EXPLORING THE COST-BENEFIT OF VACCINES FOR INFECTIOUS DISEASES IN SLAUGHTER PIG PRODUCTION

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Modern pig production is facing a number of diseases where control strategies, if available, are voluntary. An example could be the adoption of a vaccination program against Swine Influenza. Although such a vaccine currently is unavailable in Denmark, an economic analysis of application under typical Danish slaughter pig production conditions serves well to illustrate the conceptual aspects of such a decision problem.

The efficacy of a vaccine can be established under experimental conditions, while the value of a vaccination program needs modeling of the specific conditions of the production system in which the vaccine should operate. A model where the control strategy for a Swine Influenza-like disease and the delivery policy are optimized simultaneously is developed in Toft et al. (2001).

The optimal policy will consist of decisions at multiple time scales. The optimal delivery policy at the finishing time for a batch of pigs will be contingent upon the chosen vaccination policy adopted at the beginning of the current fattening period. Using this model we explore the cost-benefit relationship of vaccines with efficacy less than 1 applied to Danish conditions.

We adopt 2 different interpretations of imperfect efficacy taken from Halloran et al. (1992). A leaky vaccine that offer reduced susceptibility to all pigs, and an all-or-nothing vaccine where a fraction of pigs are offered complete immunity while the remaining pigs are left fully susceptible to the disease. Using these 2 efficacy interpretations we explore the optimal policy of delivering pigs for slaughter and controlling disease. The problem serves as an illustration of the potential shortcomings of the rather crude efficacy measure usually adopted for vaccines, as well as an introduction to the possibilities of model based decision support.

References

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