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An optimal control intervention for the interrelated dynamics of TB transmission in humans and animals amidst seasonal flux

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Tubercuosis(TB)is a global health concern,affecting both humans and animals.This paper provides a dynamic model to anayze the complicated dynamics of tuberculosis transmission, taking into account human animal interactions and a saturated incidence rate with seasonal changes.Furthermore,the model accounts for the efficiency of measures targeted at reducing the spread of tuberculosis(TB).This study intends to give insights into the intricate interpay between TB transmission patterns,seasonal changes,and the efficacy of control measures by combining epidemiological concepts with ecological dynamics.The study uses simulation and analysis to support targeted intervention techniques and policy decisions for reducing tubercuosis transmission in a shared human-animal habitat.When both control measures are taken,the alpha parameter,which represents awareness among the general public,increases,the KEa parameter,which represents efficacy of drugs,increases, and the beta and b parameters decrease, and the population of infectious individuals decreases vj=0,R0=2269426314,when vj=0.5,ba=0.05 and βh=0.04,R0=0575348645 and when v1=1.1,v2=1.5,ba=0.05 and βh=0.001,R0=0.001144038597).It is seen that increased awareness among the general public and the efficacy of therapy will subsequently prevent cases of infection at the end of the control program. It is concluded that public awareness and the efficacy of therapy should be incorporated into the control program for an optimal control strategy for TB infection to be curtailed in the hosts.
Keywords:Seasonal variations,TB spread,diverse populations,interconnected dynamics,and combined control techniques.

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