Reducing the population requiring interventions against lymphatic filariasis in Africa

The slow progress in endemicity mapping of neglected tropical diseases (NTDs) in Africa and scaling up of mass drug administration (MDA) in all endemic countries has hampered efforts to meet the London Declaration's 2020 elimination and control targets. Lymphatic filariasis is targeted to be eliminated by 2020; but by the end of 2012, 11 of the 73 countries currently endemic for the disease had not completed the endemicity mapping to define the true number of people requiring interventions. Ten of the 11 partly mapped or unmapped countries were in Africa, where 35 countries are known to be endemic for this disease.

Lymphatic filariasis is a high-burden, mosquito-borne NTD that affects 1·1 billion people worldwide.[1] In Africa, the number of people requiring treatment for lymphatic filariasis in the 35 endemic countries decreased from 472·1 million in 2013, to 409·7 million in 2014. The reduction is partly due to a reassessment of the at-risk population through a renewed, large-scale, and accelerated endemicity mapping or remapping exercise to accurately establish the burden of NTDs in the region. Mapping in previously only partly mapped or unmapped countries was initiated in 2013 by WHO's Regional Office in Africa, using refined survey methods.[1] We argue that with endemicity mapping still ongoing in the high-burden countries of the Democratic Republic of Congo (49·1 million people at risk of infection), Nigeria (114·3 million), and Tanzania (45·9 million),[1] the true number of people requiring interventions against lymphatic filariasis could be much lower than current estimates.

Elimination of lymphatic filariasis as a public health problem by 2020 will be achieved mainly through preventive chemotherapy, based on annual MDA to entire eligible populations living in implementation units (usually a district) where lymphatic filariasis is endemic (ie, if one person is reportedly positive for the disease after surveying two communities, examining about 100 people per community—ie, rate of microfilaria or circulating filarial antigen [CFA] is ≥1% in either community).[2] On completion of mapping in Ethiopia in 2013, the population requiring MDA decreased from 30 million to 11 million people.[3] In 2014, after

resurveying endemic districts that never started MDA for this disease, Tanzania reclassified 63 districts as non-endemic, and the at-risk population decreased from 39·9 million to 26·5 million people.[1] Remapping surveys completed in Gambia[4] and Gabon[5] reported no evidence for lymphatic filariasis transmissions in the countries where, altogether, 2·5 million people were estimated to be at risk. The number of people requiring interventions against lymphatic filariasis in Ethiopia could be less than the current estimate of 11 million because 45 of the 75 newly endemic implementation units had borderline results of one CFA-positive individual per implementation unit.[3] The 2015 remapping of 13 low-endemicity implementation units with borderline results in Ethiopia and Tanzania, using a new remapping method, did not show active transmission in 12 of the 13 implementation units;[6] hence the reduction in the at-risk population in Tanzania. Remapping is ongoing for the 45 implementation units with borderline results in Ethiopia. In the Democratic Republic of Congo where lymphatic filariasis is coendemic with loiasis, the CFA card test might not be reliable, and CFA prevalence could be overestimated in areas highly endemic for loiasis.[7]

Vector control methods—eg, residual spraying and sleeping under long-lasting insecticidal nets to combat malaria—led to significant reductions or interruption of lymphatic filariasis transmission by *Anopheles* mosquitoes in the Solomon Islands, Papua New Guinea, and Togo.[8] A recent endemicity remapping survey done in the previously lymphatic filariasis endemic Gambia showed no evidence for ongoing transmission.[4] Recent entomological and CFA surveys did not show evidence for lymphatic filariasis transmission in the national capitals of Liberia (Monrovia) and Sierra Leone (Freetown) where about 2·4 million people are considered at risk based on the presence of CFA positives only. Lymphatic filariasis is now virtually absent along the shores of Lake Victoria where it was endemic in the early 1900s before the implementation of dichlorodiphenyltrichloroethane (DDT) spraying against human African trypanosomiasis (HAT).[9] After the discovery of DDT in 1945, residual spraying was used as the main strategy against HAT in Africa for more than

40 years. Residual spraying was done in areas previously endemic for lymphatic filariasis including southern Uganda, eastern Kenya, and northern Tanzania, which are now all non-endemic.[10] Many unmapped areas in Botswana, Nigeria, and Zimbabwe could also be free of lymphatic filariasis transmission because vast areas were exposed to residual spraying against HAT for several years in the 1970s and 1980s. In Zimbabwe and Nigeria, residual spraying activities in 10 years covered between 148 000 km² and 210 000 km² of land.[10]

In addition to the effect of vector control against malaria and HAT on lymphatic filariasis endemicity over several years, recent improvements in NTD mapping strategies and diagnosis of *Loa loa* have greatly affected the outcomes of surveys undertaken to establish the burden of NTDs in Africa. More accurate mapping efforts, revealing lower than previously thought numbers of individuals requiring interventions, should give renewed impetus to efforts to meet the 2020 target for elimination of lymphatic filariasis.

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1   WHO. Global programme to eliminate lymphatic filariasis: progress report, 2014. *Wkly Epidemiol Rec* 2015; **90:** 489–504.
2   WHO. World Health Organization global programme to eliminate lymphatic filariasis. Monitoring and epidemiological assesment of mass drug administration: a manual for national elimination programmes. Geneva: World Health Organization, 2011.
3   Rebollo PM, Sime H, Assefa A, et al. Shrinking the lymphatic filariasis map of ethiopia: reassessing the population at risk through nationwide mapping. *PLoS Negl Trop Dis* 2015; **9:** e0004172.
4   Rebollo MP, Sambou SM, Thomas B, et al. Elimination of lymphatic filariasis in the Gambia. *PLoS Negl Trop Dis* 2015; **9:** e0003642.
5   Rebollo MP, Atsame J, Cama V, Bockarie MJ. Shrinking the lymphatic filariasis map: does Gabon need treatment to eliminate lymphatic filariasis? American Society of Tropical Medicine and Hygiene (ASTMH) 64th Annual Meeting; Philadelphia, PA, USA; Oct 25–29, 2015. Abstr 590.
6   Mwingira U, Sime H, Pelletreau S, Deming M, Rebollo MP, Gass K. Shrinking the lymphatic filariasis map: a new tool to assess active transmission of LF during mapping. American Society of Tropical Medicine and Hygiene (ASTMH) 64th Annual Meeting; Philadelphia, PA, USA; Oct 25–29, 2015. Abstr 325.
7   Bakajika DK, Nigo MM, Lotsima JP, et al. Filarial antigenemia and Loa loa night blood microfilaremia in an area without bancroftian filariasis in the Democratic Republic of Congo. *Am J Trop Med Hyg* 2014; **91:** 1142–48.
8   Bockarie MJ, Pedersen EM, White GB, Michael E. Role of vector control in the global program to eliminate lymphatic filariasis. *Annu Rev Entomol* 2009; **54:** 469–87.
9   Corson JF. A note on microfilariae in Tanganyika terrirory. *Ann Trop Med Parasitol* 1925; **19:** 381–86.
10   Allsopp R. Options for vector control against trypanosomiasis in Africa. *Trends Parasitol* 2001; **17:** 15–19.