The use of third and fourth generation cephalosporins affects the occurrence of extended-spectrum cephalosporinase-producing Escherichia coli in Danish pig herds

Extended-spectrum cephalosporinase resistance is currently the fastest emerging antimicrobial resistance problem worldwide; however, evidence documenting the effect of potential risk factors is limited. The main objective of this study was to investigate the effect of using third and fourth generation cephalosporins on the occurrence of extended-spectrum cephalosporinase-producing Escherichia coli (ESC-Ec) in Danish pig herds. Conventional, integrated, medium to large herds were selected based on information from the Danish Central Husbandry Register and two groups were formed based on the use of third and fourth generation cephalosporins within a specified period, namely, 20 herds with no cephalosporin use (non-exposed) and 19 herds with frequent use (exposed). Data on prescribed antimicrobials were obtained from the National database (VetStat). Management data were obtained through a questionnaire. At the herd level, three pooled faecal samples were collected from sows with their piglets (farrowing pens), weaners, and finishers. ESC-Ec were then identified using selective enrichment. Because several of the herds only had a low number of weaners and/or finishers, analysis was only performed on samples from the farrowing pens. Logistic regression showed a significant effect of using cephalosporins-III/IV on the occurrence of ESC-Ec in the farrowing pens, even when adjusted for use of other antimicrobials 1 year prior to sampling. No confounding effect was identified in relation to management data. The relative risk ESC-Ec in exposed compared to non-exposed was 4.7 (95% confidence interval 2.0–11.5), confirming that regular use of cephalosporins-III/IV was a significant risk factor for the occurrence of ESC-Ec.

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