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Living well in Ealing

NHS
Ealing
Clinical Commissioning Group

EALING JSNA
'Focus on'
Air Quality
2019

The Joint Strategic Needs Assessment (JSNA) is a statutory document published by the London Borough of Ealing and NHS Ealing Clinical Commissioning Group, which describes the health and social care needs of the population. The JSNA contains topic and theme-based chapters, which are updated on a rolling basis.

Navigate by scrolling each slide or clicking on the section buttons on the bottom of each slide Sections may contain more than one slide

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EALING JSNA 'Focus on'
Air Quality Key facts 2019

Main Pollutants and Impacts

- Nitrogen Dioxide (NO_2) concentrations are estimated to equal an impact of 23,500 lost lives annually in the UK
- The impact of exposure to small Particulate Matter pollution ($PM_{2.5}$) is estimated to equal an impact of 29,000 lost lives in England each year
- PHE estimates that there are 1773 Years of Lives Lost in Ealing each year as a result of air pollution (See Glossary for definitions of Attributable deaths and Years of Life Lost)
- The UK Committee on the Medical Effects of Air Pollutants has linked short term and long term exposure to NO_2 to (reduced) lung function and increased emergency hospital admissions for heart and lung problems (e.g. heart attacks and asthma).

Vulnerable Groups

- The impact and degree of adverse effects of air pollution vary between individuals
- **Vulnerability** enhances the impact of even small increases in exposure to air pollution
- Children are at a greater risk than adults from negative health effects of air pollution, this due a combination of their environment, their physical function and how they are socially
- Those with existing medical conditions of the heart and lungs e.g. asthma are at increased risk
- Those living in poor quality housing design and located by busy roads
- Social-economic deprivation compounds all of the above

Key facts — Air Quality

Key Pollutants for Air Quality

- The principal man-made pollution sources are transport vehicles, petrol and diesel engine emissions and the burning of fossil fuels for energy
- The key pollutants in outdoor air are generally regarded to be:
  - Particles (measured as PM_{10} and $PM_{2.5}$)
  - Nitrogen compounds (principally NO_2)
  - Ozone (O_3),
  - Sulphur dioxide (SO_2), carbon monoxide (CO), hydrocarbons and metals also being significant from a health perspective

Health Burden of Air Pollution

- Air pollution is a major contributor to ill health in the UK
- Although air pollution does not directly cause deaths, it is estimated to contribute to the shortening of the lives of around 40,000 people a year in the UK
- Those most affected are people with heart or lung problems and long term conditions
- Children are also more susceptible to effects of air pollution
- Others that are at a disadvantage include those at from lower socio-economic groups, who are often disproportionately exposed to more air pollution

- This JSNA report will focus on an Life Course Approach on Air Quality and Health
- There is a strong evidence base for the health effects of acute air pollution episodes as well as the adverse consequences of continuous exposure to chronic air pollution throughout the entire course of life
- The NHS long term plan has highlighted that almost 30% of preventable deaths are specifically attributed to air pollution
- We will focus on the reducing the health consequences and recommendations on improving healthy lives caused by outdoor and indoor air pollution exposure by reviewing and recommending:
  - Local, regional and national policy relating to pollution control measures
  - Examine future Ealing developments with regards to their impact on air quality, working to mitigate/improve their impact to health

Setting the scene: Ealing — Air Quality

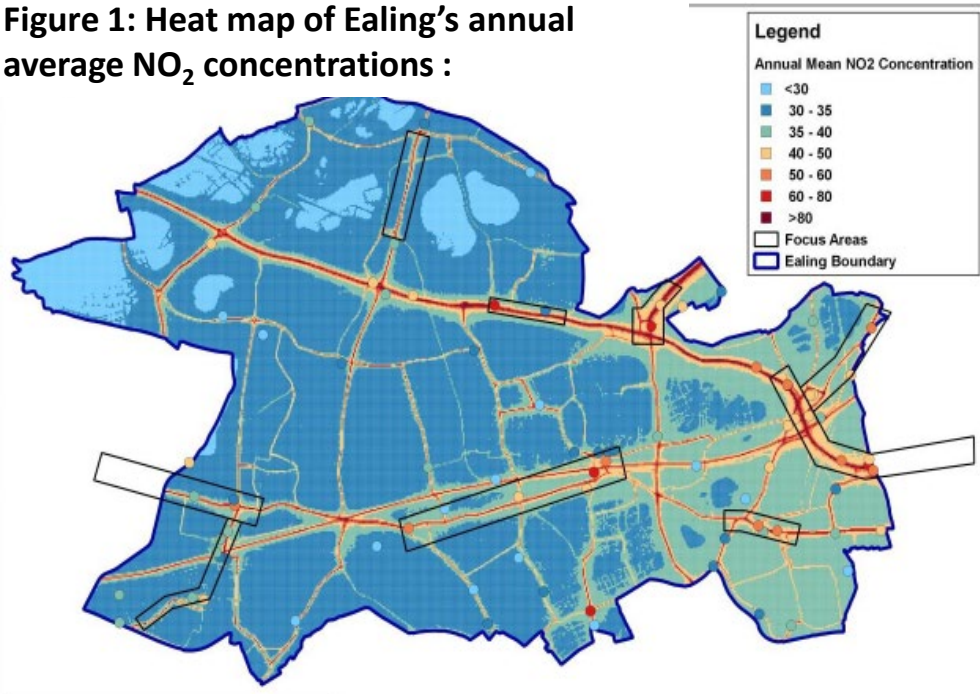
Summary of Current Air Quality In Ealing

- With the exception of Nitrogen Dioxide (NO_2), air quality in the borough of Ealing is meeting all national UK Air quality strategy standards (2007) for PM_{10} and $PM_{2.5}$
- NO_2 currently exceeds the recommended UK limits to keep levels below 40 µg/m3
- This includes pollution from sources outside the borough and in the case of particulate matter, a significant proportion of this comes from outside of London and even the UK
- More than half of NO_2 pollution and particulate matter that originates from within Ealing borough are from road transport
- Other leading sources pollution that originates from within Ealing borough emissions are domestic and commercial gas sources (i.e. boilers), human activity from cleaning (resuspension), rail and machinery

Current Focus Areas

- Air Quality Focus Area is a location that has been identified by the Greater London Authority as having high levels of pollution and human exposure. There are currently 8 focus areas in the borough.
  - Acton A40 North Acton Station/Gypsy Corner/Savoy Circus;
  - Hanger Lane/Twyford Abbey Road;
  - Perivale A40 Western Avenue Teignmouth Gardens to Alperton Lane;
  - Uxbridge Road/Ealing Broadway and Haven Green;
  - Acton High Street/Gunnersbury Lane junction to rail in Acton High Street;
  - King Street/The Green/Western Road/South Road;
  - Victoria Road/Portal Way/ Wales Farm Road; and
  - Greenford Road

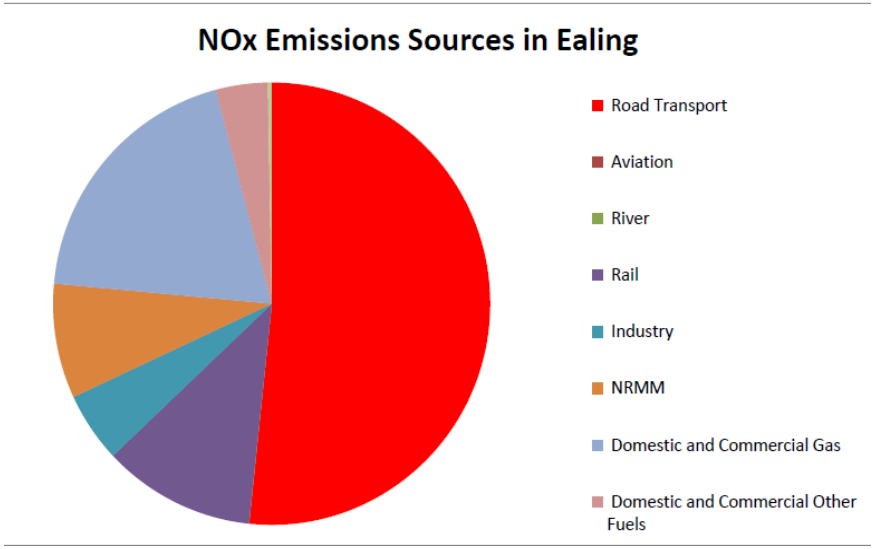
Figure 1: Heat map of Ealing's annual average NO_2 concentrations :

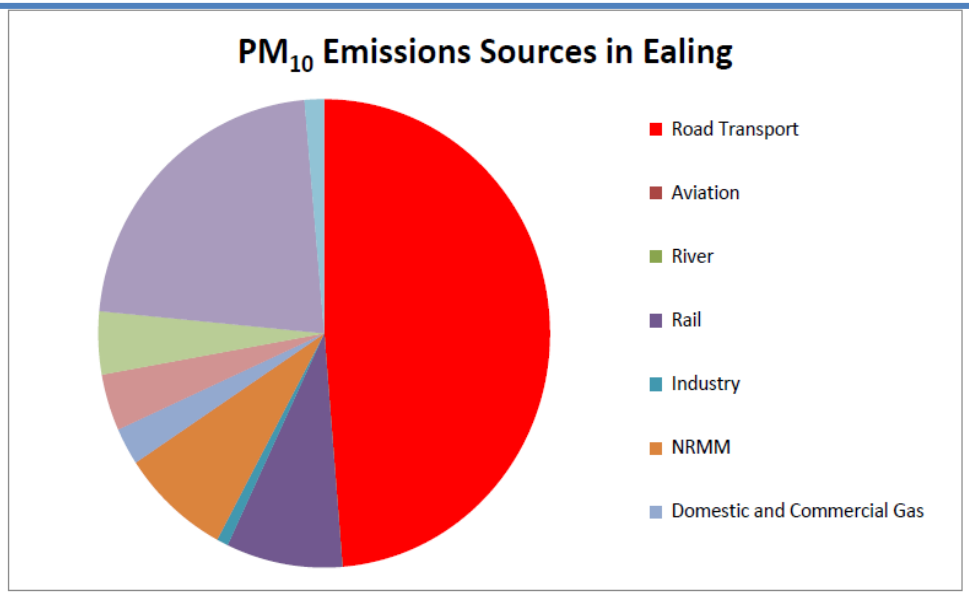


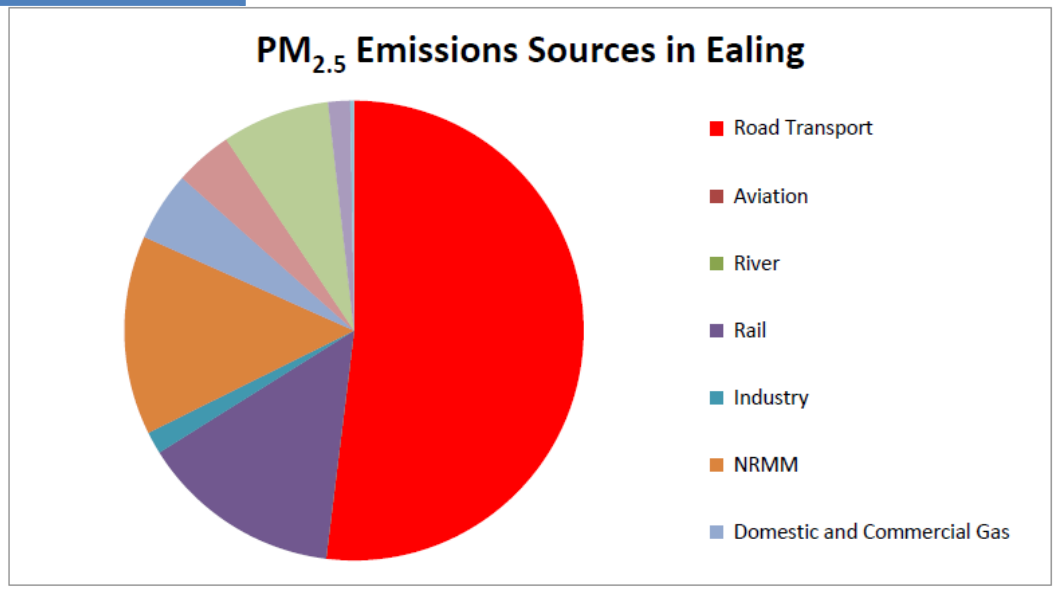
Setting the Scene — Air Quality

Causes of Outdoor Air Pollution

- Currently two air pollutants - nitrogen dioxide NO2 and particulate matter PM - remain at concentrations in many urban areas of the UK where their health impacts on the general population are of major concern (COMEAP 2009)
- A further pollutant, ozone, is a seasonal outdoor air pollutant that continues to affect many parts of the UK including Ealing when it is formed in the atmosphere in sunny and calm weather conditions (Air Quality Expert Group 2009)
- Pollutants with the greatest current impact on public health are considered to be $PM_{2.5}$, Ozone (O_3) and NO_2
- Legislated concentration limits do not represent a 'safe' level for the population as a whole, but are often talked about as levels considered to not pose a 'significant risk' to health



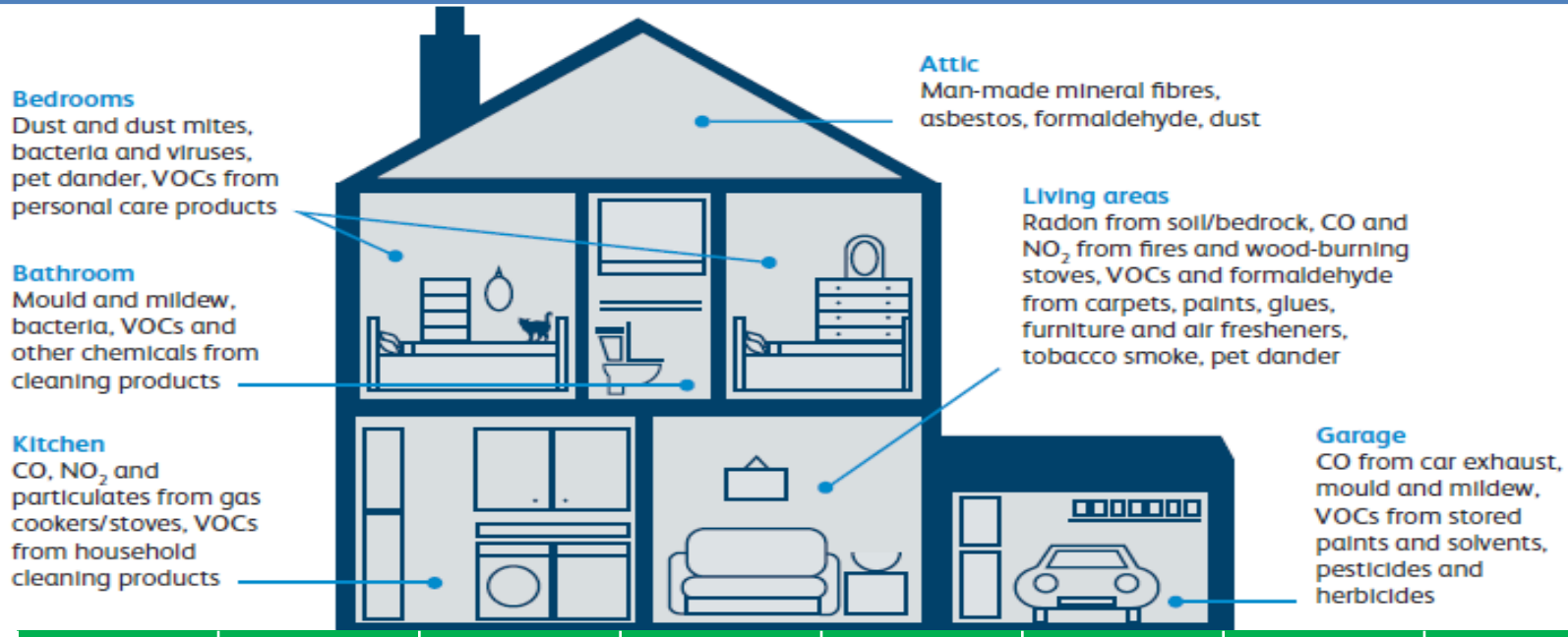




Setting the Scene — Air Quality

Causes of Indoor Air Pollution

- The quality of the air indoors is important, because it is here that we spend the majority of our time. An important source of indoor air pollution is outdoor air, gaining ingress through windows, doors and general building 'leakiness'. Good quality outdoor air will help to ensure high-quality air indoors.
- However, there are a large number of potential 'man-made' pollution sources in indoor environments such as our homes
- Tobacco smoke in the atmosphere, giving rise 'second-hand smoke' containing many noxious particles has the greatest impact on health
- Combustion appliances such as cookers, boilers, open fires and portable gas/paraffin heaters (with no flue) – are particularly significant in terms of total emissions
- The buildings, the materials from which it is built and those with which it is decorated are also important potential sources of chemical pollutants
- Exposure to particulate matter during car travel, especially travel along congested roads, is much higher than outdoor air quality

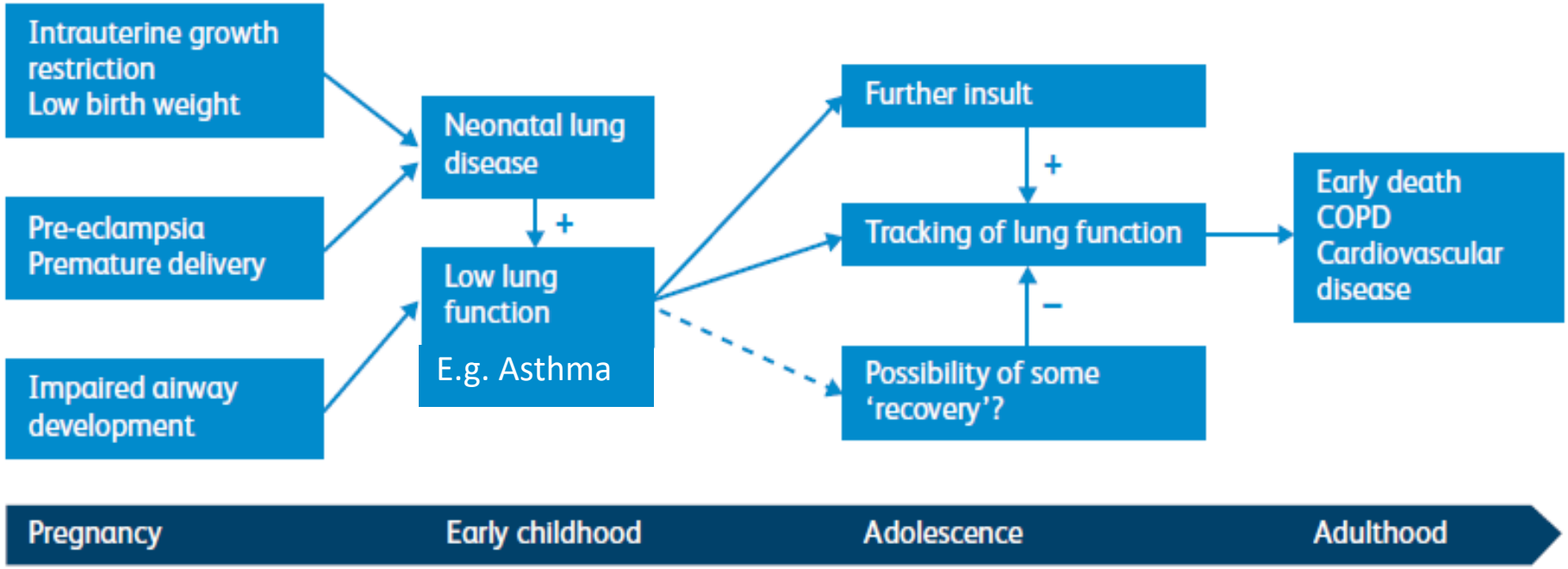


How does air pollution influence Health? Air Quality

A Life Course Approach on Air Quality and Health

- There is a strong evidence base for the adverse health effects of acute air pollution episodes as well as the adverse consequences of continuous exposure to chronic air pollution throughout entire course of life
- Exposure to air pollution has health effects at every stage of life, from before birth into old age
- Acute exposure leads directly to more hospital admissions, with increased risks of admissions for asthma, lung disease, and pneumonia, higher risk of heart attacks mong the elderly as we as causing an increase in the rate of hospital admissions for exacerbation of congestive heart failure
- More chronic impacts on health are sometimes gradual, and may not be apparent for many years

Figure 2: Illustration of air pollution effects on lung function throughout the life course:



What are the influences of air pollution on Health? Air Quality

Air pollution affects multiple organs and systems of our body and is associated with development of diseases

The health effects of air pollution are a result of chronic inflammation processes that pollutants and toxins causes to multiple organs of our body, which in turn damages it.

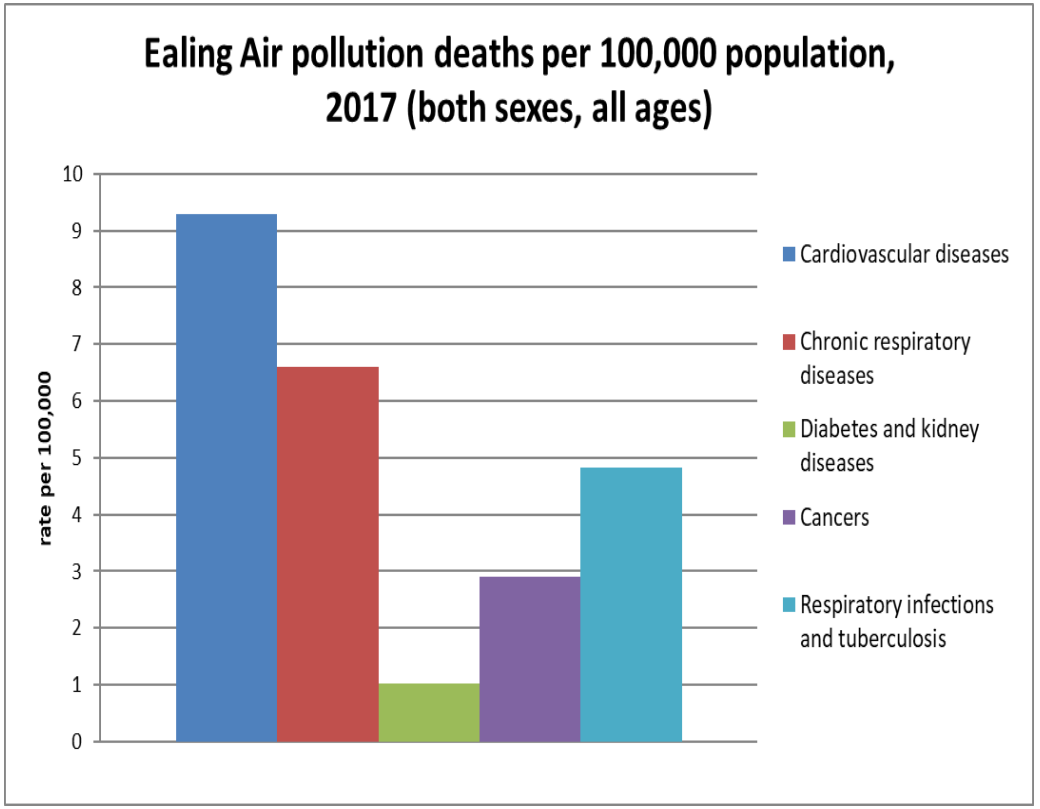
As an example, our lungs naturally develop throughout childhood, and there is evidence that long-term exposure to air pollution suppresses this development. In addition, exposure to air pollution can speed up the decline of lung function through adulthood and into older age. There is also good evidence that outdoor air pollution contribute to and causes lung and other cancers.

As a result long-term exposure to air pollution is linked to the development of asthma. For people who already have asthma, there is strong evidence that air pollution can make it worse.

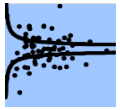
Evidence suggests that exposure to air pollution is also associated with damage to other organs of the body, it can impact on earlier onset of diseases such as the development of diabetes, and could also affect the brain's thinking abilities (cognition) in subtle ways that build up over time.

Large studies have shown a strong link between air pollution and cardiovascular disease , such as the development of high blood pressure, increase risk of heart attacks and stroke.

Figure 3: Rate of attributable death per 100 000 due to air pollution, source Global Burden of Diseases



Influences of outdoor air pollution on Health? Air Quality








Transportation-related air pollution, a major contributor to total urban air pollution, increases the risks of cardiopulmonary-related deaths and respiratory disease. There is clear evidence of association between air pollution with increased risks of developing lung cancer, heart attacks, and adverse pregnancy outcomes (e.g. premature birth and low birth weight).

Particulate matter

- Linked to a range of adverse health outcomes
- Causes temporary changes in the respiratory tract and impairs lung function, increased risk of symptoms requiring acute hospital treatment (e.g. A&E visits and hospital admissions), and increased risk of death from cardiovascular, respiratory diseases and lung cancer.
- Particulate matter is estimated to cause about 8% of deaths from lung cancer
- 5% of deaths from cardiopulmonary disease and about 3% of deaths from respiratory infections

Ozone

- Short-term exposure to ozone is linked to negative effects on lung function, through lung inflammation
- Linked to increased medication usage, emergency hospitalisation and deaths
- Reduced lung function has been associated with long-term ozone exposure

Nitrogen Dioxide

- Short-term exposure to Nitrogen Dioxide has been associated with effects on reducing lung function, increasing allergic airway inflammation reactions, and worsens asthma
- It is associated with increased hospital admissions and deaths
- Reduced lung function and increased probability of respiratory symptoms are associated with long-term exposure to nitrogen dioxide

What are the influences of Air pollution on Health? Air Quality

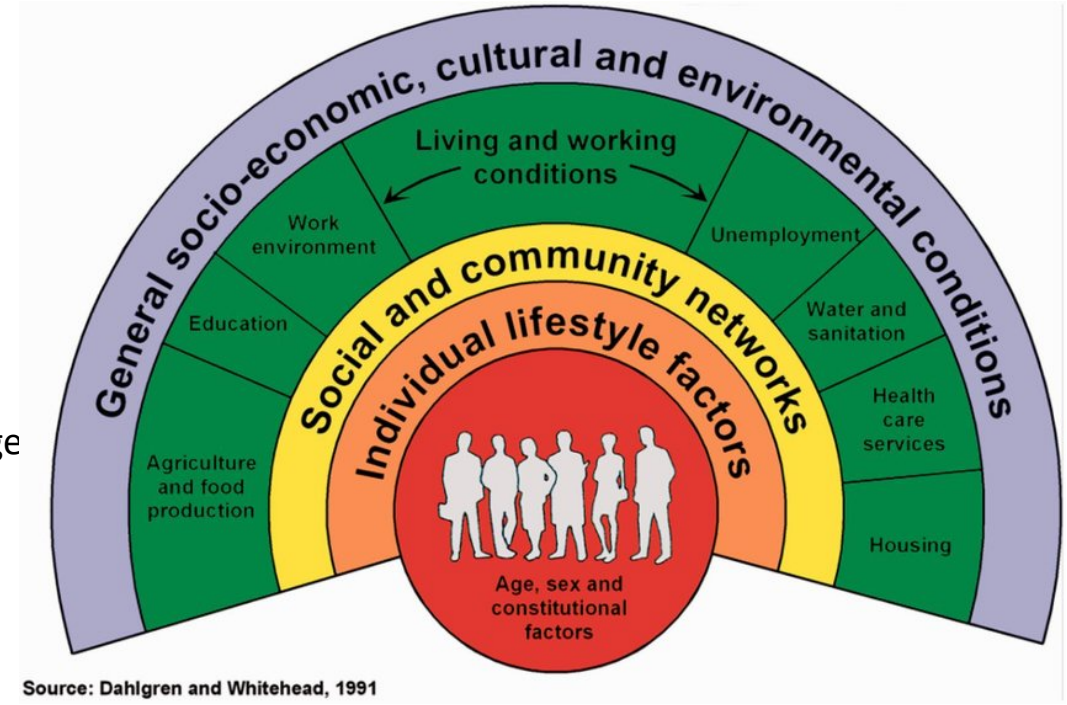
Unequal health impacts of Air Pollution

The impact and degree of adverse effects of air pollution vary between individuals. This is due to a combination and variety of factors both due to the individual and external factors. These are often termed 'vulnerability', susceptibility' or 'sensitivity', and are often used interchangeably.

'Vulnerability' results in unequal health impacts from air pollution. Some factors include those innate to an individual, such as their age and their genetically regulated capacity to metabolise inhaled pollutants, and those that are acquired, such as the presence of respiratory or heart disease. Together, these influences are reflections of an individual's biological 'susceptibility'.

In addition, vulnerability includes environmental, social and/or behavioural factors that determine an individual's level of exposure and their capacity to manage it; these factors include, co-exposures in their living and working environments, for example schools and workplaces, their proximity to exposures.

Finally, there may be differences in peoples' ability and opportunities to minimise exposure to air pollution and also equitability to access treatment and healthcare.



Source: Dahlgren and Whitehead, 1991

Vulnerability enhances the impact of even small increases in exposure to air pollution.

On the contrary, reductions in pollution levels may lead to pronounced health benefits in population groups with the highest vulnerability.

What are the influences of Air pollution on Health? Air Quality

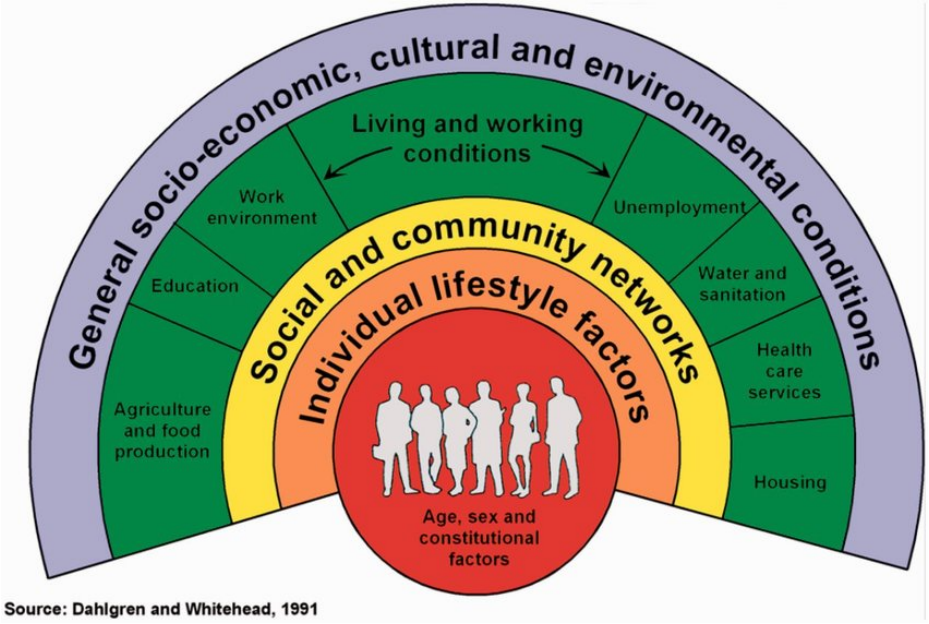
Reasons for Vulnerability

Although air pollution in harmful to everyone, some people have disadvantages that results in the greater impact of air pollution:

- ***Non modifiable factors***
  - Genetics: the body's defences against hazards like air pollution are partly controlled by our genes
  - Age: Older people are more vulnerable to the harmful effects of air pollution. Air pollution can also harm the health of children, starting from effects in the womb
  - Some health problems, such as already having heart and lung conditions, can make a person more vulnerable to harm from air pollution.

- ***Behavioural risk factors***
  - Being overweight can also make people more vulnerable to the harmful effects of air pollution
  - Good diets that are rich in nutrients, vitamin and mineral can give protection whereas poor diets do not have this protection

- ***Environmental factors***
  - Those living or working on busy roads are more exposed to air pollution
  - Unhealthy housing (see slide 7), with poor ventilation



Source: Dahlgren and Whitehead, 1991

- ***Social economical***

  Deprivation increases predisposition to risk factors

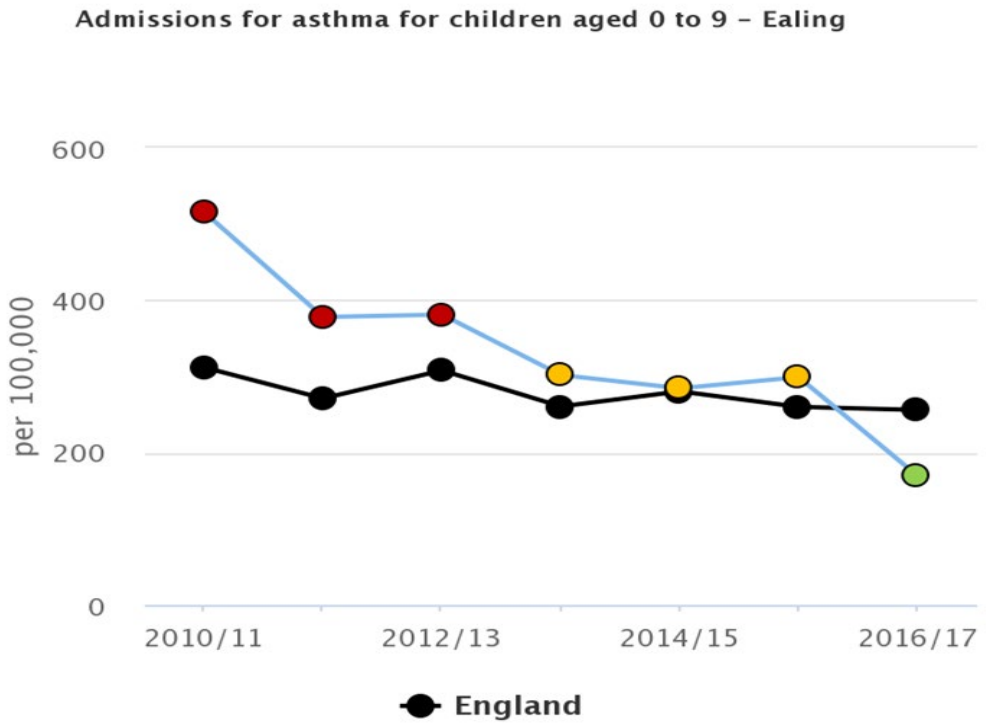
  There is a social-gradient in terms of the cumulative impacts of health risks across the life course.

What are the influences of Air pollution on Health? Air Quality

Reasons for Vulnerability for children

- Children are at a greater risk than adults from negative health effects of air pollution, this due a combination of their environment, their physical function and how they spend their time.
- Children are vulnerable to air pollution, during pregnancy and in their earliest years, as the function of organs such as their lungs, hearts and brain are still maturing throughout childhood.
- Children exposed to air pollution in early life are more likely to experience adverse health outcomes as they mature into adulthood. Exposure to air pollution early in life increases the risk of chronic lung disease in adulthood, as well as predisposes individuals to cardiovascular disease later in life.
- There has been a recent decline in Ealing's rate of hospital admissions for asthma in children under 10 years, with rates in 2016/17 being lower than the national average.

Figure 4: Rate of childhood (0-9yrs) hospital admissions for Asthma in Ealing, 2010-2017



What Works? Air Quality

Effective Principles

- **Different air pollutants should be considered and tackled together**
- **Reduce air pollution at source to mitigate the consequences**
- **Effective strategies require a coherent approach**
- **Improving air quality can go hand in hand with economic growth**
- **Some groups may need particular support**
- **Local authorities need to work together**

Effective interventions from PHE review of evidence

Interventions on traffic-related pollution

- Reducing emissions from existing vehicles:
  - planning for active travel and public transport
  - Interventions that tackle immediate emissions include driving restrictions (during episodes of high air pollution)
  - Anti-idling enforcement.
- Promoting the uptake of low emission vehicles
  - reducing demand for more polluting forms of transport
  - uptake of low emission vehicles (such as low emission or clean air zones)
  - development of electric vehicle charging infrastructure
  - Cleaner buses and taxis on polluted routes,
  - lorry restrictions in urban areas

Interventions on non-traffic sources of pollution

- Reducing exposure to pollution from local airports, ports and the railway sector.
- Reducing exposure to pollution from local industry and agriculture. Technological interventions include dust abatement and primary and secondary control measures
- Adoption of a “net health gain” principle in any new policy or work programme which affects air pollution. Any new development should be clean by design and would reduce pollution, support walking, cycling and clean public transport, as well as providing charging points for future ultra-low emission vehicles.

Interventions on public behaviour

- Raising awareness of air pollution and health. Local interventions include: awareness campaigns, and hosting or participating in events such as Clean Air Day.
- Providing information and advice to businesses and the public explaining how people can minimise their contribution to air pollution. Use of behavioural change interventions to promote active transport, promotion of public transport, and no-idling campaigns.
- Providing information and advice to the public explaining how people can minimise their exposure to air pollution, e.g. provision of day-to-day air quality notifications and exposure reduction programmes providing information about less polluted travel routes and times of day.

Assets and services - National/ Local Plans — Air Quality

National Plans

Mayor's Air Quality Strategy: Key Objectives

- Reducing exposure, and tackling inequality
- Achieve legal compliancy for UK and EU limit on major air pollutants through working with London boroughs
- Achieving new tighter air quality target - to meet WHO guidelines by 2030
- Transitioning to a zero emission London

Three new strategies:

London Environmental Strategy

- Polices to ensure that reductions in climate change
- Decrease gas emissions, increased green space

Mayor's Transport Strategy:

- Includes targets to improve Air Quality
- Promote sustainable active modes of travel
- Reduce the need car use generally

The London Plan:

- Focuses on the spatial policies
- Key policies on "good growth" design led solutions

Actions:

- Modelling air quality trends in London
- Air quality alerts- on London public transport systems
- T-Charge for older polluting vechicles since 2017
- Introduction of the Ultra-Low Emission Zone 2019-2021

Local Plans

Ealing Council Air Quality Action Plan (Draft)

Cleaner transport: road transport contributes to around half of air pollution in London. We need to incentivise a change to more walking, cycling, public transport and ultra-low emission vehicles (such as electric).

• Public health and awareness raising: increasing awareness can drive behavioural change to lower emissions as well as to reduce exposure to air pollution

• Delivery servicing and freight: light and heavy goods vehicles (usually diesel-fuelled), vehicles with high NO_2 emissions

• Council fleet actions: cleaning our own fleet of light and heavy goods vehicles, usually diesel-fuelled vehicles with high NO_2 emissions to lead by example.

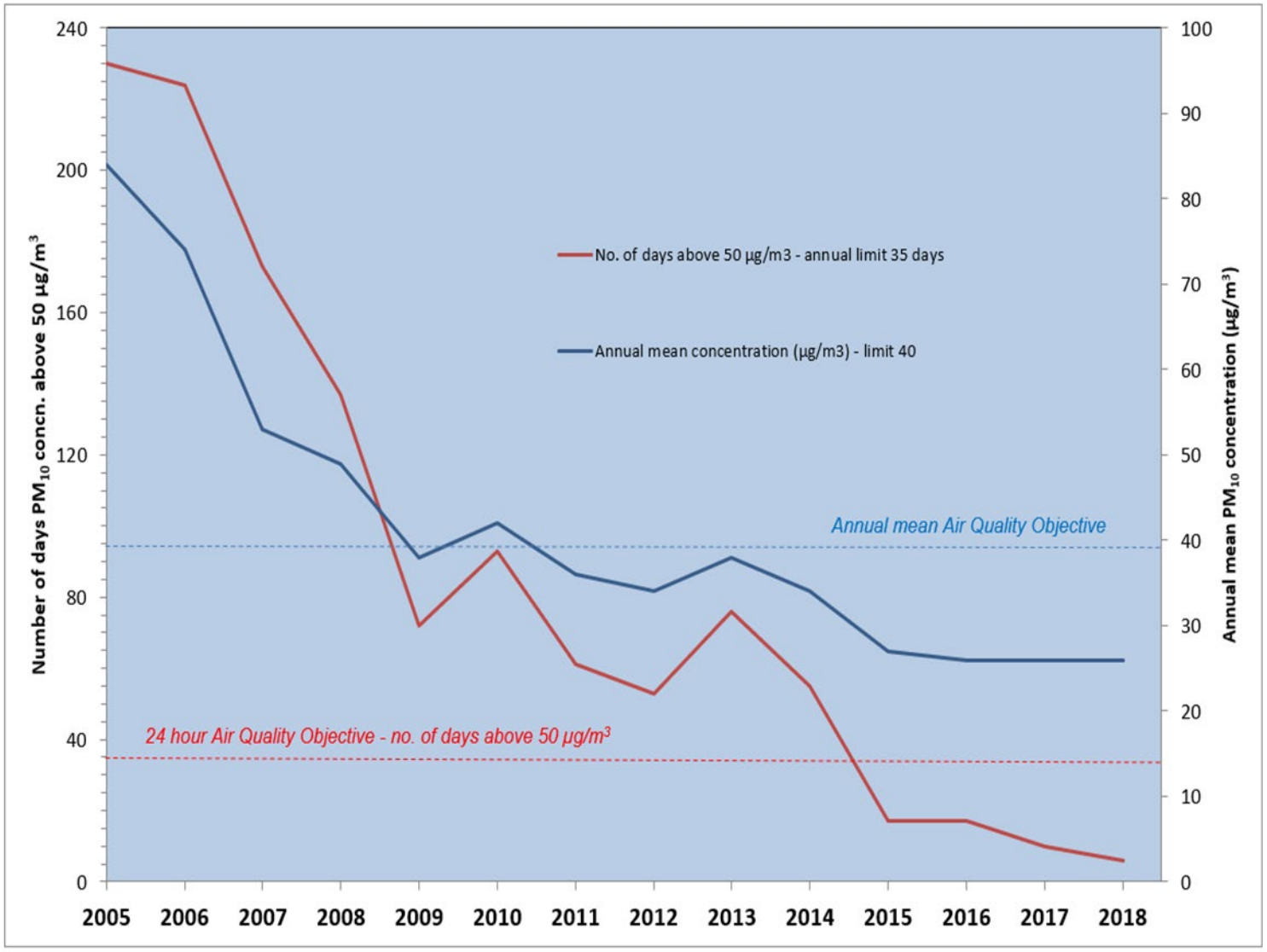
• Cutting emissions from developments and buildings: this accounts for about 15% of the nitrogen oxides (NO_X) emissions

• Localised solutions: these seek to improve the environment of neighbourhoods through a combination of measures

1. To undertake co-ordinated monitoring, advisory and enforcement activities with the Environment Agency to achieve further reductions in particulate emissions from waste management facilities in the borough.
2. To minimise human exposure to air pollution through the application of appropriate mitigation measures for new developments.

Targets and Outcomes

Air Quality



Acton Horn Lane Case Example

The Low Emissions Strategy

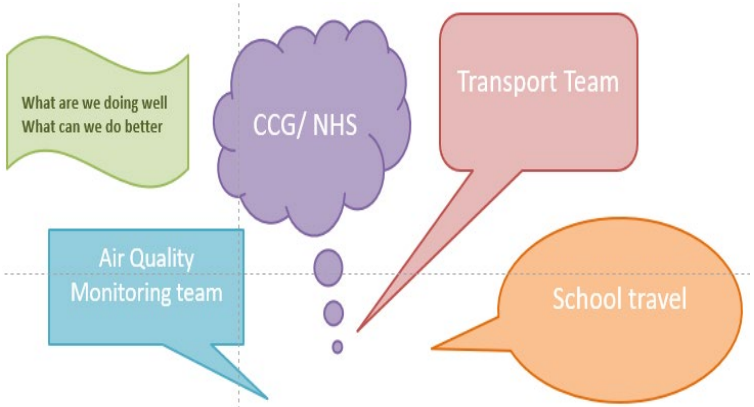
The Low Emissions Strategy (LES) from earlier air quality strategy commitments 2003, Acton Goods Yard, Horn Lane provided a framework for voluntary agreement between the site operators and Ealing Council to reduce emissions and improve local air quality.

It aimed to secure a commitment from each of the occupiers to take all reasonable steps by providing good practice measures to reduce emissions. These include measures relating to site management, staff training, visitor and HGV driver training, monitoring, inspection and maintenance, water dust suppression, HGVs and mobile machinery, materials handling and storage and conveyors. It goes on to provide a checklist for occupiers of Acton Goods Yard.

The voice: Stakeholders views

Within limited resources, we need to take ownership of our role and continue to commit resources to this ongoing priority of improving the lives to residents by improving local air quality.

As a council, we want to be listening and agile in responding to air quality issues that have arisen locally



Our assets are the combination of influence, relationships with local businesses, and regulatory functions to formulate local solutions in improving Air Quality

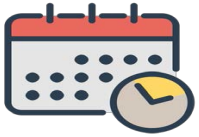
We are also aware that there are air quality issues are beyond the sole control of the Council. We need to continue to increase our partnership with our colleagues from the GLA, NHS, Environment Agency and other local authorities in improving our influence and partnership to support coordinated strategic approaches, such as tackling the throughput of traffic on a major route through Ealing.

Schools are a great way to engage with a wide audience and pupils can help to deliver important messages back to their families. It would be very useful to have officers dedicated to delivering air quality awareness to schools, supporting schools to encourage families to reduce air pollution

More integrated working between Public Health, Transport and Highways including looking at where financial resources are being used. Cross teams involvement in priority projects and consultations to support improvement in air quality: e.g. Let's Go Southall and Heathrow Expansion

Future need

Air Quality



The population of Ealing is likely to grow from 348,000 in 2016 to 394,000 by 2036 – an annual growth rate of 0.7%.

Heathrow Expansion

- Transport team and public health will need to be actively involved and engaged in Heathrow expansion discussions to ensure appropriate mitigation and best provisions for council residents
- There is a future need for councils as stakeholders to pursue joined-up approaches with evidence based briefings to support consultation responses to ensure impacts and mitigation are considered
- Reduce health inequalities and mitigate impacts due to air quality as a result of increase potential freight and travel, promotion on active transport, and public transport

London Plan/ Transport Strategy

- Expansion of the Ultra-Low Emission Zone to Greater London areas (including EB from 2020)
- The Mayor of London set an aim for a 28% reduction in NO_2 road transport emissions in 2021
- To promote the use of active travel modes, by stimulating mode shift to active travel modes
- To introduce differential parking charges based on vehicle emissions to encourage the use of smaller, less polluting vehicles
- Use plants and greenery to act as a barrier and absorb traffic-based pollution
- To introduce no-idling zones where possible around schools

Public Health/ NHS

- Greater links between NHS CCG and Ealing Council to improve Air pollution awareness and alerts to local communities.
- Greater joined-up working with stakeholders between council and CCG on air quality, including Air Quality discussions annually in Health Protection Forums
- Commitment to reducing air pollution in all NHS activities as per NHS long term plan

Ealing Plan

- Developing a policy framework through the Ealing Plan which promotes the role of green infrastructure in reducing exposure to air pollution
- Consideration for new developments include the use of innovative housing designs that are healthy and support good air quality including commitments for arrangements e.g. for gas heating.
- Promoting active travel by healthy urban design such as adequate secure cycle storage is available for each new home built and plug-in technology for hybrid/electric vehicles

Recommendations Air Quality

Key Principles

1. Different air pollutants should be considered and tackled together
2. Reduce air pollution at source to mitigate the health consequences
3. Effective strategies for addressing air pollution require a coherent approach to policy development
4. Improving air quality can go hand in hand with economic growth
5. People with vulnerability to air pollution need proportionate support
6. Local authorities need to work together across London

The below recommendations should be incorporated into Air Quality Action Plan and Ealing Local Plan with timescales agreed with teams

Effective interventions on traffic-related pollution

- Local authorities work with partners to ensure the Local Plan, local transport plan, and other key strategies identify the approach to addressing air pollution, including enabling zero- and low emission travel and developing buildings and spaces to reduce exposure to air pollution.
  - Work with the GLA and TFL To promote the use of active travel modes, by stimulating mode shift to active travel modes, taking account of safety and accessibility issues
  - Directing development to sustainable locations, which are well connected to sustainable modes of travel or within close proximity of town centres,
  - Reintegrate land uses, including specifically places of work and living, in order to reduce the length of journeys
  - To introduce differential parking charges based on vehicle emissions to encourage the use of smaller, less polluting vehicles.
  - To introduce no-idling zones where possible around schools
  - Proportionate universalism approach to promote active travel modes in primary school children. This includes a universal offer as well as selecting priority schools using criteria that focusses on air quality. These schools should continue to receive support and funding.

Interventions on non-traffic sources of pollution

- Working with other councils in West London on the Heathrow Airport consultation and planning response
- Recommend that new developments where gas heating is proposed are required to install ultra-low NOx boilers and to ensure that the best possible emissions performance is secured from combined heat and power and biomass installations

Interventions on public behaviour

- NHS commissioners ensure that commissioned services provide advice on what to do when outdoor air quality is poor at routine health appointments.
  - Sending air text alerts on pollution levels through CCG channels to general practices and community providers to raise awareness of high pollution in the borough and promote precautionary measures
- Running awareness campaigns such as the ‘enormous walking bus’ initiatives to promote active travel and explain the impacts of air pollution due to vehicle idling in priority areas
- Raise awareness of health impact of second hand smoke through existing campaign channels

Glossary

Air Quality

Attributable Deaths
The number of deaths attributed to air pollution is an estimate and does not represent the actual number of individuals whose length of life is shortened by air pollution. This is because, air pollution is rarely the only cause of death but rather contributory factor. This means that it is likely that air pollution contributes to a small amount to death of a larger number of exposed individuals rather than being solely responsible for the number of deaths equivalent to the calculated figure of 'attributable deaths'. However the true distribution in the population is unknown.

Years of Life Lost
This takes into account both the attributable death estimate and the likely age of death to give an estimate of years lost due to air pollution

Particulate matter (PM):
Material suspended in the air in the form of minute solid particles or liquid droplets. Airborne PM includes a wide range of particle sizes and different chemical constituents. It consists of both primary components, which are emitted directly into the atmosphere, and secondary components, which are formed within the atmosphere as a result of chemical reactions. Of greatest concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Air Quality Objectives are in place for the protection of human health for PM_{10} and $PM_{2.5}$ – particles of less than 10 and 2.5 micrometres in diameter, respectively.

Oxides of Nitrogen (NO_X):
Combustion processes emit a mixture of nitrogen oxides (NO_X), primarily nitric oxide (NO) which is quickly oxidised in the atmosphere to nitrogen dioxide (NO_2).

Ozone (O_3):
Ozone (O_3) is not emitted directly into the atmosphere, but is a secondary pollutant generated following the reaction between nitrogen dioxide (NO_2), hydrocarbons and sunlight. Ambient concentrations are usually highest in rural areas, particularly in hot, still and sunny weather conditions which give rise to summer "smogs".

NRMM *slide 6 legend:
Non Road Mobile Machinery causing resuspension from human activity, in particular moving vehicles and cleaning, resuspends particles, regenerating airborne contaminants

Further information

Resources

Key references

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