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Title:

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Date:

2018-09-01

Citation:

Kane, S. & Mahal, A. (2018). Cost-effective treatment, prevention and management of
chronic respiratory conditions: A continuing challenge. *Respirology*, 23 (9), pp.799-800.
<https://doi.org/10.1111/resp.13337>.

Persistent Link:

<https://hdl.handle.net/11343/284027>

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Editorial Office Notes:

RES-18-355

EDITORIAL

Author Manuscript

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as doi: [10.1111/resp.13337](https://doi.org/10.1111/resp.13337)

Cost-effective treatment, prevention and management of chronic respiratory conditions:

A continuing challenge

Keywords: Emphysema, Endobronchial valve, Respiratory Conditions, Low- and Middle-Income Countries

Almost 3.7% of the global burden of disease in 2015 was due to COPD and asthma, 90% of which was accounted for by people in low- and middle-income countries (LMICs)¹.

Individuals with COPD use much higher levels of health services compared to their counterparts without COPD, and experience major declines in earnings and employment as their condition progresses.^{2,3} The design and implementation of strategies to prevent, manage and treat chronic respiratory conditions cost-effectively therefore are subjects of considerable health policy significance.

Improving the health and quality of life of individuals with serious health conditions is a key goal of governments, as is the reduction of any associated financial burden. Endobronchial valve (EBV) placement has been established as an alternative technique for treating COPD patients with advanced emphysema. The recent publication by Hartman and colleagues in *Respirology*⁴ highlights the economic viability of bronchoscopic lung volume reduction using one-way endobronchial valves (EBV) for the treatment of a subset of patients with severe emphysema. The paper showcases how a thorough and methodical application of robust cost effectiveness analysis can inform system level resource allocation decisions. Although

set in the context of the Dutch healthcare system, their paper confirms an earlier finding from Germany that the EBV option is more cost-effective than procedures currently available for similarly placed emphysema patients. Although promising in the context of high-income country health systems, at almost AU\$62,000 per QALY gained over a 5-year horizon, however, the EBV option will be difficult to implement in LMICs that have considerably lower resources to devote to health services. It is possible that in some cases lower personnel expenses may lead to lower intervention costs in LMICs, so that at least for the better off individuals in these countries the treatment could be affordable.

Focusing solely on treatment interventions for advanced stages of COPD is unlikely to be sustainable as a strategy for containing its consequences, however. With nearly 174 million cases of COPD worldwide, including 131 million in LMICs¹, available resources will not be sufficient for treatment alone as an option. In LMICs moreover, health systems are too poorly funded and ill-equipped to support the subsidized treatment of patients with COPD. Shortages of health personnel, including but not limited to those with expertise in pulmonary rehabilitation are also widespread in LMICs. And with limited avenues for insurance-based financial protection for expenses associated with even the most cost-effective treatments currently available in high income countries, the likely outcomes are large out of pocket payments and medical impoverishment among households containing individuals with COPD, except for the economically better off. This situation reminds us that prevention approaches ought to continue to receive priority attention.

With smoking, household air pollution, and particulate ambient air pollution being major risk factors for COPD, strategies continue to be needed to directly address them. Smoking is the biggest culprit; globally, 25% of all men, most of whom are in LMICs, smoke. In recent years, multiple measures to address initiation and continued use of tobacco products, including large increases in tobacco taxes⁵, and packaging interventions have had significant effects on tobacco use⁶; these preventive interventions remain the best bets for COPD control. Worldwide, 3 billion people, almost all LMICs, disproportionately women from lower socioeconomic strata, are exposed to smoke from the burning of biomass for cooking. Increasing evidence suggests that health outcomes are most likely to improve when clean cooking programs focus on the provision of clean fuels (LPG, electricity, biogas, or ethanol)⁷. Tackling ambient air pollution is a global challenge and requires concerted global action; in 2016, under the aegis of the World Health Organisation, all nations have agreed on a road map for “an enhanced global response to the adverse health effects of air pollution”⁸.

Interventions for smoking cessation have been shown to be highly cost-effective for patients with COPD too⁹. Similarly, pulmonary rehabilitation is another option for patients with moderate to severe COPD that limits exacerbations and improves their quality of life. However, facility-based programmes can be inconvenient in terms of cost and time and thus tend to have poor uptake; recent evidence suggests that home-based pulmonary rehabilitation can produce equivalent patient outcomes, and is also cost-effective¹⁰.

Tackling the burden of COPD requires simultaneous promotive, preventive, curative and rehabilitative interventions. Inevitably countries need to decide their resource allocation priorities. Robust cost effectiveness analysis, as done by Hartman et al are critical for making these informed choices. As new treatments become available to improve the health and quality of life of individuals with advanced illness, such analyses will play a central role in health policy discussions on resource allocation, rationing and prioritisation.

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