

Respiratory research funding is inadequate, inequitable and a missed opportunity: the future requires well-funded long-term large-scale implementation science collaborations

V5 draft

Target is 750 words. 10 references and one *Currently 750 words if we don't have to include the numbers/figures – see below for discussion. Need to prune references.*

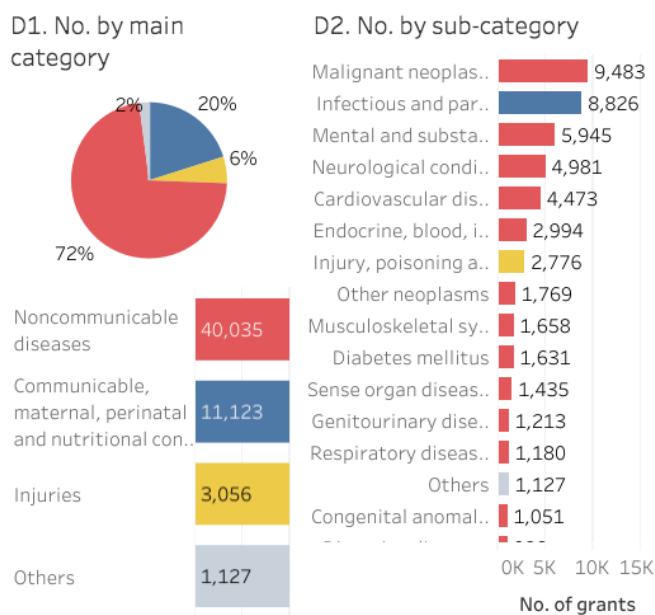
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One thousand people die of asthma every day¹; two thousand children die of pneumonia;² lung cancer is the commonest cause of cancer deaths(#); and chronic obstructive pulmonary disease is predicted to be the fourth greatest cause of early death by 2040.³ Respiratory diseases generate an enormous burden of mortality, the majority of falls on people in the global south and vulnerable populations in high income economies.⁴ They are diseases of poverty and disadvantage which further compound inequity by increased disability, loss of productivity and catastrophic out-of-pocket health costs (**). As a major driver of ill-health and poverty, the burden of respiratory disease is a global rate-limiting step towards achieving health equity, economic growth and achieving the Sustainable Development. ⁵SAME AS REF 4

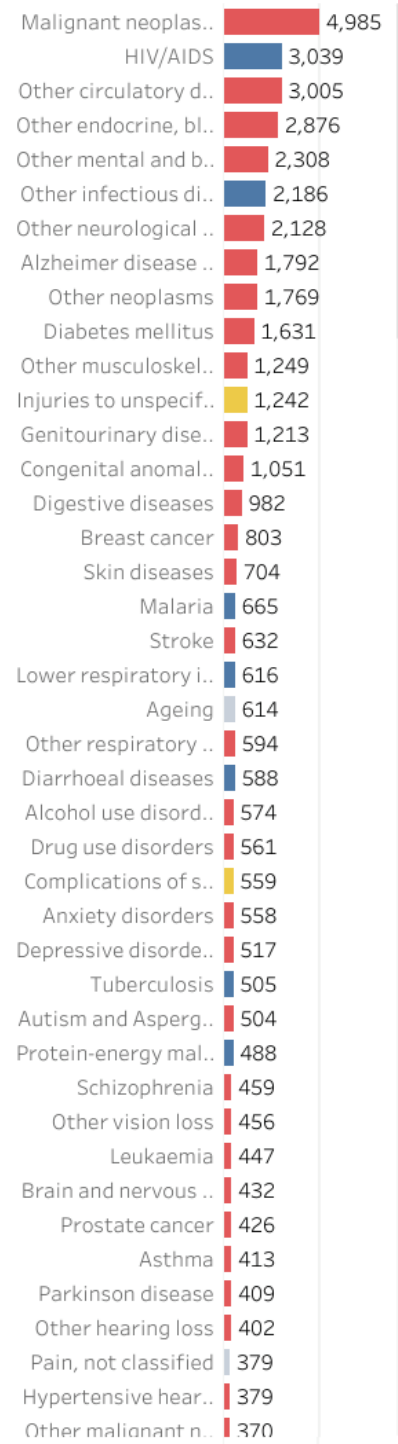
Research is also needed to address the unwarranted variation in access to and quality of respiratory diagnosis and care in LMICs.**Error! Bookmark not defined.** Underuse of effective interventions and overuse of ineffective or expensive interventions are important problems. For example the overuse of bronchodilators and underuse of inhaled corticosteroids in asthma, underuse of nicotine replacement therapy in treating tobacco dependence and poor adherence to TB treatment.⁸

Yet if we look at the World Health Organization's (WHO's) latest analysis of research expenditure from 12 major funders, from 2012-2017,⁹ where is respiratory disease? Almost three-quarters of grants were for non-communicable diseases (NCD), but respiratory disease lies 13th in the NCD category list with 2% of total; and by disease, TB lies 19th, asthma 27th; COPD 50th. Only 0.2% of research funding went to low income countries. Of the 450 grants received by African countries, allocations to respiratory diseases were: TB n=39; lower respiratory infections n= 7 grants; and asthma n= 2 grants. The situation in other regions is worse: only 19 grants to south-east Asia of which 2 were respiratory-related.

D. No. of grants by health category



D3. No. by disease/condition



There is a substantial mismatch between burden and research investment. This has not improved in over a decade.^{10 11} Although necessarily limited by data availability, our analysis suggests that advocacy for respiratory research has not been successful in communicating the urgency or size of the problem. There is no research strategy or feasible roadmap that aligns the interests of all stakeholders: governmental and commercial research funders, academic institutions, global and national health agencies, clinicians, patients and the public. Therefore there is a need for national recognition and investment, plus a rebalancing of global investment in LMICs that have the biggest burden but least resource. Furthermore, the contribution of tobacco dependence, air pollution, and nutrition to respiratory morbidity means that to have impact, respiratory health research needs to increasingly expand its focus and partnerships beyond the health sector and health systems.

Comment: We have a number of options for the infographic to show size of respiratory research funding compared to respiratory burden – potentially compared to CVD (but may be same problem in LMICS for CVD too). Eg Would a river plot based on proportions of

funding/burden work? Or take a proxy for one condition eg COPD. We welcome your advice
It has mapped disease burden and research opportunities, and is beginning to
prioritise the most important questions to present to research funders.

There is an urgent need for the respiratory research community work more effectively with other stakeholders to increase recognition of the catastrophic burden of respiratory diseases and to develop, test, implement and scale-up the necessary multiple and multi-sectoral strategies to turn the tide of respiratory ill-health. In addition to improving national recognition of the problems, as China has illustrated,¹³ donors have a key role to ensure that research funding reflects the burden and recognises the substantial opportunities to increase impact. In its first Global Health Research call, the NIHR committed 12% of the total allocation to responsive respiratory research in DAC listed countries. This has triggered the formation of a global health respiratory network (GHRN)¹⁴: a meta-collaboration of UK respiratory research institutions and their global health partners. The GHRN has created opportunities for synergistic working between research programmes in areas ranging from risk factors such as microbial resistance and exposure to air pollution to health systems strengthening across the spectrum of communicable and non communicable respiratory diseases. We call on all funders to publish and review their research spend on respiratory health. We ask them to work synergistically to build on early investment and to share a roadmap¹⁵ that minimises the risk of duplication and helps maximise the impact on health, wellbeing and economic growth.

1. *There is momentum building for societal value through such programmes*
<https://www.timeshighereducation.com/features/are-research-links-developing-world-still-one-way-street>

References – *these will be sorted once we agree journal.*

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1. ¹ Lenney W, Bush A, Fitzgerald DA, et al. Improving the global diagnosis and management of asthma in children. *Thorax* 2018;73: 662–669
 2. ² https://www.who.int/gho/child_health/mortality/causes/en/

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3. ^{#2} <http://gco.iarc.fr/today/data/factsheets/cancers/39-All-cancers-fact-sheet.pdf>
 4. ³ Institute for Health Metrics and Evaluation (IHME). Findings from the Global Burden of Disease Study 2017. Seattle, WA: IHME, 2018.
 5. (**) Squire SB, Thomson R, Namakhoma I, El Sony A, Kritski A, Madan J. Catastrophic care-seeking costs as an indicator for lung health. BMC Proc. 2015 Dec 18;9(Suppl 10):S4. doi: 10.1186/1753-6561-9-S10-S4
 6. ⁸ Hogan DR, Stevens GA, Hosseinpoor AR et al. Monitoring universal health coverage within the Sustainable Development Goals: development and baseline data for an index of essential health services. The Lancet Global Health, Volume 6, Issue 2, e152 - e168
 7. ⁹ https://www.who.int/research-observatory/monitoring/inputs/world_report/en/
 8. ¹⁰ Rudan I, El Arifeen S, Black RE, Campbell H. Childhood pneumonia and diarrhoea: setting our priorities right. Lancet Infect Dis. 2007 Jan;7(1):56-61. PMID: 17182344
 9. ¹¹ Stuckler D, King L, Robinson H, McKee M. WHO's budgetary allocations and burden of disease: a comparative analysis. The Lancet. 2008;372(9649):1563-9.
 10. ¹³ Wang C et al. Prevalence and risk factors of chronic obstructive pulmonary disease in China (the China Pulmonary Health [CPH] study): a national cross-sectional study. The Lancet, Volume 391, Issue 10131, 1706 - 1717
 11. ¹⁴ Sheikh A et al J Glob Health. 2019 Dec;9(2):020104. doi: 10.7189/jogh.09.020104
 12. ¹⁵ Vardavas CI, Kyriakos CN, Fernández E, et al. H2020 funding for respiratory research: scaling up for the prevention and treatment of lung diseases. Eur Respir J 2019; 54: 1901417 [https://doi.org/10.1183/13993003.01417-2019].