

The invisible threat:

how we can protect people from air pollution
and create a fairer, healthier society



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Forewords

A health emergency

Over the last year, the COVID-19 pandemic has pushed lung health to the front of all our minds. It has turned the world upside down and shone a spotlight on the devastating impact that respiratory conditions can have on people's lives. It has shown us the importance of building resilient and healthy societies that can better withstand shocks, both now and in the future.

That's why I'm so pleased to introduce our new report, which sets out actions policymakers can take immediately to protect people from toxic air and ensure we build back better from COVID-19.

At Asthma UK and the British Lung Foundation we're fighting for a world where everyone can breathe clean air with healthy lungs. Just as no one should have to drink dirty water, no one should be forced to breathe dirty air. For decades we've known about the risks of toxic air but there is still far too little being done to protect those most at risk – those with a lung condition, pregnant women, children, older people and those living on the lowest incomes.

No one should have to protect themselves from the air around them, but until policies deliver cleaner air in the UK, it is the responsibility of governments to put plans in place to safeguard people.

It's time now for a seismic shift in the way we tackle air pollution. The evidence of its dangers is overwhelming, and people's lives are being put at risk every day. It is stunting the growth of children's lungs, causing new lung conditions and worsening existing ones. It's no exaggeration to say that this is a health emergency that demands urgent action.

We hope this report urges policymakers to make immediate changes that will protect all our lungs from harm, and deliver change for the millions of people currently living with a lung condition in the UK. We know that if the recommendations in this report are followed, lives will be both improved and saved. Respiratory health has been underprioritised for far too long. It's time to turn the tide, take bold action on toxic air, and protect everyone's lungs.



A handwritten signature in black ink, appearing to read 'Sarah Woolnough'.

Sarah Woolnough
Chief Executive, Asthma UK and the British Lung Foundation
Co-Chair of the NHS England National Respiratory Board

A tipping point for change

You might not be able to see it but the air pollution that fills our towns and cities poses a very real and potent danger to our health. These toxic gases and tiny particles cut thousands of lives short every year and affect the lives of many more. This report sets out this stark picture in vivid detail and should be a wake-up call for us all.

As a practising respiratory consultant and clinical researcher on air pollution I see and hear about the damaging effects of air pollution every day. It has been well known for many years that air pollution is a trigger for lung conditions like asthma, and there is mounting evidence it is also a cause. Its damaging effects, from the moment we are conceived until old age, are well-documented; with evidence linking it to lung damage, cancer, cardiovascular disease and even cognitive impairment.

Last year I gave expert testimony to the inquest of Ella Kissi-Debrah, a young girl from London who had severe asthma. For years health professionals had been baffled by Ella's symptoms and the severity of her condition, yet on reviewing the evidence it became clear to me that toxic air had played a significant and deadly role. Air pollution put Ella's condition on a knife-edge and forced her family to live in constant fear. The coroner agreed and for the first time anywhere in the world, air pollution featured on someone's death certificate.

This landmark case cannot go ignored. We in the medical profession and the general population have to stand up and say something. There is no debate that air pollution is a serious public health problem, yet awareness in the health community is still very low and much more needs to be done by governments to safeguard people's health.

That's why I'm delighted to support this report and call for immediate action from the government to produce an air pollution health protection plan. For far too long people with lung conditions have been forced to live in fear of the air around them. They deserve action now and the health community needs to stand alongside them.



Stephen T. Holgate

**Professor Sir Stephen Holgate CBE,
FMedSci**
MRC Clinical Professor of
Immunopharmacology
UKRI Clean Air Champion and Special
Advisor to the RCP on Air Quality

Executive summary and recommendations

Air pollution is a health emergency. It is harmful for everyone, but some groups are being hit hardest – pregnant women, children, older people, those living with lung conditions and those on the lowest incomes. This group potentially also includes those experiencing long-term breathing challenges from COVID-19. It's an invisible killer that is impacting people's lives every day.

Last year, for the first time anywhere in the world, air pollution featured on a death certificate – that of Ella Kissi-Debrah, a young girl from London with asthma. This landmark ruling found that not enough was done to protect her, that health professionals knew far too little about air pollution to help her, and that her family weren't provided with the information they needed to do what they could to reduce her exposure to air pollution.

These trends are stories we hear all too often. For this report, we spoke to people living with lung conditions, such as asthma and chronic obstructive pulmonary disease (COPD). They told us that air pollution is trapping them in their homes, that it often triggers flare-ups and has even led to some of them being hospitalised. It's worsening their mental health and reducing their ability to socialise and access treatment. Many of them told us it remains a major barrier to them walking and cycling, reducing their ability to be part of the solutions needed to tackle toxic air.

The health effects of air pollution are well documented, and politicians have known about its devastating health effects for well over a decade, yet there is no comprehensive public health plan in place to protect people from this harm. Health professionals aren't taught enough about air pollution in their training, there is no national system to warn people when air pollution is going to be high, and this report finds there are toxic levels of pollution outside our care homes, hospitals, GP surgeries and schools. New analysis in this report finds:

- **Over a quarter of care homes in England** (26%) are located in areas with fine particulate matter (PM_{2.5}) over levels recommended by the World Health Organisation (WHO), putting older people and those with health conditions at unnecessary risk.
- **Nearly a third of English schools and colleges** (31%) are located in these areas of high PM_{2.5}, putting children's growing and fragile lungs at risk.
- **Nearly 3,000 English medical centres** (37% of all GPs and 29% of hospitals) are located in these areas of high PM_{2.5}, putting vulnerable groups, as well as healthcare professionals, at unnecessary risk.

Additionally, legal targets in the UK are failing people's health. Targets for fine particulate matter are twice as high as those recommended by experts at the WHO. Our report concludes that tackling air pollution is critical

to help improve the lives of people with a lung condition, reduce asthma attacks, protect the NHS, reduce health inequalities, prevent new lung conditions, and improve the resilience of the UK population in the context of COVID-19 recovery.

We are calling on the UK Government to:

- **Produce a health protection plan for England to safeguard those most at risk** from the effects of toxic air. It should sit with a newly created cross-government **air quality minister** who will oversee the development of the health protection plan and set out a cross-departmental framework for immediate action.

As a priority, we are calling on all four governments to:

- **Roll out an improved nationwide air pollution alerts system** that tells the general public when air pollution is due to be high and is integrated with weather forecasts. The system should directly warn schools, care homes, GP surgeries and hospitals and be accompanied by robust health advice so people know how to protect themselves.
- **Set out a comprehensive health education programme to equip health professionals** with the skills and knowledge they need to protect patients from air pollution. This should focus on training for those working in primary care, secondary respiratory and cardiovascular care, maternity units and geriatrics.
- **Fund national public health campaigns on air pollution** that set out clear health advice for people to protect themselves, as well as guidance on how to reduce their own contribution.

- **Establish Schools Air Pollution Taskforces**, chaired by senior education ministers, to make sure that every polluted school is given the tools they need to protect pupils from harm. This must include plans for a national schools audit programme and the funding for local authorities to protect young lungs when they are at and travelling to school. Taskforces must lead on effectively tracking the progress of schools to ensure action is taken.
- **Set out funding and guidance for traffic reduction measures around care homes, schools and hospitals.** This should provide local areas with the best available evidence to ensure pollution reduction is targeted to the areas where at-risk groups are most likely to be.
- **Commit to inclusive walking and cycling policies that enable everyone to be part of the solution.** This should include the funding and extension of safe cycling paths, the banning of pavement parking, and financial support for e-bike purchase.
- **Ensure health bodies and employers introduce programmes to encourage (Covid-safe) public transport and walking and cycling,** in order to support staff to move towards cleaner forms of travel and reduce emissions around care homes, hospitals and GP surgeries.
- **Be underpinned by world-leading health targets set out in law.** Targets need to be updated in all four nations and enforced. Currently Scotland is the only nation where WHO limits for PM_{2.5} are in law. We want the Environment Bill, the proposed Clean Air (Wales) Bill and future Northern Ireland legislation to put new WHO limits in law, alongside a commitment to continual improvement.

Local and regional areas should:

- **Roll out strong clean air zones and low emission zones across cities and city regions** to lower pollution from all vehicles and support people to move to cleaner modes of travel. These should include financial incentives for people with long-term lung conditions who may need to use their car to move to cleaner options.
- **Ensure all clean air policies deliver maximum public health impacts** and are integrated with wider respiratory health plans, such as health and wellbeing boards and sustainability and transformation partnerships.
- **Work closely with care homes, hospitals and GPs** to prioritise emissions reduction around these areas and exposure reduction for at-risk groups.

Local and national policymakers should ensure that all air quality policy:

- **Takes a ‘public health first’ approach** that seeks to address health inequalities. This should include the setting of ambitious health targets for all clean air policies, as well as the publication of equalities impact assessments.
- **Is co-designed with communities, specifically those who are most at risk** and under-represented in policymaking. This is particularly important for health information provision and air pollution alerts.
- **Has enforcement mechanisms in place that ensure the best possible health outcomes are delivered.** In particular, governing

bodies such as the new Office for Environmental Protection should hold national and local policymakers to account and monitor the delivery of ambitious health targets.

Local and national policymakers should also commit to funding the following research to drive forward change:

- **Investigating the mechanisms by which air pollution** contributes to the development of asthma and causes asthma attacks, leading to the development of targeted treatments for the millions of people who have poorly controlled asthma.
- **Developing an exposure indicator for groups vulnerable** to the effects of air pollution, so that we can better understand their exposure and monitor progress.
- **Exploring air pollution’s contribution to health inequalities to better mitigate its effects.** Specifically, we need to learn more about links with gender, and the relationship between ethnicity, social deprivation, and air pollution.
- **Examining the different ways air pollution affects different lung conditions.** For instance, there is emerging research linking air pollution with interstitial lung disease, but we need to understand far more so that professionals can better treat and manage people’s health.
- **Evaluating different policy interventions and the public health outcomes they deliver.** This knowledge should be scaled up and shared as best practice to help local areas design impactful and sustainable clean air schemes.

I Introduction

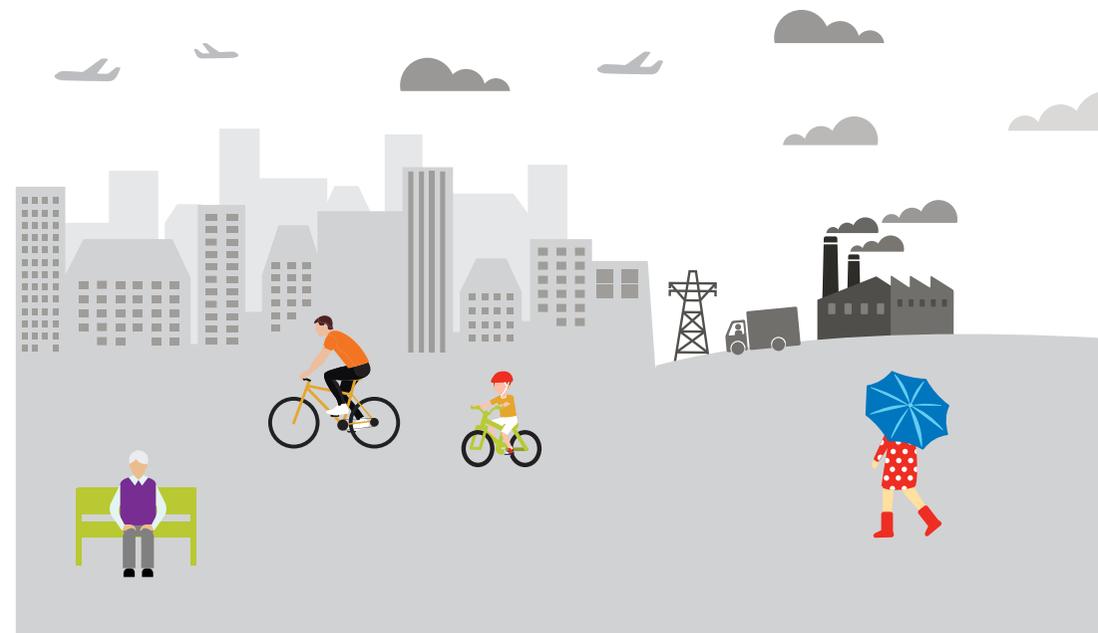
Air pollution is a significant cause of poor health and the single biggest environmental threat to health.¹ There is no safe amount for anyone to breathe in, and levels in the UK are extremely damaging to health.² Air pollution can affect us all, but we know that pregnant women, children, older people, people living with lung conditions and those on the lowest incomes are being hit the hardest. This is likely to include people experiencing long-term breathing challenges from COVID-19.

Our report examines the unfair ways air pollution is affecting the most disadvantaged communities. It sets out new analysis showing people who are the most susceptible are being exposed in the places they should feel most safe, and calls for politicians to immediately commit to air pollution health protection plans and stronger clean air laws before it's too late.

During the COVID-19 pandemic we saw a substantial shift in the way people got around due to travel restrictions. As less people drove on the roads and worked from home, levels of some pollutants plummeted in cities and we had a glimpse of what cleaner air could feel like. One in six lung patients told us they'd noticed improvements to their condition during the first wave of lockdown.³ We've also seen an influx of government funding for walking and cycling to enable social distancing and help people avoid public transport. While traffic levels are lower now, before the third COVID-19 lockdown traffic had returned to near normal pre-pandemic levels⁴ and could rocket even higher when restrictions lift, given fears around travelling on public transport. Therefore it's essential we take ambitious

action now to reduce emissions and support people to use cleaner forms of transport in the long term.

Given that many people with long-term breathing challenges from COVID-19 are also likely to be more susceptible to air pollution, protecting at-risk groups and improving the nation's lung health has never been more critical. Now is our opportunity to build back better and healthier, to ensure that children grow up breathing air that isn't damaging their health or their futures.



Nitrogen dioxide – NO₂

What is it?

A gas.

How bad is it?

The UK has been breaching legal limits for NO₂ for the last ten years and was first successfully taken to court five years ago due to this breach. Yet last year 75% of our air quality reporting zones were still breaching EU legal limits.⁵

Where does it come from?

At the roadside 80% of this pollution comes from road transport.⁶

Fine particulate matter – PM_{2.5}

What is it?

Tiny particles of solids and liquids in the air, such as dust or dirt. Referred to by their diameter in size, so PM_{2.5} has a diameter smaller than 2.5µm: 30 times smaller than the average human hair.

How bad is it?

Around a third of people in the UK are breathing levels of PM_{2.5} over what is recommended by the WHO. We aren't breaking the law on this pollutant but that's only because legal limits are twice as high as those recommended by the WHO (except in Scotland).⁷ Improvements in this pollutant have stalled in recent years.

Where does it come from?

Domestic wood and coal burning (38%), industrial combustion (16%), road transport (12%) and industrial processes (13%).⁸

2.2 Who is most at risk from toxic air?

Air pollution is bad for everyone and breathing it in throughout our lives poses a threat to us all. It increases our risk of lung cancer and cardiovascular disease, and has been linked to up to 36,000 people dying early each year in the UK.⁹

Health effects of air pollution

Short-term:

- inflammation and irritation of the lining of the airways, which can cause symptoms such as coughing and difficulty breathing.
- asthma attacks, heart attacks or COPD flare-ups for people with lung conditions, including potential hospitalisation.

Long-term:

- increased chance of early death, lung cancer and cardiovascular disease
- damage to developing lungs and brains during pregnancy
- increased chance of low birth weight and premature birth
- likely to cause new cases of asthma
- stunted and smaller lungs in children, increased lung infections and likelihood of future lung problems
- potentially increased risk of type 2 diabetes and dementia.



However, the following people are more susceptible than others due to their underlying health and resilience.

2.2.1 Pregnant women

Air pollution puts pregnant women and unborn children at risk of lung damage, which compromises their chance of a happy and healthy future. The Royal College of Physicians and the Royal College of Paediatrics and Child Health's landmark 2016 report *Every breath we take* showed that developing organs are at particular risk, with air pollution affecting us from our earliest stage of development in the womb throughout our lives.¹⁰

Air pollution particles have been shown to reach the foetal side of the placenta.¹¹ Links have been shown with lower birth weight^{12,13} and preterm birth,¹⁴ both which have been linked with underdeveloped lung growth. Such organ damage from the womb, and its health effects, may sustain across a person's life.¹⁵

2.2.2 Children

Children are particularly susceptible as they have a higher metabolic rate so they breathe more air than an adult does, relative to their size.¹⁶ Breathing polluted air can cause irreversible damage to growing lungs, with estimates suggesting children growing up in highly polluted areas are four times more likely to have reduced lung function in adulthood.¹⁷

Exposure to high levels of air pollution can increase respiratory symptoms in children, including increased wheeze.¹⁸ And there is growing evidence it causes new cases of asthma.^{19,20} Emerging evidence has even shown damage to children's brains and cognitive development.²¹

2.2.3 Children and adults living with a lung condition

For the millions of people in the UK today who live with a lung condition, such as asthma or chronic obstructive pulmonary disease (COPD), air pollution poses a real and immediate threat to their physical and mental health. A spike in air pollution levels can lead to symptoms getting worse, flare-ups such as asthma attacks, and even hospitalisation. This is having a significant and avoidable impact on our NHS, with an estimated additional 20,000 hospital admissions each year linked to air pollution episodes.²²

There is robust evidence, including from BLF-funded research, showing a link between high levels of air pollution and increased numbers of patients with breathing problems presenting at hospitals and GP surgeries.^{23,24} These devastating effects were well documented in the case of Ella Kissi-Debrah, where the coroner ruled air pollution was a significant trigger for the asthma attack that proved fatal for her,²⁵ and that air pollution played a critical role in the induction of her asthma and the worsening of her symptoms.²⁶

Phillip's story

“ At three years old I was diagnosed with asthma, and at about six I was first admitted to hospital because of the impact of air pollution on my lungs. When I was nine, a nurse had to stay by my bedside because I stopped breathing several times throughout the night. I've been admitted about twenty times throughout the course of my life. I now use a Continuous Positive Airway Pressure (CPAP) machine which aids my breathing when I sleep, but for decades I dealt with poor sleep.

My asthma has had a big impact on my adult life and is directly affected by air pollution. It exacerbates my symptoms and makes me breathless. I can really feel the difference in my breathing when the weather is hot and air pollution is more concentrated. When air pollution levels are too high I'm unable to work, which means air pollution has undoubtedly contributed to the amount of sick leave I've had to take from my work.

It's very important to shift the narrative of air pollution to focus on the health impacts that it has on people like me. It's absolutely crucial that we all take action now.”

What did people living with a lung condition tell us?

We recently surveyed 2,316 people; three quarters of whom had been diagnosed with a lung condition. Those people with a lung condition told us air pollution affects their mental health, the management of their condition, and their ability to socialise and access treatment. We also surveyed over 1,000 people with a lung condition via YouGov. (Data from YouGov survey marked with *). These surveys found:

- **88%** of people with a lung condition said that **air pollution affects their health and wellbeing**.
- **63%** of people with a lung condition can **feel out of breath** and **53%** have increased coughing due to high levels of air pollution.*
- **7%** also reported that high air pollution levels have led to them being **hospitalised or seeking emergency medical care**.*
- **58%** of people with **asthma** have their condition **triggered by air pollution**.²⁷
- **60%** of people with a lung condition affected by air pollution say they've been **discouraged from leaving their home** due to air pollution at some point, with 28% feeling this way at least once a month.*

- People often had to **resort to their car** to travel around, given the way high levels of air pollution affected them when they walked.
- Air pollution has also **affected people financially** and left them unable to work.

“It’s very depressing and affects my mental health by anxiety and worry for the future.”

“Leaving the house is a hard choice every day because I know as soon as I step out of my front door, I’m being forced to breathe dirty air.”²⁸

“I’ve applied for ill health retirement from my job in London as my bronchiectasis and asthma are too strongly affected by pollution.”

2.2.4 Older people

For older people the risk of death from air pollution is higher. A review of academic studies found that deaths associated with exposure to particulate matter are twice as high among older people than in their younger counterparts.²⁹ Air pollution can exacerbate cognitive decline in older people and speed up the rate of lung function decline associated with ageing.³⁰ This susceptibility is largely linked to the increased risk of having a long-term health condition in later life, particularly true for lung conditions like COPD and lung cancer.

2.2.5 COVID-19 and people living with long COVID

Initial studies suggest that exposure to air pollution could increase vulnerability to the most severe impacts of COVID-19.³¹ While at this stage we need more research to understand any direct link, we do know that air pollution contributes to the development and exacerbation of long-term respiratory, heart and circulatory diseases. These are some of the very diseases which can increase people's risk of severe outcomes from COVID-19, including hospitalisation and death.

We need to see more research, but it's likely that people living with long-term breathing challenges from COVID-19 may also be more affected by breathing in air pollution, due to their weakened lung health.

2.2.6 Families and people living on the lowest incomes

As outlined by BLF president Sir Professor Michael Marmot in his recent report on health equity, life expectancy in the UK has stalled in the last ten years, inequality has widened, and years of ill-health have increased.

John's story

“ I spent the whole of my working life driving a big lorry to and from the docks. I had no idea the harm all the diesel fumes were doing to me, and I've now developed asthma. This limits what I can do and I take medication on a daily basis. I live on a busy road and my doctor tells me that the poor air quality makes my condition worse. I do think the government needs to bring in stricter air quality standards not just to protect people like me with lung conditions, but my grandchildren so their lungs stay healthy.”

The report found that among other determinants of health, air pollution is playing a significant role in worsening health inequalities.³²

“Health inequalities are not inevitable and can be significantly reduced... avoidable health inequalities are unfair and putting them right is a matter of social justice.”

Professor Sir Michael Marmot, The Marmot Review

Studies suggest that many of the poorest people in the UK are more likely to live near busy main roads.³³ In 2011, 85% of people living in areas with illegal levels of NO₂ were also the poorest 20% of the population.³⁴ This is a huge injustice given there is less car ownership in lower income groups so it is often the very people who contribute the least to air pollution who are being most burdened by its health impacts. Studies also suggest that many

BAME communities tend to be more exposed to higher concentrations of air pollution, but more research is still needed to fully understand this relationship.³⁵

“When [my health] first deteriorated I lost four months off work, was unwell for years after and have never recovered to full fitness. I’ve got off the bus or out of my car and taken a breath and the asthma has exacerbated. I totally avoid the city centre as I struggle to walk through without symptoms, once in 10 years I’ve gone into the city without symptoms. I have family loyalties and can’t afford to move.”

Person with a lung condition

In terms of greater susceptibility to toxic air, lung disease continues to be a major factor in health inequalities. Someone from the most deprived section of society is two-and-a-half times more likely to have COPD, and nearly twice as likely to develop lung cancer as someone from the least deprived section of society.³⁶ Likewise, in 2012, incidence rates of asthma were 36% higher in the most deprived communities than in the least deprived.³⁷ COVID-19 has shaken up existing societal and economic structures, while exposing the harsh realities of health inequality across the UK. Communities living with multiple deprivations are not only exposed to the highest levels of air pollution,³⁸ but are also being disproportionately impacted by the pandemic,³⁹ on top of the multitude of other health and social impacts they may face.

“We must account for pollution within the health inequalities agenda and address and plan to prevent/reduce pollution in the context of equality and fairness.”

Prof Dame Sally Davies, Former Chief Medical Officer for England⁴⁰

Recommendations

Decision makers across the UK should ensure that all air quality policy:

- **Is co-designed with communities, specifically those who are most at risk** and underrepresented in policy development. This is particularly important for health information provision and air pollution alerts.

Decision makers should commit to funding the following research to drive forward change:

- **An investigation into the mechanisms by which air pollution contributes to the development of asthma and causes asthma attacks**, leading to the development of targeted treatments for the millions of people who have poorly controlled asthma.
- **The development of an exposure indicator for groups vulnerable** to the effects of air pollution, so that we can better understand their exposure and monitor progress.
- **An assessment of air pollution’s contribution to health inequalities, in order to better mitigate its effects.** Specifically, we need to learn more about links with gender, and the relationship between ethnicity, social deprivation, and air pollution.
- An **examination of the different ways air pollution affects different lung conditions.** For instance, there is emerging research linking air pollution with interstitial lung disease, but we need to understand far more so professionals can better treat and manage people’s health.

3 Dirty air where people should feel most safe

Not only are pregnant women, children, people living with lung conditions, older people and those on the lowest incomes the most susceptible to air pollution, they are the ones being unnecessarily exposed to toxic air in the very places they should feel most safe.

New analysis we commissioned from Cambridge Environmental Research Consultants (CERC) finds that levels of PM_{2.5} around many care homes, hospitals, schools and GP surgeries across England are extremely high. In 2019 the following places were in areas with levels of PM_{2.5} over those which are recommended by the WHO:

 **Nearly a third of English hospitals (317 – 29%)**

 **Over a third of GP surgeries in England (2,644 – 37%)**

 **Nearly a third of English schools and colleges (8,535 – 31%)**

 **Over a quarter of care homes in England (4,382 – 26%)**

What's even worse is that there is no comprehensive picture available of what at-risk groups are being exposed to on a daily basis.

Our analysis provides a snapshot of the toxic air people are breathing in.

By mapping the Office for National Statistics' population estimates from mid-2019 against local authorities that had levels of PM_{2.5} breaching WHO

recommendations, we find that **around six million people aged 65 and over in England are at increased risk of breathing difficulties and having asthma attacks or COPD flare-ups due to living in heavily polluted areas.**⁴¹

See how many care homes, hospitals, GPs and schools in your local area have PM_{2.5} levels above the WHO guideline by using our interactive tool: blf.org.uk/take-action/clean-air



4 Urgent public health response needed

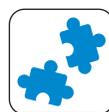
Ambitious action to reduce air pollution emissions is critical to improve people's health and save more lives. But change will take time – the end of the sale of new diesel and petrol cars isn't planned until 2030, many clean air zones haven't even started, and while walking and cycling have started to receive more attention, car travel is still dominant.

There is no safe level of air pollution to breathe in, so while work to reduce emissions is ongoing, policymakers should immediately set out plans to safeguard those most at risk, as well as urgently ramping up the delivery of policies to clean up the air.

Over the last five years, tackling air pollution has risen significantly up the agenda and secured strong cross-party support from politicians across the UK. National strategies have been published in Scotland, England and Wales (with a draft strategy out for consultation in Northern Ireland). Targets have been set to end the sale of petrol and diesel vehicles, and clean air zones and low emission zones are being set up in some polluted towns and cities.

Progress has been made, but we are yet to see the delivery of actual results. Policies are also generally failing to take a public health and holistic approach.

In particular, current air quality policy:



Is disconnected: It is often disconnected across government which is hampering a holistic and public health focus.^{42,43} For example, DEFRA's *Clean Air Strategy*⁴⁴ was published in January 2019 without any review of how it would improve human health, and it was a number of months before the Health Secretary commissioned this review from Public Health England. Action is not being driven by a central ambition, or co-ordinated across government.



Is delayed: Policy has been subject to huge delays.⁴⁵ Despite being in the pipeline for the last four years, the only clean air zone up and running is in central London, and in some areas clean air zones have been scrapped altogether, while in other areas plans have been watered down to avoid charging private vehicles. Currently only London, Birmingham and Oxford involve plans for charging for private cars – one of the largest sources of pollution on the road. It appears that many of these zones will be inadequate in reducing toxic air and protecting people's health in the shortest time possible. Likewise, the Environment Bill has also been significantly delayed and is now not expected to be in law until late 2021, delaying the opportunity for far more ambitious clean air targets that protect our health.





Lacks a focus on public health: It often fails to take a 'public health first' approach in some nations, and often lacks a strategic framework to drive forward health improvement and protect those most at risk. This approach has differed across nations, with some examples of best practice emerging in Wales (outlined on the next page), as well as co-creation with charities in Scotland. While air pollution is a welcome strategic priority for Public Health England, they often lack the funding and resources to carry out many of the recommendations in this report. Action isn't being driven centrally to achieve health outcomes or enable reporting on health impact. There is a lack of resource and funding for policies that seek to improve public education and provide health information, rather than simply reaching legal limits. This is despite governments frequently stating the importance of public health.



Is informed by inadequate air quality data: Clean air policy is rarely informed by a detailed idea of who is being most exposed to air pollution and where. Data is also often not presented in ways people can easily access or understand. Premature deaths from air pollution are reported on at local levels⁴⁶ but there are no national targets in place to improve public health, reduce exposure and improve respiratory outcomes for at-risk groups. Current air quality data is not granular enough to map individuals' exposure, and is often averaged across locations. There are often large gaps in the data available, and differences in its quality and collection.

4.1 It's time for a seismic shift on toxic air

A new strategic approach focusing on public health is urgently needed. This must be rooted in the principles of public health and set out ambitious national goals to drive progress and reporting against health outcomes. It should be integrated across government, as well as respiratory health plans such as NHS England's Long Term Plan.

4.1.1 A public health approach to tackling toxic air

By definition, public health aims to provide the maximum benefit for the largest number of people.⁴⁷ While definitions of a public health approach vary, this report focuses on the following principles that underpin the work of public health bodies across the UK:

- A duty to protect population health, specifically those most at risk
- Reduction and addressing of inequalities
- Prevention and tackling the wider determinants of health (the socio-economic, cultural and environmental conditions that shape our health), rather than focusing on solely improving services or the symptoms of health problems
- Empowerment and co-creation with the public, including health promotion and behaviour change
- Collective and holistic action from actors across government

Case study: public health approach to tackling air pollution in Wales

We spoke to the Environmental Public Health Team at Public Health Wales about the public health approach they are taking to manage air quality. They told us:

“ Recognising air pollution as a significant environmental risk to health, Public Health Wales works in conjunction with a range of stakeholders in Wales to understand risks and inform air quality improvement policy and practice.

Not only is it important to understand the available evidence in this field, but it is crucial to advance it. Public Health Wales has been especially active in the field of air quality research over recent years and has carried out several studies to explore and quantify interactions between air pollution exposure, wider determinants of health and health impacts (including inequalities).⁴⁹ Through this and other work, Wales-specific evidence has been generated to plug information gaps and advocate for change. In turn, the intelligence has been used to shape delivery of enhanced air quality management actions (across local governments, NHS and public health bodies and Wales environmental regulator) which are underpinned by core principles of public health protection and improvement and take account of a broader public health context.⁵⁰

Public Health Wales also works closely with Welsh Government to support development of integrated air quality policy. Notable outputs from this collaboration include:

- **Publication of guidance for NHS Wales** to reduce air pollution, risks and inequalities – this seeks to raise awareness amongst, and engage, wider NHS Wales colleagues in collective efforts to reduce air pollution, risks and inequalities.⁵¹
- **Publication of the Clean Air Plan for Wales.** For the first time in Wales, public health is a core theme running through all aspects of the policy to tackle air pollution in Wales. It advocates for a public health-driven approach to Local Air Quality Management risk assessment and management, new health-based air quality standards which take account of wider health influences, and better risk communications which support wider behaviour change.⁵²
- **Supporting work to consider the public health implications** of changes in air pollution observed at the time of COVID-19 first wave lockdown in Wales.⁵³”

The WHO has set out⁴⁸ the following parts of a public health approach:

- **Surveillance:** defining and monitoring the problem through the systematic collection of data and transparent reporting of this
- **Identify risk and protective factors:** strategic focus on health protection, and protecting those who are most at risk
- **Develop and evaluate interventions:** designing, implementing and evaluating tailored interventions for different groups to see what works
- **Implementation:** scale up effective policy programmes and promising interventions, evaluate their impact on health and continually monitor and adapt.

4.1.2 Emissions reduction which goes further and faster

If improving public health is set as our primary goal, it will drive forward and ramp up emissions reduction across the UK. Crucially we need to see an urgent shift away from the use of vehicles, which are the primary source of pollutants in towns and cities where the most people live.⁵⁴ Not only will further and faster action protect more people, it will deliver significant economic benefit. A recent report found that the UK economy could benefit to the tune of £1.6 billion each year if it were to achieve the guidelines set by the WHO for air quality.⁵⁵



Charging clean air zones and low emission zones have a key role in getting the dirtiest vehicles off the streets of our towns and cities. London's Ultra Low Emission Zone shows they work with a 44% reduction in NO₂ levels seen since 2019.⁵⁶ For these zones to best protect public health they need to charge all of the most-polluting vehicles and cover significant geographical areas. Air pollution doesn't stop at political boundaries, so we need to see joined up and holistic clean air zone plans across regional areas.

The strong move towards electric vehicles and hydrogen is welcome⁵⁷ but they still produce PM_{2.5} due to brake and tyre wear. We need to have fewer, not just cleaner, vehicles on the roads, with as many journeys as possible shifted to walking, cycling and public transport. There is strong public support for tackling air pollution and often this support increases when people talk about tangible public health outcomes.

Financial and political support is needed to enable business to shift towards cleaner practices, as well as financial support for people who will need to continue to drive, such as those with a lung condition resulting in mobility issues, to purchase cleaner vehicles. This shift to cleaner and active transport will deliver multiple benefits for other health challenges, including reducing obesity and improving road safety.

4.1.3 Air quality monitoring, data collection and reporting that focuses on exposure reduction

Our current understanding of exposure mostly stems from ecological models (spatial maps of environmental variables) which estimate air pollution levels across a geographical area and assume that exposure is equal for all people in that area. To better understand exposure and measure reductions for certain groups, we need to see the development of new methods to better understand exposure for individuals.

4.1.4 Stronger laws to underpin and drive change

In order to protect public health our laws must set out targets and ambitions to minimise the health effects of all pollutants. Given there is no safe level of air pollution to breathe, and the WHO are currently revising their guideline even lower, this must include a commitment to continuous improvement. At present only Scotland has WHO limits on PM_{2.5} in law.

Setting new health-based limits represents a huge opportunity for decision makers to be world leading and demonstrate their commitment to public health. Any target setting process should be driven by health throughout and should be strongly guided by health professionals and scientific evidence. We also need to see laws that set out the basis for national health protection plans to ensure they are on a strong statutory footing and that local areas have the powers they need to protect public health.

Recommendations

We are calling on the UK Government to:

- **Produce a health protection plan to safeguard those most at risk** from the effects of toxic air. It should sit with a newly created cross-government air quality minister who will oversee the development of the health protection plan and set out a cross-departmental framework for immediate action.
- **Underpin all action by ensuring world-leading health targets are set out in law**, including setting WHO standards for PM_{2.5} and other pollutants, alongside a commitment to continual improvement.

We are calling on the Welsh Government to:

- **Introduce and pass a new Clean Air (Wales) Act within 100 days of the Senedd elections**, and to use this to enshrine in law WHO standards.

We are calling on the Northern Ireland Executive to:

- **Develop new legislation to implement the new Clean Air Strategy**, including enshrining in law WHO standards.

We are calling on the Scottish Government to:

- **Amend their pollutant standards** if the new WHO limits for PM_{2.5} are lower than the current legal targets.

Local and national policymakers should ensure that all air quality policy:

- **Takes a ‘public health’ first approach** that seeks to address health inequalities. This should include the setting of ambitious health targets for all clean air policies as well as the publication of equalities impact assessments.
- **Is designed to deliver maximum public health impacts** and is integrated with wider respiratory health plans, such as health and wellbeing boards and sustainability and transformation partnerships.
- **Has enforcement mechanisms in place that ensure the best possible health outcomes are delivered.** In particular, governing bodies such as the new Office for Environmental Protection should hold national and local policymakers to account and monitor delivery of ambitious health targets.

Local and regional areas should:

- **Roll out strong clean air zones and low emission zones across cities and city regions** to lower pollution from all vehicles and support people to move to cleaner modes of travel. These should include financial incentives for people with long-term lung conditions who may need to use their car to move to cleaner options.
- **Work closely with schools, care homes, hospitals and GP surgeries to prioritise emissions reduction around these areas**, as well as co-creating plans to protect at-risk groups from harm, by carrying out audits and setting out solutions.

And decision makers should fund research into:

- **Evaluations of different policy interventions and the public health outcomes they deliver.** This knowledge should be scaled up and shared as best practice to help local areas design impactful and sustainable clean air schemes.

5 Protecting people with a lung condition

Air pollution has an outsized impact on children and adults living with lung conditions and potentially those experiencing breathing problems from COVID-19. Public awareness on toxic air has grown in recent years, but many people told us they still don't know where to get adequate information, advice or local data.

Likewise, people have told us that health professionals often don't know how to help them, and that they feel disempowered when it comes to protecting themselves from harm. As part of national health protection plans, we need to see a complete revamp to the way air pollution data, information and advice is communicated to patients and the wider population to ensure that people can protect their own health.

5.1 Effective and health-based air pollution alerts

There is no effective national approach to air pollution alerts in any of the four nations, or a common UK approach. These alerts are essential for making sure people can protect their health during short-term pollution peaks and to keep people with lung conditions out of hospital. Currently air pollution alerts feature on government websites as an opt-in email service, and some local and regional areas have text message services people can sign up to receive warnings, such as AirText.

Governments have a responsibility to ensure they reach people, particularly at-risk groups, with crucial information about air pollution and the health actions they can take to protect themselves. These alerts must also be designed in a way that works for the people who need them and provided in ways people can understand.

While we've seen some examples of good practice in terms of health alert provision, such as the Scottish Government's Clean Air Detectives website for children⁵⁸ and the provision of air pollution alerts on the London Underground, a comprehensive, national approach to air pollution alerts is still lacking.

Current alerts also lack strong alignment with health-based guidance from the WHO, and mask high levels of single pollutants, giving artificially low guidance from the Daily Air Quality Index (DAQI). Further, people report find that they find the DAQI hard to understand.



What did people with a lung condition tell us?

Our survey found that people with a lung condition are more likely to look for information to protect themselves but aren't getting what they need to protect themselves.

- Across the UK we found that weather forecasts/Met Office alerts are the most checked source, with **41%** of respondents saying they check these **daily**, and **13%** saying they check it **multiple times a week**.
- **92.8%** of respondents said they **never** check the UK Government's Twitter account.
- **65.5%** said they **never** check the UK Government's UK Air website.

These are the primary sources of information from DEFRA. (In the nations and regions with stronger and differing systems, these figures may be different).

Focus group discussions revealed a range of reasons for this:

- Lack of awareness that alerts are available
- Lack of confidence in alerts, with people worried that they're not accurate because there aren't enough monitors and they're not locally located
- A wish for more real-time data
- Feeling that alerts aren't accessible because they're too complicated.

What is the Daily Air Quality Index (DAQI)?

The DAQI⁵⁹ is a simplified way of presenting data about levels of air pollution and provides recommended actions and health advice. The index is numbered 1-10 and divided into four bands, from low (1) to very high (10), to provide detail about air pollution levels in a simple way.

Banding	Value	Accompanying health messages for at-risk individuals*	Accompanying health messages for the general population
Low	1-3	Enjoy your usual outdoor activities.	Enjoy your usual outdoor activities.
Moderate	4-6	Adults and children with lung problems, and adults with heart problems, who experience symptoms, should consider reducing strenuous physical activity, particularly outdoors.	Enjoy your usual outdoor activities.
High	7-9	Adults and children with lung problems, and adults with heart problems, should reduce strenuous physical exertion, particularly outdoors, and particularly if they experience symptoms. People with asthma may find they need to use their reliever inhaler more often. Older people should also reduce physical exertion.	Anyone experiencing discomfort such as sore eyes, cough or sore throat should consider reducing activity, particularly outdoors.
Very High	10	Adults and children with lung problems, adults with heart problems, and older people, should avoid strenuous physical activity. People with asthma may find they need to use their reliever inhaler more often.	Reduce physical exertion, particularly outdoors, especially if you experience symptoms such as cough or sore throat.

5.1.1 Weather reports must play a key role

Information should be available where people are most likely to access it. Our research found that the most likely place people look for information is on weather reports or from the Met Office. Yet air pollution alerts are currently uncommon on weather bulletins.

There is a huge opportunity to reach large numbers of people with information about upcoming high air pollution episodes on weather reports, and weather presenters, as experienced meteorologists, are well placed to present this information. To ensure this happens, weather reports need to be provided with centrally recognised forecasts. Further, they must be able to signpost to health information about air pollution and the steps people can take to protect themselves to ensure that the information doesn't just cause stress.

Providing forward-looking forecasts to broader audiences can also help implement and encourage behaviour changes to limit emissions. For instance, in Paris on high pollution days, alerts are provided to the public to help them protect themselves, and traffic numbers are limited into the city centre by only allowing odd or even numbered number plates in.⁶⁰

5.1.2 A proactive alert system that directly informs schools, care homes and medical centres

In order to best protect people who are most at risk it's critical that education, health and care establishments are proactively informed of high air pollution levels. Proactive alerts to schools are currently used in London, and learnings should be taken from this and scaled up across the UK. This would allow people to make choices to avoid pollution, and should be joined with advice for parents and carers to avoid driving on these days.

5.2 Raising public awareness

It's crucial that everyone learns about the effects of air pollution on their health in order to protect themselves, particularly those whose health condition may be affected. As we've seen from smoking,⁶¹ public health campaigns can be effective in increasing awareness and driving change.

5.3 Upskilling health and care professionals

Medical professionals need to play a key role in protecting people from the health impacts of air pollution. As the case of Ella Kissi-Debrah showed, this is crucial to protect lives.

Yet medical professionals do not currently have the resources and training they need to speak to patients about the risks of air pollution and ways they can reduce their exposure.⁶² As key trusted voices who have a strong relationship with their patients, they should play a strong role in sharing this information. There is also a major opportunity here to ensure that people with a lung condition are able to effectively self-manage their condition and reduce their admittances to hospital.

Medical guidelines have been produced for health professionals by NICE on indoor and outdoor air quality, and air pollution has now been included in some disease-specific guidelines, such as COPD. However, there appears to be a disconnect in practice, as air pollution rarely tends to feature in care pathways for people with respiratory conditions. We also often hear that professionals don't have the time, knowledge or confidence to implement NICE guidelines.

“Just as air pollution affects every organ in our bodies, so all health professionals must learn about this impact and how to talk to their patients about lessening their risk. The Alliance, representing over 700,000 health professionals, has been delighted that many have worked with us to develop materials to use, from the nurse conducting the asthma check to emergency clinicians. We all need this knowledge to protect people from harm the best that we can.”

Nicky Philpott, Director, UK Health Alliance on Climate Change

5.4 Action around hospitals, care homes and GP surgeries

As outlined earlier in this report, thousands of health centres and care homes in Britain, including major teaching hospitals, children’s hospitals, clinics and GP surgeries, are in areas which exceed the WHO’s guidelines for PM_{2.5}.

Many people live in these care homes and visit these hospitals, clinics, and GP surgeries every year, and some people – including many with a lung condition – need ongoing hospital treatment so need to visit multiple times. It’s unacceptable that health and care staff and GPs have to care for children, people with heart and lung problems, and elderly patients, in environments that could aggravate existing conditions and significantly worsen acute illnesses.

As key employers, controllers of large estates and a key source of journeys, hospitals can be key catalysts for action for both reducing air pollution and tackling exposure. Indeed, as the NHS Sustainable Development Unit has

found, “approximately 3.5% (9.5 billion miles) of all road travel in England relates to patients, visitors, staff and suppliers to the NHS, contributing around 14% of the system’s total emissions.”⁶³

NHS England recently launched its Net Zero NHS plan in which they outlined plans to reach net zero carbon emissions by 2045.⁶⁴ Action outlined in this plan will go some way to also reduce the NHS’s contribution to air pollution. But on top of this, we need to see urgent action to reduce air pollution exposure at the hospital door, and an extension to social and care services.

Action should be introduced to ensure that as many journeys to hospital are completed by sustainable means as possible, reducing the numbers of trips taken by car. Behaviour change programmes – driven by health bodies and employers – for staff, visitors and appropriate patients are needed to help encourage modal shift and get people out of their cars and onto (Covid-safe) public transport and using active travel.

Given a large amount of the pollution at many hospitals is due to roads situated close to the hospital, traffic reduction measures should, where possible, be put in place on roads around hospitals for non-emergency vehicles to minimise traffic-related pollution. Likewise, this should be done around care homes and GP surgeries to protect those at highest risk. This would also deliver additional benefits, such as improved emergency response times for ambulances, reduced car parking congestion and improved road safety.

5.5 Helping everyone be part of the solution

In order to lower emissions as much as possible, we all need to be part of the solution and choose cleaner travel options. However, some people will require extra support to do this. Many people who live with a severe lung condition struggle to walk long distances and may rely more on their car to socialise, work and carry out daily tasks. For some people, walking and cycling may remain out of reach because of their underlying health, so they should be financially supported by government to access cleaner electric vehicles, public transport or accessible active travel options, such as e-bikes.

What did people with a lung condition tell us?

Our survey and focus group discussions found the following barriers to walking and cycling for many people living with a lung condition:

- High levels of air pollution that may trigger their condition when they're out and about
- Lack of infrastructure for walking and cycling, including poor quality pavements
- Lack of programmes to improve access to bikes, such as bike-hire schemes and financial support for the purchase of e-bikes
- Poorly planned connections between modes of transport, e.g. bus stops situated a significant walk away from train stations
- Too much parking on the pavement making it difficult to move around safely.

Our survey and focus group discussions found the following barriers for accessing public transport for many people living with a lung condition:

- Cost
- Lack of space for access requirements, such as wheelchairs
- Space to wait safely, for example for a bus, away from busy road traffic.

“I'd like to cycle and walk more but don't feel able to due to pollution from vehicles and the lack of dedicated and safe infrastructure, e.g. cycle paths and wide footpaths. I therefore, somewhat ironically, use a car instead – adding to the pollution.”

Rapid improvements to air pollution will help many more people with a lung condition be able to walk and cycle and lower their own contribution to toxic air. Alongside this, decision makers must implement inclusive transport policies so more people can access these solutions.⁶⁵ This should include safe and effective active travel infrastructure: extensive networks of segregated cycle lanes, and safe and well-maintained pavements which are free from parked cars, and e-bikes which have been shown to expand and diversify the range of people who are able to cycle.⁶⁶

Exercise is an essential way to help people with a lung condition improve and manage their conditions.⁶⁷ So not only will inclusive active travel help reduce emissions, but it will help people self-manage their lung conditions and reduce costs for the NHS.

Recommendations

The Health Protection Plan in England and national clean air strategies in the devolved nations should:

- **Roll out an improved nationwide air pollution alerts system** that tells the general public when air pollution is going to be high and is integrated with weather forecasts. The system should directly warn schools, care homes, GP surgeries and hospitals and be accompanied by robust health advice so people know how to protect themselves.
- **Set out a comprehensive health education programme to equip health professionals** with the skills and knowledge they need to protect patients from air pollution. This should particularly focus on

training for those working in primary care, secondary respiratory and cardiovascular care, maternity units and geriatrics.

- **Fund national public health campaigns on air pollution** that set out clear health advice for people to protect themselves, as well as guidance on how to reduce all our emissions.
- **Set out funding and guidance for traffic reduction measures around care homes, schools and hospitals.** This should provide local areas with the best available evidence to ensure pollution reduction is targeted to the areas where at-risk groups should be the safest.
- **Commit to inclusive walking and cycling policies that enable everyone to be part of the solution.** This should include the funding and extension of safe cycling paths, the banning of pavement parking and financial support for e-bike purchase.
- **Ensure health bodies and employers introduce programmes to encourage (Covid-safe) public transport use and walking and cycling,** in order to support staff to move towards cleaner forms of travel and reduce emissions around hospitals and GP surgeries.

6 Protecting little lungs

One in 11 children in the UK already have asthma, so taking action on air pollution is critical to stopping more conditions forming and ensuring the next generation can grow up happy and healthy.

We also know that one in four cars on the road during the morning peak are on the school run, so by targeting action and behaviour change here we can both reduce emissions and protect young lungs.⁶⁸ National health protection plans should set out targeted action and funding for schools and ensure teachers are equipped with the knowledge they need to safeguard children's health.

6.1 Action at the school gate and on the school run

There are some exciting developments currently being rolled out to reduce air pollution around schools, from 'school streets' (which restrict motor traffic from accessing the road outside school gates for a short period of time) to behaviour change programmes which encourage people out of their cars. But a comprehensive, widespread and evidence-based approach across the UK is lacking. There is little funding available to scale up this action and a lack of central guidance to make sure it's being done in an evidence-based way.

We need to see greater leadership in this space from education policymakers and a more holistic whole-school approach to create long-term change. By empowering local areas to work holistically with local

Sandra's story

“ I started campaigning on air pollution in Birmingham because I was so worried about what my children were breathing in on the school run. Parents all over the UK are asking questions and sharing great ideas about how to reduce pollution. But we shouldn't have to do this alone. We need politicians to lead the way, set out the money and make sure schools are supported to make the best changes for our children.”



schools, collective action across all schools in a local authority can become more than the sum of its parts, driving cohesive and complementary action to protect children from harm.

Shivaji's story

“Together with other concerned parents, I’ve been helping promote school streets in Bournville to make it easier and safer for children to complete their journey to school. School streets ensure vehicles can’t drive up to our school gates and pollute our children’s lungs and make it easier for people to do the school run without a car. We’ve seen many positives from our school street, with feeling safer when crossing the road and more people walking and cycling to school. I’ve also been involved with local air quality projects and couldn’t believe how high levels are in our area. I’m sure if more people knew about this invisible risk, they’d be demanding immediate change.”

Action to tackle air pollution also has other health benefits and these should be an explicit part of how we tackle air pollution.⁶⁹ For instance, promoting walking and cycling helps decrease inactivity and helps address childhood obesity, of which the UK has some of the highest rates in Europe.⁷⁰ Further, by capturing existing energy behind campaigns to tackle air pollution at the school gate, communities and local policymakers can build support for wider changes required, such as charging clean air zones.

Amani's story

“Last year I monitored the air outside my school in Liverpool. I couldn’t believe it, but the air pollution was illegally high. I felt so sad as this is the air me and my friends breathe in every day and it will be hurting our lungs. I don’t think people realise how bad it is as they often see the trees and think they’re safe. We need way more information about this problem.”

6.2 Audits and healthy air plans for every polluted school

6.2.1 Governments need to set out nationwide taskforces to audit schools

In order to ensure action at the school gates and the school run is both effective and appropriate for local areas it must be supported by national guidance and evidence from national governments. This can be best achieved by scaling up the schools audit approach that has been taken in London (see box to the right). Audits should include analysis of air pollution levels, and an assessment of the recommendations for individual schools to tackle both emissions and exposure. This work should be a cross-government collaboration driven by education departments and led by a Schools Air Pollution Taskforce.

6.2.2 Air pollution audits for every polluted school

Audits at schools can improve understanding of the issue in each area and provide strong advice to drive action. To prioritise action, audits should first focus on the most polluted schools. Learnings can also be used to inform and develop UK-wide evidence and support other local areas.

Audit results for each school should be made available to parents and carers so they understand the issue at their school and are part of implementing solutions. School leaders should be financially supported by local areas to put solutions in place, and even schools in less polluted areas may be able to make small changes to protect children.

Case study: the Mayor of London's School Air Quality Audit Programme

In London the Mayor undertook a trial audit programme at 50 primary schools.⁷¹ This audit programme's main objectives included identifying sources of outdoor air quality at each school, identification of measures to reduce emissions and exposure, and engagement with school communities.

It provided recommendations to reduce emissions and exposure including: 'no engine idling schemes', reducing emissions from boilers and kitchens, green infrastructure such as green walls/screens, and encouraging active travel along less polluted routes.

Following the success of the school audit programme, in May 2018 the Mayor launched a second programme of air quality audits involving 20 nurseries in the city's most polluted areas. A number of boroughs (to date, Newham, Islington, Southwark, Westminster and Brent) have now agreed to fund air quality audits at all their state primary schools, meaning an additional 200 schools will benefit from the auditing process.

6.2.3 Healthy air action plans for all schools

As recommended by UNICEF UK this work should inform a healthy air action plan for each school. These plans should be driven by evidence provided in each school's audit, and whole-school communities should come together to discuss the audit's recommendations and co-create a plan for implementing action.

This approach will ensure that schools are provided with the best possible evidence, and that action can be driven as close to the ground as possible. As part of these action plans, school travel plans that promote walking, cycling and public transport should be co-created with local authorities. They should include action that can reduce exposure for children, such as advice on cleaner routes, specific physical intervention and transport interventions like school streets. These plans should also be integrated with asthma action plans which schools should have in place for every child with asthma.



6.2.4 Funding

In order to deliver this important work, we must see new ring-fenced funding for local authorities to put the solutions outlined in their healthy air action plan in place.

Guidance for school leaders

In 2019 the National Education Union, Living Streets and the BLF came together to publish guidance for schools on air pollution. This guidance is a strong example of joint working and should be drawn on as a key resource. Read more here: <https://neu.org.uk/advice/air-pollution-guidance-school-and-college-staff>

Recommendations

Decision makers across the UK should:

- **Establish Schools Air Pollution Taskforces**, chaired by senior education ministers, to make sure that every polluted school is given the tools they need to protect pupils from harm. This must include plans for a national schools' audit programme and the funding for local authorities to protect young lungs when they are at, and traveling to, school. Taskforces must lead on effectively tracking the progress of schools to action is taken.

Guidance for parents: how can I best protect my child with asthma at school?

Making sure your child stays safe with their asthma at school or nursery can feel a bit daunting. It's important to make sure the school or nursery knows all about your child's asthma, to make sure that you, your child and school staff are comfortable. Book a meeting with your child's teacher or keyworker to discuss:

- Your child's asthma action plan, and make sure all staff are given a copy
- Your child's usual triggers, such as high pollen days or high air pollution, and medication required
- Signs and symptoms of an asthma attack, and how to contact you in an emergency
- Ways they could think about reducing air pollution around the school, including changing outdoor activity to less polluting times of day or to less polluted areas of the school or inside.

On the school run the best thing you can do to reduce pollution exposure is avoid main roads, sign up to air pollution alerts so you know when it's high, and try to walk and cycle where possible, as air pollution can build up to very high levels inside vehicles. Your child should take preventer medication every day as prescribed and make sure they carry their reliever inhaler with them at all times.

Dr Andy Whittamore

Clinical lead and in-house GP, Asthma UK

7 Concluding remarks

This report outlines the significant impact air pollution is having on many people's quality of life right now and the damage it's doing to children's futures. As the case of Ella Kissi-Debrah showed, air pollution kills. Weakened and growing lungs are most at risk, with air pollution hitting pregnant women, children, older people, those living with a lung condition and those on the lowest incomes the hardest. It's in this way that dirty air is unfair and unjust, and is worsening the UK's already startling levels of inequality.

Air pollution could get even worse

We have seen some significant shifts in how people get around during the pandemic. There has been a welcome move towards walking and cycling, and working from home has become an option for many of us. However, confidence in the safety of public transport has taken a significant hit, and there is a concern that car use could significantly increase beyond previous levels when we move back towards normality.

Further, COVID-19 is clearly having a significant economic impact on society. This will mean that people find it harder to upgrade to a new cleaner vehicle, less money may be invested in public and active transport, and there may be a greater backlash to charging schemes such as clean air zones. These behavioural and economic shifts may make efforts to tackle toxic air even harder, but politicians must persevere and ramp up ambition if we're serious about protecting people's health.

Let's build back better and healthier

As this report shows, tackling air pollution is critical to improve the lives of people with a lung condition. It can help reduce asthma attacks and assist in protecting the NHS. Further, it can reduce health inequalities, prevent new lung conditions, and improve the resilience of the UK population in the context of COVID-19 recovery.

Making the changes outlined in this report to protect people from toxic air will reap rewards for years to come.



8 Methodologies

8.1 Our survey and focus groups

Survey

Our Asthma UK-BLF survey asked respondents their opinion on a range of scenarios relating to air pollution and was conducted online. It ran for two weeks in August 2020. It was promoted via Asthma UK and BLF newsletters, on social media and via both charities' websites. The survey had 2,316 responses in total. 761 of survey respondents were acquired via paid social media.

Focus groups

To ensure that the discussion around air pollution was shaped by a representative sample of the target groups, focus group discussions were held to encourage participation. A total of five two-hour discussions were held. Attendees were selected at random as survey respondents who self-identified as people with a lung condition, people from the BAME community, people living with a disability, people with children, and people who are unemployed.

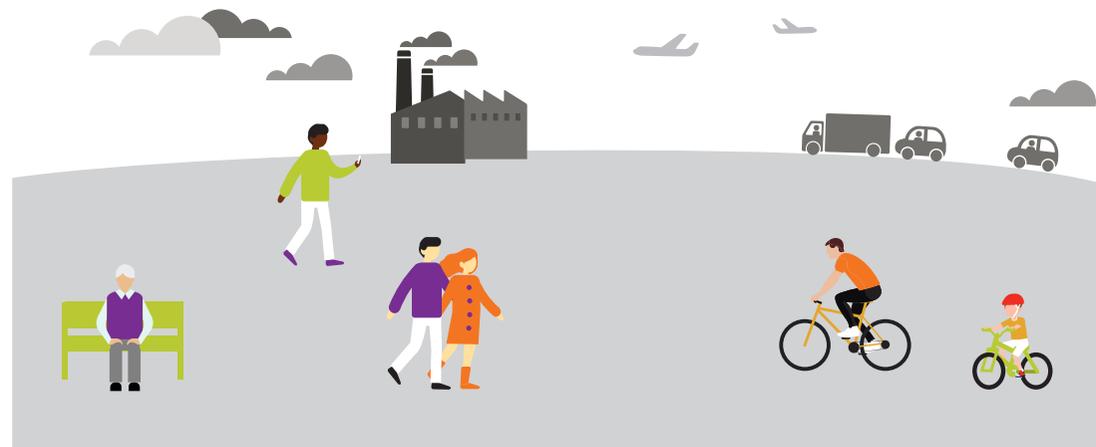
8.2 CERC research

We commissioned Cambridge Environmental Research Consultants (CERC) to look at how many schools, colleges, hospitals, GP surgeries and care homes are in areas above the WHO's guidelines levels for PM_{2.5}. The schools research covers England, Scotland and Wales. Postcodes for schools

were extracted from the Scottish Government school statistics and the English and Welsh governments register of schools and colleges. In total, 31,979 schools and colleges were included.

CERC used existing modelled PM_{2.5} data published by the UK Government as part of their responsibilities under the Environment Act 1995. CERC used predicted annual average PM_{2.5} data for 2019. This data has a spatial resolution of 1 km x 1 km, and therefore represents 'background' levels of PM_{2.5}. This data gives a representative indication of expected PM_{2.5} levels across the whole of the UK at sufficient resolution to provide good evidence.

CERC is a UK SME which undertakes a range of research projects covering air quality assessment, atmospheric issues and complex flow problems, often with academic, government, NGO or commercial partners. For instance CERC are a partner in Breathe London, which has deployed over 100 new fixed air quality sensors in London, and they have modelled pollution to quantify contributions from 15 source categories at different points across London. For more information visit www.cerc.co.uk.



8.3 Roundtables

We undertook two digital roundtable discussions with representatives of key civil society organisations, relevant academics and practitioners. These were on the topics of 1) protecting children from air pollution, and 2) improving alerts and information about air pollution.

8.4 YouGov Survey

YouGov surveyed people with a serious lung condition and family/carers of those with a serious lung condition. Total sample size was 1,069 people. This included: 899 with a serious lung condition (patients), 170 who care for someone with a serious lung condition (carers).

The breakdown of conditions (among patients and carers) was:
Bronchiectasis: 163, COPD: 709, lung cancer: 88, pulmonary fibrosis: 63, Interstitial lung disease: 49.

Fieldwork was conducted online using members of the YouGov panel. Additionally, an open survey link was sent to direct contacts of the British Lung Foundation (45 responses came from this route, with the remaining 1,024 coming from the YouGov panel).

The survey was live from the 18th May to the 12th June 2020 (during the 2020 COVID-19 outbreak and lockdown).

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If you have a lung condition and are concerned about anything in this report, or would like talk to one of our specialist advisors, please call one of our helplines:

Asthma UK Helpline: 0300 222 5800

British Lung Foundation Helpline: 03000 030 555

References

- ¹ DEFRA (2019) **Clean air strategy**. Available at: www.gov.uk/government/publications/clean-air-strategy-2019
- ² WHO (2013) **Health Effects of Particulate Matter**. Available at: www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf
- ³ British Lung Foundation (2020) **Nearly 2 million people with lung conditions notice improved symptoms as a result of drop in air pollution**. Available at: www.blf.org.uk/media-centre/press-releases/nearly-2-million-people-with-lung-conditions-notice-improved-symptoms-as
- ⁴ Department for Transport (2021) **Official Statistics: Transport use during the coronavirus (COVID-19) pandemic**. Available at: www.gov.uk/government/statistics/transport-use-during-the-coronavirus-covid-19-pandemic
- ⁵ ClientEarth (2020) **New data shows 75% of UK ‘zones’ illegally polluted – don’t pause action now, say lawyers**. Available at: www.clientearth.org/press/new-data-shows-75-of-uk-zones-illegally-polluted-dont-pause-action-now-say-lawyers/
- ⁶ Department for Environment Food & Rural Affairs and Department for Transport (2017) **UK plan for tackling roadside nitrogen dioxide concentrations**. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633270/air-quality-plan-detail.pdf
- ⁷ Department for Environment Food & Rural Affairs. (No date) **UK and EU Air Quality Limits**. Available at: <https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits>
- ⁸ Department for Environment, Food & Rural Affairs (2020) **National Statistics Emissions of air pollutants in the UK, 1970 to 2018 – Particulate matter (PM10 and PM2.5)**. Available at: www.gov.uk/government/publications/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-1970-to-2018-particulate-matter-pm10-and-pm25#major-emission-sources-for-pm10-and-pm25-in-the-uk
- ⁹ Committee on the Medical Effects of Air Pollutants (2018) **Associations of long-term average concentrations of nitrogen dioxide with mortality**. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734799/COMEAP_NO2_Report.pdf

- ¹⁰ Royal College of Physicians & Royal College of Paediatrics and Child Health. (2016) **Every breath we take: the lifelong impact of air pollution**. Available at: www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution
- ¹¹ Bove et al (2019) **Ambient black carbon particles reach the fetal side of human placenta**. Available at: www.nature.com/articles/s41467-019-11654-3
- ¹² Shama et al. (2007) **Traffic-related atmospheric pollutants levels during pregnancy and offspring's term birth weight**. Available at: www.ncbi.nlm.nih.gov/pmc/articles/PMC1964922
- ¹³ Pedersen et al (2013) **Ambient air pollution and adverse birth outcomes**. Available at: <https://pubmed.ncbi.nlm.nih.gov/24429273>
- ¹⁴ Ritz et al. (2007) **Ambient air pollution and preterm birth in the environment and pregnancy outcomes study at the University of California, Los Angeles**. Available at: <https://pubmed.ncbi.nlm.nih.gov/17675655>
- ¹⁵ Royal College of Physicians & Royal College of Paediatrics and Child Health. (2016) **Every breath we take: the lifelong impact of air pollution**. Available at: www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution
- ¹⁶ British Lung Foundation. (No Date) **Risks to your child's lungs**. Available at: www.blf.org.uk/support-for-you/risks-to-childrens-lungs/air-pollution
- ¹⁷ Chen et al (2015) **Chronic effects of air pollution on respiratory health in Southern California children: findings from the Southern California Children's**. Available at: <https://pubmed.ncbi.nlm.nih.gov/25694817>
- ¹⁸ Royal College of Physicians & Royal College of Paediatrics and Child Health. (2016) **Every breath we take: the lifelong impact of air pollution**. Available at: www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution
- ¹⁹ Dick et al. (2014) **A systematic review of associations between environmental exposures and development of asthma in children aged up to 9 years**. Available at: <https://bmjopen.bmj.com/content/4/2/e003827>
- ²⁰ Khreis et al. (2017) **Exposure to traffic-related air pollution and risk of development of childhood asthma: a systematic review and meta-analysis**. Available at: <https://pubmed.ncbi.nlm.nih.gov/27881237>
- ²¹ Peters et al (2019) **Air Pollution and Dementia: A Systematic Review**. Available at: <https://pubmed.ncbi.nlm.nih.gov/30775976>

- ²² Royal College of Physicians (2018) **Reducing air pollution in the UK: progress report**. Available at: www.rcplondon.ac.uk/news/reducing-air-pollution-uk-progress-report-2018
- ²³ Williams et al. (2019) **Personalising the Health Impacts of Air Pollution**. Available at: <http://erg.ic.ac.uk/Research/docs/Personalised-health-impacts-Summary%20for%20Decision%20Makers.pdf>
- ²⁴ Pieter et al. (2018) **The impact of acute air pollution fluctuations on bronchiectasis pulmonary exacerbation: a case-crossover analysis**. Available at: <https://erj.ersjournals.com/content/52/1/1702557>
- ²⁵ London Inner South Coroner's Court (2020) **Inquest touching the death of Ella Roberta Adoo Kissi-Debrah** Available at: www.innersouthlondoncoroner.org.uk/news/2020/nov/inquest-touching-the-death-of-ella-roberta-adoo-kissi-debrah
- ²⁶ Hodge Jones & Allen Solicitors (2020) **“Extraordinary” landmark inquest rules air pollution contributed to death of 9-year-old Ella Adoo Kissi-Debrah** Available at: www.hja.net/press-releases/extraordinary-landmark-inquest-rules-air-pollution-contributed-to-death-of-9-year-old-ella-adoo-kissi-debrah
- ²⁷ Asthma UK. (2019) **The great asthma divide: the annual asthma survey 2019**. Available at: www.asthma.org.uk/58a0ecb9/globalassets/campaigns/publications/The-Great-Asthma-Divide.pdf
- ²⁸ British Lung Foundation (2019) **Air pollution is causing untold misery to people like me**. Available at: www.blf.org.uk/your-stories/air-pollution-is-causing-untold-misery-to-people-like-me
- ²⁹ Bell et al. (2013). **Evidence on vulnerability and susceptibility to health risks associated with shortterm exposure to particulate matter: a systematic review and meta-analysis**. Available at: <https://pubmed.ncbi.nlm.nih.gov/23887042>
- ³⁰ Royal College of Physicians & Royal College of Paediatrics and Child Health. (2016) **Every breath we take: the lifelong impact of air pollution**. Available at: www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution
- ³¹ Wu et al. (2020) **Air pollution and COVID-19 mortality in the United States: Strengths and limitations of an ecological regression analysis**. Available at: <https://pubmed.ncbi.nlm.nih.gov/33148655>

- ³² Marmot et al. (2020) **Health Equity in England: The Marmot Review 10 Years On**. Available at: www.health.org.uk/publications/reports/the-marmot-review-10-years-on
- ³³ Department for Environment Food & Rural Affairs. (2017) **Air Quality A Briefing for Directors of Public Health**. Available at: www.local.gov.uk/sites/default/files/documents/6.3091_DEFRA_AirQualityGuide_9web_0.pdf
- ³⁴ Mitchel et al (2015) **Who benefits from environmental policy? An environmental justice analysis of air quality change in Britain, 2001–2011**. Available at: <https://iopscience.iop.org/article/10.1088/1748-9326/10/10/105009/meta>
- ³⁵ Walker et al (2017) **Pollution and inequality. (In Annual Report of the Chief Medical Officer.)** Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/690846/CMO_Annual_Report_2017_Health_Impacts_of_All_Pollution_what_do_we_know.pdf
- ³⁶ British Lung Foundation (2016) **The battle for breath – the impact of lung disease in the UK**. Available at: www.blf.org.uk/policy/the-battle-for-breath-2016
- ³⁷ Asthma UK. (2018) **On the edge: How inequality affects people with asthma**. Available at: www.asthma.org.uk/globalassets/get-involved/external-affairs-campaigns/publications/health-inequality/auk-health-inequalities-paper.pdf
- ³⁸ Marmot et al. (2020) **Health Equity in England: The Marmot Review 10 Years On**. Available at: www.health.org.uk/publications/reports/the-marmot-review-10-years-on
- ³⁹ Office for National Statistics (2020) **Deaths involving COVID-19 by local area and socioeconomic deprivation: deaths occurring between 1 March and 31 May** Available at: www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsinvolvingcovid19bylocalareasanddeprivation/deathsoccurringbetween1marchand31may2020
- ⁴⁰ Department of Health and Social Care (2018) **Chief Medical Officer annual report 2017: health impacts of all pollution** Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/690846/CMO_Annual_Report_2017_Health_Impacts_of_All_Pollution_what_do_we_know.pdf
- ⁴¹ Office for National Statistics (2020) **Population estimates for the UK, England and Wales, Scotland and Northern Ireland: mid-2019**. Available at: www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates

- ⁴² Brunt et al. (2018), **Enhancing local air quality management to maximise public health integration, collaboration and impact: a Delphi study**. Available at: www.sciencedirect.com/science/article/abs/pii/S1462901117302599
- ⁴³ Brunt et al. (2016). **Local air quality management policy and practice in the UK: The case for greater public health integration and engagement**. Available at: www.sciencedirect.com/science/article/abs/pii/S1462901116300090?via%3Dihub
- ⁴⁴ Department for Environment, Food & Rural Affairs (2019) **Clean Air Strategy 2019**. Available at: www.gov.uk/government/publications/clean-air-strategy-2019
- ⁴⁵ Taskforce for Lung Health (No date). **Lung health data tracker**. Available at: www.blf.org.uk/taskforce/data-tracker
- ⁴⁶ Public Health England (2021) **Public Health Profiles**. Available at: <https://fingertips.phe.org.uk/search/air%20pollution>
- ⁴⁷ World Health Organization (2020) **The public health approach**. Available at: www.who.int/violenceprevention/approach/public_health/en
- ⁴⁸ World Health Organization (2020) **The public health approach**. Available at: www.who.int/violenceprevention/approach/public_health/en
- ⁴⁹ Brunt et al. (2016) **Air pollution, deprivation and health: understanding relationships to add value to local air quality management policy and practice in Wales, UK**. Available at: <https://academic.oup.com/jpubhealth/article/39/3/485/3076806>
- ⁵⁰ Brunt & Jones (2019) **A pragmatic public health-driven approach to enhance local air quality management risk assessment in Wales, UK**. Available at: www.sciencedirect.com/science/article/abs/pii/S1462901119301145
- ⁵¹ Public Health Wales (2018) **Working together to reduce outdoor air pollution, risks and inequalities**. Available at: <https://gov.wales/sites/default/files/publications/2019-06/working-together-to-reduce-outdoor-air-pollution-risks-and-inequalities.pdf>
- ⁵² Welsh Government (2020) **The Clean Air Plan for Wales**. Available at: <https://gov.wales/sites/default/files/publications/2020-08/clean-air-plan-for-wales-healthy-air-healthy-wales.pdf>
- ⁵³ Welsh Government (2021) **Clean Air Advisory Panel report – Impact of the Covid-19 pandemic on air quality in Wales**. Available at: <https://airquality.gov.wales/reports-seminars/reports>

- ⁵⁴ Department for Environment, Food & Rural Affairs (2019) **Clean Air Strategy 2019**. Available at: <https://www.gov.uk/government/publications/clean-air-strategy-2019>
- ⁵⁵ CBI Economics (2020) **Breathing life into the UK economy Quantifying the economic benefits of cleaner air**. Available at: www.cbi.org.uk/media/5539/2020-09-cbi-economics-caf-report.pdf
- ⁵⁶ Mayor of London (2020) **Central London ULEZ – Ten Month Report**. Available at: www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/central-london-ulez-ten-month-report
- ⁵⁷ Office for Low Emission Vehicles and Office for Zero Emission Vehicles (2018) **Reducing emissions from road transport: Road to Zero Strategy**. Available at: www.gov.uk/government/publications/reducing-emissions-from-road-transport-road-to-zero-strategy
- ⁵⁸ Scottish Government (2021) **Air Pollution Detectives**. Available at: <http://children.scottishairquality.scot>
- ⁵⁹ Department for Environment (No date) **Daily Air Quality Index**. Available at: <https://uk-air.defra.gov.uk/air-pollution/daq>
- ⁶⁰ The Independent (2016) **Paris bans cars with even plates in third day of transport restrictions to ease air pollution**. Available at: www.independent.co.uk/news/world/europe/paris-banned-cars-even-number-plates-pollution-latest-public-transport-air-smog-bans-a7462621.html
- ⁶¹ Durkin et al. (2012) **Mass media campaigns to promote smoking cessation among adults: an integrative review**. Available at: <https://tobaccocontrol.bmj.com/content/21/2/127>
- ⁶² UK Health Alliance on Climate Change (2018) **Moving beyond the air quality crisis**. Available at: www.ukhealthalliance.org/wp-content/uploads/2018/10/Moving-beyond-the-Air-Quality-Crisis-4WEB-29_10-2018-final-1.pdf
- ⁶³ NHS Sustainable Development Unit (2018) **Reducing the use of natural resources in health and social care**. Available at: www.sduhealth.org.uk/policy-strategy/reporting/natural-resource-footprint-2018.aspx
- ⁶⁴ NHS England (2020) **A Net Zero NHS**. Available at: <https://www.england.nhs.uk/greenernhs/a-net-zero-nhs>
- ⁶⁵ ARUP (2019) **Inclusive cycling in cities and towns**. Available at: www.arup.com/-/media/arup/files/publications/i/inclusive_cycling_in_cities_and_towns.pdf

- ⁶⁶ House of Commons Library (2020) **Active Travel: trends, policy and funding**. Available at: <https://commonslibrary.parliament.uk/research-briefings/cbp-8615>
- ⁶⁷ Cochrane (2015) **Pulmonary rehabilitation for chronic obstructive pulmonary disease**. Available at: www.cochrane.org/CD003793/AIRWAYS_pulmonary-rehabilitation-for-chronic-obstructive-pulmonary-disease
- ⁶⁸ Living Streets (2018) **Swap the school run for a school walk**. Available at: www.livingstreets.org.uk/media/3618/livingstreets_school_run_report_web.pdf
- ⁶⁹ Rojas-Rueda et al (2012) **Replacing car trips by increasing bike and public transport in the greater Barcelona metropolitan area: a health impact assessment study**. Available at: www.sciencedirect.com/science/article/pii/S0160412012001833
- ⁷⁰ Bupa (2021) **Obesity in children**. Available at: www.bupa.co.uk/health-information/childrens-health/obesity-children#:~:text=The%20UK%20has%20one%20of,aged%2010%20to%2011%20were
- ⁷¹ Mayor of London (2020) **The Mayor's school air quality audit programme**. Available at: www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/mayors-school-air-quality-audit-programme#:~:text=The%20Mayor%20is%20concerned%20about,to%20reduce%20emissions%20and%20exposure



We're working to change the lives of everyone affected by asthma, bronchiectasis, COPD, ILD, mesothelioma, pulmonary fibrosis and all other lung conditions.

Our support helps people who struggle to breathe manage their lung condition and live well.

Our world-leading research finds new ways to prevent, treat and cure lung disease.

Our campaigns help make vital, lasting change.

Asthma UK
info@asthma.org.uk
asthma.org.uk

British Lung Foundation
enquiries@blf.org.uk
blf.org.uk