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A study investigating the prevalence of *Escherichia coli* involved in post-weaning diarrhea in Southern Ontario, antimicrobial resistance patterns and risk factors associated with the problem

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Introduction and Objectives

Post-weaning diarrhea and mortality caused by enteropathogenic strains of *E. coli* (PWECD) has increased in Ontario, however, not true prevalence studies of *E. coli* serogroups involved in this problem have been published. The objectives of this study were: to determine the prevalence of different *E. coli* serogroups involved in PWECD in Southern Ontario; to determine their antimicrobial resistance patterns; and to investigate risk factors associated with the problem.

Material and Methods

The population of this cross-sectional study comprised a total of 61 herds. Rectal swabs of 5 pigs that showed clinical signs of diarrhea were collected from each farm to determine the presence of O149:F4 *E. coli*. Presence of O138:K81 and O139:K82 was tested from only 53 farms, using a slide agglutination test. A farm was considered positive for *E. coli* if at least one of the rectal swabs was positive to at least one of the serogroups tested. Information on nursery and feed management, hygiene biosecurity and other possible risk factors was collected by means of a survey. Antimicrobial resistance was determined using the diffusion sensitivity test (Kirby-Bauer) for 9 different antibiotics. Information of antibiotic usage on the farm was also collected through the survey.

Results and Discussion

A total of 28 (45.9%) of the farms were positive for at least one of the *E. coli* antigens. The prevalence of O149:F4 was 32.8%; O139:K82 was 15.1%, and O138:K81 was 9.4%. This demonstrates that the O149:F4 is the most prevalent serogroup found in PWECD cases. Positive farms more commonly reported severe diarrhea than negative farms (22.2% vs 3%) ($P=0.04$) and higher average nursery pig mortality (3% vs 2%) (0.07). Mortality during a disease outbreak was 4.8% on average but some farms reported mortalities of 15%.

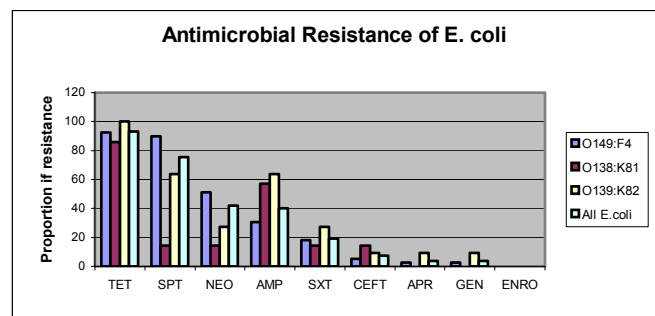
High correlation between enteric and respiratory problems has been reported (1). Moreover PWECD has been associated with PRRSV (2). Weaning at lower age, is associated with an increased prevalence of PWECD (3).

Resistance to at least 2 distinct antimicrobials classes was observed in 89% of the isolates. Resistance to neomycin, tetracycline and trimethoprim/sulfadoxine was associated with the use of the corresponding antimicrobial or antimicrobial of the same class on the farms. Some resistance to ceftiofur was observed. Resistance to this drug is of concern, since cephalosporins are used in human medicine. Resistance to ampicillin was associated with the use of sulfonamides in the first nursery feed, evidence of co-selection between different classes of antimicrobials was observed in this study. Spectinomycin resistance was high and was not related to usage of this antimicrobial on farms. Development of high levels of resistance to spectinomycin through chromosomal mutation of bacteria has been reported (4)

Table 1. Final multi-variable analysis of risk factors for *E. coli* in nursery pigs

	OR	P	95% CI of OR
Nursery previously diagnosed with <i>E. coli</i>	18.8	<0.001	4 – 88
Coughing in the older nursery pigs	4.16	0.06	0.91 – 19
Average weaning age	0.85	0.05	0.73 - 1

Figure 1. Prevalence of antimicrobial resistance of 3 different *E. coli* serogroups



References

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