Medical screening and fly control could rapidly reduce sleeping sickness in key locations

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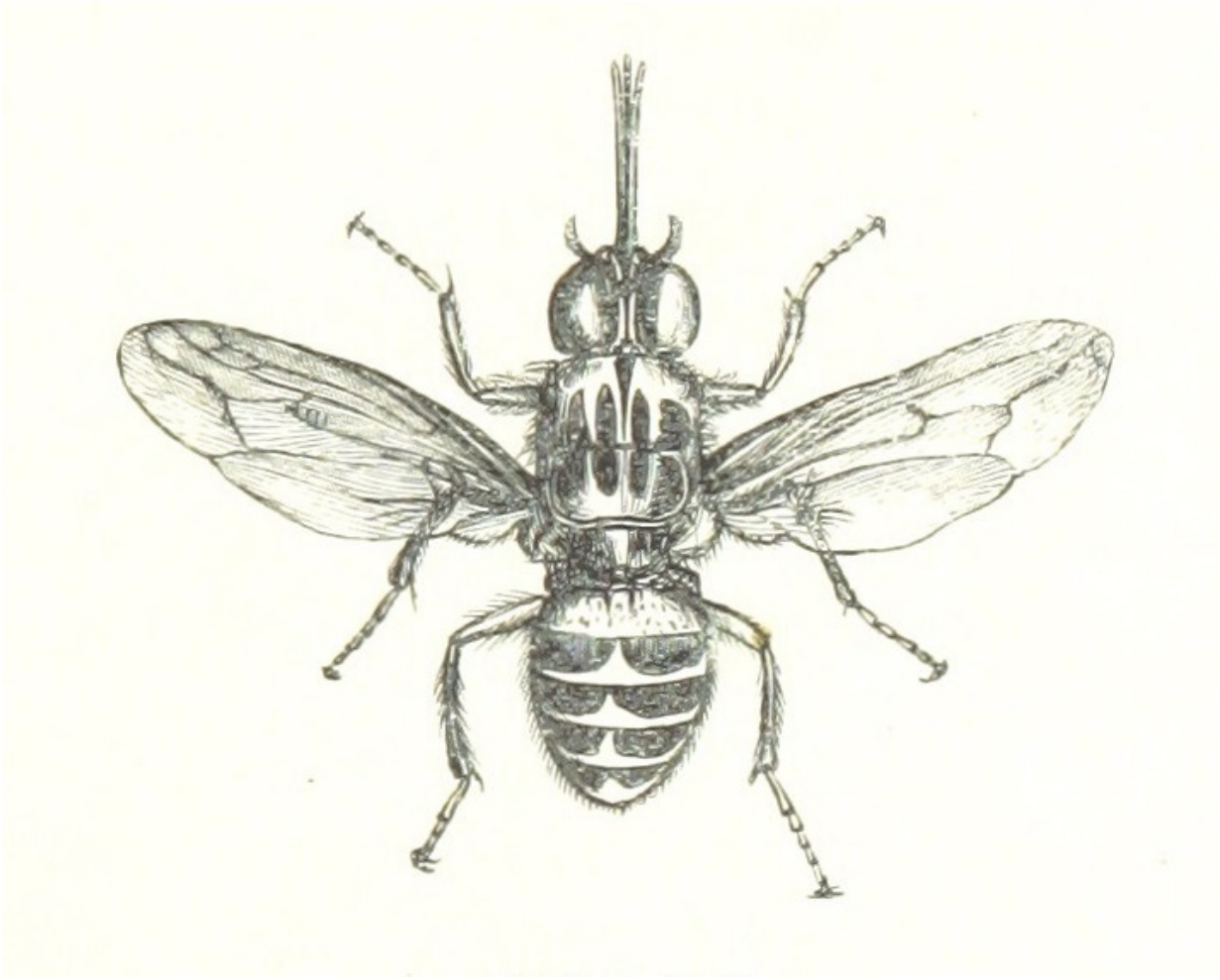

Medical screening and fly control could eliminate sleeping sickness in six years in some key locations. Credit: Carl Johan Andersson

In 2012, the World Health Organization set two public health goals for Gambian sleeping sickness, a parasitic disease spread by the tsetse fly. The first is to eliminate the disease as a public health problem and have fewer than 2000 cases by 2020. And the second goal is to achieve zero transmission around the globe by 2030. Now, by mathematically modeling the impact of different intervention strategies, researchers reporting in *PLOS Neglected Tropical Diseases* have described how two-pronged approaches, integrating medical intervention and vector control, could substantially speed up the elimination of sleeping sickness in high burden areas of the Democratic Republic of Congo (DRC).

Gambian sleeping sickness, or Gambian human African trypanosomiasis, is caused by a parasite called *Trypanosoma brucei gambiense*, carried by tsetse flies in Central and West Africa. Without treatment, the disease usually results in death. In recent years, programmes have performed intense active and passive screening to help decrease disease incidence and a few areas have also combined these medical interventions with vector control. But some high-prevalence areas of DRC have not achieved the reductions in disease seen in other parts of Africa.

In the new work, author Kat Rock, of the University of Warwick, UK, and colleagues developed a complex mathematical model to calculate the impact of intervention strategies on the population dynamics of tsetse flies and humans. They used the models to compare the effectivity of six key strategies and twelve variations within two areas of Kwilu province (within former Bandundu province), DRC. The researchers could then conclude which strategies show the most promise to control and eliminate disease.

Strategies which rely only on self-reporting of illness and screening of low-risk individuals are unlikely to lead to elimination of sleeping sickness transmission by 2030, the models concluded, instead delaying elimination until next century. However, improving screening so that all

people are screened equally, regardless of risk factor, may allow elimination as a public health problem between 2023 and 2031. And if vector control strategies—such as those using "tsetse targets" coated with insecticide to attract and kill flies—are added, this elimination goal is likely to be achieved within four years when coupled with any screening approach. If DRC adopts any of the new strategies with vector control, the researchers showed, transmission would probably be broken within six years of launching the new program in these areas and over 6000 cases could be averted between 2017 and 2030.

"We found that vector control has great potential to reduce transmission and, even if it is less effective at reducing tsetse numbers as in other regions, the full elimination goal could still be achieved by 2030," the researchers write. "We recommend that control programmes use a combined medical and vector control strategy to help combat sleeping sickness."

More information: Rock KS, Torr SJ, Lumbala C, Keeling MJ (2016) 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* 10(12): e0005162. DOI: 10.1371/journal.pntd.0005162