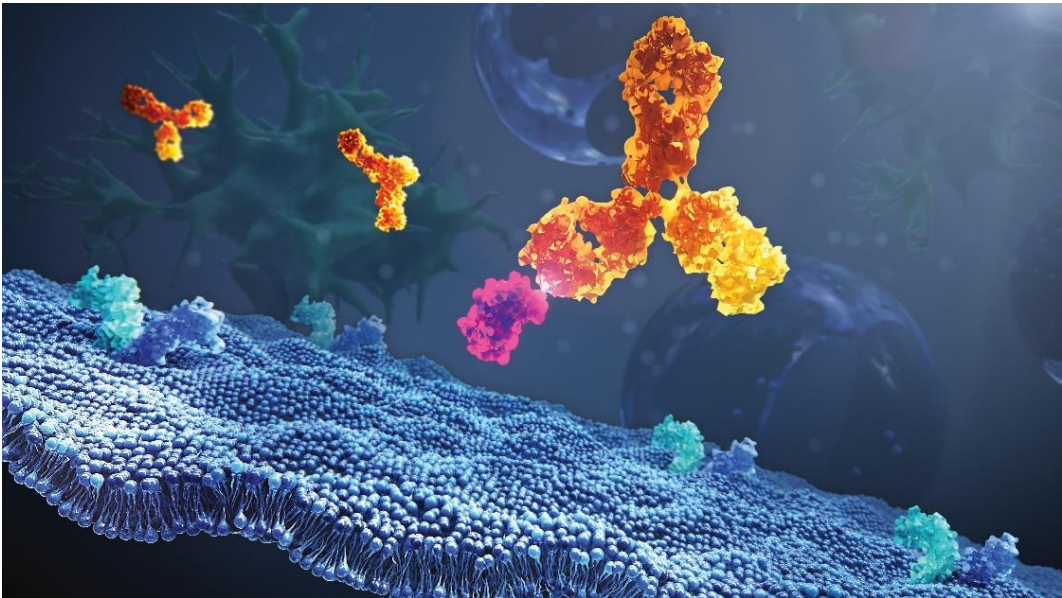


Care pathway for Monoclonal Antibody Therapy of Severe Eosinophilic Asthma

Care Pathway Case Study



AstraZeneca 



**Sustainable
Healthcare
Coalition**

Care pathway for Monoclonal Antibody Therapy of Severe Eosinophilic Asthma

Title	Care pathway for Monoclonal Antibody Therapy of Severe Eosinophilic Asthma
Organisation	AstraZeneca
Company website	www.astrazeneca.com/
Contact details	Nigel Budgen (Nigel.Budgen@astrazeneca.com)
Completion date	June 2018
Assurance	Internal assurance
Supporting information	Budgen N, Care pathway for Monoclonal Antibody Therapy of Severe Eosinophilic Asthma, (2018) AstraZeneca
Conformance with 2012 Greenhouse Gas Protocol Pharmaceutical Sector Guidance and Care Pathways: Guidance on Appraising Sustainability (“the Guidance”)	Adheres to the principles of the Guidance
Care pathway description	Care pathway for Monoclonal Antibody (Mab) Therapy of Severe Eosinophilic Asthma
Environmental issues appraised	Global warming potential (IPCC, CO ₂ eq, 100-year) Water consumption (m ³) Waste generation (kg)

Conclusions

This study estimates that the greenhouse gas (GHG) emissions associated with a patients’ management of severe asthma is reduced by approximately 50% through the use of monoclonal antibody treatment. This reduction results from the combined effects of improved control of symptoms, reduced exacerbations and a decrease in hospital admissions. These trends directly affect the environmental impact associated with asthma management and are important steps towards a more sustainable treatment paradigm for this debilitating disease.

Learnings

This study has demonstrated the value of appraising the sustainability of care pathways. The assessment has identified the environmental hotspots in the care of a patient with asthma and how they are affected by the use of new treatments.

The relative impact reduction estimated in this study, is based on reliable published peer reviewed data^{1,2,3}. Other clinical trials on immuno-therapeutic treatments of eosinophilic asthma have revealed similar overall outcomes⁴. The assessment is therefore well founded and is not reliant on derived factors. However, environmental impact values are calculated using a number of generic emission factors. This introduces a degree of uncertainty with the final absolute footprint value estimates given here. A more in depth assessment of all the standard procedures that are specifically deployed to control asthma, especially during healthcare interventions, would be needed to provide a definitive measure of the absolute values.

The use of Mab therapy is relatively new and evolving, but promises to revolutionise the management of the disease. Further studies are needed to confirm the key conclusions provided here. By using innovative medicines to improve a patient’s control of asthma, to reduce the need for health care interventions and to prevent exacerbations are all steps towards a more sustainable approach to control the disease.

1 ZONDA Trial; Nair, P, Wnnzel S., Rabe K., F., Bourdin A., Lugogo N.L., Kuna P., Barker. P., Sproulele S., Ponnaramil S., Goldman M., Oral Glucocorticoid-Sparing Effect of Benralizumab in Severe Asthma. N Engl J Med 376; 25 June 22 (2017)
2 SIROCCO Trial Bleeker, Eugene R et al. Efficacy and safety of benralizumab for patients with severe asthma uncontrolled with high-dosage inhaled corticosteroids and long-acting β2-agonists (SIROCCO): a randomised, multicentre, placebo-controlled phase 3 trial The Lancet . Volume 388 , Issue 10056 , 2115 – 2127
3 Goldman M1, Hirsch I1, Zangrilli JG1, Newbold P2, Xu X1. The association between blood eosinophil count and benralizumab efficacy for patients with severe, uncontrolled asthma: subanalyses of the Phase III SIROCCO and CALIMA studies. Curr Med Res Opin. 2017 Sep;33(9):1605-1613. doi: 10.1080/03007995.2017.1347091. Epub 2017 Jul 19.
4 SIRIUS trial, Elisabeth H. Bel, et al Oral Glucocorticoid-Sparing Effect of Mepolizumab in Eosinophilic Asthma N Engl J Med 2014; 371:1189-1197 DOI: 10.1056/NEJMoa1403291

Globally, it is recognised that health and care systems are undergoing transformative change to adapt to the needs of patients and communities, with increasing pressure to be financially, socially and environmentally sustainable. Appraising the sustainability of care pathways is seen as a crucial step to enabling a more sustainable health system⁵.

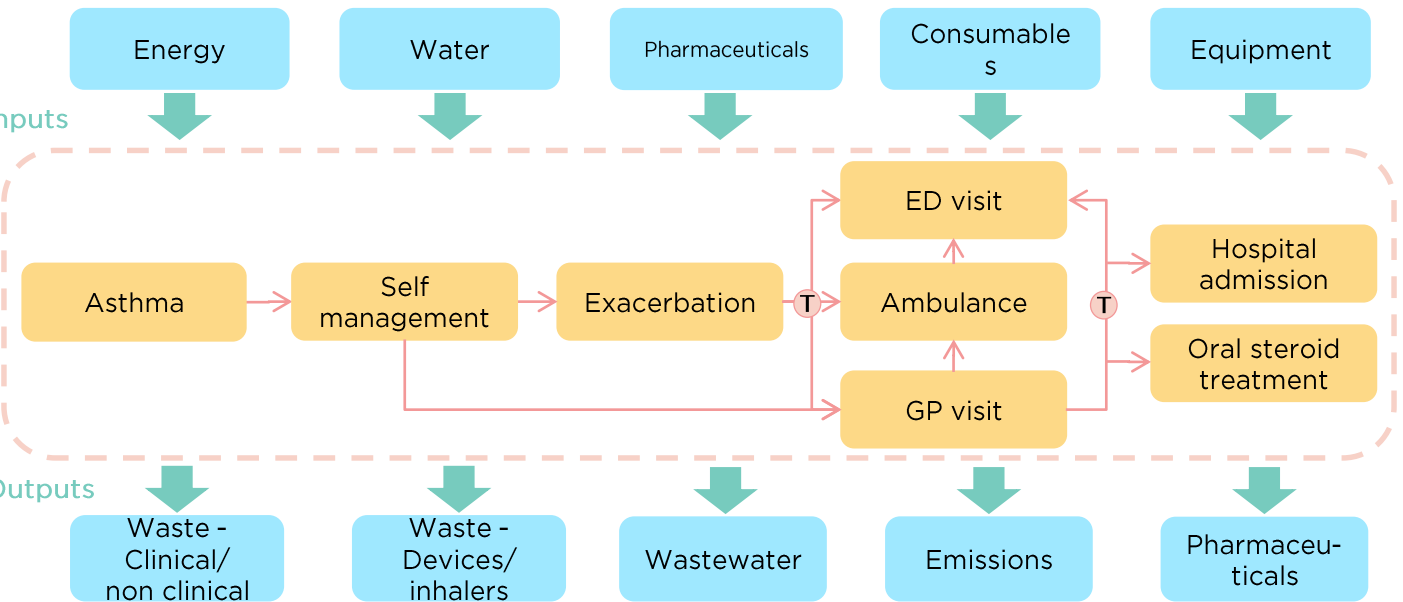
Scope

This appraisal considers the environmental impacts of the management of severe eosinophilic asthma. Prevention and control of asthma exacerbations are key goals of treatment of asthma. The unit of analysis for this appraisal is:
The annual management of a person, aged 12 years or above, taking regular inhaled steroids, typically poorly controlled or regularly requiring healthcare interventions and with an eosinophilic phenotype.

The overall environmental burden was assessed of monoclonal antibody (Mab) therapy of severe eosinophilic asthma. The patient population are individuals with asthma aged 12 years and above taking regular inhaled steroids, based in the UK. All have poorly controlled asthma, assessed by ACQ scoring or from their healthcare history. The study is based on the use of benralizumab every 8 weeks by severe eosinophilic asthma sufferers. The active substance, benralizumab, is an anti-eosinophil, humanised monoclonal antibody (ATC code: R03DX10) .

The care pathway is based on NICE and BTS SIGN guidance *Summary of asthma management - for adults*⁶.

GHG emissions, water consumption and waste product have been considered in this appraisal by using the approach and impact factors set out in the ‘Care Pathways: Guidance on Appraising Sustainability’ guidance document⁵. The diagram below sets out the process stages included in study.



⁵ Care Pathways: Guidance on Appraising Sustainability, 2015
⁶ British guideline on the management of asthma ISBN 978 1 909103 47 4 (First published 2003 Revised edition published 2016)

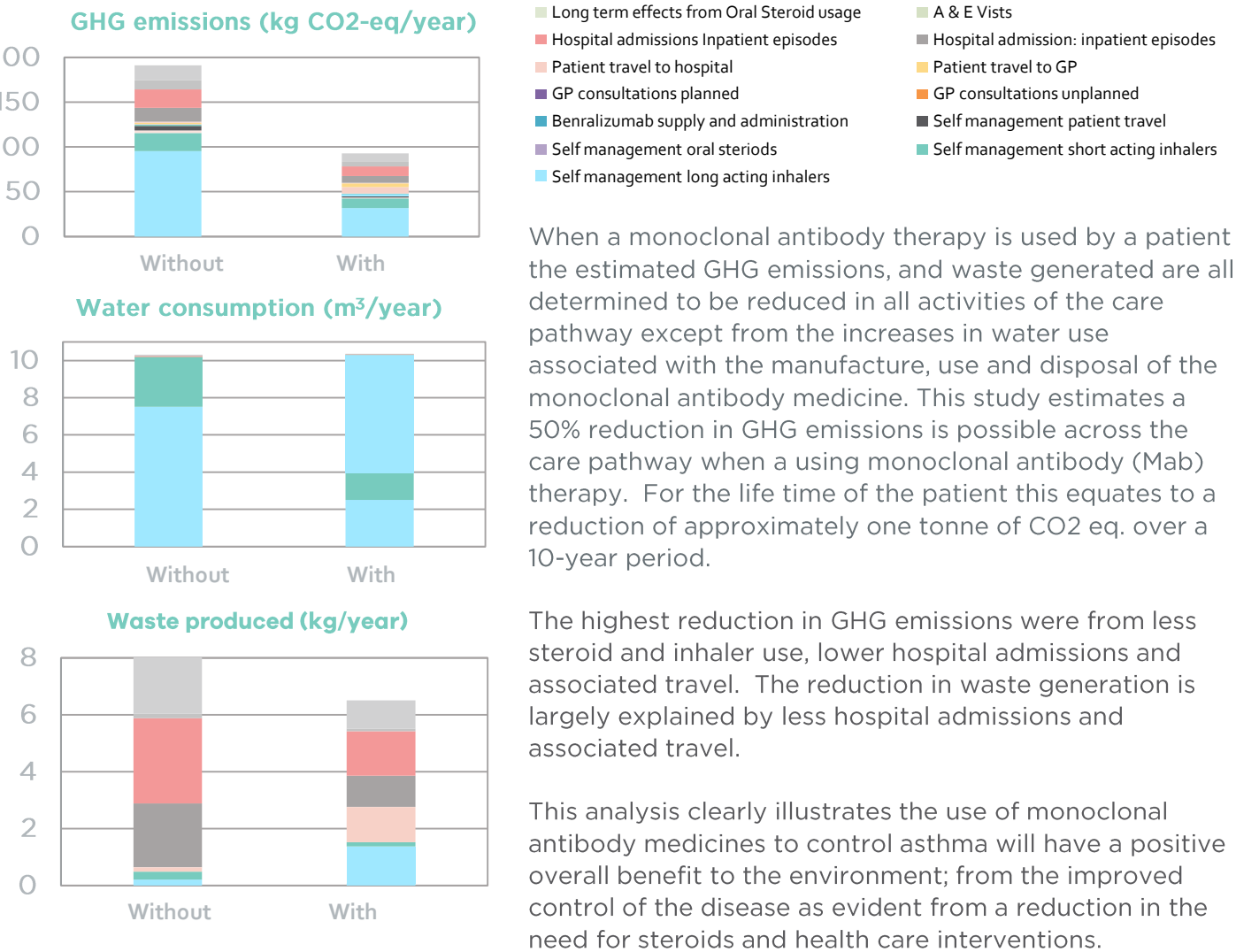
Data

The healthcare frequency and incident rates for the UK asthma patient population are derived from published UK NHS health surveys collected by GPs and health care trusts. The frequency of health interventions were extracted from 2011-2012 NHS datasets; published by Mukherjee et al⁷.

Emission factors were taken from the SHC care pathway guidance⁸, AstraZeneca’s LCA model for benralizumab⁹, GSK Carbon Trust data for a pressurised metered inhaler¹⁰ and AstraZeneca’s LCA for an oral steroid tablet¹¹.

Results

The impacts of each care pathway activity were determined to provide an estimate of the GHG emissions, water consumption and waste generation for treatment of a patient using monoclonal antibody (Mab) therapy .



Acknowledgements

This document has been developed collaboratively through the Sustainable Healthcare Coalition, which comprises a range of organisations within the healthcare sector including pharmaceutical and medical device companies, trade bodies, procurement, government organisations and other stakeholders. The Sustainable Healthcare Coalition operates with the aim of facilitating the journey towards good health and wellbeing on a finite planet, through open-minded collaboration across public and private healthcare.

⁷ Mukherjee M. Estimating the incidence, prevalence and true cost of asthma in the UK. BMJ Open (2014). ⁸ <http://www.shcoalition.org/download-area/>
⁹ AstraZeneca internal LCA reports for Symbicort and Fasenra. Authored by ERM (2018)
¹⁰ GSK Data: (2014) <http://networks.sustainablehealthcare.org.uk/sites/default/files/media/GSK%20Carbon%20Trust%20Certification%202014.pdf> .
¹¹ AstraZeneca internal LCA reports For Symbicort. Authored by ERM (2017)