

Effect of emergency vaccination against outbreaks of foot-and-mouth disease in the Republic of Korea

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An emergency vaccination against foot-and-mouth disease (FMD) was implemented during the biggest epidemic in the winter of 2010/2011 in Korea. Then it was extended throughout Korea and settled as a large-scale preventive scheme with a vaccination-to-live policy. A vaccination reduces the risk of transmitting FMD among animals and farms, however the levels of protection may vary by animal species and farm types. In this study, the effect of vaccination against FMD was measured to understand why pigs were more seriously affected even with emergency vaccination. Cases of Hongseong, Chungcheongnam-do, where the FMD was confirmed on 127 pig farms but not on beef and dairy cattle farms, were examined. A deterministic model on between-farm transmission of FMD was constructed under Susceptible-Infected-Removed structure. The model was fit in account of numbers of susceptible and new report of FMD positive farms in each day. Scenarios on control measures including vaccine coverage and efficacy, culling, and pre-emptive slaughter were simulated. The goodness of fit of the model was better when the study population constituted only swine farms than including whole cloven-hoofed animal farms in the area. Assuming that almost 80% of swine farms were already vaccinated when the first case of the area was confirmed, very little efficacy of preventing transmission among pig farms was measured from the vaccination. An increase of vaccine coverage did not influence to the number of infected farms in the simulation models, while increases of the vaccine efficacy proportionally decreased the number of infected farms predicted by simulations. It must be associated with the strategy of vaccination that the injection was not simultaneously carried out on all age classes in the swine farms, while all animals in each cattle farm were vaccinated at once.