

Contribution ID: 249

Type: **Poster Presentation**

A mathematical model for the effect of domestic animals on the basic reproduction number of Human African Trypanosomiasis (Sleeping Sickness)

Monday, 9 July 2018 19:45 (15 minutes)

The Human African Trypanosomiasis (HAT) parasite, which causes African Sleeping Sickness, is transmitted by the tsetse fly as a vector. It has several possible hosts, including humans and domestic animals. Because domestic animals can be a host for the parasite, it has long been assumed that keeping domestic animals near human populations increases the spread of the disease. However, several parameters found in the literature, including the shorter lifespan of the male vector and the female vector's preference for domestic animals, made us question this assumption.

We have developed a differential equation compartmental model to examine whether increasing the domestic animal population can be used to deflect the infection from humans and reduce its impact. This 9-dimensional system of nonlinear ordinary differential equations includes tsetse flies in their various stages of maturity, which is more than most previous models have done. We used the Next Generation Matrix method to obtain an expression for R_0 , the basic reproduction number, based on the other parameters in the model.

Our study indicates that strategies that were not previously considered, such as vaccinating domestic animals, may reduce the impact of the disease on humans even better than vaccinating humans.

Primary author: Mr SHAIER, Sagi (Kennesaw State University)

Co-author: Dr BURKE, Meghan (Kennesaw State University)

Presenter: Mr SHAIER, Sagi (Kennesaw State University)

Session Classification: Poster Session

Track Classification: Disease - infectious