Climate Change and Health
Lambeth Annual Public Health Report 2020
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Climate change has been identified as the greatest public health challenge impacting mankind. In the context of the current Covid-19 pandemic it is harder to focus on the longer term risks when the immediate health impacts have been brought into such sharp relief.

Earlier in 2020 parts of the UK were hit by terrible floods impacting on the lives of many people. In the wake of Covid-19 we risk forgetting that the key to managing any public health crisis lies not in the response but in the preparedness and prevention work before the crisis actually hits and the resilience that is built from this. Some argue for climate change it is already too late. The Covid-19 lock down enabled us to imagine a world with fewer cars, good air quality and an appreciation of our green spaces and the impact these things have on our wellbeing. Critically, by identifying the co-benefits and interdependencies of actions to address climate change we can achieve our dual goals of improving health and wellbeing in the short and medium term as well reducing the longer term impacts likely to be faced by London and Lambeth.

We have some tough choices ahead. Our ageing Victorian buildings are not well adapted to the challenges of climate change, and our new buildings are often dependant on heating and cooling systems which add to the consumption of energy and emissions. Trading up diesel for electric vehicles may reduce (some) emissions but won’t encourage more active travel getting people fitter and healthier. The cost of these vehicles will also put them beyond the reach of many of our Lambeth residents, potentially further increasing inequalities.

Working with our residents we need to build solutions which work for all of us, but especially those who are least able to afford to mitigate the consequences at an individual level. This requires the adoption of a “health in all policies” approach where we apply policy which can serve the dual purpose of improving health whilst building a more sustainable future.

This report has been written to inform the conversation and engagement with partners and residents to make the adaptations and changes required to enable Lambeth to both meet its goals in relation to CO₂ reduction and to contribute to the longer term goals of building resilient communities and infrastructure to support sustainability.

Ruth Hutt
Director of Public Health
June 2020
Introduction

This is the Lambeth Annual Public Health Report for 2020. This report focuses on climate change and its impacts on the health of people who live in Lambeth, and actions to reduce or mitigate the consequences of climate change.

In this report we look at the health impacts of climate change in the Lambeth, London and UK contexts with a focus on:

- Air quality
- Rising temperatures and heat waves
- Flooding
- Cross-cutting issues and interdependencies.

Accompanying the chapters of this report are a set of factsheets which provide more details on these topics.

Lambeth council was the first London council to declare a climate emergency, and has committed that the council will be carbon-neutral by 2030.

As well as describing the health impacts of climate change, this report suggests actions that can be taken to reduce or mitigate these impacts by individuals, communities, local government and other public sector organisations, and others.
Climate change is the term used to describe long term change to temperature and weather patterns.

Since the industrial revolution in the 1850s the average temperature has risen by 10ºC.

This is due to human activity such as burning of fossil fuels (e.g. coal, oils, natural gas).

Burning of these fossil fuels releases “greenhouse” gases such as carbon dioxide, methane and nitrous oxides. Over time large quantities of these gases have built up in the atmosphere.

Once in the atmosphere these greenhouse gases form a blanket around the planet that traps heat from the sun causing the earth to heat up.

Although some level of a greenhouse blanket is important for life on earth, excessive levels of these gases as a result of human activity have created an enhanced effect.

The UK passed a Climate Change Act in 2008. This set a target for reduction of greenhouse gases by 2050 by 100% from a 1990 baseline amongst a range of other actions.

Lambeth Council became the first London council to declare a climate emergency, reflecting the urgency of the task ahead of us, and has committed that the council will be carbon-neutral by 2030.
Climate change – UK Risk Assessment

The UK and devolved governments commissioned an independent assessment of the available evidence on climate risks and opportunities, from the “Adaptation Sub-Committee on Climate Change.”

The sub-committee has published a second risk assessment of current and predicted risks of climate change: UK Climate Change Risk Assessment 2017 Evidence Report which sets out six priority areas needing urgent further action over the next five years:

- Flooding and coastal change
- Risks to health and wellbeing from high temperatures
- Infrastructure shortages e.g. water shortages
- Risks to natural capital e.g. biodiversity
- Risks to food production and trade
- Risks from new or emerging pests and diseases and invasive non-native species.

Top six areas of inter-related climate change risks for the United Kingdom

<table>
<thead>
<tr>
<th>RISK MAGNITUDE</th>
<th>FUTURE</th>
<th>NOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding and coastal change risks to communities, businesses and infrastructure</td>
<td>More action needed</td>
<td></td>
</tr>
<tr>
<td>Risks to health, wellbeing and productivity from high temperatures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risks of shortages in the public water supply, and for agriculture, energy generation and industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risks to natural capital, including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risks to domestic and international food production and trade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New and emerging pests and disease, and invasive non-native species, affecting people, plants and animals</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Healthy Planet Healthy People

A healthy planet is important for the health and wellbeing of all people.

Evidence from a range of scientific experts now shows that the planet is becoming increasingly unhealthy and that these changes are likely to have a negative impact on human health and wellbeing.

Climate change is one element of the changes that are happening to the earth’s natural systems. Other changes to the Earth’s natural systems include:

- Loss of biodiversity including loss of both animal and plant species (with some becoming extinct)
- Air pollution
- Water pollution
- Ocean pollution and degradation
- Land use changes.

Experts also believe that we have an opportunity to stop and/or reverse some of these changes but may have to adapt to others.

The Mayor of London published an Environment Strategy for London in 2018. This covers the broad range of actions required for a healthier environment for London which will contribute to a healthier planet.

“

To safeguard human health we need to maintain the health of the planet on which we depend.”

Lancet Planetary Health
Groups most vulnerable to the impact of climate change

Our ability to prepare for, respond to and recover from rising temperatures and heat waves, flooding and poor air quality depends on our physical and mental capacity, where we live and work, and the resources available to us.

Ability to Prepare: Our awareness and physical and financial capacity all dictate how able we are to prepare.

People in deprived areas are more likely to live in poorly ventilated homes or accommodation with limited access to green space and limited options to improve housing conditions.

Ability to Adapt: Adapting to climate change depends on our awareness of climate change as a problem and our physical and financial capacity to adapt our behaviours to mitigate the impact.

Ability to Recover: Recovery will depend on our physical reserve.

Profile of vulnerable Lambeth residents:

Health:
- 37,000 people living with illness or disability that limits their daily activities
- More than 50% residents over 75 have a limiting health condition

Demographics
- 1 in 10 residents aged 65 or over
- Population over 65 projected to grow by 25% in the next 10 years

Socioeconomic status:
- 9th most deprived borough in London
- Nearly one third of residents live in areas of high deprivation
- 87,000 people in poverty after housing costs
- 5th most densely populated borough in England and Wales
- 70% households live in flats, many with limited access to green space
Rising temperatures and heat waves

Key messages
Lambeth is a densely populated urban borough, which puts our residents at high risk of exposure to heat and the Urban Heat Island effect (where the urban environment leads to heat absorption and trapping, resulting in higher temperatures).

We will all experience rising temperatures, but heat illness and death will have the greatest impact on our oldest and youngest residents, and anyone with an existing illness. This includes our 37,000 residents living with illness or disability that affects their daily activities.

Socioeconomic status also dictates our ability to adapt to and recover from heat. Nearly a third of Lambeth residents live in areas of high deprivation and are less likely to have the financial or physical resources to mitigate the impact of heat.

Heat exposure threatens to exacerbate existing vulnerabilities and worsen inequalities.

Mapping vulnerabilities and heat exposure risk can help Lambeth decision makers target interventions to benefit the most vulnerable populations.

Co-benefits of ‘urban greening’ and other strategies to reduce overheating include better air quality, sustainable flood prevention, and improved mental and physical health.
Rising temperatures and heat waves in Lambeth and the UK

Climate change means that rising temperatures and more frequent heat waves are inevitable and the UK is already affected by rising temperatures.

The most recent decade (2008–2017) has been on average 0.8°C warmer than the 1961–1990 average. All ten of the warmest years in the UK have occurred since 1990 with the nine warmest occurring since 2002.

Even if global temperature increases are limited to 2°C or less, land temperatures in the UK would be expected to increase by more than the 2°C global average.

As well as rising temperatures, we can expect to experience longer, more frequent heat waves. The Met Office predicts that intense summer heat waves are 30 times more likely due to climate change.

The Met Office chart to the right shows that global average temperatures have risen markedly, particularly since the 1980s.

Source: Met Office. Trend in global average temperatures 1850-2016. JPEG available at: https://assets.rbl.ms/9191222/980x.jpg
Health impacts of rising temperatures and heat waves

Heat-related deaths in the UK could rise by 250% by the 2050s from a current baseline of around 2,000 per year. Deaths related to hot weather are usually linked to worsening of existing disease, in particular heart and lung disease. Even moderate increases in temperature have a significant impact on our health, putting increasing pressure on our health services.

Higher temperatures also contribute to increased air pollution, which is already linked to excess morbidity in Lambeth.

Morbidity, reduced productivity and wellbeing related to overheating are major economic and social concerns. The cost from heat-related deaths due to climate change is estimated to increase from £10–50 million to £25–100 million per year by 2050, and to £40–350 million by 2080.

Rising temperatures may make it easier for vectors like mosquitoes to survive and spread infections not normally transmitted in the UK, such as dengue fever.

The charts above show that heat-related deaths are expected to increase by 250% whilst cold-related deaths are expected to reduce only slightly.

Groups most vulnerable to rising temperatures and heat waves

Our ability to prepare for, respond to and recover from rising temperatures and heat waves depends on our physical and mental capacity, where we live and work, and the resources available to us.

Exposure to rising temperatures is a borough-wide risk, but the greatest health and economic burden will be experienced by those unable to prepare, adapt and recover due to existing health problems, extremes of age, and social deprivation. These factors are interconnected, and anyone with multiple vulnerabilities is more likely to experience worse health impacts.

This means that rising temperatures threaten to worsen inequalities across our borough. Climate action needs to recognise this threat and mitigate the risks for our most vulnerable residents.

Climate Just has created interactive maps to illustrate how social vulnerability and exposure to climate events such as rising temperatures may lead to worsening inequalities and climate disadvantage.

Groups most vulnerable to the Urban Heat Island effect

The ‘Urban Heat Island’ effect describes how urban areas experience temperatures up to 10°C higher than the adjacent countryside.

The effect is often worse in deprived urban areas with low quality, poorly ventilated housing. The map to the right illustrates this Urban Heat Island effect.

Lambeth is the fifth most densely populated borough in England and Wales with an average of 12,020 residents per square kilometre with limited green space. 31% of our residents live in areas of high deprivation. These factors mean our residents are more at risk of heat exposure and the Urban Heat Island effect than people living in rural areas.

Up to 70% of Lambeth residents live in flats. London wide, by the 2030s, three in four flats are projected to experience indoor temperatures over 28°C in heat wave scenarios. Noise, air pollution and high crime deter people from opening their windows, which leads to even higher indoor temperatures.

Mean midnight temperature May to September 2011

Without urgent action, the cost of energy required to cool buildings is projected to exceed £1 billion by 2050. Cooling homes with air conditioning is expensive and generates heat waste and carbon emissions.

Source: London.gov.uk Datastore
**Actions to mitigate and adapt to rising temperatures and heat waves**

A coordinated approach to heat reduction will have multiple co-benefits for health and wellbeing.

Green spaces help reduce the impact of the Urban Heat Island effect, by releasing moisture into the atmosphere, shading buildings and pavements and deflecting radiation from the sun. Protecting and increasing our green spaces also improves air quality, improves mental and physical health and can protect against flooding.

Technologies exist to create affordable, low carbon homes and retrofit existing homes to be resistant to heat, cold, flooding and water scarcity. Well insulated, well ventilated homes stay cooler in summer and warmer in winter, reducing reliance on heating and air cooling and reducing carbon emissions. This could improve winter mortality rates by reducing fuel poverty.

Urban planning can reduce the Urban Heat Island effect by considering where a building is located in relation to its surroundings, how green spaces can be incorporated, and minimising summer exposure.

Better building insulation, ventilation and energy efficiency will contribute to more comfortable indoor living conditions and will help prevent heat and cold-related deaths.

Coordinated strategies targeting the most vulnerable will lead to greener, more comfortable healthier living spaces and reduce climate disadvantage.

Socio-spatial vulnerability maps can show us where our most vulnerable residents live.

By overlaying maps that illustrate the risk of the Urban Heat Island effect with socio-spatial vulnerability, we can identify areas likely to experience the greatest climate disadvantage from rising temperatures. This can help decision makers target climate mitigation to the most vulnerable residents.

Similarly, overlaying socio-spatial vulnerability maps with ecological maps can help prioritise community ‘greening’. The map to the right is an example of an ecological map, showing an ecological score for each area of Lambeth.


Greenspace Information for Greater London.
www.gigl.org.uk
Flooding

Key messages

Climate change in England is predicted to cause more frequent and intense rainfall.

In Lambeth, surface water flooding is the most relevant flood risk to residents.

It is estimated that 2,949 residential properties in Lambeth are at high risk of flooding from surface water, a probability of 3.3% of flooding in any one year.

This risk is amplified by the continued increase in paved surfaces, and the combined sewer network and its capacity.

Immediate health implications include injuries and death (drowning, electrocution, carbon monoxide poisoning from pumps).

Medium term implications include mental health illness and respiratory illness as a result of damp.

Vulnerability to flooding is associated with:

- the capacity to mitigate a flooding incident especially individual mobility and ability to make decisions, resulting in older people and people with mental health and disability being at high risk; and
- the capacity to adapt to the risk. Households on low income are less likely to have insurance and enough resources to renovate after a flooding incident, and are also more likely to be impacted by transport disruption.

Sustainable drainage systems are a type of measure that can significantly reduce the risk of flash flooding while having significant benefits to people’s health (physical and mental health) and the environment.

Preparedness is critical, including identifying people vulnerable to a flooding incident.

The presence of combined sewer/drainage systems remains a challenge to the prevention of surface flooding risk.
Flooding in Lambeth and the UK

Flooding is the most common natural disaster, and described as ‘an event that threatens to cause serious damage to human welfare’ (National Flood Emergency Framework, 2014).

There are various types of flooding (surface water, groundwater flooding, sewer flooding and tidal flooding) with surface water flooding being the main type of flooding risk in Lambeth. Recent examples of flooding in Lambeth include:

- June 2005 - Major roads in Stockwell and Oval areas
- July 2007 - Clapham Common, Kennington, Stockwell and Vauxhall
- June 2016 - Nine Elms.

In addition there is regular flooding associated with surface water (e.g. basements in Herne Hill, West Norwood and Streatham Vale) and with groundwater (e.g. Central Brixton, West Norwood, Streatham, Streatham Hill, east of Clapham Common and Brixton).

Climate change will increase the chance of flooding and coastal erosion due to:

- Increased rainfall intensity, duration and frequency of extreme rainfall, and high river flows
- Sea level rises as a consequence of climate change increasing risk of coastal flooding and erosion
- Evapotranspiration (the movement of water from the land to the atmosphere by evaporation and transpiration from plants)
- Raised river flows.

Due to climate change, it is predicted that in England, by 2050:

- Daily extreme rainfall intensity could increase by 20%
- Winter daily average rainfall could increase by 25–44%
- Peak river flows could increase by 25–50%.
Flooding in Lambeth
The following factors increase the risk of flooding in Lambeth.

**Urban infrastructure**
Which increases the risk of surface flooding due to:
- ongoing loss of permeable urban green space as a result of increasing paving;
- development on flood plains; and
- an ageing sewer network that is at or near capacity. In Lambeth rain and sewage drain through same pipes.

**Population growth, ageing and population distribution**
Pressure to develop in areas at risk increases the impact as well as the likelihood of flooding, although new developments can be constructed to reduce this risk.

**Natural infrastructure**
- The majority of the borough has clay soil which generates more surface water
- The distribution of rivers in the borough means there is a concentration of fluvial
- Flood risk from the River Thames in the north of the borough, and along the River Graveney in the south. This is due to the lack of rivers running through the borough as they were converted to sewers in the Victorian era
- The topography of the borough means that much surface water from the upper catchment (Norwood, Crystal Palace, West Dulwich), drains through central Lambeth before being funnelled through Kennington and Vauxhall.
Areas at risk of flooding

- Surface water and sewer flooding poses the highest risk of flooding to Lambeth.

- The map to the right shows areas that are at high, medium and low risk of flooding from surface water. This model does not take into account the combined sewer system’s location or capacity.

- The highest risk areas follow the position of where the River Effra once flowed. These areas include Herne Hill, Brixton, Vauxhall, Streatham and Clapham.

- An estimated 2,949 homes in Lambeth are at high risk of internal flooding, with a 3.3% probability of flooding in any one year.

- A more detail model that integrates the combined sewer system for Lambeth is currently under development, and is expected to be available by 2021.

Flooding risk to residential properties in Lambeth

<table>
<thead>
<tr>
<th>Risk level</th>
<th>Number of residential properties at risk of internal flooding from surface water</th>
<th>Probability of occurring in any one year</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>2,949</td>
<td>3.3%</td>
</tr>
<tr>
<td>Medium</td>
<td>8,706</td>
<td>1.0%</td>
</tr>
<tr>
<td>Low</td>
<td>28,683</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Note: Nationally produced map - does not include all drainage data
Health impacts of flooding

Flooding can cause a range of significant health effects, including death. The health effects can be short or long term, and can be caused directly or indirectly by the flood event.

Mortality from flooding

A 2013 review found that across Europe over the previous decade, 1,000 deaths had been caused by flooding. Overall two thirds of flooding deaths were due to drowning, with the remainder due to trauma, electrocution, carbon monoxide poisoning, fire and heart attacks. (WHO/PHE 2013)

<table>
<thead>
<tr>
<th>Direct effects - immediate</th>
<th>Direct effects – medium to long term</th>
<th>Indirect effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drowning and injuries from walking or driving through flood water</td>
<td>Mental health issues e.g. psychological distress, probable anxiety, probable depression and probable post-traumatic stress disorder (especially from clear up process)</td>
<td>Water shortages and contamination</td>
</tr>
<tr>
<td>Injuries from collapse or damage to buildings</td>
<td></td>
<td>Damage to property, including those for essential public services</td>
</tr>
<tr>
<td>Electrocution</td>
<td></td>
<td>Damage to sanitation infrastructure</td>
</tr>
<tr>
<td>Chemical contamination e.g. carbon monoxide poisoning</td>
<td></td>
<td>Barriers to accessing or providing healthcare – inaccessible routes, damage to healthcare infrastructure</td>
</tr>
<tr>
<td>Mental health issues, stress</td>
<td></td>
<td>Displacement of residents</td>
</tr>
<tr>
<td>Increase in diarrhoeal diseases (water contamination from sewage)</td>
<td></td>
<td>Disruption of income – long term economic impacts can also cause poor health</td>
</tr>
<tr>
<td>Increase in infections of the respiratory system, skin and eyes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted from WHO, 2013
Groups most vulnerable to flooding

Vulnerability is affected by exposure to flooding (elements at risk and the characteristics of the flood), susceptibility (awareness and preparedness, and ability to cope) and resilience (capacity to cope and recover).

It is important to identify the factors that affect an individual or population’s vulnerability to ensure that plans for mitigation or prevention of flooding can be prioritised in the areas prone to flooding.

Often those that are more vulnerable may be less able to reduce the impact of flooding on their lives. To inform planning and target interventions, a neighborhood flood vulnerability index (NFVI) was developed. Those who are more vulnerable will need more resources to cope with flooding.

The table on the right lists the various individual level vulnerability factors.

<table>
<thead>
<tr>
<th>Susceptibility</th>
<th>Community support</th>
<th>Inability to respond, prepare or recover</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Age</strong></td>
<td>1. Housing characteristics</td>
<td>1. Income</td>
</tr>
<tr>
<td>Older people and children are more vulnerable</td>
<td>Those living in poor quality housing with limited flood protection, and residents less likely to move</td>
<td>Lower income residents may be less likely to prepare adequately for future</td>
</tr>
<tr>
<td><strong>2. Health</strong></td>
<td>2. Direct flood experience</td>
<td>2. Information use</td>
</tr>
<tr>
<td>Those with existing health problems (who may need access to medicines or medical interventions)</td>
<td>More community support and knowledge available</td>
<td>Non-English speakers may be unable to access information on flooding</td>
</tr>
<tr>
<td>Mental health impacts of flooding can affect those with existing health problems more</td>
<td><strong>3. Social Networks</strong></td>
<td>3. Local knowledge</td>
</tr>
<tr>
<td></td>
<td>Socially isolated people more vulnerable</td>
<td>Those recently moved to Lambeth may be unaware of information on flooding</td>
</tr>
<tr>
<td>If more services are affected, more vulnerable</td>
<td>If more services are affected, more vulnerable</td>
<td>Those who are less mobile may be less able to adapt their homes</td>
</tr>
<tr>
<td></td>
<td><strong>5. Physical mobility</strong></td>
<td>6. Crime</td>
</tr>
<tr>
<td></td>
<td>Those who are less mobile may be less able to prepare for, respond to or recover from flooding</td>
<td>The level of crime in an area can affect ability to evacuate</td>
</tr>
</tbody>
</table>
Actions to mitigate effects of flooding

Mitigating the effects of flooding requires cooperation and coordination across many sectors, and can be considered against primary, secondary and tertiary prevention measures.

For further information on Flooding in Lambeth, please go to https://www.lambeth.gov.uk/sites/default/files/APHR_Factsheet_Flooding_in_Lambeth_July_2020.pdf

### Primary, secondary and tertiary flooding prevention measures

<table>
<thead>
<tr>
<th>Prevention</th>
<th>Possible mitigations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary prevention – prevention of flooding affecting human welfare</strong></td>
<td>• <strong>Structural</strong>&lt;br&gt; E.g. Land use management – avoid building on sites at high risk; tree planting; control of water sources and flow – sustainable drainage systems (SuDS);&lt;br&gt; • <strong>Policy and organisational</strong>&lt;br&gt; Plans for emergency preparedness&lt;br&gt; Flood insurance – to reduce mental stress and financial impact</td>
</tr>
<tr>
<td><strong>Secondary prevention – reduce or mitigate impact of flooding</strong></td>
<td>• Identification of vulnerable populations&lt;br&gt; • Individual and household preparedness&lt;br&gt; • Forecasting, warning systems and plans; evacuation&lt;br&gt; • Maintain health services and ensure infrastructure&lt;br&gt; • Contingency plans&lt;br&gt; • Plans for increased healthcare demand due to flood&lt;br&gt; • Communication to local communities affected regarding how they can reduce their health risks from flooding</td>
</tr>
<tr>
<td><strong>Tertiary prevention – provision of safe infrastructure, surveillance of effect</strong></td>
<td>• Provision of infrastructure e.g. safe drinking water&lt;br&gt; • Early treatment of medical conditions (physical and mental) to mitigate against long term effects&lt;br&gt; • Monitoring of health impacts</td>
</tr>
</tbody>
</table>

Adapted from WHO/PHE, 2013
Air quality

Key messages

Air pollution, whilst invisible, remains a significant issue in Lambeth and London.

Some people are more vulnerable to the health impacts of exposure to air pollution than others. Children, older people, those living on low incomes and those who have heart and lung problems or who are overweight are most at risk.

People on low incomes are also more likely to have existing medical conditions or to live near a busy road so their overall risk is increased.

Air pollution and climate change influence each other through complex interactions. Increasing levels of greenhouse gases can lead to temperature changes that change the chemical composition of the atmosphere. Direct emissions of air pollutants or those formed from emissions such as sulphate and ozone, can also influence this balance.

Policies to address air quality and climate change can therefore provide mutual benefits.
Sources of air pollution in Lambeth

Although it is invisible, air pollution remains an issue in Lambeth and London.

Air pollution comes from many different sources, both man-made and natural.

The main sources of air pollution in Lambeth are:

- road transport (particularly diesel vehicles);
- residential and commercial premises (mainly gas boilers used for space and water heating); and
- construction sites (including dust and machinery emissions).

Air pollution is a *silent* and *invisible* killer....

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Particulate Matter (PM2.5)</td>
<td>Transport</td>
<td>52%</td>
</tr>
<tr>
<td>Heavy Particulate Matter (PM10)</td>
<td>Transport</td>
<td>48%</td>
</tr>
<tr>
<td>Nitrogen Dioxide (NO₂)</td>
<td>Gas Heating</td>
<td>28%</td>
</tr>
<tr>
<td>Re-suspended Old Particles (PM2.5)</td>
<td>Transport</td>
<td>22%</td>
</tr>
</tbody>
</table>
Exposure to air pollution in Lambeth

Lambeth has not yet achieved the national target for safe nitrogen dioxide levels.

The highest exposure to air pollution occurs due to:

- Reduced access to green spaces
- Homes, schools and walking routes located near congested roads
- Unhealthy housing, such as homes with damp or poor ventilation

The concentration of nitrogen dioxide (NO₂) is highest near busy roads.

The most deprived neighbourhoods in Lambeth, as elsewhere, also tend to be amongst the most polluted.

Children living near congested roads have been shown to have double the risk of breathing problems.

The map to the right shows that within Lambeth, there are many nurseries, schools and residential or nursing homes within air pollution focus areas.
Health impacts of air pollution

Air pollution is a major environmental risk to health. It affects our health through our lifetime.

The effects of air pollution may be divided into short-term and long-term, depending on the time lag from exposure to air pollution until they make themselves felt. The health effects range from minor upper respiratory tract irritations to chronic lung and heart disease.

In 2013 in Lambeth, air pollution was thought to cause 400 emergency admissions for lung disease and 351 emergency admissions for heart disease.

The image to the right summarises the main health effects of air pollution across the life-course.

Per year in Lambeth

61
premature deaths

338
new cases of disease per 100,000

751
cardio-respiratory admissions

£1.3m
health and social care costs
Groups most vulnerable to air pollution

Air pollution is harmful to everyone but does not affect everybody in the same way.

People who are most vulnerable to poor air quality are:

- Unborn babies, children and older people;
- People with existing heart or lung conditions;
- Overweight people; and
- People in poorer working and living conditions.

There is a strong correlation with socio-economic inequalities. Those on low incomes tend to live in environments where they are more exposed to air pollution, for example from busy roads or in unhealthy housing and are less likely to be able to afford to move home.

Low income is also associated with higher probability of long-term health conditions or being overweight, increasing vulnerability to the health impacts of air pollution.

The map to the right shows areas of high air pollution across Lambeth, and the schools and nurseries located in these areas.

Lambeth has not yet achieved the national target for safe nitrogen dioxide levels.
**Actions to mitigate and adapt**

Lambeth has an Air Quality Action Plan 2017–2022 which focuses on:

- reducing emissions of pollutants into the air;
- reducing exposure to existing air pollution; and
- raising awareness in order to lower emissions and reduce exposure to air pollution.

The introduction of electric and hybrid buses has contributed significantly to a decrease in the levels of NO\(_2\) in Brixton.

Climate change interdependencies and conclusions

Why understanding interdependencies matters

In Lambeth the three main climate change risks (air quality, rising temperatures and heat waves, and flooding) are interconnected.

For example:

- During heat waves air pollution increases, which then affects health (as described in the air quality chapter).
- Reducing precipitation (rainfall) and increasing temperatures together combine to impact on water availability and quality, which in turn affect various sectors such as the health, energy and transport systems. Heat may also affect transport infrastructure, which is critical for London life, care provision and economy.

Understanding the interdependencies of flooding, temperature rises and heat waves, and air quality is needed to identify critical points for action. For example rising temperatures and heat waves lead to greater use of air conditioning, which in turn generates more air pollution.

Identifying local factors likely to mediate climate risk (such as attitudes, motivations, culture, values and different sets of concerns of individuals, local organisations and communities) should be part of the planning to address climate change.

The diagram on page 28 describes the main links between climate change risks, mitigation measures, and the socio-economic and climate drivers of these climate change risks.
Examples of interdependencies arising from climate change risks

**Legend**
- Climate drivers
- Responses and risks
- Adaption options

**Climate change**
- Sea level rise
- Increased storminess
- Changed precipitation
- Warming

**Socio-economic change**
- Urban Heat Island
- Population migration
- Urban and transport infrastructure
- Discomfort and health problems
- Impact on energy demand and supply

- Coastal flooding
- Wind damage
- Fluvial and pluvial flooding
- Building subsidence
- Building integrity
- Pumped drainage
- Groundwater mining
- Desalination
- Water transfers
- Cooling
- Urban greenhouse gas emissions

**Environmental impacts**
- Water scarcity
- Deteriorated water quality
- Air quality
- Ecological impacts
- Discomfort and health problems

**Legend**
- Climate drivers
- Responses and risks
- Adaption options

Co-benefits of climate change mitigation and adaptation interventions

Co-benefits refer to the positive effects that a policy or measure aimed at one objective might have on other objectives related to critical sectors such as health, mobility, resources, building and economy.

Co-benefits may be:

1. Secondary benefits from climate policy action e.g. sustainable drainage systems (SUDS) used to prevent flash flooding can also benefit well being and air quality – see page 30.

2. Secondary climate benefits from other policy actions e.g. reducing obesity through active travel will benefit air quality. Also, improving air quality can bring climate co-benefits through reducing use of fossil fuel which is both a main source of air pollution and a main source of greenhouse gas.

3. The combination of climate and non-climate benefits e.g. promoting the local production of solar energy will contribute to the local economy and could contribute to reducing inequalities. A more recent example is the positive impact on air quality of Covid-19 lockdown.

Identifying co-benefits of climate actions at local level is useful because it:

• allows a better understanding of the effects of policies in different sectors;
• helps prioritise mitigating measures;
• helps gain support for climate change policies and interventions; and
• links climate change interventions to innovation, economic benefits, and the quality of life of urban populations, which can in turn lead to significant climate change benefits.
Example of co-benefits: Sustainable Drainage Systems (SuDS)

SuDS are a collection of water management practices that aim to align modern drainage systems with natural water processes. SuDS are used to control flash flooding, and can also bring other benefits through:

- Reducing poor air quality
- Reducing ambient temperature and reducing the urban heat island effect
- Supporting water re-use/recycling.

For further information on Interdependencies and co-benefits in relation to Climate Change, please go to [https://www.lambeth.gov.uk/sites/default/files/APHR_Factsheet_Climate_Change_Interdependencies_July_2020.pdf](https://www.lambeth.gov.uk/sites/default/files/APHR_Factsheet_Climate_Change_Interdependencies_July_2020.pdf)

The four pillars of Sustainable Drainage System design

Control the quantity of the runoff to:
- Support the management of flood risk; and
- Maintain and protect the natural water cycle

Manage the quality of the runoff to prevent pollution

Create and sustain better places for people

Create and sustain better places for nature

Source: [Living with Rainwater, London Wildlife Trust](http://www.wildlondon.org)

Covid-19 and vulnerability to climate events

Covid-19 has amplified inequalities and has the potential to exacerbate vulnerabilities to climate change.

In many cases, social distancing and self isolation combined with the wider health and socioeconomic impacts of Covid-19 will worsen existing vulnerabilities to climate change and widen the inequalities across Lambeth.

For example, vulnerable residents who are not working due to Covid-19 related illness, caring responsibilities or job losses now have reduced resources to adapt their living conditions and mitigate the impact of climate events such as heat wave and flooding.

However, the Covid-19 response has also had some short term positive effects. For example reduced output from industrial and urban sources has improved air quality, which could reduce the Urban Heat Island effect and make night time temperatures more comfortable.

Many of the homeless population, who were previously highly vulnerable to extreme weather events, now have temporary accommodation and shelter.

Covid-19 has the potential to disrupt existing coping mechanisms and significantly worsen the impact of climate events. The pandemic should prompt fast action to reduce this risk and harness positive impacts such as improved air quality.
Conclusions

This Annual Public Health Report describes three main aspects of climate change: rising temperatures and heat waves; flooding; and air pollution. It is important to remember, however, that across these three issues there are many common factors and potential solutions (interdependencies).

Climate change actions are not a specific and independent set of actions, but are affected by and affect actions in other sectors.

In deciding where to focus our actions, it is important that we concentrate on those which are most urgent, where the biggest gains can be made across the whole climate change system, and where impacts are sustainable, ensure justice and are fair and equitable.

It is important that we are aware of the interdependencies of various climate change risks, and actions to address them.

The impacts of Covid-19 are very likely to worsen existing vulnerabilities to climate change and widen the inequalities across Lambeth. Our response to this pandemic should prompt fast action to reduce this risk and harness positive impacts such as improved air quality.

Finally, it is essential that we work with local residents to identify those interventions which both mitigate the impacts of climate change but bring significant co-benefits. There will be a number of trade offs which will require engagement and debate to ensure that we do not inadvertently further increase negative impacts on the most vulnerable in our population.
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