



PCRS Greener Respiratory Healthcare That is Kinder to the Environment

WHITE PAPER AND CALL TO ACTION

#nowastenoharm

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We are grateful to our corporate supporters including AstraZeneca UK Ltd, Boehringer Ingelheim Ltd, Chiesi Ltd, Cipla EU Ltd, for their financial support which supports the core activities of the Charity and allows PCRS to make its services either freely available or at greatly reduced rates to its members. PCRS is grateful to Chiesi Ltd for sponsorship to support the PCRS Greener Healthcare Initiative and to Boehringer Ingelheim Ltd and AstraZeneca UK for sponsoring the PCRS Greener Respiratory Healthcare Initiative meeting held July 2020. Boehringer Ingelheim also provided project management support through Dods (a third party supplier).

Contents

About PCRS	3
The PCRS vision for the future of greener respiratory healthcare	4
Call to action	5
Case for action	6
Impact of environment on respiratory conditions	10
Impact of respiratory management on the environment.....	11
Optimising disease control is essential to minimise the environmental impact of respiratory healthcare	12
Actions we can take today to achieving greener patient-centred respiratory care	14
Early and accurate diagnosis.....	14
Appropriate prescribing	14
Appropriate monitoring and review	14
Supported self-management	15
Primary care practice-level actions.....	15
Inhaler use and recycling	15
Lessons from COVID 19.....	17
Air pollution	17
Remote consultations	17
Actions we should seek for the longer term.....	18
Partnering with the pharmaceutical industry and other sectors providing services to the NHS	18
Vision for the future.....	20
References	23

About PCRS

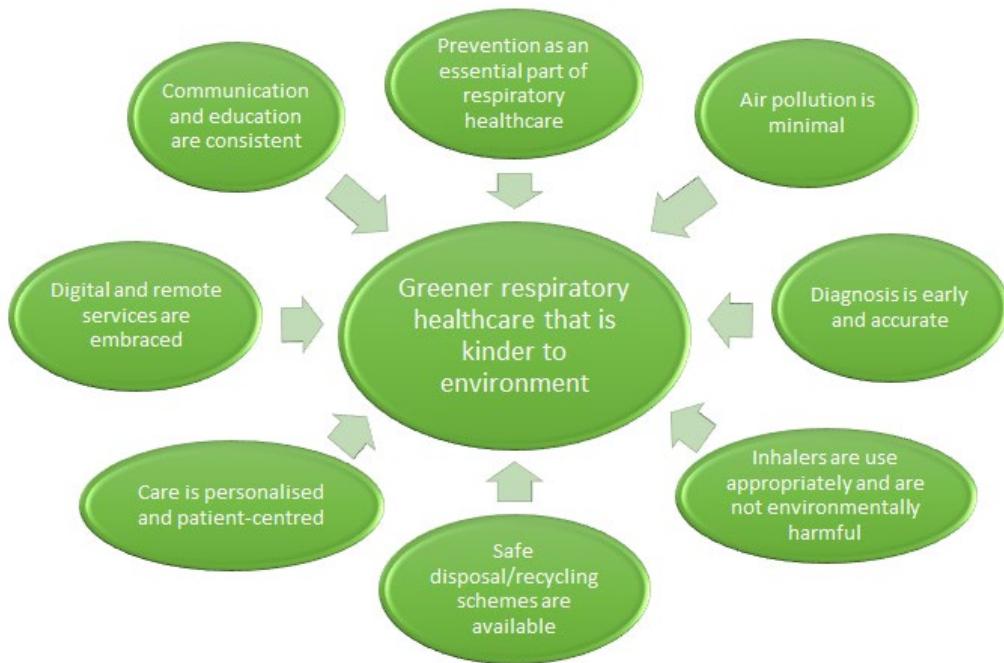
The Primary Care Respiratory Society (PCRS) is the UK-wide professional society supporting any health professional working in or with primary care to deliver high value patient-centred respiratory care.

Our vision is “optimal respiratory health for all” which we seek to achieve through:

- Campaigning to influence policy and set standards in respiratory medicine, relevant to populations nationally and locally.
- Educating health professionals working in primary and community settings to deliver and influence out-of-hospital respiratory care through open access to succinct best practice, evidence-based clinical guidance and resources.
- Promoting and disseminating real life respiratory research relevant to population health needs that supports policy and education activities including through our scientific journal, *npj Primary Care Respiratory Medicine*, published in conjunction with Springer Nature.
- Describing how to deliver value-based healthcare, impacting on clinical effectiveness, patient safety and a better patient experience.
- A committed and engaged membership network providing mutual support enabling professional development to support the provision and commissioning of high value, patient-centred care.

The PCRS vision for the future of greener respiratory healthcare

PCRS believe that by working together we can achieve greener respiratory healthcare that is kinder to the environment.



The PCRS Greener Healthcare Initiative has identified six key areas that require action by individual healthcare professionals, healthcare commissioners, professional organisations and the pharmaceutical industry to make respiratory healthcare greener and kinder to the environment:

- **Advocate for clean air** for all by supporting strategies to reduce air pollution at a personal level as well as part of their own clinical practice
- Ensure every patient receives **early and accurate diagnosis** and the **treatment most appropriate** for them to achieve optimal control of their respiratory condition
- **Become knowledgeable** about the impact of respiratory healthcare on the environment
- **Educate colleagues and patients** about the environmental impact of respiratory healthcare
- Consider and actively **seek ways to minimise the associated environmental impact** of respiratory healthcare without compromising quality of care
- **Collaborate** with patient groups, professional bodies and the pharmaceutical industry to tackle climate change together

PCRS advocate a focus is on the complete patient journey from prevention of disease and diagnosis, through to routine chronic care and including the acute situation with a #nowastenoharm approach. The COVID-19 pandemic has posed many challenges to the way we deliver care but has also shown that radical changes, many of which are kinder to the environment, can be made and can enhance the patient experience. PCRS invite colleagues and patients to join us as we seek to consider what we have learnt over recent weeks and months and explore ways to integrate these lessons into the way we deliver a #nowastenoharm respiratory healthcare in the 21st century.

Call to action

PCRS, through our Greener Healthcare Initiative, will

- Seek to raise awareness and advocate for proactive strategies to reduce the impact of the environment on respiratory health and of respiratory healthcare on the environment
- Enable all those involved in the delivery of respiratory healthcare to deliver care that is kinder to environment without compromising on quality of care through early and accurate diagnosis and appropriate treatment that ensure optimal symptom control
- Educate colleagues and patients about the environmental impact of respiratory healthcare and how they can reduce this impact without compromising on quality of care or symptom control

We call on our membership to educate themselves about the environmental impact of respiratory healthcare and consider the environment and environmental issues in their daily lives as well as their clinical practice.

We call on healthcare commissioners to consider the impact of their decisions on the ability of healthcare practitioners to deliver respiratory healthcare that is greener and kinder to the environment without compromising the quality of care they deliver.

We ask other healthcare, patient and environmental organisations to engage and partner with PCRS to advocate for strategies aimed at preventing respiratory disease and that reduce the impact of respiratory healthcare on the environment without compromising on quality.

We ask the pharmaceutical industry to engage and partner with PCRS to develop and deliver strategies and treatments that will ensure respiratory healthcare can be delivered in a way that is greener and kinder to the environment and ensure patients receive the highest quality of care for their respiratory condition.

Case for action

- In recent years there has been an increasing focus on the impact of the environment on human health and on the impact of the practice of medicine on the environment, both of which are relevant to respiratory medicine.
- The Climate Change Act (2008) was introduced to ensure the UK cuts its carbon dioxide equivalent emissions by 80% by 2050 against a 1990 baseline. The interim targets for reductions in carbon dioxide equivalent emissions to meet the Climate Change Act are a 34% reduction by 2020 and a 50% reduction by 2025.
- The NHS is responsible for 6.3% of England's total carbon emissions and for 5% of all road traffic in the UK (Sustainable Development Unit [SDU] metrics for 2018) and the UK is regarded as a major emitter with regard to healthcare-related emissions (**Figure 1**).

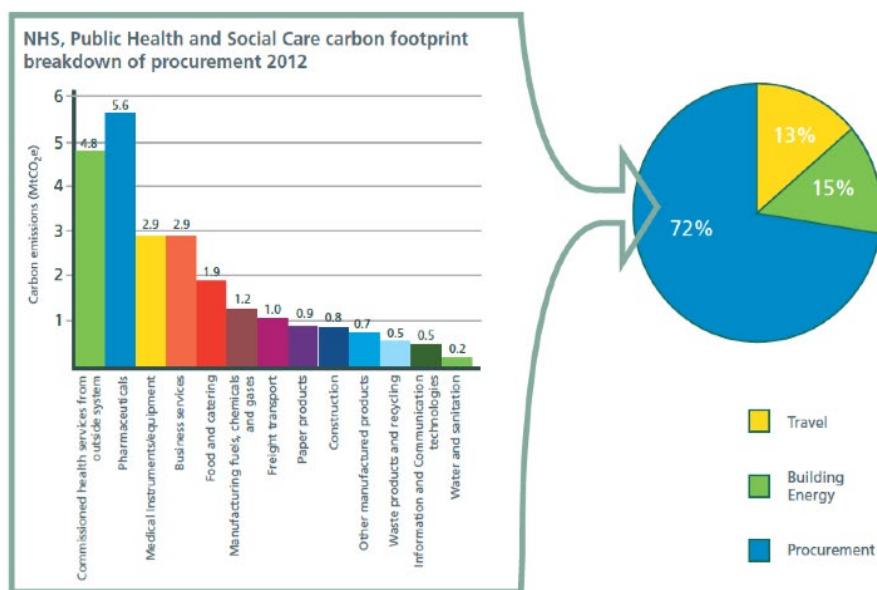
Figure 1: Healthcare emissions in context (From: *Health Care Without Harm. Health care's climate footprint. 2019; www.noharm.org*)

Health care emissions per capita by country				
Top emitters: (over 1t per capita)	Major emitters (between the 0.50t and 1t per capita)	Higher than average emitters (between global average 0.28t and 0.50t per capita)	Lower than average emitters	Unknown
Australia	Austria	Bulgaria	Brazil	Rest of World (ROW)
Canada	Belgium	Cyprus	China	
Switzerland	Denmark	Czech Republic	Croatia	
United States	Estonia	France	Hungary	
	Finland	Greece	India	
	Germany	Italy	Indonesia	
	Ireland	Malta	Latvia	
	Japan	Poland	Lithuania	
	Korea	Portugal	Mexico	
	Luxembourg	Slovenia	Romania	
	Netherlands	Spain	Slovak Republic	
	Norway	Sweden	Turkey	
	Russia	European Union		
	Taiwan			
	United Kingdom			

- In order to meet the ambitious targets set out in the UK Climate Change Act, it is essential to define and understand what is meant by the environmental impact of healthcare in general and as it relates to respiratory-related healthcare.
 - In 2012, an estimated 72% of the NHS carbon footprint related to procurement (**Figure 2**) including, in size order:
 - Pharmaceuticals
 - Commissioned health services from outside the system
 - Medical instruments/equipment
 - Business services
 - Food and catering
 - Manufacturing fuels, chemicals and gases

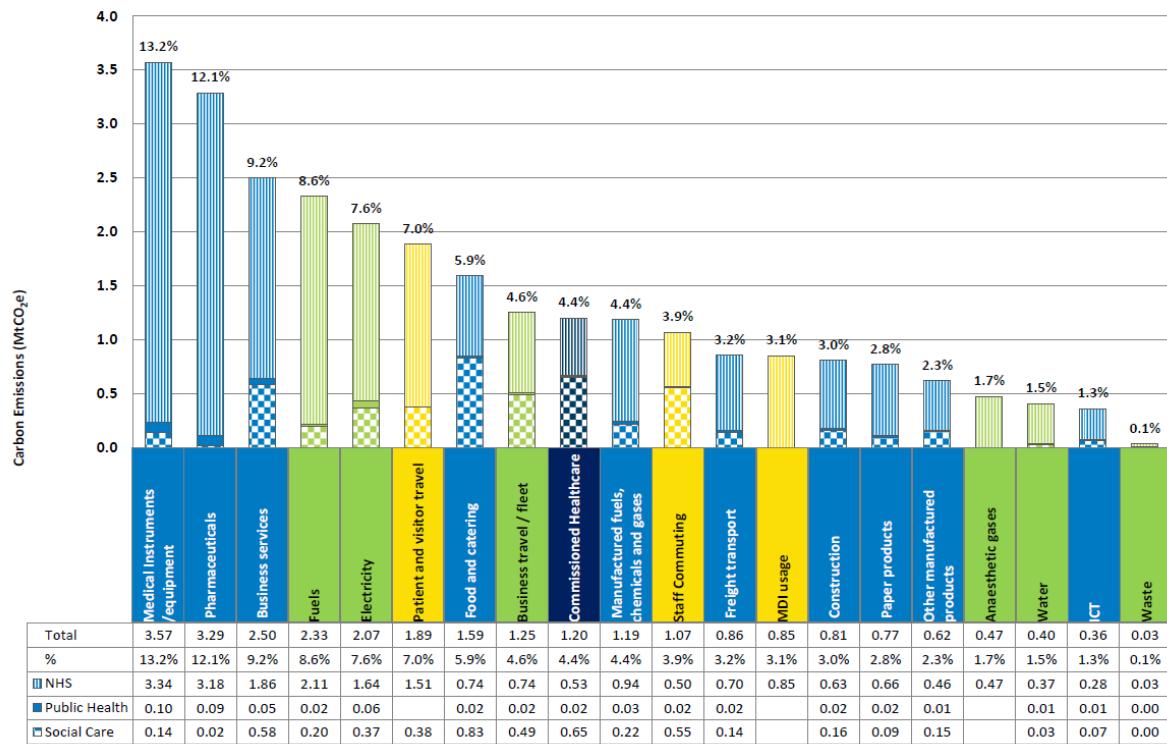
- Freight transport
- Paper products
- Construction
- Other manufactured products
- Waste products and recycling
- Information and communication technologies
- Water and sanitation

Figure 2: NHS carbon footprint breakdown in 2012 (Southern Health NHS Trust. Sustainability Development Strategy 2015-2020. 2017)



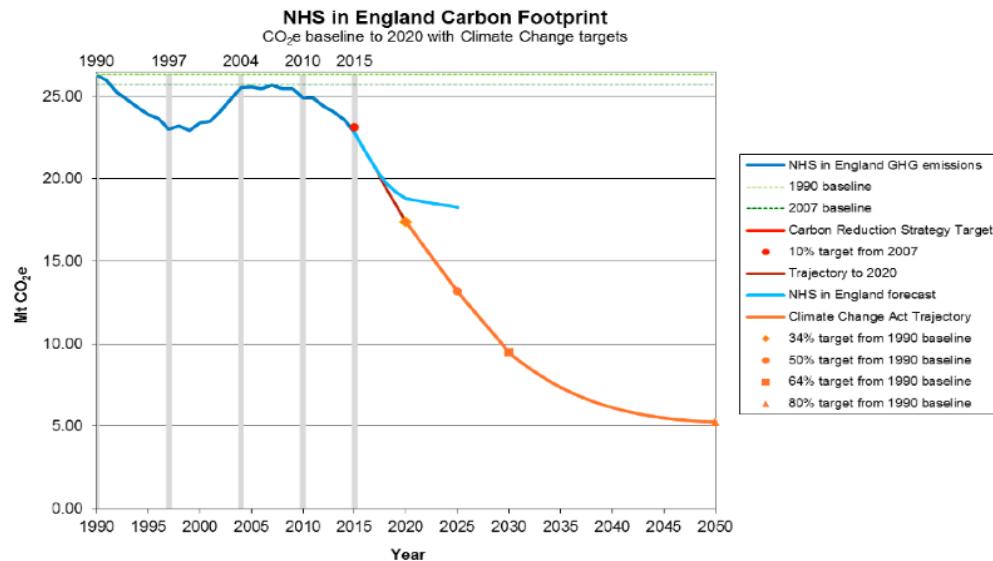
- A more recent analysis of the carbon footprint of the NHS in England issued by Public Health England in 2018 indicated that the environmental burden remained, principally due to procurement of medical instruments/equipment, pharmaceutical and business services (**Figure 3**).

Figure 3: NHS England carbon footprint breakdown in 2018 (Public Health England (2018) Reducing the use of natural resources in Health and social Care (2018 report) Available from <https://www.sduhealth.org.uk/policy-strategy/reporting/natural-resource-footprint-2018.aspx> (accessed 1/3/2020)



- The NHS set up the NHS Sustainability Development Unit (NHS SDU) in 2008 to champion sustainable practices in the NHS and enable the NHS 'to fulfil its potential as a leading sustainable and low carbon service'. At the time, the NHS contributed around 3% of England's total carbon dioxide emissions the equivalent of 18m tonnes of CO₂ per year, making it the largest public sector contributor to climate change.
- Subsequent reports and evaluations have highlighted steady progress:
 - In 2016/17 NHS providers generated nearly 590,000 tonnes of waste. Of this 15% went directly to landfill, with 23% of waste recycled.
 - Between 2010 and 2017 the health and care sector reduced water consumption by 21%, equivalent to around 243,000 Olympic swimming pools. The carbon footprint of health and social care has reduced by 19% since 2007, despite a 27% increase in activity. This leaves a significant challenge to deliver the Climate Change Act target of 34% by 2020 and 51% by 2025.
 - The estimated carbon footprint of the NHS in England has demonstrated a downward trend since 2008 (**Figure 4**)

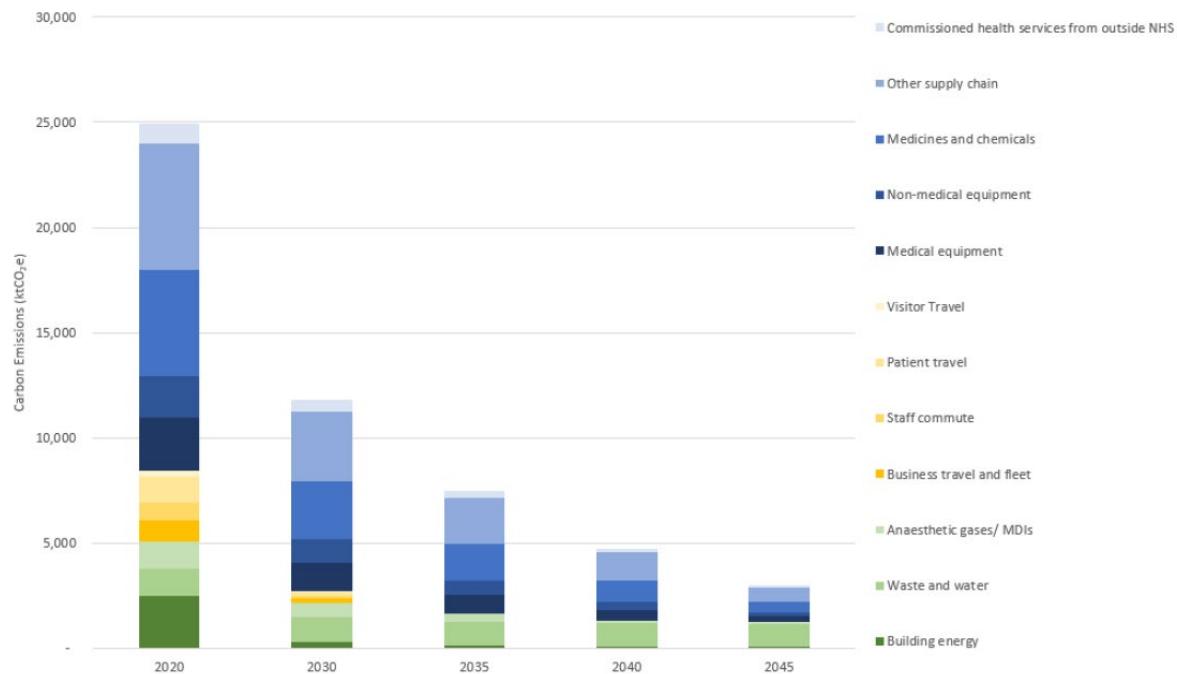
Figure 4: Carbon Footprint Update for NHS IN England 2015. Sustainability Development Unit. <https://www.sduhealth.org.uk/policy-strategy/reporting/hcs-carbon-footprint.aspx> (accessed 14/2/2020)



- The NHS Long Term plan (2019) states that ‘the NHS will work to reduce air pollution from all sources’ and the 2020 report “Delivering a ‘Net Zero’ National Health Service” has identified targets and a timeline for reducing the carbon footprint of the NHS in England (**Figure 5**).
 - The target areas encompass all activities of the NHS in England from buildings and waste services to medicines (including inhalers) and equipment with anticipated reductions and offsetting seen as achievable in all areas.

Figure 5: Target areas to reduce the carbon footprint of the NHS.

<https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2020/10/delivering-a-net-zero-national-health-service.pdf> (accessed 4/11/2020)



Impact of environment on respiratory conditions

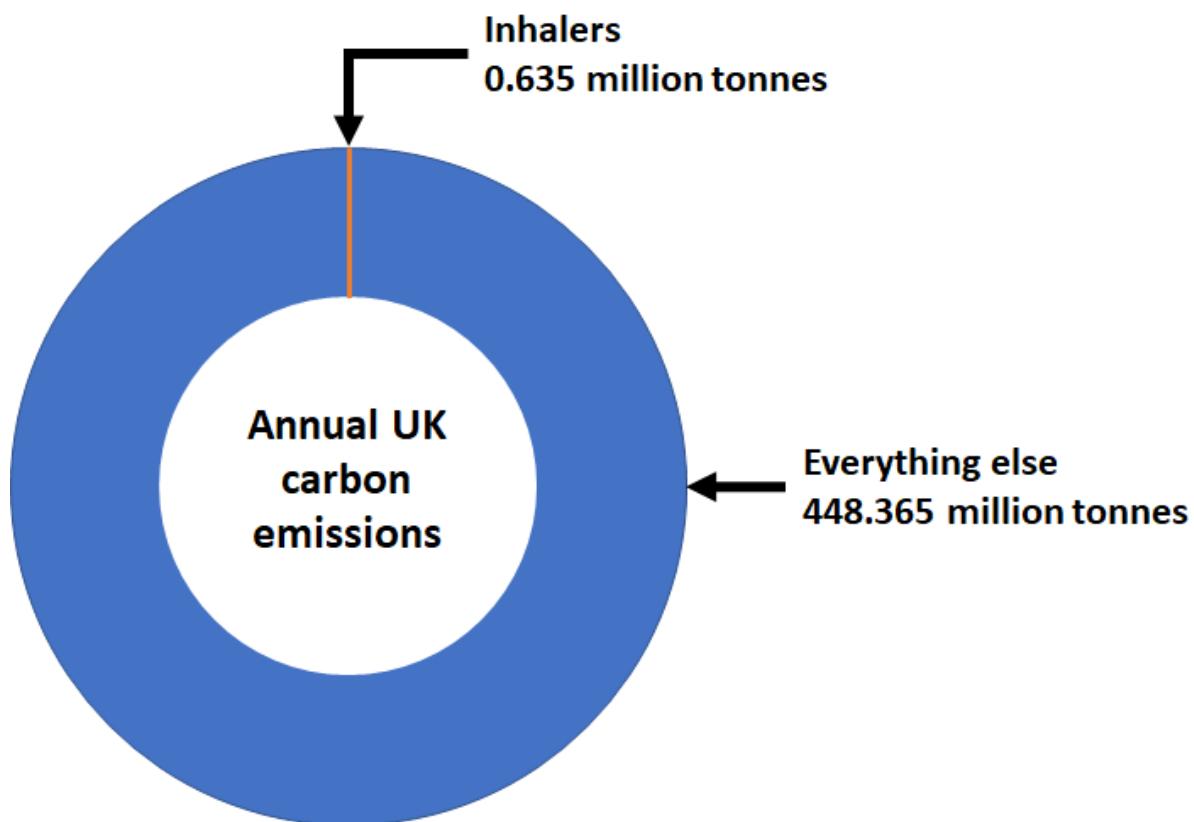
- Both external and internal environments can be implicated in the aetiology and control of respiratory conditions. Between 28,000 and 36,000 deaths in the UK are thought to be attributable to human-made air pollution (PHE 2019).
- Poor outdoor air quality is an increasing cause of concern in lung disease, and measures led by international agreements and UK based initiatives are working to improve the air that we breathe.
 - In 2010, the three leading risk factors for global disease burden were high blood pressure (7·0% [95% uncertainty interval 6·2–7·7] of global disability-adjusted life years [DALYs]), tobacco smoking including second-hand smoke (6·3% [5·5–7·0]), and household air pollution from solid fuels (4·3% [3·4–5·3]) (Lim et al 2012)
 - Poor indoor air quality and pollution from household activities such as heating and cooking can also be an issue both in the instigation of lung disease and in exacerbating existing lung conditions
 - The International Primary Care Respiratory Group (IPCRG) has a FRESH AIR initiative focused on improving air quality in low income countries, with a focus on all types of smoke (IPCRG)
- Environmental pollutants such as traffic fumes and industrial waste are targeted by policies designed to improve air quality for all which will particularly benefit people with lung conditions (DEFRA 2017)

- The ban on smoking in public places has had a significant impact on the experience of people with lung disease, but smoking tobacco continues to be a causal factor in some lung conditions, and the impact of environmental tobacco smoke in the home or in cars remains a major concern, particularly for children and those with underlying long-term health conditions
- There is increasing awareness of workplace substances being harmful to the lungs. Prompt recognition and removal of the patient from exposure can actually cause a condition such as occupational asthma to be better managed

Impact of respiratory management on the environment

- The other side of the environmental story is that the treatment of lung disease may also be contributing to harming the environment. In 2017, the British Thoracic Society (BTS) issued a statement on lung disease and the environment, which they updated in 2019. This sets out their perspective on how the respiratory community could seek to minimise the impact of lung disease on the environment and the measures that clinicians and the NHS could take. The BTS perspective includes a call for the use of low carbon inhalers where clinically appropriate and safe, expansion of recycling and disposal schemes, and training for HCPS in delivering training in inhaler technique.
- The NHS too is increasingly engaged with how it can reduce harm to the environment and has identified inhalers as an area for attention.
 - Low levels of inhaler recycling results in a considerable amount of plastic and metal going into landfill, and the use of hydrofluorocarbon (HFC) propellants in pressurised metered dose inhalers (pMDIs) contributes to global warming.
 - The Government's Environmental Audit Committee (EAC), in their 2017 scrutiny of F-gases (fluorinated gases used as propellants in pMDIs for transporting active medicine to the lungs), recommended a 2022 NHS target of 50% of all inhalers to be of 'low global warming impact', as well as an increase in the recycling of used inhalers with residual F-gas propellants to 50% of all those prescribed by 2020. (Parliamentary Environmental Audit Committee 2018)The NHS SDU inhaler taskforce recommends more moderate targets to reduce the carbon footprint of NHS inhalers by 50% by 2030.
- In 2017. Approximately 70% of the inhalers used in the UK were pMDIs and this was estimated to contribute 705 kilotonnes of CO₂e/year (Janson et al 2020). While considerable, it is important to place this in context (**Figure 5**).

Figure 5. Inhalers in perspective. Annual UK carbon emissions from asthma inhalers and all other sources (Wilkinson et al. UK Department for Business, Energy & Industrial Strategy. The Washington Post)



- A particular challenge at the present time is that the low levels of inhaler recycling results in a considerable amount of plastic and metal going into landfill, and the use of HFC (hydrofluorocarbon) propellants in pressurised metered dose inhalers (pMDIs) contributes to global warming
- The NHS Sustainable Development Unit (SDU) has taken this up and developed a position paper on reducing the impact of inhalers on climate change. The NHS SDU inhaler taskforce has recommended a target of reducing the carbon footprint of NHS inhalers by 50% by 2030 (NHS SDU)
- Inhalers such as dry powder inhalers (DPIs) and soft mist inhalers (SMIs) do not contain propellants, so the global warming potential of these inhalers is limited to the manufacturing process, packaging, transportation. Alternative low global warming potential (GWP, a measure developed to allow comparison of the global warming impacts of different gases) propellants for pMDIs are also under development.

Optimising disease control is essential to minimise the environmental impact of respiratory healthcare

Delayed or inaccurate diagnosis has the potential to increase the number of repeat visits to primary care and, potentially, hospital admissions as patients continue to struggle to cope with ongoing respiratory symptoms.

- Similarly, poor disease control also has the potential to increase the number of repeat primary care visits and emergency hospital visits due to acute exacerbations of their condition.
- Lack of patient education and support may result in poor understanding of their prescribed regimen, inappropriate use of their prescribed medication (eg underuse of preventer medication and consequent over-reliance of reliever medication among patients with poorly controlled asthma). Poor or inappropriate adherence to their prescribed regimen can lead to wasted prescriptions, stockpiling when patients are not using the medication they are receiving and medications going unused as their use-by day expires.
- Inefficient systems that do not consider the patient first may lead to wasted NHS visits for repeated tests and visits to see different HCPs for different conditions.

Actions we can take today to achieving greener patient-centred respiratory care

- Doing the right thing clinically for individual patients must remain the primary focus of clinicians.
- Greener respiratory healthcare that is kinder to the environment should be:
 - Patient-centred, putting patients at the heart of systems and decision-making processes so that they are more likely to adhere to appointments, prescribed medications and self-care advice.
 - Focused on achieving and maintaining disease control including appropriate prescribing and holistic care to enable patients to understand and adhere to their prescribed regimen/s. Inhaled respiratory medications should be delivered using the inhaler with the lowest carbon impact that is appropriate for an individual and alongside recycling schemes.
 - Delivered through simple, efficient systems.
 - Focused on waste minimisation, recycling and safe disposal at all levels, from the local pharmacy to the national policy and including decision makers.
- Achieving greener respiratory healthcare that is kinder to environment requires a holistic approach that considers the causes of respiratory disease as well as the causes of poor symptom control.

Early and accurate diagnosis

- All patients presenting with respiratory symptoms should receive prompt and accurate diagnosis of their condition.
- Accurate diagnosis ensures that patients can embark on the appropriate management plan to gain and maintain control of their respiratory symptoms.

Appropriate prescribing

- Appropriate medication (right medicine for their condition) and dose (lowest optimal dose) is essential to reduce the impact of wasted prescriptions for medicines a patient doesn't require or are not used to optimal efficacy.
- Balancing environmental goals and personalised treatments to ensure patients receive their medication via a device that is effective and appropriate for them (Panigone et al 2020; Usmani 2019)
- Awareness of potential interactions e.g. interaction of smoking with some respiratory medicines such as theophylline and ICS, which means that higher doses may be required (MHRA 2009)
- Electronic prescriptions should be used wherever possible.

Appropriate monitoring and review

- Risk stratification and identification of patients 'at risk' for proactive review should be a core part of primary care practice level service delivery. Such patients can be targeted for review and intervention to ensure they have received the correct diagnosis and the appropriate medication and also that they are taking their medication as directed using the correct inhaler technique.

- Group consultations have the potential to streamline routine care delivery by bringing groups of patients together who require the same supportive service. Such group consultations have the additional benefit of establishing peer support networks for patients.
- Digital respiratory assessments can be conducted, where appropriate and the patient is willing and able, via telephone, or app-based video messaging services using computers, tablets or smart phones.

Supported self-management

- As noted above, the NHS app can provide a central hub for patients to access information, remotely request medications or make appointments. Such websites can serve as hub where patients can access information to facilitate self-care may including:
 - Links to relevant sites such as the British Lung Foundation (BLF)/Asthma UK (AUK) (website, emails, SMS)
 - Seasonal advice (flu, hay fever, back to school, COVID 19 support)
- All patients with respiratory conditions requiring medication delivery via inhalers should be provided with web links to relevant inhaler videos on every inhaler prescription. These can also be provided on a practice website so that patients do not need to store the information.
- Digital action plans may be useful for patients to store on smart phones or tablets so that they do not need to carry large printed plans with them.

Primary care practice-level actions

- Primary care practices should seek to integrate sustainable healthcare principles in every aspect of clinical practice to ensure patient empowerment, disease control and lean service delivery.
- Primary care practice websites can be integrated with the NHS app to provide a central hub for staff to deliver and patients to access information, remotely request medications or make appointments.
- Embracing remote consultation technologies (telephone, video messaging via app-based web services) can contribute to a significant reduction in appointment-related patient visits and travel.

Inhaler use and recycling

- In the same way that a clinician may consider the cheaper product if efficacy and safety are equivalent, so clinicians should only take environmental impact into account in selecting an inhaler device with the patient, if all other factors are the same (Keeley et al 2020).
- Where clinically appropriate a change from pMDI to non-propellant inhaler may be considered if a suitable alternative is available and the patient is willing and able to change to the alternative inhaler (NICE 2019; Wilkinson et al 2019)
- Patients should receive regular review of their inhaler technique as part of their routine care.

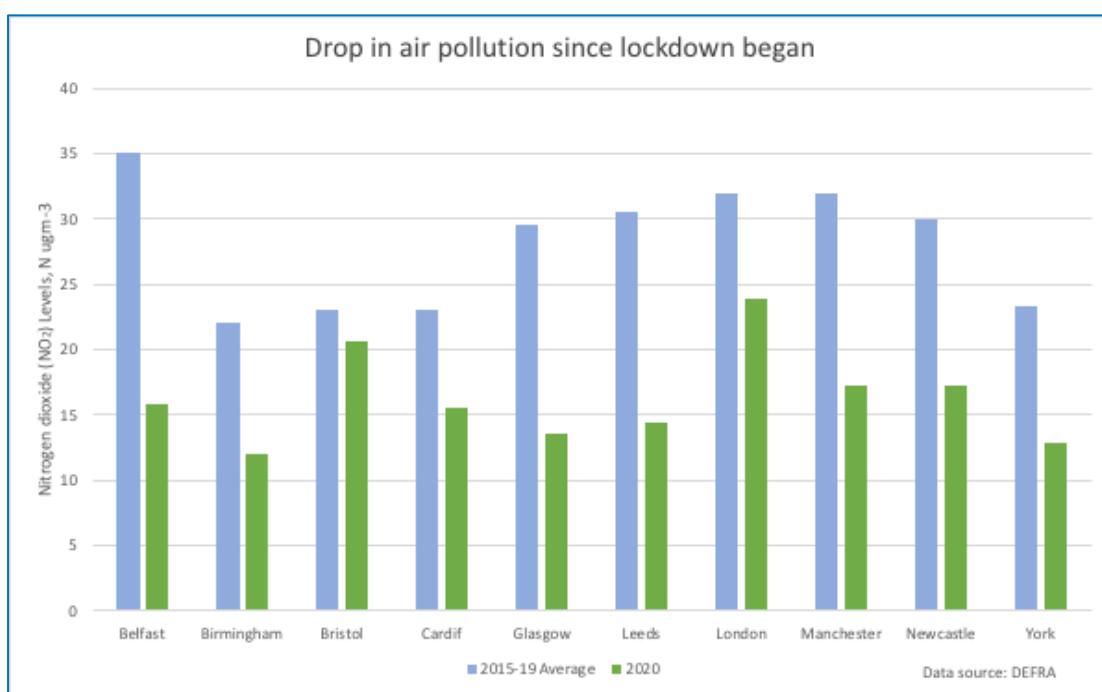
- When patients have deteriorating control of their respiratory condition, they may lack the inspiratory effort required to deliver sufficient quantities of the medicine for adequate drug deposition via DPIs.
- It is very important that the role of pMDIs in respiratory emergencies is recognised and protected (NICE 2019).
- Patients should be informed of whether safe disposal or recycling schemes are available for their inhaler, the difference between them and how to access them. They should also be educated on the importance of ensuring their inhalers are fully empty before submitting them for recycling.
- The role of community pharmacies in education and monitoring of patients should be supported. Community pharmacists are ideally placed to check support patients to manage their condition in terms of recognising triggers, checking patient inhaler technique, providing education on the importance of preventer medication use and monitoring the number and frequency of reliever inhalers used.

Lessons from COVID 19

Air pollution

- Data from DEFRA has clearly demonstrated a considerable reduction in levels of air pollution during the period of national lockdown in 2020 due to the COVID 19 pandemic (**Figure 6**). A reduction in travel is likely to have played a major part in this reduction emphasising the need to reduce healthcare related travel in order to improve air quality of patients with respiratory diseases and the wider community.

Figure 6. Drop in air pollution during the 2020 COVID 19 pandemic (Source: <https://geographical.co.uk/nature/climate/item/3680-coronavirus-measures-taken-now-could-ensure-a-greener-life-after-lockdown>)



Remote consultations

- The lockdown situation imposed by the COVID 19 pandemic forced primary healthcare service provision to switch to almost exclusively remote consultation. The situation revealed that remote consultations are possible and can be used to triage patients to identify those for whom a face to face consultation is warranted while meeting the healthcare needs of those not requiring face to face evaluation.
- However, there is a risk that by relying heavily on remote consultation as the first point of the health inequalities gap may be widened even further. Those who, for example, do not have access to appropriate technology or connectivity, do not have English as a first language, or have other communication difficulties are likely to be further disadvantaged in accessing care.

Actions we should seek for the longer term

- Achieving greener respiratory healthcare requires system-level changes that enable integration of sustainable healthcare principles in every aspect of clinical practice to ensure patient empowerment, disease control, lean service delivery and use of low carbon alternatives where appropriate. Inefficient systems, in addition to wasted resources, result in poor care and ultimately poor disease control.
- The healthcare community should seek to engage with NHS management and policy makers to demonstrate how care pathways can be redesigned for respiratory patients through use of digital technologies and telemedicine networks.
 - In 2017, 3.5% (9.5 billion miles) of all road travel in England was related to patients, visitors, staff and suppliers to the NHS. Utilisation of remote consultations and digital technologies has the potential to reduce travel-related emissions (Dullet et al 2017; Holmner et al 2012; Wootton et al 2010)
- Regular patient-centred reviews should be the cornerstone of care for patients with chronic respiratory conditions.
 - Current respiratory care pathways too often lead to repeated visits for appointments, tests, treatments with patients requiring multiple visits to see different HCPs for different aspects of their respiratory condition or for comorbid conditions.
 - Chronic disease hubs with multi-disciplinary healthcare teams could be established to streamline regular and routine care services for patients with chronic respiratory disease, including those with comorbidities and complex healthcare needs. Such hubs have the potential to avoid wasted NHS visits repeated tests and visits to see different HCPs for different conditions.
- Clear formulary-level detail should be readily available on which inhaler devices are high and low in terms of carbon footprint.
- Building of new or upgrading of existing health care facilities should focus on ensuring efficient use of renewable energy sources as well as efficient waste management and conservation and maintenance of water resources (NHS Sustainable Development Unit, Centre for Sustainable Healthcare)

Partnering with the pharmaceutical industry and other sectors providing services to the NHS

- Comprehensive, effective and national recycling schemes should be established with a requirement on providers to demonstrate the recyclability of products procured for use within the NHS.
- The NHS should seek to partner with providers to practically solve environmental impact of their products within respiratory care pathways.
- Providers should seek to minimise the environmental impact of their products with a focus on recyclable plastics (alongside clinically appropriate and effective recycling schemes) and effective/efficient alternatives to pMDI for use even by patients with low inspiratory force (Janson et al 2019).

- Providers should actively share information on new innovations and the timelines for lower carbon alternatives to enable commissioners and healthcare professionals to make appropriate decisions for patients.

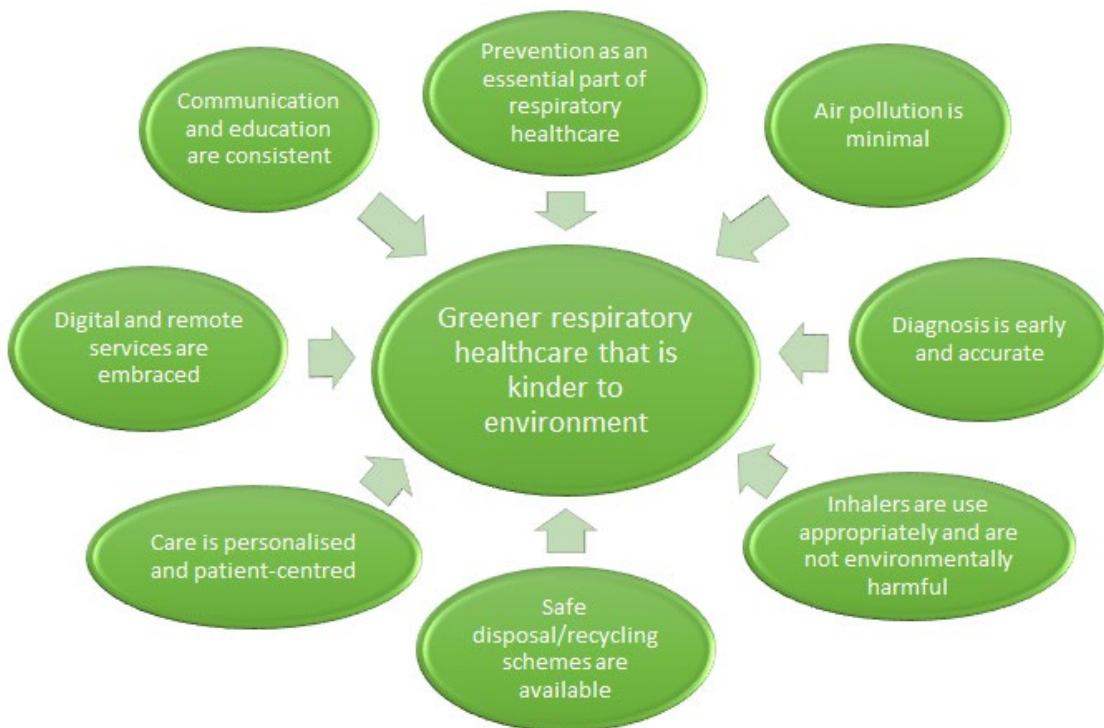
Vision for the future

Our vision for the future of environmentally friendly respiratory healthcare (**Figure 7**) is one in which:

- **Prevention of respiratory disease is regarded as an essential part of the respiratory healthcare**
 - Clean air is regarded as a fundamental right and its provision is a policy priority at the government level and recognised as fundamental to the respiratory health of the nation.
 - There is widespread understanding and awareness of the impact of environmental, including air, pollution on respiratory health.
 - Reduction of indoor air pollution (in the home or workplace and including second hand tobacco smoke) is recognised as a priority for the prevention of respiratory disease.
 - Tobacco dependency is recognised and prioritised as a key factor in the prevention of respiratory disease and stop smoking support is available to all patients wishing to attempt a quit.
 - New technology is embraced that helps patients and the wider public to understand and be aware of local environmental air conditions and make appropriate decisions in their daily lives.
- **Air pollution due to healthcare services is minimal**
 - Air quality is improved and healthcare organisations take active responsibility for contributing to this.
- **Diagnosis is early and accurate**
 - All patients are diagnosed correctly, receiving the right medication for them in the most effective delivery format that has minimal/no environmental impact.
 - All patients are educated and supported to self-manage and started on effective, personalized treatment.
 - Comprehensive and holistic diagnostic pathways that are not based on presumed diagnosis but on symptom-based assessments and treatments are the default service framework. This will lead to more accurate diagnosis, less waste and more effective non-pharmacological management of patients with emphasis on rehabilitative services (eg respiratory physiotherapy, pulmonary rehabilitation) and social prescribing strategies to support patients in maintaining an active and healthy lifestyle that supports their mental and emotional wellbeing.
- **Inhalers are used appropriately and are not environmentally harmful**
 - All CCGs and primary care practices understand the environmental impact of inhalers and take responsibility for reducing this in a way that maintains or improves patient outcomes.
 - Information on the carbon impact (very high, high, low) of inhalers is readily available and is a consistently considered aspect of shared decision making in device selection. To support this all suppliers publish the carbon impact of their devices and commit to a rapid transition to low carbon propellants from 2025 onward.

- Lower GWP inhalers are included in local formularies and presented above or alongside higher GWP inhalers.
- Inhalers are chosen based on patient preference and ability to use in conjunction with environmental rating.
- **Care is personalised and patient centred**
 - Asthma and COPD patients are diagnosed quickly and correctly, are educated and supported to self-manage and started on effective, personalised treatment.
 - Respiratory care that is designed around the patient through the utilisation of digital technologies (e.g. remote consultations) and devices (e.g. smart inhalers) to help keep them well and reduce NHS emissions.
 - Inhalers chosen based on patient preference and ability to use in conjunction with environmental rating. Patients are informed of the environmental differences between inhalers.
- **Digital and remote services are embraced**
 - Remote contact with the NHS is available as the first option for all services.
 - There are more opportunities for NHS staff to work from home.
 - Paperless practice (including electronic medication requests and prescribing) is the norm.
 - There is a shift in working practices so that face to face consultation is used only when necessary but remains a choice for patients.
 - There is increased use of digital services to help support people in understanding and monitoring their respiratory condition and in accessing clinical support when needed.
 - There is support for patients to engage with digital services.
 - There is increased use of social media and digital communications to support self-management including alerts for common triggers like pollen, high pollution levels, viruses.
 - Virtual group consultations are available.
 - Utilises a system-wide approach to deliver the right care closer to the patient with IT systems that talk to each other to help the paperless agenda, greater use of remote working
 - There is better understanding of the impact of treatments on the environment for clinicians and patients.
 - Virtual, remote specialist assessments are available where necessary.
 - Digital action plans are hosted on patients' smart device and available within shared records.
- **Communication and education are embraced**
 - All NHS colleagues receive the same consistent message about what they can do on a personal level and at work.
 - Healthcare professionals understand the relationship between environment and health, are aware of the differential carbon footprints of different inhaler devices, and know how make a choice to prescribe the most appropriate inhaler for each patient.

Figure 7: The PCRS vision for the greener future of respiratory healthcare



References

- BTS Environment and lung health position statement, 2019. Available at: <https://www.brit-thoracic.org.uk/about-us/position-statements/>. Accessed October 2020.
- Centre for Sustainable Healthcare. Commissioning sustainable healthcare. Available at: <https://networks.sustainablehealthcare.org.uk/networks/sustainable-respiratory-care>. Accessed October 2020.
- Department for Environment, Food & Rural Affairs (DEFRA). Air quality: A briefing for directors of public health. March 2017. Available at: laqm.defra.gov.uk/assets/63091defraairqualityguide9web.pdf. Accessed October 2020.
- Dullet NW, et al. Impact of a university-based outpatient telemedicine program on time savings, travel costs, and environmental pollutants. *Value Health* 2017;20:542-6
- FRESH AIR initiative – International Primary Care Respiratory Group. Available at: <https://www.ipcrg.org/freshair>. Accessed October 2020.
- Hansel M, et al. Reduced environmental impact of the reusable Respimat® Soft Mist™ inhaler compared with pressurised metered-dose inhalers. *Adv Ther* 2019;36:2487-92
- Holmner A, et al. Climate changes and eHealth: a promising strategy for health sector mitigation and adaptation. *Glob Health Action* 2012;5:18428
- Janson C, et al. Carbon footprint impact of the choice of inhalers for asthma and COPD. *Thorax* 2020;75:82-84
- Keeley DK, et al. Minimising the environmental impact of inhaled therapies: problems with policy on low carbon inhalers. *Eur Respir J* 2020;55:2000048
- Lim S, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2011. *Lancet* 2012;380:2224–60
- Ortsater G, et al. A budget impact model to estimate the environmental impact of adopting RESPIMAT® re-usable in the Nordics and Benelux. *Adv Ther* 2019;36:3435-45
- Parliamentary Environmental Audit committee. UK progress on reducing F-gas emissions. 2018. Available at: <https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/469/469.pdf>. Accessed October 2020.
- Sustainable Development Unit. Natural Resource Footprint. Reducing the use of natural resources in health and social care. Available at: <https://www.sduhealth.org.uk/policy-strategy/reporting/natural-resource-footprint-2018.aspx>. Accessed October 2020
- MHRA. Smoking and smoking cessation: clinically significant interactions with commonly used medicines, 2009. Available from: <https://www.gov.uk/drug-safety-update/smoking-and-smoking-cessation-clinically-significant-interactions-with-commonly-used-medicines>. Accessed October 2020
- NHS England. Delivering a ‘Net Zero’ National Health Service. Available at: <https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2020/10/delivering-a-net-zero-national-health-service.pdf>. Accessed 4/11/2020

NHS Sustainable Development Unit. Available at: <https://www.sduhealth.org.uk/>. Accessed October 2020

NICE COPD guideline. 2019. Available at:
<https://www.nice.org.uk/guidance/ng115/chapter/Recommendations>. Accessed October 2020

NICE. Patient decision aid. Inhalers for asthma. 2019. Available at:
<https://www.nice.org.uk/guidance/ng80/resources/inhalers-for-asthma-patient-decision-aid-pdf-6727144573>. Accessed October 2020

Panigone S, et al. Environmental impact of inhalers for respiratory diseases: Decreasing the carbon footprint while preserving patient-tailored treatment. BMJ Open Respir Res 2020;7:e000571

Parliamentary Environmental Audit Committee. Available at:
<https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/469/469.pdf>. Accessed October 2020

Public Health England. Review of interventions to improve air quality and public health. Available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/795185/Review_of_interventions_to_improve_air_quality.pdf. Accessed October 2020

Usmani OS. Choosing the right inhaler for you asthma or COPD patients. Ther Clin Risk Manag 2019;15:461-72

Wilkinson AJK, et al. Costs of switching to low global warming potential inhalers. An economic and carbon footprint analysis of NHS prescription data in England. BMJ Open 2019;9:e028763

Wootton R, et al. Environmental aspects of health care in the Grampian NHS region and the place of telehealth. J Telemed Telecare 2010;16:215-20