

Prevalence and persistence of *Salmonella* in Belgian broiler chicken flocks: An identification of risk factors

Harriet Namata¹, Sarah Welby², Marc Aerts¹, Christel Faes¹,
José Cortiñas Abrahantes¹, Marc Dispas² and Koen Mintiens²

¹ Center for Statistics, Hasselt University, Diepenbeek, Belgium

² Veterinary and Agrochemical Research Centre, Brussels, Belgium

Salmonellosis is still one of the main causes of gastroenteritis in humans. Broilers are an important source of salmonellosis after eggs, pork and beef. Between 1987 and 1999 the trend of human salmonellosis incidence in Belgium increased constantly. However, from 2000 until 2005 a decrease in human cases was observed, with an exceptional increase in 2003. In order to enhance human health it is essential to tackle the problem at the farm level to minimize cross contamination from farm to fork. This paper seeks to answer two questions: (1) given the *Salmonella* status of the farm at the previous occasion, what is the probability that the farm will be *Salmonella* positive at a current occasion and what are the risk factors for this? (2) what are the risk factors that a farm will be persistently positive on two consecutive occasions? We used surveillance data on 6824 broiler chicken flocks studied for *Salmonella* infectivity from 2005 to 2006 in Belgium. The farms were tested regularly for the presence of *Salmonella* based on multiple faecal samples per flock on a farm. Generalized estimating equations, alternating logistic regression models, and random-intercept logistic regression models were employed to analyze these correlated binary data. Our results indicate that there are many factors that influence *Salmonella* risk in broiler flocks, and that they interact. Accounting for interactions between risk factors leads to an improved determination of those risk factors that increase susceptibility to *Salmonella*. The risk factors found to increase the risk of *Salmonella* infection on a farm at a current occasion include: *Salmonella* infection of day-old chicks, a previously infected farm even though equipped with a hygiene place to separate birds, availability of different species of birds and having temporary workmen, the presence of different species of birds in the Walloon relative to the Flanders region, and increasing the distance to the nearest poultry holding but with one hand wash place. The most important factors for the persistent infection of a farm were interactions between having temporary workmen and workmen who have contacts with foreign countries, and having temporary workmen and workmen who have external contacts with other workmen.