Eliminating lymphatic filariasis - Is it worth it?

Niessen, LW [1,2*£] and Taylor, M [1$£]

[1] Department of International Public Health and Department of Tropical Disease Biology, Liverpool School of Tropical Medicine, Liverpool L3 5QA, UK
[2] Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, USA

*Corresponding author:
Louis Niessen,
Louis.niessen@lstmed.ac.uk
Phone: 44 (0) 151 705 3779
Address: Liverpool School of Tropical Medicine, Pembroke Place, Liverpool. Suite 1966-206, Liverpool L3 5QA, UK

[£] Equal contributions

Keywords: Lymphatic filariasis, disease burden, economic burden, MDA, treatment

As the 2020 target for LF elimination looms, we are still far from reaching this goal. This must not be considered as a failure of the programme, but instead as failure to set realistic and achievable targets.

Now, findings on household-level productivity loss among people with LF – and for other neglected diseases - are most important for themselves and their household members and for the world to know. Of all the evidence for rational policy making that is needed, economic evidence is often politically most interesting to policy makers at the global and local levels: they justify continuing and increased investments.

New approaches to deal with transmission hotspots, cross-border endemicity, conflicts and environmental catastrophes and integration of vertical programmes into fragile systems require continued research and further investments in programme implementation to meet elimination objectives. And now, let us learn from our past and present experiences and trash the targets.

Globally, lymphatic filariasis (LF) remains an immense problem for the affected individuals and communities both in terms of health and wellbeing, as well as in economic measures.[1, 2] It is a parasitic disease and an important cause of chronic morbidity in low-income countries[3]. The internationally supported strategy is to break disease transmission by mass treatment of affected communities with antifilarial drugs and provision of morbidity management and disability prevention for patients with clinical disease (lymphoedema and hydrocoele). [3] Current drugs, all of which are wholly or partially donated by pharma companies, are diethylcarbamazine or ivermectin, combined with albendazole, which predominantly kill the microfilariae i.e. the parasites offspring.

As the 2020 target for LF elimination looms, we are still far from reaching this goal. This must not be seen as a failure of the programme, but instead a failure to set a realistic and

achievable target. Setting targets is a politically precarious exercise, which risks compromising continued donor support, investment in continued R&D and the credibility of health policy makers in this domain. The arguments for setting targets are often generic, poorly justified, and only driven by international bodies, yet fail to consider valuable lessons from previous experiences of premature targets. Why not simply make the target - the elimination of LF? This 2020 milestone, nevertheless, has driven reviews of the immense health and economic burden of LF to justify continued investment at global and national levels towards the elimination of this disabling disease.

Mathew et al. present in this issue detailed estimates of the global health and economic burden of LF, prior to the start of mass drug administration (MDA) programmes in 2000.[2] They conclude that, despite considerable progress in reaching the vulnerable, poor and often hard-to-reach populations, there is still a huge task for national governments and the supporting international agencies to secure increased prevention, treatment, and financing options for the near future.

The authors estimated the global burden of LF before the introduction of MDA in a careful and transparent way. Worldwide it is a big societal burden: about 130 million people were affected with a third suffering from clinical manifestations. The findings on the average annual economic burden per household are new: these amount to a US$115 per chronic case, with the major part coming from productivity loss and subsequent lost income at the household level. The total global economic burden of LF in the pre-MDA situation was estimated at US$5.8 billion annually. The productivity losses are from both the acute and chronic – lifetime consequences of LF.

The total estimates of productivity are, however, measured in several ways and vary from US$1.5 billion to US$13.2 billion, depending on the selected economic approach. The

authors use existing methods and documented modeling approaches published already with comparative results yet over different time intervals since implementing MDA programmes for LF[4]. Uncertainties are a consequence of the paucity of robust data across the globe and are, hence, inevitable, yet are well described. Redekop and Lenk et al. also published estimates, based on similar data and methods, also applied to other NTDs, and arrive at corresponding findings. [5]

The Global Programme to Eliminate Lymphatic Filariasis (GPELF), launched in 2000, aims to eliminate LF as a public health problem by 2020. The present coverage of MDA programmes is only 40%, while the 2013 WHO estimates from the global disease burden programme report an observed decline in DALYs of only about 30% since 1990. With this limited decline over the past two decades, the situation urges for continuous and increased investments in MDA, as well as for an additional and much stronger focus on the management of long-term morbidity and disability, given the international commitment to universal health coverage and financial protection especially in case of chronic diseases. [6, 7].

The new findings on household-level productivity loss among people with LF – and for other neglected diseases - are most important for themselves and their household members and for the world to know. There is still a major omission: the mental health burden in terms of depression among chronic disease patients and their carers, because of stigma and disability is documented to be at least half of the primary LF burden.[8, 9] Of all the evidence for rational policy making that is needed, economic evidence is often politically the most interesting to policy makers at the global, national, and local level, as they do justify continuing and increased investments across disease control programmes. It is clear in the case of LF, that the potential societal returns of investments are huge. This research serves

an immediate and direct purpose i.e. global advocacy in relation to priority setting as already seen in various other disease control areas, demonstrating its net worth to societies. [5, 10, 11].

A better understanding of the existing barriers to the integration and scaling-up of Neglected Tropical Disease programmes requires ongoing multi-disciplinary implementation research. Improvements in alternative treatment strategies [12]; combination regimens of existing drugs [13] and the benefits of complementary vector control [14] require large-scale multi-disciplinary evaluation and integration into existing strategies in order to bring about the benefits of reducing the challenging programmatic timeframes. New approaches to deal with transmission hotspots, cross-border endemicity, the risk of conflict and environmental catastrophe and integration of vertical programmes into fragile health systems also requires continued research and further investments in programme implementation to meet the elimination objectives.

And now, let us learn from this and previous experiences and trash the targets.

Acknowledgements

LN and MT participate in the COU**NTD**OWN programme of multi-disciplinary implementation research to overcome the barriers to scale-up of NTD programmes, funded by the Department for International Development (DFID), UK.

MT is the Director of the Centre for Neglected Tropical Disease, an implementing partner of DFID's investment in LF elimination.

Conflict of Interest

None to be declared.

References

1. Herricks, J.R., et al., *The global burden of disease study 2013: What does it mean for the NTDs?* PLoS Negl Trop Dis, 2017. **11**(8): p. e0005424.
2. Mathew, C.G. and H.C. Turner, *The health and economic burden of lymphatic filariasis prior to mass drug administration programmes.* Clin Infect Dis, 2019. **In press**.
3. Taylor, M.J., A. Hoerauf, and M. Bockarie, *Lymphatic filariasis and onchocerciasis.* Lancet, 2010. **376**(9747): p. 1175-85.
4. Turner, H.C., et al., *Investment Success in Public Health: An Analysis of the Cost-Effectiveness and Cost-Benefit of the Global Programme to Eliminate Lymphatic Filariasis.* Clin Infect Dis, 2017. **64**(6): p. 728-735.
5. Redekop, W.K., et al., *The Socioeconomic Benefit to Individuals of Achieving the 2020 Targets for Five Preventive Chemotherapy Neglected Tropical Diseases.* PLoS Negl Trop Dis, 2017. **11**(1): p. e0005289.
6. Niessen, L.W. and J.A. Khan, *Universal access to medicines.* Lancet, 2016. **387**(10013): p. 9-11.
7. Nugent, R., et al., *Investing in non-communicable disease prevention and management to advance the Sustainable Development Goals.* Lancet, 2018.
8. Eneanya, O.A., T. Garske, and C.A. Donnelly, *The social, physical and economic impact of lymphedema and hydrocele: a matched cross-sectional study in rural Nigeria.* BMC Infect Dis, 2019. **19**(1): p. 332.
9. Ton, T.G., C. Mackenzie, and D.H. Molyneux, *The burden of mental health in lymphatic filariasis.* Infect Dis Poverty, 2015. **4**: p. 34.
10. Stack, M.L., et al., *Estimated economic benefits during the 'decade of vaccines' include treatment savings, gains in labor productivity.* Health Aff (Millwood), 2011. **30**(6): p. 1021-8.
11. van Ekdom, L., et al., *Global cost of child survival: estimates from country-level validation.* Bull World Health Organ, 2011. **89**(4): p. 267-77.
12. Clare, R.H., et al., *Industrial scale high-throughput screening delivers multiple fast acting macrofilaricides.* Nat Commun, 2019. **10**(1): p. 11.
13. King, C.L., et al., *A Trial of a Triple-Drug Treatment for Lymphatic Filariasis.* N Engl J Med, 2018. **379**(19): p. 1801-1810.

14. Nsakashalo-Senkwe, M., et al., *Significant decline in lymphatic filariasis associated with nationwide scale-up of insecticide-treated nets in Zambia.* Parasite Epidemiol Control, 2017. **2**(4): p. 7-14.