

# A mathematical epidemiological model of Bartonella infections in the invasive Rattus rattus in South Africa

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**SAMS Subject Classification: Applications of Mathematics to the Sciences**

We study mathematically the relationships between the contributing factors of Bartonella infections in a rural rodent population of South Africa. We develop a mathematical model in the form of a system of ordinary differential equations representing a dynamical system involving both the host (*Rattus rattus*) and the vector (Ixodidae) by using a compartmental approach. Apart from giving a better understanding of the relationships and their significance for the sylvatic cycle of Bartonella, the model may impact on future research direction and the design of control measures. While the modelling process enhances the existing knowledge, it also highlights the lack of it in relationships of this sylvatic cycle.