

## POLICY BRIEF

# The Role of Vector Control in Preventing and Responding to Rhodesian Human African Trypanosomiasis (rHAT) in Malawi

April 2020

### KEY MESSAGES

- Rhodesian Human African Trypanosomiasis (rHAT) is a disease transmitted by the tsetse fly
- It has a high fatality rate and high economic costs
- There has been a surge in the number of cases of Human African Trypanosomiasis (HAT) in Malawi in 2019/2020
- HAT interventions in Malawi focus on diagnosis and treatment with limited vector control
- Strengthening diagnostic and treatment capacity, increasing vector control and conducting surveillance could reduce and eventually eliminate rHAT in Malawi
- Inter-sectoral collaboration, relevant research and adequate sustained financing are necessary to achieve rHAT elimination

Figure 1: *Glossina morsitans morsitans*



### The rHAT Problem in Malawi

Human African Trypanosomiasis (HAT), also known as 'sleeping sickness,' is a neglected tropical disease caused by subspecies of the parasite *Trypanosoma brucei* transmitted by tsetse flies (*Glossina* – Figure 1). There are two forms of sleeping sickness, and both are found only in sub-Saharan Africa.<sup>1</sup> Gambian HAT (gHAT), caused by *T. b. gambiense*, is responsible for >95% of all cases across Africa but is not present in Malawi. Rhodesian HAT (rHAT) is caused by *T. b. rhodesiense* and occurs in East and Southern Africa including Malawi. Both forms of the disease are fatal without treatment. gHAT and rHAT cases have declined significantly due to national and

global commitment to eliminate the disease. Globally, there are fewer cases than there have ever been before, with <2000 cases of gHAT and <30 cases of rHAT annually since 2017.<sup>2</sup> Eliminating rHAT is difficult because the parasite circulates in wild (e.g., buffalo, warthog) as well as domestic (cattle) hosts.

In Malawi, there are areas of persistent rHAT transmission associated with the conservation areas of Vwaza, Nkhotakhota, and Kasungu<sup>3</sup> (Figure 2). For the last decade, Malawi has reported ~30 cases/year of rHAT, mostly from Vwaza, but in 2019, the number unexpectedly increased to 90 (Graph 1). Consequently, Malawi has the highest number of rHAT cases in Africa, impacting the health and livelihoods of affected families,<sup>4</sup> tourism, and the wider economy. The underlying cause

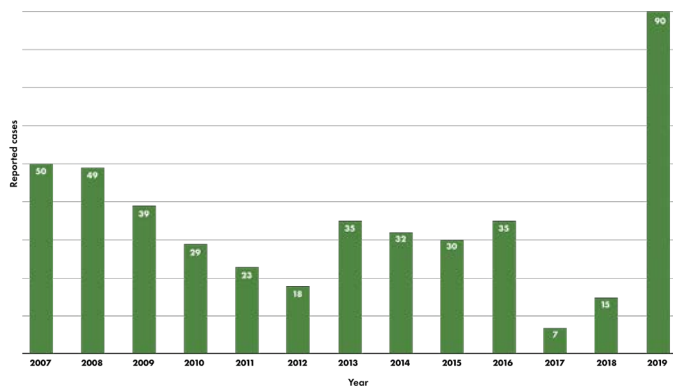
<sup>1</sup> Simarro et al. (2012). Estimating and mapping the population at risk of sleeping sickness. *PLoS Negl Trop Dis* 6, 10.

<sup>2</sup> WHO. Global Health Observatory data repository. Accessed at <http://apps.who.int/gho/data/node.main.A1637?lang=en>

<sup>3</sup> Uniting to Combat NTDs. The Third Report: Country Leadership and Collaboration on NTDs. Available at <https://unitingtocombatntds.org/reports/3rd-report/> [accessed on 25 Nov 2019].

<sup>4</sup> Mwiinde et al. (2017). Estimating the economic and social consequences for patients diagnosed with human African trypanosomiasis in Muchinga, Lusaka, and Eastern Provinces of Zambia [2004-2014]. *Infect Dis Poverty* 6, 150.

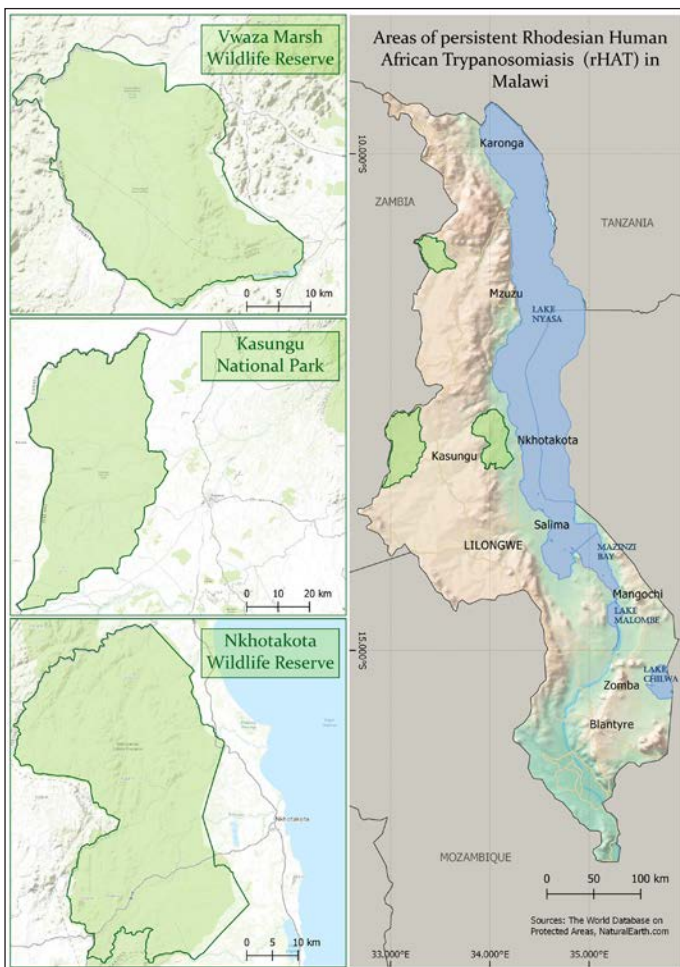
**Graph 1: Reported cases of HAT in Malawi (2007-2019)**



Source: WHO Global Health Observatory Data. \*2019 cases based on data from the Malawi National Trypanosomiasis Programme

of the increase in cases is not well understood. It could be due to greater diagnostic capacity within the health system i.e. more cases are being detected while the true number of cases has remained consistent, but recent evidence suggests that this is unlikely.<sup>5</sup> Alternatively, it may be because tsetse-human contact has increased, possibly resulting from changes in temperature or spatial distribution

**Figure 2: Areas of persistent rHAT transmission in Malawi (2019)**



Source: Uniting to Combat NTDs. The Third Report: Country Leadership and Collaboration on NTDs

## Health and Economic Consequences of HAT

of wildlife/humans. To better inform strategies for vector control and messages disseminated in sensitisation campaigns, research should focus on understanding the drivers of tsetse-human contact in areas of rHAT transmission.

The objective of this policy brief is to summarise the current status of rHAT in Malawi and provide guidance on research and implementation needs to ensure targets for reducing and eliminating HAT are achieved.

rHAT is a severe disease that progresses rapidly. Most people are diagnosed when they are at an advanced stage, experiencing severe symptoms like convulsions, and when the chance of survival is low.<sup>6</sup> HAT disproportionately affects economically active adults in an environment where agricultural labour is critical for survival, thereby disrupting agricultural activities and exposing infected people and their families to poverty and famine. rHAT also places a huge financial burden on households for costs of treatment and transport. Information on household costs of rHAT in Malawi is not readily available, but one study in DR Congo found that the average household cost of rHAT was equivalent to five months of annual income.<sup>7</sup> Furthermore, rHAT potentially affects revenue from tourism, which is the second largest contributor to GDP in Malawi.<sup>8</sup>

## HAT interventions and the associated challenges in Malawi

rHAT is closely associated with wildlife reserves in Malawi but poses the most risk at the interface between wildlife parks and livestock areas. HAT interventions in Malawi focus on diagnosis, treatment and community awareness. Vector control is less emphasised and multisectoral coordination is weak. PIIVeC conducted a situation analysis (Table 1) between 9-14 February 2020, including site visits and consultations with key stakeholders from 6 institutions.<sup>9</sup> Through these consultations, we have identified the key challenges and outstanding research questions.

## The potential impact of vector control in Malawi

Historically, vector control using odour baited insecticidal targets was used extensively and successfully in the southern region of Africa through the Regional Tsetse and Trypanosomiasis Control Project (RTTCP).<sup>10</sup> However, throughout the 1990s, vector control was not widely implemented in the region. A recent modelling study suggested that screening high-risk populations and adding vector control to existing interventions in DR Congo would reduce transmission and achieve HAT elimination before 2030.<sup>11</sup> PIIVeC rHAT specialists recommend that Malawi consider using large insecticide-treated targets baited with a blend of acetone, octenol and phenols which have been successfully used in conservation areas across East and Southern Africa (personal communication S. Torr). In Vwaza, 50 odour baited targets are available to be deployed, but ~1500 targets would be needed for a control

<sup>5</sup> Lemerani et al. (2020). Improved Access to Diagnostics for Rhodesian Sleeping Sickness around a Conservation Area in Malawi Results in Earlier Detection of Cases and Reduced Mortality. *J Epi and Glob H.* In Press

<sup>6</sup> Madanitsa, Chisi & Ngwira. (2009). The epidemiology of trypanosomiasis in Rumphi district, Malawi: a ten-year retrospective study. *Malawi Medical Journal*, 21(1): 22-27

<sup>7</sup> Lutumba et al. (2007). Human African trypanosomiasis in a rural community, Democratic Republic of Congo. *Emerging Infectious Disease*, 13(2)

<sup>8</sup> Kandaya, H. (2019). Identification of tourism developmental success factors: Benchmarking the Malawi tourism industry. MPhil thesis, University of Derby. Accessed at <https://derby.openrepository.com/handle/10545/624013>

<sup>9</sup> WHO, National MoH, District MoH, Lilongwe Wildlife Trust, Vwaza game reserve, Makerere University (leading a HAT clinical trial)

<sup>10</sup> Lovemore, D. F. (1992). A regional approach to trypanosomiasis control: Activities and progress of the RTTCP (Regional Tsetse Trypanosomiasis Control Programme). *FAO Animal Production and Health Paper* (FAO). Accessed at <http://www.fao.org/3/T0599E/T0599E12.htm>

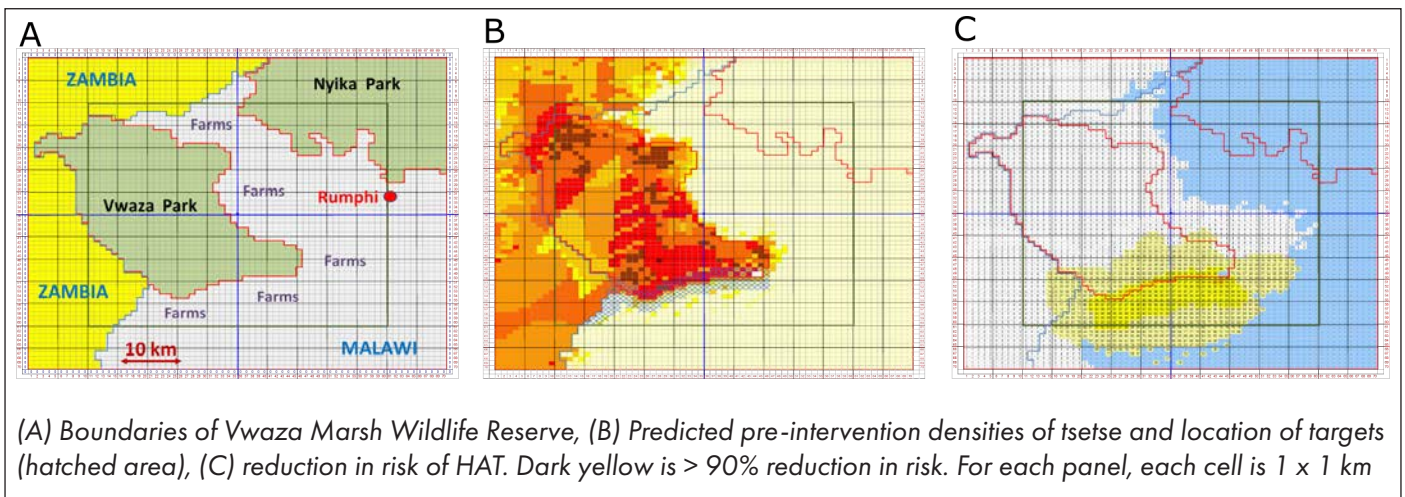
<sup>11</sup> Rock et al. (2017). Predicting the Impact of Intervention Strategies for Sleeping Sickness in Two High-Endemicity Health Zones of the Democratic Republic of Congo. *Plos Negl Trop Dis*, 11(11)

**Table 1: Key Findings from the PIIVeC rHAT situational analysis in Malawi**

<b>Diagnosis and treatment</b>	Five out of 20 health facilities in the rHAT endemic Northern region have diagnostic facilities and free medicine. There is a lack of sustained funding for diagnostic equipment and inadequate rHAT trained health workers. This results in poor community access to diagnosis and treatment.
<b>Community sensitisation</b>	There is radio messaging and engagement with community leaders and traditional healers around rHAT. But awareness of newly available diagnosis centres is inadequate and there is no messaging about the tsetse vector
<b>Surveillance</b>	There is a lack of clear policy guidance and financial support for rHAT surveillance which limits health system capacity to address the health problem
<b>Vector control</b>	Insecticide treated odour baited targets and insecticide treated cattle are used to prevent rHAT. However, the financing is insufficient to expand this to the scale required and there is inadequate data to target the interventions appropriately to maximise impact.
<b>Collaboration</b>	A multisectoral rHAT task force exists but is currently inactive, resulting in inadequate collaboration between stakeholders in health, wildlife, veterinary and research institutions.

Source: WHO, 2017. Malawi Status Report

**Figure 3: Results of simulations of tsetse control at the interface of Vwaza Marsh Wildlife Reserve in Mzimba and Rumphi districts (credit: Glyn Vale)**



programme to protect people in Mzimba and Rumphi, the most severely affected districts (Figure 3). The Tiny Targets used elsewhere in Africa are not suitable for the species of tsetse fly found in Malawi and a larger design, successfully used across East and Southern Africa, is recommended for Malawi (Figure 4).

**Figure 4: Deployed target for controlling tsetse**



The blue and black fabric is visually attractive, and a plastic bottle attached to the target emanates olfactory attractants (a blend of acetone, octenol, and phenols). The entire target is impregnated with insecticide.

## Opportunities

A clear opportunity exists to strengthen research, collaboration, and diagnosis and treatment. The PIIVeC programme is supporting research to inform targeting of vector control in Vwaza. This will leverage initial data to support broader research proposals to international funding bodies to understand the zoonosis so that we can strengthen our response to future outbreaks. This research will need to factor any negative impacts that the current COVID-19 epidemic will have on existing health systems with the potential for further rises in rHAT case numbers. Similar research in other rHAT hotspots could generate evidence to inform control strategies. In addition, we have supported the establishment of a multisectoral Technical Vector Control Working Group (TVCAG) within the

Ministry of Health. This platform could be used to bring together additional stakeholders, advocate for greater resources, and organise regional efforts.

## Conclusion and recommendations

To reduce the burden of rHAT in Malawi and eliminate by 2030, we recommend the following:

### Diagnosis, treatment, prevention

- Expand rHAT diagnostic capacity to health facilities in all endemic areas of Malawi
- Strengthen capacity of health workers for early detection and treatment of rHAT
- Deploy large targets for vector control in border regions of National Parks
- Integrate tsetse awareness into community sensitisation

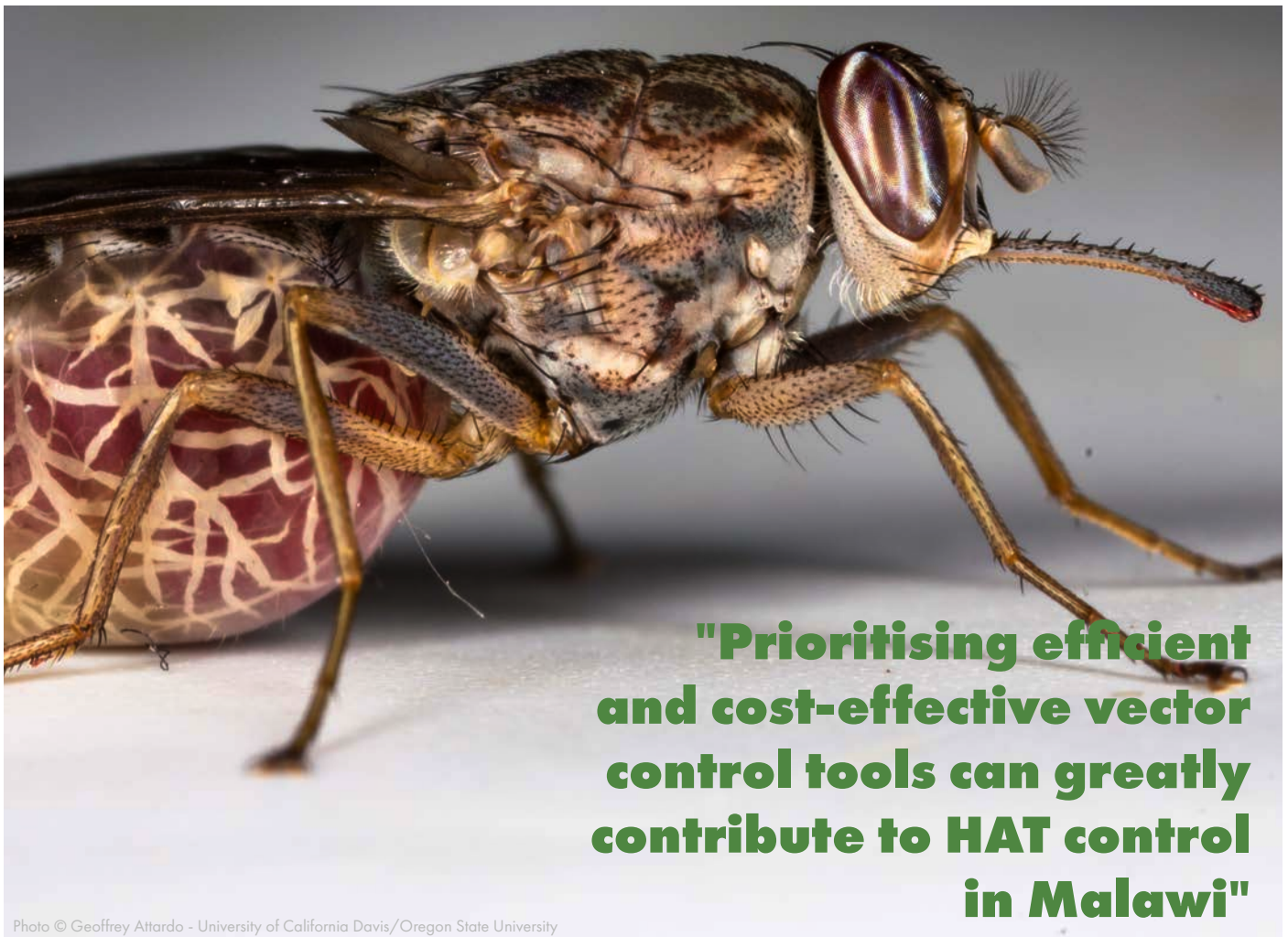
campaigns and create awareness about new rHAT diagnosis centres

### Research

- Identify underlying causes of the 2019 surge in cases
- Validate appropriateness of existing vector control tools in Malawi
- Develop improved tools and strategies to prepare for and control future outbreaks

### Collaboration

- Reactivate the national multisectoral task force on rHAT and strengthen linkages between stakeholders in health, wildlife, veterinary and research institutions, perhaps through the existing TVCAG
- Create sustainable funding mechanisms for the national rHAT control programme
- Initiate and strengthen joint cross-border surveillance and interventions with Zambia



**"Prioritising efficient and cost-effective vector control tools can greatly contribute to HAT control in Malawi"**

Photo © Geoffrey Attardo - University of California Davis/Oregon State University

## PIIVeC

With funding from the UK Global Challenges Research Fund, the Liverpool School of Tropical Medicine (LSTM) in 2017 established the Partnerships for Increasing the Impact for Vector Control (PIIVeC) with the purpose of promoting vector control to address VBDs burden in Burkina Faso, Cameroon, and Malawi. Vector control is key in preventing the spread of VBDs. This policy brief aims at promoting the support for continued investment in vector control solutions.

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