Further spread of Rhodesian sleeping sickness in Uganda likely due to livestock movements

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The northwards spread of human Rhodesian sleeping sickness in Uganda is likely due to the movement of infected livestock, according to new findings from an interdisciplinary research group including members from the Centre for Infectious Diseases, University of Edinburgh; the Ministry of Health, Uganda; and the Universities of Oxford and Southampton.

The current study, published December 15 in the open-access journal *PLoS Neglected Tropical Diseases,* provides evidence that the spatial distribution of the disease in a recently affected area is constrained by the location of livestock markets, indicating the role of cattle (the predominant reservoir of disease) in its spread. A complex interaction of environmental and climatic factors was also found to affect distribution of the disease.

Human African trypanosomiasis (HAT, or sleeping sickness) is a fatal disease transmitted by the tsetse fly in sub-Saharan Africa. Endemic in some regions, it spreads across 36 countries. It is estimated that around 60,000 people are currently infected. There are two forms of the disease (an acute "Rhodesian" form, which the research focuses on, and a chronic "Gambian" form), but fears are growing that they may overlap in Uganda, which could render current diagnosis and treatment protocols ineffective.

Previous work implicated livestock movements in the spread of this disease. Regulations were therefore reinforced that required the treatment of all cattle from endemic areas prior to sale at livestock markets. The primary aim of the new research was to investigate potential reasons for this subsequent spread of the disease. The researchers conducted both a one-step logistic regression analysis of HAT prevalence and a two-step logistic regression method, which enabled separate analysis of both occurrence and prevalence of the disease. Both the occurrence and prevalence were negatively correlated with distance to the closest livestock market in all models.

To prevent the overlap of the two disease forms, a large-scale intervention, Stamp Out Sleeping Sickness (stampoutsleepingsickness.org), has been applied. This public-private partnership has treated over 250,000 animals to clean the disease from the overlap zone. However, continued movements of untreated animals into the cleaned zones present an ongoing risk. The authors conclude that "the stringent implementation of regulations requiring the treatment of cattle prior to sale at livestock markets should be a priority for the Ugandan Government."

Future research by the group will aim to extend this study by assessing the risk of further Rhodesian HAT spread and the potential for overlap with the Gambian form of the disease.

More information: Batchelor NA, Atkinson PM, Gething PW, Picozzi K, Fe`vre EM, et al. (2009) Spatial Predictions of Rhodesian Human African Trypanosomiasis (Sleeping Sickness) Prevalence in Kaberamaido and Dokolo, Two Newly Affected Districts of Uganda. PLoS Negl Trop Dis 3(12): e563. doi:10.1371/journal.pntd.0000563