

# MODELING THE JOINT EPIDEMICS OF TUBERCULOSIS AND SMOKING

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## ABSTRACT

Tuberculosis (TB) is the top three fatal infections of man worldwide and it has been considered one of the most serious problems facing South Korea. Moreover, smoking has long been associated with tuberculosis. In this article, we formulate TB models to determine possible mechanisms with observed data in South Korea and then we take into account the fact that some people in the population are smoking in order to explore the effect of smoking on TB infection dynamics. The least-squares fitting has been used for estimating model parameters to the observed data of active-TB incidence and relapse. We also propose optimal treatment strategies of TB model and TB-Smoking model. We have considered three control mechanisms representing infection, case finding and case holding efforts in TB model and we add two controls, smoking distancing control and quit-smoking control in TB-Smoking model. In order to suggest optimal treatment strategies, we compare the numerical results and real national budget.

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