Model Formulation

* The model considers two (2) populations: mosquitoes and sheep with disease dependent death rate for sheep. The mode of transmission from vector to host, host to host, and host to vector is shown in Fig 1
* To simplify the model, vertical transmission in vector population, age structure in hosts, and spatial effects are not included in the model
* The mosquito population contains 3 compartments: Susceptible Sm, Exposed Em, and Infectious Im.
* The size of the mosquito population is therefore given as M = Sm+Em+Im.
* The sheep population contains an additional compartment in addition to mosquito population, namely recovered/removed sheeps Rs.
* The total population for sheep is given by S = Ss+Es+Is+Rs.
* Given the above assumptions and terminology, the proposed model is given by the following system of non-linear equation: