Regional Drug and Therapeutics Centre.

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Quantification of Respiratory Inhaler Carbon Footprint in primary care prescribing

The impact of climate change on health is increasing, as global warming continues to rise. [1] The NHS Long Term Plan (LTP) sets a target of '51% reduction in the carbon footprint by 2025' for the Health and Social Care Sector, as part of the Climate Change Act. [2] Furthermore, the Sustainable Development Unit (SDU), a collaboration of NHS England (NHSE) and Public Health England (PHE) identified pharmaceuticals as a 'hot spot' accounting for 22% of the NHSE carbon footprint [3] with pressurised metered dose inhalers (pMDIs) and breath-actuated pMDIs (BA-pMDIs) contributing 3.2%. [4] To meet the Climate Change Act targets, the NHS LTP outlines that 4% of the total NHS carbon footprint savings are expected to be realised through a 'shift to lower carbon inhalers' equivalent to a 50% reduction in the total inhaler carbon footprint. [2,5,6]

Independently verified manufacturer product carbon footprint (PCF) certificates are available for some, but not all, of the commercially available inhalers. There are also several review publications which report on inhaler carbon footprints. [7-10]

In an endeavour to overcome the limitations of the published literature and variability in known values, the Regional Drug and Therapeutic Centre (RDTC) at Newcastle has collated the available manufacturer PCF data, primary research papers and formulation specifics to generate a set of assumptions which enables carbon footprint values to be estimated for all currently available inhalers. Subsequently, a commissioning tool was developed to quantify the financial and carbon impact of inhaler prescribing (RDTC Inhaler Carbon Impact Assessment Tool [11]). The tool currently presents the impact of switch options for SABA, SAMA, LAMA, and ICS inhalers with further development in progress on combination respiratory inhalers for COPD and Asthma.

In the NENC CCGs, Inhaler carbon footprints (Jul-Sep 20/21) weighted for the number of Asthma & COPD patients range from 27.8 kgCO2e – 46.8 KgCO2e, with a NENC footprint average of 36.1 KgCO2e. This is comparable to the England average of 35.8 KgCO2e. Based on a target of 50% reduction of England's total Inhaler carbon footprint, it is possible to calculate a national target of 19.3 KgCO2e average per asthma & COPD patient in England per quarter.

Subsequent analysis has included a review of refill prescribing for Spiriva® Respimat® 2.5mcg and Spiriva® Handihaler® 18mcg (30 pack). In the NENC ICS footprint, 12,258 KgCO2e and 22,531 KgCO2e could be saved annually by using refills as per the manufacturer's directions, for the respective devices.

Furthermore, it is estimated that pMDIs have on average between 20% through [12] and 50% [13] of propellant/doses remaining on disposal by patients, which will be emitted into the atmosphere if these inhalers go into landfill. [12] If patients were supported with education to reduce the number of wasted doses/inhaler on disposal, it is estimated that a 20% improved efficiency of the inhalers currently prescribed in the NENC would release an annual carbon footprint and financial saving of 9,344,157 KgCO2e and £5.1 million respectively.

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