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Abstract – oral presentation

Diagnostic herd sensitivity using environmental samples

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Due to logistic and economic benefits, the animal industry has an increased interest in using environmental samples to classify herds free of infections. For a valid interpretation of results obtained from environmental samples, the performance of the diagnostic method using these samples must be assessed. In this abstract we present an approach to evaluate the sensitivity of environmental samples used for herd classification. This is illustrated using results from samples for isolation of methicillin resistant *Staphylococcus aureus* (MRSA) in 48 pig herds that had previously been tested positive either at farm or slaughter. Three sample matrices were collected; dust samples (5 environmental swabs), nasal swabs (10 pools with 5 animals per pool) and air samples (1 filter). Based on the assumption that MRSA occurred in all 48 herds the overall herd sensitivity was 58% for nasal swabs, 33% for dust samples and 63% for air samples. However, we assumed that the sensitivity of environmental samples varies between herds due to variation in the amount of the analyte. This assumption can be tested by analyzing the association between animal prevalence and the result obtained using environmental samples. In our example, the prevalence of infected pigs in each herd was estimated from the pooled samples of nasal swabs. Logistic regression was used to estimate the effect of animal prevalence on the probability to detect MRSA in the dust and air samples at herd level. The results show a significant increase in the probability of isolating MRSA in the environmental samples by increasing within-herd prevalence. This relationship was strongest for dust where the sensitivity increased from 25% at 1% infected pigs, to 35% at a 25% infected pigs. The air sampling was more sensitive to detect infected herds irrespectively of the within herd prevalence, and performed almost perfectly at a prevalence of 25% infected pigs (sensitivity=99%). In general, the dependence of within herd prevalence should be considered in designing surveillance programs based on environmental samples.