### Project Number & Title
2A-106: A Comprehensive Risk Factor Analysis of Post-weaning Diarrhoea

### Project Leader
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### Project Participants
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### Aims and Objectives
Determine the risks inherent in a piggy environment responsible/contributing to *Escherichia coli* disease via an epidemiological risk factor characterisation study.

### Key Findings
*Escherichia coli* disease in pre- and post-weaned piglets has a major impact on the Australian pork industry. Using a snapshot survey approach 22-pig producers located across southeastern Australia were recruited. More than 1,100 faecal samples and detailed management and other information was collected:

- Scours prevalence in pre- and post-weaned pens was 17% and 24%, respectively.
- The most prevalent enterotoxigenic genes were F18 (32%) and STb (32%); the most common combination in herds was F4: STb.
- Of 60 factors screened with logistic regression, recent disease events (within the last 12 months) and presence of bedding were risk factors for scours.
- Using Bayesian network analysis, the importance of herd-level management was confirmed; larger herds and those where other livestock were managed on the same farm were more at risk of scours.
- *E. coli* resistance to a range of antibiotics was detected, such as tetracyclines (75%), trimethoprim-sulfamethoxazole (45%) and neomycin (35%).
- Resistance to third-generation cephalosporins (3GC; an antibiotic class *critically important* to human health) occurred in 6.1% of *E. coli* isolates.
- 3GC resistance was more likely to be detected in normal (non-scours) pens.
- Four extended spectrum β-lactamase (ESBL) genes – previously unreported in Australian pigs – were detected.
- *E. coli* isolates were susceptible to five of six disinfectants tested.

In a separate longitudinal study, the number of male piglets per pen and sow condition score at weaning were identified as key risk factors. Disease was seasonal, and during outbreak periods, a high diversity of *E. coli* clones was observed. This project represents the most comprehensive study of *E. coli* disease in Australian pig herds conducted in the past 20 years.

### Application to Industry
Controlling *E. coli* disease via management – such as more attention to hygiene and husbandry in large herds, reviewing the use of bedding, and improved biosecurity – allows producers to improve productivity and profit, and to reduce their reliance on antibiotic therapy. Antibiotic resistance appears widespread in the industry. Judicious use of available effective antibiotics for *E. coli* is critical. With continued and increasing concern over antibiotic resistance as a public health issue, modifying risk factors for *E. coli* disease also will enhance market access. Surveillance for antibiotic resistance and resistance genes in clinically normal post-weaned pigs will provide further market assurance.