO prioritises local energy solutions which are focused on testing new ways of delivering and using clean energy to the best possible advantage of households and their communities. This project works with a range of partners in collaboration with communities. For example, in Deddington and Duns Tew, the potential for use of **heat pumps** (devices which transfer heat from a cooler area to a hotter area using mechanical energy) to deliver clean, affordable energy for a rural community was tested and evaluated.

- Meanwhile, in Rose Hill the **solar saver** initiative trialled whether it would be possible for tenants in urban apartment buildings to modify their use of energy throughout the day to avoid peak hours of energy usage and to be better synchronised with peak levels of clean energy provided by solar panels.

Positive health impacts (associated with these examples)

- Reduce financial pressures of heating costs (and likely future cooling costs) for occupants and core local facilities [5]
- Reduce burning of fossil fuels (including through open fires or poorly ventilated stoves) which significantly and negatively impact our health, primarily through air pollution – both indoor and outdoor [5]
- Reduce air pollution which contributes to cardiovascular and respiratory morbidity and mortality along with other illnesses [5]
- Reduce carcinogenic and developmental health risks associated with fossil fuel extraction [5]
- Reduce cold-related mortality and morbidity by improving indoor temperatures during winter for occupants and core local facilities [5]
- Improve health of those with existing respiratory and chronic disease, with benefits for disease symptoms, mental wellbeing, reduced health service contacts and fewer days of absence from school and work, by improving home warmth [5]
- Improve community cohesion, resilience and adaptation in case of extreme weather events which may cause disruption to national energy supplies

2.2 Sustainable travel and clean air

Across the county, there are efforts to promote active, more sustainable travel. These initiatives have benefits for both physical and mental health – directly through increased physical activity and indirectly through cleaner, less polluted air. **Oxon Air** (www.oxonair.uk) now provides outdoor air quality monitoring maps and air quality forecasts across the county.

What are we doing with our schools?

The **School Streets** pilot scheme which is now being rolled out further, trialled the restriction of motor traffic at the school gates during drop off and pick up times. The project sought to improve road safety, by allowing school roads to be open for walking and cycling.

Nine school street trials took place between March and July 2021. Active travel to school increased by 6 per cent, with a majority of pupils surveyed describing feeling much safer or safer during trials than before. By contrast, there was a 7 per cent reduction in pupils being driven to school. Approximately 1 in 5 parent, resident and teacher drivers said that they were driving less since the school street trial had started. Almost half agreed that the air quality had improved at drop off and pick up times during the closures.

What are we doing with our bus services?

In support of the government's road to zero strategy for transition to zero emission transport by 2050, Oxfordshire was granted £32.8 million to support the local **zero emission bus regional areas (ZEBRA)** scheme. The initiative seeks to cut air pollution, reduce noise pollution, and provide more reliable bus services for local people.

The Oxfordshire County Council bid secured 159 zero emission buses now incrementally operating on 34 routes across Oxford City and nearby surroundings. This area has been defined through consideration of three core air quality management areas. All of these buses will be in operation by the end of June 2024 on services in and around Oxford City.

These new vehicles will have zero emissions at the point of operation and will be virtually silent. The impact on both air and noise pollution is expected to be significant. The ZEBRA proposal also supports wider policy proposals for Oxford, including **Connecting Oxford**, which will deliver a zero emissions zone and traffic filters to remove traffic from congested city centre routes.

What are we doing with cyclists?

There are now an increasing range of community led organisations which promote safe, accessible cycling across the county. **Windrush Bike Project** is one example, which operates as a not-for-profit social enterprise based in Witney, West Oxfordshire. The programme empowers individuals to improve their mental and physical health through cycling and developing skills in repairing bikes. The community bike workshop is run from Witney, with children and adults upskilled to repair and fix donated bikes through mechanics courses.

Additionally, the organisation runs **bikeability training** across 48 schools, with a weekly inclusive cycling activity and fortnightly social bike rides. Last year, 27 adults completed the 12 hour bike mechanics for wellbeing course – 19 asylum seekers were involved in the programme and were able to make use of the repaired bikes at the end of the course. The programme has also loaned 92 bicycles to children from low income families through the bike library, in addition to 19 trike and adapted cycles for children with additional needs.

27 

adults completed bike mechanics for wellbeing course

19 

asylum seekers were involved in the programme

92 

bicycles loaned to children from low income families

Positive health impacts (associated with these examples)

- Shift unnecessary journeys from private vehicles, reducing emissions and improving air quality[5]
- Reduce risk of many chronic health conditions (such as obesity, respiratory disease and cardiovascular disease) by adopting more active, cleaner transport[5]
- Reduce harmful noise pollution through electrification of vehicles
- Improve physical health, mental health and wellbeing by adopting more active, cleaner transport[5]
- Improve equity and access to work and educational opportunities through more affordable and accessible public transport[5]
- Improve connection and engagement among and between communities

2.3 Green health and social care

In Oxfordshire, there are climate actions, policies and networks among health and care professionals working in primary care, secondary care, mental health services, out of hours services and social care. These all have a role to play in the health and wellbeing of patients, staff, and residents across the county. In particular, by greening and increasing biodiversity of estates and sites managed by healthcare providers, we can boost access to green spaces and nature across the county.

What are colleagues doing in general practice?

Greener Practice Oxfordshire is a new group bringing together like-minded primary care clinicians from across the county with the aim of supporting each other and their practices to make local healthcare more sustainable, improve the lives of local patients and communities and to be advocates for climate health. The group meets regularly and shares practical resources and solutions. Increasing numbers of GP practices across Oxfordshire can also now signpost and refer patients to green spaces for social prescribing interventions which improve mental health.

What are colleagues doing in secondary care?

In 2022, Oxford University Hospitals (OUH) NHS Foundation Trust launched the **'Building a Greener OUH' plan** which sets out the trust's intention to achieve net zero carbon emissions by 2040, in line with NHS England's carbon neutral target.[42] From April 2023, the NHS will require all suppliers with new contracts above £5 million per annum to publish a carbon reduction plan for their direct emissions. From April 2024, this will be a requirement for all new contracts irrespective of value.

OUH are one of the largest NHS teaching hospital trusts in the UK and one of the largest employers in Oxfordshire. This strategy focusses on key areas including travel and transport, procurement and supply chains, estates and facilities, medicines and digital transformation.

Oxford University Hospitals have pledged

- To invest in active travel, to support the electrification of the NHS fleet and help reduce unnecessary journeys to hospital
- To build sustainability into the scoring for award of tenders and choosing which products are purchased, to focus on inventory and supply chain management and to work to reduce single use plastics
- To review anaesthetic gases and to reduce the proportion of desflurane to sevoflurane used in surgery, to promote the appropriate prescription of low carbon inhalers and encourage taking medicine in tablet form where possible (liquid medicines require refrigeration and have shorter expiration dates)
- To care for patients closer to, or at home, to be a truly paperless organisation and be mindful of the true carbon footprint associated with digital services
- To build sustainably, to encourage biodiversity and green space for patients and staff and to promote greener cleaning and catering.

Examples of progress already made include:

- The John Radcliffe Hospital and Oxford and Horton General Hospital, Banbury, have recently been awarded **£29.8 million** across both hospitals as part of the government's public sector **decarbonisation scheme**, which supports the aim of reducing emissions from public sector buildings and estates. Oxford University Hospitals will also contribute £7.5 million toward the wider scheme, meaning that the total expenditure is £37.3 million over a three year period. Both hospitals will undergo replacement of existing pipework and plumbing with modern, cleaner and more efficient infrastructure. Existing gas boilers will be replaced with lower carbon electric heat pumps and additional energy efficiency measures. Solar panels, insulation, double glazing and draught proofing will also be installed.
- Oxford University Hospitals are currently piloting a carbon accounting methodology called **E-Liability**. This technology was developed by academics from Harvard and Oxford. It consists of an accounting algorithm that allows organisations to produce real-time, accurate and auditable data on their total direct and supplier emissions (referred to as 'cradle-to-gate'). This methodology is intended to help inform purchasing decisions by providing reliable emission impacts of making a product or delivering a service.
- **Electric vehicle charging points** have been installed at the John Radcliffe Hospital, in Headington. This supports staff to charge and park their electric vehicles at work. There is a plan to roll out more electric vehicle charging points across clinical sites.
- **Local bike couriers** were partnered with to deliver chemotherapy and parenteral nutrition from the local depot at the John Radcliffe and Churchill hospitals. In the first ten months of the partnership, over 36,000 products were delivered. The new OUH Swindon radiotherapy centre opened in Spring 2022, with the goal of providing patients and families with a service closer to home which will reduce their travel time (more than 13,000 journeys to Oxford each year) and features 60 solar panels to help power the building.

What are colleagues doing in community and mental health services?

Oxford Health NHS Foundation Trust provides essential services across Oxfordshire, not limited to district nursing, out of hours services, minor injuries units and core mental health services. Oxford Health is prioritising climate action across its sites, with examples including:

Oxford Health NHS Foundation Trust planted its first **Tiny Forest** at Littlemore Mental Health Centre on 6 December 2021.

The Tiny Forest is home to approximately 600 saplings of 18 different tree species and includes a range of features such as paths and rest areas for patients, staff, and visitors. It also provides a great spot to watch wildlife as a Tiny Forest can attract over 500 animal and plant species within the first three years.

As part of regular monitoring of the Tiny Forest, the team complete science days with staff and patients to find out more about how nature can have a positive impact for patients, staff, and visitors to the hospital. Both the learning disability and child and adolescent mental health services have used the Tiny Forest as part of patient therapy. Tiny Forest brings the benefits of a forest – connecting people with nature, raising awareness of the environment, and helping to mitigate the impacts of climate change, as well as supporting urban wildlife.

Tiny Forest science days include learning about:

- Wildlife in the forest including butterflies, bees and bugs
- How trees can capture and store carbon from the air we breathe
- The forest's ability to store water
- The cooling benefits of the trees

Feedback from staff and patients has been positive. One staff member described **"I enjoy going there not just with the people we support but also going on my own. I like going round there as I find it relaxing, it takes you away from other things and lets you focus on nature".**

A young patient said, **"I look forward to going to the Tiny Forest, I feel excited when I go there and nice and chilled out".**

Oxford Health NHS Foundation Trust completed a successful six month **trial of e-bikes for the district nursing team** in 2023. The team recognised that transport of clinical staff is essential to deliver high quality community care and wanted to use this as an opportunity to take climate action. The team adopted e-bikes as a strategy to help low carbon goals, improve local air quality and boost the mental and physical health of staff.

The project involved a scoping exercise, review of governance procedures, engagement with the community team and involvement of volunteers, implementation, and evaluation. Through this process, the team also recognised the need for more safe cycling infrastructure across the county, access to changing facilities and safe cycle storage. They also acknowledged a need for alternative forms of active, sustainable travel as e-bikes are not suited to everyone.

What are colleagues doing in social care?

Alongside the commitment to realise net zero emissions from the corporate estate by 2030, Oxfordshire County Council is committed to working with its **supply chain** to reduce emissions and ensure they are increasingly aligned to science-based targets for net zero emissions. Current work is being undertaken with Oxfordshire County Council's top 10 suppliers (by spend), including the council's main care home provider, Order of St John.

Oxfordshire County Council's business mileage is around 4 million miles a year, with 66 per cent accounted for by children's services and 15 per cent by adult social care. Progress is being made to roll out a **fleet decarbonisation programme** for council owned vehicles (including those that might be used by social service teams). This will be electrification by default but will also involve proactive work on innovation projects for hard to electrify fleet (for example heavy vehicles). E-bikes and electric pool cars are also being trialled for social care delivery.

In addition to this, Oxfordshire County Council is expanding its **supply chain emissions report**. This includes the main care home provider, Order of St John. The initial estimates suggest that social care suppliers make up a quarter of supply chain emissions and work is currently underway with suppliers to calculate actual emissions. Aligned with this work, the following policy position was adopted by cabinet in June 2023:

- Engage with our suppliers on their carbon emissions and expand supply chain emission reporting.
- Collaborate with our suppliers, partners and purchasing organisations on decarbonisation opportunities.
- Implement low carbon principles and specifications in future council contracts.
- Maximise the effectiveness of Oxfordshire County Council's social value policy to realise further supply chain emission reduction opportunities.

Positive health impacts (associated with these examples)

- Reduce the significant contribution of emissions accounted for by the NHS, and in doing so reduce longer-term demand for health and social care services[5]
- Shift unnecessary journeys from private vehicles, reducing emissions and improving air quality[5]
- Reduce risk of many chronic health conditions (such as obesity, respiratory disease and cardiovascular disease) by adopting more active, cleaner transport to and from work[5]
- Improve quality of health care through more stable power supplies for refrigeration, lighting, and medical equipment[5]
- Improve quality and sustainability of social care services, especially for our ageing population
- Improve access to digital care for patients with limited mobility or living in remote areas[5]
- Improve air quality, mental health of staff and patients, natural cooling and carbon storage by maximising use of green space for health[5]
- Contribute to the circular economy of Oxfordshire by influencing positive social change among staff and patients on climate and health action

2.4 Healthy and sustainable diets

Food and nutrition are implicitly linked to our health. Accessible, healthy and sustainable food has the potential to reduce the burden of cardiovascular disease, type 2 diabetes and several cancers. As discussed in last year's annual report, in Oxfordshire, over half of adults and one third of children in year 6 are overweight or obese and the burden of obesity is higher in the most deprived wards of the county.

In tandem, the number of people using services to address food poverty is significant – a snapshot of 40 providers of community food services in Oxfordshire reported over 23,000 beneficiaries on average per month in 2021.[24]

To overcome the combined challenges of health, food poverty and our changing climate, Oxfordshire must strive toward a sustainable food system. Most recently, the war in Ukraine, COVID-19 pandemic and Brexit have all impacted on the cost and availability of food in the county and have emphasised the importance of resilient local food chains and community led programmes to tackle food poverty.

What are we doing within local authorities?

The Oxfordshire food strategy champions the importance of healthy and sustainable diets across the county and represents a joint commitment to tackling local food insecurity and climate related food impacts.[24] The strategy was developed in partnership with **Good Food Oxfordshire**, an organisation which represents over 150 organisations working to create a better food system across the county.

Oxfordshire was awarded a prestigious **Sustainable Food Places silver award** in November 2023. This award acknowledges the work across Oxfordshire to build a local food system that is good for people, communities and climate.

The award recognises the work of the food partnership – Good Food Oxfordshire – and of stakeholders (communities, food and farming businesses and institutions) across the local area in promoting healthy, sustainable and local food. It also acknowledges work to tackle some of today's greatest social challenges; from food poverty and diet related ill health to the disappearance of family farms and the loss of independent food retailers. Sustainable Food Places commended Oxfordshire's excellent example of transitioning from city to county scale, promoting representation and encouraging participation through District Food Action working groups.

What are volunteer groups doing?

The Cherwell Collective. This umbrella organisation aims to empower their local community to reduce waste and their carbon footprint. The organisation was founded during COVID-19 due to concerns that families and individuals were facing unprecedented hardship and adversity, in particular families with young children reliant on free school meals.

The Cherwell Collective is based in Kidlington, but the community encompasses all of Oxfordshire. Actions include the direct distribution of food surplus via the **Cherwell Larder Marketplace**, the repurposing of surplus food via the **Climatarian Kitchen** and by growing food for the community in **Harvest@Home**. A new related project includes the Waste Innovation Station, which repurposes non-food items.

OX4 Food Crew. OX4 Food Crew is an alliance of nine grassroots organisations working collaboratively toward a common goal: – that everyone living in OX4 has enough food, is well nourished and can thrive. These organisations came together during the COVID-19 pandemic to tackle the high levels of food inequality experienced by people living in OX4. During 2021, this partnership developed and expanded, responding to diverse needs and a shift in emphasis with a focus on community led recovery and resilience.

Collectively, the OX4 Food Crew has distributed 20,000 food parcels and 20,000 cooked meals to people living in OX4. 'Pay as you feel' community meals are also run every Monday, across different venues in OX4. Cooking for health and wellbeing courses are run in conjunction with the programme, with some focussing on family cooking and people experiencing homelessness.

Positive health impacts (associated with these examples)

- Reduce the health burden and related costs of obesity-related illness to the NHS for both children and adults [5]
- Reduce greenhouse gas emissions attributed to food waste in households and communities, and their indirect impacts on health [5]
- Improve support for low-income families and provide affordable nutritious options
- Improve social cohesion and community resilience

2.5 Accessible green spaces, clean water and nature

Nature is an important asset for our communities, and biodiversity allows the natural world to be productive, resilient and adaptable. Time spent in green space and nature is linked to reduced stress, improved mood, boosted self-esteem and better mental health. However, the indirect health co-benefits of the natural world are far greater. In the absence of biodiversity and crop biodiversity, we are more reliant on pesticides and fertilisers to compensate for lowered crop resilience and less rich soil.[29]

Some pesticides and fertilisers have negative impacts on human health, depending on their composition – these effects may include the nervous system, irritation of the skin or eyes, altered hormone production and increased risk of developing certain cancers.

In the UK, the greatest benefits from green space are generally seen for those living in the most deprived areas.[5] Barriers to accessing and engaging with green space and nature are associated with a range of physical, practical, and sociocultural factors.

Green spaces, clean water, nature and biodiversity are increasingly prioritised across Oxfordshire, as demonstrated through the Oxfordshire Local Nature Partnership. Oxfordshire Local Nature Partnership is an organisation of key partners working together to radically enhance nature, its positive impact on our climate and the priority it is given, helping to make Oxfordshire a county where people and nature thrive.

What are we doing with district councils?

Our district councils are each prioritising access to green space and nature for residents:

- **Cherwell District Council** began their partnership with walking app **Go Jauntly** in 2022 to digitise and make more accessible local countryside walks and health routes. Walks are available in Banbury, Bicester and Kidlington and more are added all the time. Print ready guides are also available.
- **South Oxfordshire and Vale of White Horse District Councils** have recently launched a nature recovery project called **Let it Bee**, which aims to increase biodiversity of council land by allowing wildflowers and plants to grow on specific sites. The councils have chosen locations which do not impact on pedestrians or sightlines for drivers and are also near shorter grass areas and pathways for people wishing to exercise, play or relax.
- **Oxford City Council's GO Active Outdoors** programme aims to provide the public with all the information they need to be more active outdoors. The programme has dedicated web pages on green spaces and nature, including links with information on how to access city parks, local nature reserves, walking routes and wellbeing walks, and is a provider and licenser of Forest School activities.
- **West Oxfordshire District Council** has **funded the planting of wildflower meadow bulbs, plug plants and seed** through the UK shared prosperity fund as part of its commitment to enhance green spaces within the district. Thirty volunteers turned out to help in a planting session at Carnival Meadow, an area of Eynsham's playing fields owned by the town council, to provide colour and bring wildlife to the space. West Oxfordshire District Council has also installed **two brand new wooden footbridges** at Deer Park South in Witney with further developments planned for the area. The new footbridges will provide a safer and more accessible route across Colwell Brook.

What are volunteer groups doing?

- **Children's allotment**. This is a volunteer run community space in East Oxford. The site hosts Forest Schools, family music sessions, a Growing Group and more. The site had been disused for 10 years and was overgrown with brambles. A group of parents, community members and educators formed a cooperative and transformed the dilapidated plant nursery into a positive green educational space for families to be outside and connect with nature. The site offers child and community education, for early years foundation stage children and older, with a focus on Forest School, food growing, outdoor play and self-directed learning.

- **Oxford Urban Wildlife Group**. Oxford Urban Wildlife Group manages **Boundary Brook Nature Reserve**. The reserve was created in 1990 when local community members formed Oxford Urban Wildlife Group, rescuing a plot of disused allotments to create a tranquil, wild space in East Oxford. The reserve includes mixed woodland, meadows, a nature pond and butterfly glade. It has been described as a vital green lung in East Oxford. Events include mindfulness in nature, singing in nature, weekly conservation work and grassland restoration work.

- **International Trees Foundation (ITF)** with partner Refugee Resource. This project coordinates a series of visits for refugees and asylum seekers to local nature sites across the county. The project focusses on adults, children and young people who are currently in receipt of psychological, social or practical support from Refugee Resource to engage them in a series of woodland activity sessions. The aim of this initiative is to improve physical and mental wellbeing, build confidence, reduce social isolation and give individuals the opportunity to be immersed in nature. The project builds on a series of taster sessions for families during the summer of 2022. The first event was held at the Oxford Botanic Gardens: '**Healing in the Outdoors**'.

Positive health impacts (associated with these examples)

- Improved self-assessed physical and mental health[5]
- Improve maintenance of a healthier weight[5]
- Improve wellbeing and cognition in children[5]
- Reduce all-cause and cardiovascular mortality[5]
- Reduce incidence of low birth weight[5]
- Reduce demand for (carbon intensive) healthcare[5]
- Improve availability of natural cooling and carbon storage provided by natural environments[5]
- Reduce flooding risk, and secondary health effects, through sustainable drainage systems and tree planting along rivers[5]

Section 3:

Call for action

This report identifies both the opportunities and threats posed by the climate emergency to health. We highlight exciting climate actions, policies and strategies which are underway in Oxfordshire and show why we all need to take urgent climate action now to improve our health and wellbeing and protect our environment.

This report mandates urgent climate action for health across Oxfordshire.

We have shown the immediate and positive health benefits of taking action to address our changing climate, and we need to ensure that we accelerate and facilitate these measures across our county.

Every climate action, policy and strategy should identify and maximise the opportunity to improve our health and wellbeing.

By the same token, every health action, policy, and strategy should mitigate for and prevent the negative health impacts of our changing climate.

3.1 System actions

This responsibility cannot and should not be shouldered by individuals alone. We need real structural changes, and system wide actions to mitigate and adapt to our changing climate and to improve health.

Based on this report, our main priorities for system partners are:

1. 

   Work together for cleaner indoor and outdoor air by promoting active, sustainable travel and adopting low-carbon energy and supply chains

2. 

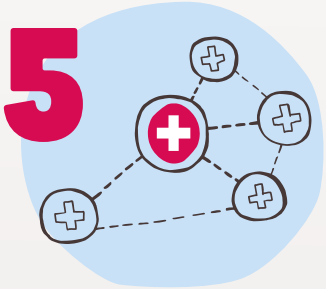
   Increase and improve access for all to safe, inclusive green spaces and clean waterways with positive impacts on wildlife, biodiversity and adaptation

3. 

   Adapt and upgrade buildings, estates and facilities to ensure high-quality services can be delivered now and in the future as resources are made available

4. 

   Work with suppliers and the supply chain to reduce carbon emissions, ensure decisions consider carbon impacts, and encourage suppliers to develop more sustainable practices, including maximising social value and environmental standards for food and catering

5. 

   Ensure partnership working through existing forums and networks to accelerate action on climate mitigation and adaptation, whilst maximising benefits for health and wellbeing, with a particular focus on delivery of system wide action to address the risks of extreme weather events

6. 

   Build and continuously bolster community resilience by adapting infrastructure to meet the needs of our changing climate

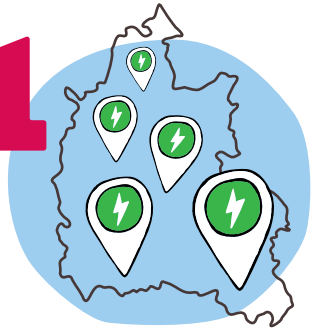
3.2 National policy and funding

With the right national policy framework, local authorities could achieve so much more. The recent report by Chris Skidmore MP, The Future is Local, sets out the key opportunity for local authorities working in partnership with central government to deliver low carbon solutions.

With favourable policy from central government, local authorities will be able to deliver more, faster than under the current national policy and legislative framework. Based on this report, our main priorities for central government are aligned with the Blueprint Coalition.

The Blueprint Coalition is an influential group of local government organisations, environmental groups and research institutions who are calling on the government altogether to support local authorities in delivering climate action with a joined up approach:

1



Reduce air pollution by investing in low carbon and climate resilient infrastructure including public transport, renewable energy and electric vehicle charging

2

Create good, secure employment and reduce inequalities by supporting reskilling, retraining, remote working and research to accelerate the move to a net zero economy

3

Improve our residents' health and wellbeing by upgrading our homes, healthcare facilities and schools to ensure they are fit for the future

4

Boost our physical and mental health by making it easy for people to walk, cycle, and use active, sustainable transport

5

Improve our mental and physical health, capacity for natural cooling and air quality by ensuring access for all to green spaces and other green infrastructure

3.3 Individual actions

Last, but not least, there are many practical things that each of us can do, with very little time and effort. Some of these are free and many save money. Almost all improve our own health and the health of others. These small changes can add up to big action.

Take a look at Climate Action Oxfordshire or Home | Cag Oxfordshire | Community Action Group Network | England where there are plenty of suggestions to get started.

There are also resources and support available if you are experiencing the effects of climate anxiety, or eco anxiety (often defined as a longer-term fear of environmental doom, and worries about what might happen if we do not take action to avert disaster due to the climate emergency). There is also tailored support available for young people.

Appendix A

Health and Wellbeing in Oxfordshire

Oxfordshire is the most rural county in the South East region. Oxfordshire's population is relatively healthy.

Oxfordshire does better or similar to the national average on most Public Health indicators. Life expectancy and healthy life expectancy in Oxfordshire are each significantly higher than national and regional averages for both males and females.

Oxfordshire's population is ageing, a trend that is forecast to continue.

House prices are continuing to increase, and the cost of renting remains well above average. The future increase in the population (especially the numbers of young people) is very dependent on levels of house building in future and will vary across the county.

For 2019 to 2021, Cancer was the leading cause of death in Oxfordshire, followed by Heart Disease for males and Dementia & Alzheimers Diseases for females. The prevalence of Cancer and Depression in Oxfordshire in 2020-21 were each above the national average.

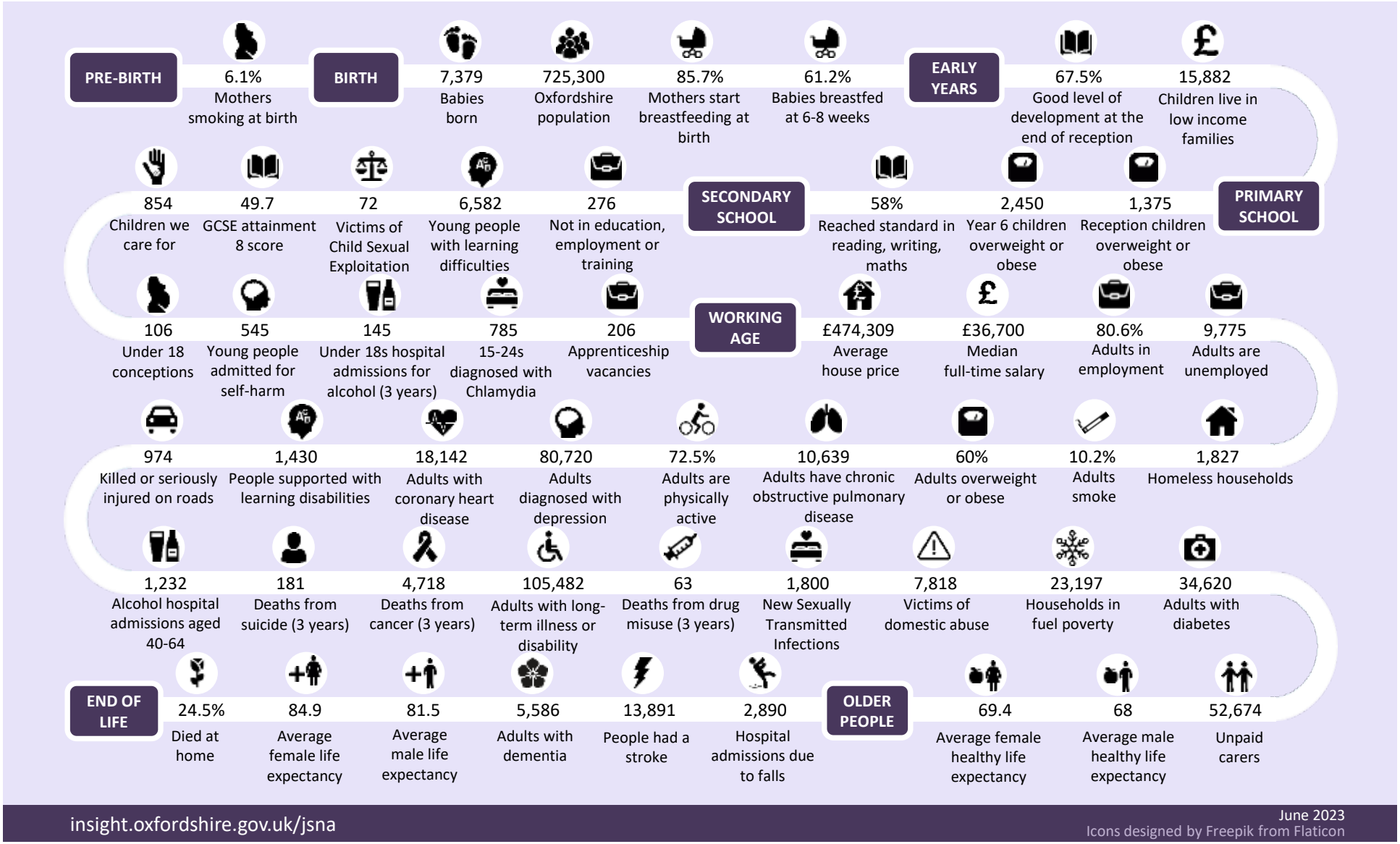
The latest ONS measures of personal wellbeing (2020-21) for Oxfordshire show a decline in reported happiness and an increase in anxiety. The average level of anxiety in Oxfordshire has remained above the England average. Mental health rates of diagnosis and referrals are continuing to increase.

According to the Indices of Multiple Deprivation (IMD 2019), Oxfordshire was ranked the 10th least deprived of 151 upper-tier local authorities in England (up from 11th in 2015). Oxfordshire had 1 out of 407 Lower Super Output Areas (LSOAs) ranked within the 10% most deprived areas nationally, part of Northfield Brook ward, south east Oxford. A further 16 areas were ranked in the 20% most deprived areas nationally, 9 in Oxford City, 6 in Banbury and 1 in Abingdon.

As a result Oxfordshire has wide inequalities in health and wellbeing. Males living in the more affluent areas of the county are expected to live around 11 years longer than those in poorer areas. For females the gap in life expectancy is around 12 years.

For more detailed live information on Oxfordshire's health and wellbeing please see the Joint Strategic Needs Assessment 2022.

Oxfordshire JSNA, health and wellbeing facts and figures 2023



insight.oxfordshire.gov.uk/jsna

June 2023

Icons designed by Freepik from Flaticon

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Footnotes:

'Anchor institutions' are large organisations that have a strong and long term tie to the area and who make a significant and lasting impact to the prosperity and wellbeing of the community. Examples include NHS trusts, Oxford Health, GP practices, councils, care homes, universities and colleges, housing groups and large established companies. Anchor institutions have a significant stake in a region, in terms of spaces they occupy, their environmental impact and the direct and indirect jobs they sustain. They also have significant economic and social influence through the budgets they manage, the supply chains they use and their approach to development.

Testimonies were gathered from individual interviews with Oxfordshire residents completed in November and December 2023. People agreed to share their lived experience of the impacts of climate change on the basis that their account would remain anonymous.