

1. Introduction

1.1 The evidence that climate change is happening, driven by human activities which increase atmospheric greenhouse gases, is overwhelming ⁽ⁱ⁾. Climate change represents a health crisis, and along with action to mitigate it, will impact on human health and respiratory health in particular. Increased temperatures and disruption of ecosystems by climate change impacts directly on lung health but is also a cause of poverty, conflict and mass population displacement, increasing individuals' susceptibility to illness and reducing their ability to access healthcare. This represents a significant global injustice, as those who experience the worst consequences of climate change are in general both least responsible for it and least able to respond to it.

1.2 The importance of climate change to health has prompted several medical societies to develop specific policies and reports to address it ^(ii, iii). The British Thoracic Society (BTS) produced its first detailed position statement on this topic in 2017, to mark the 60th anniversary of the UK Clean Air Act.

1.3 The first BTS Position Statement was published in March 2017. It was updated in January 2019 to set out more clearly the Society's position on inhalers and their impact on the environment. It has been updated again in March 2020 to expand this section further (section 3, following).

1.4 This update has been done in advance of a wider review of the Statement by a BTS Task & Finish Group. This element of the work has been put on hold because all resources of the Society and its members are being used to counter the COVID-19 emergency.

2. Advocacy: The lung health perspective

2.1 BTS welcomes the historic decision by the United Nations in December 2015 to adopt the Paris agreement on climate change. This pledged action to hold the increase in global temperature "to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C" (<https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>). We note also the IPCC report published in October 2018 which argues that "limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society"^(iv). Healthcare systems are not exempt from this and must transform to reduce their carbon footprint.

2.2 Many of the proposed mitigation and adaptation responses to the current climate emergency have the potential to promote health both at an individual level and a global level. Examples include pedestrianisation and traffic-free routes, which, by promoting walking and cycling, will increase physical activity levels, reduce road traffic accidents and at the same time reduce proximity to emissions ^(v, vi). Air pollution resulting from road transport, namely nitrogen dioxide and particulate matter, is of particularly urgent concern in relation to climate change and respiratory health.

Action areas:

- BTS and its members will highlight the links between climate change, air quality and health in policy documents and in interactions with policy stakeholders in healthcare and more broadly. Synergies between actions which both protect against climate change and improve human health, such as reducing exposure to indoor and outdoor pollution, will be highlighted in documents on the management and aetiology of respiratory conditions.
- BTS will press for active transport and clean air policies, as these reduce greenhouse gas emissions while improving respiratory health and overall fitness, reducing the current and future burden of disease.

3. Low carbon inhalers

3.1 Summary of recommendations

In order to provide guidance on clinically appropriate and safe means by which the environmental impact of inhaler prescribing can be reduced, BTS recommends the following:

- Where a new class of inhaler is commenced, this is a Dry Powder Inhaler (DPI).
- Where patients are using several classes of inhalers and poor inhaler technique is identified with one device, that the DPI class is prioritised if the patient is able to use these safely. Similarly, future and additional inhalers would ideally also be DPIs.
- That during all respiratory reviews, prescribers recommend low carbon alternatives to patients currently using Pressured Metered Dose Inhalers (pMDIs), where patients are able to use these safely.
- Taking all opportunities, including respiratory reviews, to optimise inhaler technique which may improve drug delivery / lung deposition.
- Supporting patients to reduce hoarding and use up existing medication in the first instance.
- The dissemination of information that some devices can be reused and the canister changed, and that prescribers encourage patients to ask their pharmacists about safe inhaler disposal.

BTS also calls for and will work to support the following:

- The expansion of recycling and disposal schemes to prevent remaining propellant gases from being released into the atmosphere, and avoid waste of plastic casing.
- The provision of information on where recycling and disposal schemes are available, including which large pharmacy chains offer this service.
- Training of health care professionals in delivering training in inhaler technique.

It is crucial that, while efforts are made to reduce the emissions associated with inhalers, patient choice is maintained and that changes are only made where clinically appropriate. These recommendations should

be read in the context of advice that decisions on inhaler types and usage should always be made in collaboration with healthcare professionals during routine respiratory reviews. BTS recognises that switching away from pMDIs will not be possible for all patients.

3.2 Background

The Montreal Protocol, introduced to protect the ozone layer, saw a planned phase-out of chlorofluorocarbon (CFC) propellants, replacing them with the hydrofluorocarbons (HFCs) now used in MDIs (Metered Dose Inhalers) (http://ozone.unep.org/new_site/en/montreal_protocol.php). Hydrofluorocarbons do not deplete the ozone layer, but they are powerful greenhouse gases, with an effect on climate change up to 3,800 more powerful than carbon dioxide. In 2018, these propellants were estimated to be responsible for 4% of the NHS's entire carbon footprint or 850,000 tonnes of CO₂ emissions, a figure which exceeds the entire carbon footprint of some small nations^(vii).

Pressurised Metered Dose Inhalers (pMDIs) make up 70% of prescribed inhalers in the UK. The propellant gases used in pMDIs, HFA134a and HFA227ea, are potent greenhouse gases which are respectively 1300 and 3350 times more potent than CO₂. In the rest of Europe, pMDIs account for less than 50% of prescribed inhalers, while in Scandinavia the proportion is only 10-30%^(viii). This variation suggests that there are clinically appropriate means by which to reduce the level of pMDI prescribing in the UK.

Low carbon alternatives are available in the form of propellant-free DPIs and reusable Soft Mist Inhalers. DPIs have a carbon footprint 18 times lower than pressurised pMDIs and clinical studies have shown them to be equally effective and as cost effective as pMDIs^(ix). Similarly, some pMDI inhalers are lower carbon than others with smaller canister salbutamol devices having a third of the environmental impact of salbutamol SABA inhalers with large canisters.

The correct disposal of inhalers is also critical as propellant gases may remain in spent canisters and can escape into the atmosphere if devices are disposed of domestically. Currently a very high proportion of

inhalers go to landfill with almost half of their usable propellant left inside (*).

3.3 NHS contracts and guidance

BTS members, and clinicians generally, are advised to note the inclusion in NHS contracts and guidance of targets to reduce the environmental impact of inhalers:

- NHS Long Term Plan targets require reducing the carbon impacts of inhalers by 50% by 2030 ^(xi).
- The updated GP contract notes that:
“All inhaler prescriptions, Structured Medication Reviews or planned Asthma Reviews taking place in primary care should consider moving or facilitating patients to lower carbon options where it is clinically appropriate to do so.”
It also includes as an indicator for the Investment and Impact Fund, pMDI prescriptions as a percentage of all inhaler prescriptions (excluding salbutamol).
- The Best Practice Tariff 2020/21 ^(xii) states:
“Providers should review both preventer and reliever inhaler technique with consideration given to using the lowest environmental impact inhaler device.”

3.4 Related resources and guidance

The BTS-SIGN 2019 Asthma Guideline ^(xiii) is clear that:

- “Prescribers, pharmacists and patients should be aware that there are significant differences in the global-warming potential of different MDIs and that inhalers with low global-warming potential should be used when they are likely to be equally effective. Where there is no alternative to MDIs, lower volume HFA134a inhalers should be used in preference to large volume or HFA227ea inhalers.”
and
- “Patients should be encouraged to ask the pharmacy they use if they can recycle their used inhalers.”

The 2019 NICE shared decision aid on asthma ^(xiv) includes details of the carbon impact of different types of inhalers and asks encourages patients and prescribers to consider this in choosing inhalers.

The Sustainable Development Unit for NHS England and Public Health England

(<https://www.sduhealth.org.uk/>) convenes a working group on low carbon inhalers and offers advice and resources for clinicians.

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4. The Society's own activities

4.1 In order to support the implementation of the positions and actions outlined above and as a mark of its commitment to sustainability in its own activities, the Board of Trustees of the Society, supported by the Chief Executive, have undertaken to:

- Bear responsibility for monitoring and evaluating progress against commitments in this document and the accompanying Environment and Lung Health Action Plan.
- Consider the carbon footprint of its investment portfolio. The Society currently has no investments in fossil fuel extraction industries and will not make any such in the future.
- Ensure its own offices have efficient heating and lighting systems and consider environmental issues in its own commissioning and procurement.
- Consider provision of video and other remote links for internal meetings to reduce travel as well as attempting to minimise and offset travel to meetings internationally.
- Encourage members to read *Thorax* online, rather than in print version, to reduce waste.
- Conduct a review of BTS activities and identify opportunities to promote sustainability, in addition to those listed here.
- Support members in developing and adopting sustainable practice, e.g. using conference programmes / abstract categories, awards, education materials and training courses.
- Measure and improve the environmental impact of BTS events.
- Partner with the Centre for Sustainable Healthcare (CSH) to create a Sustainable Respiratory Care programme.

5. Conclusions

5.1 BTS recognises that climate change is one of the greatest threats to human health ^(xv) which “left unabated ... will define the health profile of current and future generations” ^(xvi), and disproportionately affect patients with pre-existing lung disease.

5.2 Healthcare professionals have a duty to protect and promote the health of patients and the public ^(xvii) and climate change currently represents the greatest global threat to public health. Sustainable use of precious environmental resources is therefore the responsibility of all healthcare professionals, delivering health benefits now as well as protecting the health of future generations. Professionals working in respiratory medicine have an important role in combating climate change and developing sustainable practices. We also care for patients who are particularly vulnerable to the effects of climate change. Responding to the threat of climate change will require innovation; leadership; and a broad perspective; but action is crucial if we are to protect the health of our patients now and in the future.

BTS is a membership organisation and a registered charity. We have over 3,700 members in respiratory medicine and allied health professions (January 2020) and can lay claim to being the professional voice of respiratory medicine in the UK. Our objectives are to develop and promote the best evidence-based standards of care for patients with respiratory and associated disorders; to disseminate knowledge and learning about their causes, prevention and treatment; and to raise the profile and provide information about prevention of respiratory diseases.

6. References

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- ^x [Sustainable Development Unit for NHS England and Public Health England \(2019\) "Carbon hotspot: inhalers" slide deck](#)
- ^{xi} [NHS England \(2019\) "NHS Long Term Plan"](#)
- ^{xii} https://improvement.nhs.uk/documents/6261/2021/Annex_DtD_Best_practice_tariffs.pdf
- ^{xiii} [BTS/SIGN guideline for the management of asthma \(2019\)](#)
- ^{xiv} [National Institute for Health and Care Excellence \(2019\) "Patient decision aid: inhalers for asthma"](#)
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