

Zero Zinc Summit 2019 – Copenhagen - Denmark

Improved weight gain and reduced mortality and antibiotic use following an oral vaccination with Coliprotec[®] F4 in piglets with post-weaning diarrhea

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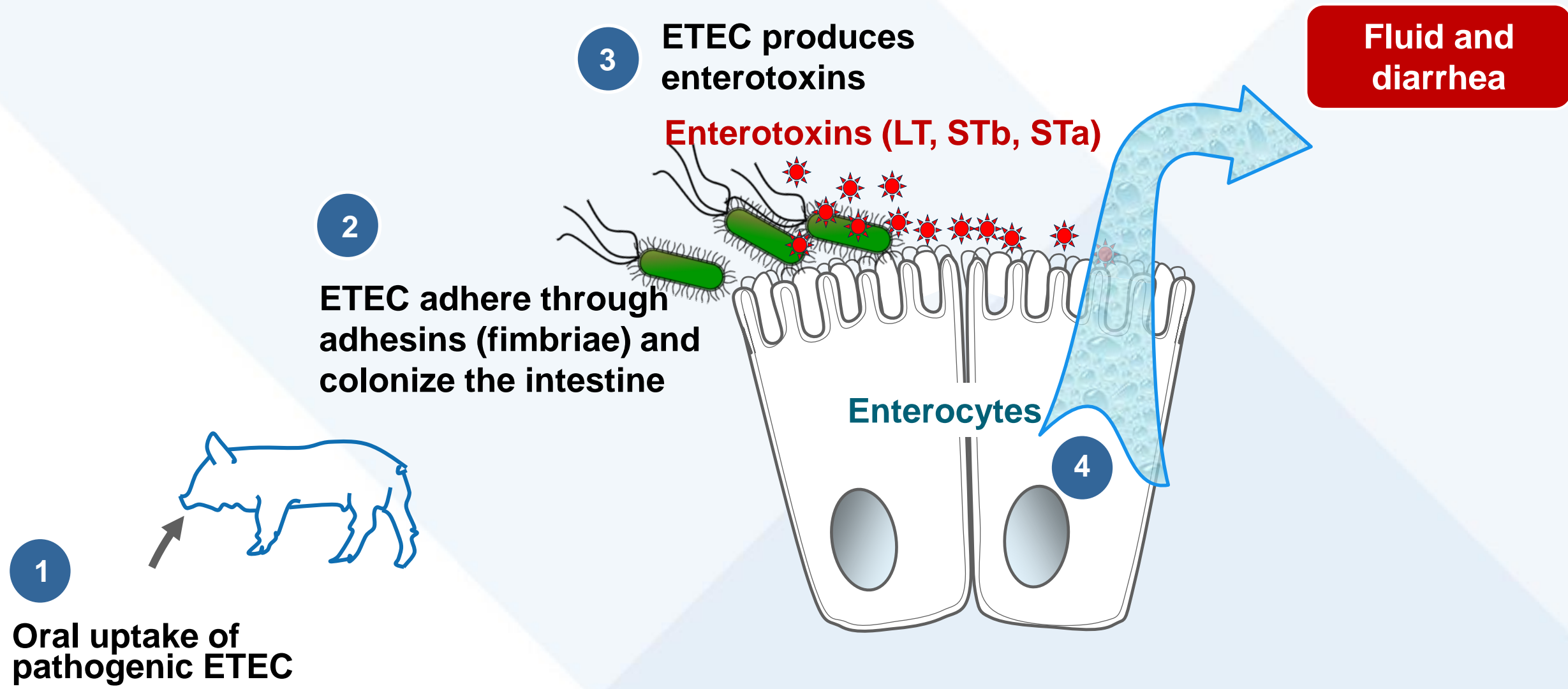
Elanco

Positive effect of oral vaccination using Coliprotec[®] F4 in piglets with post-weaning diarrhea

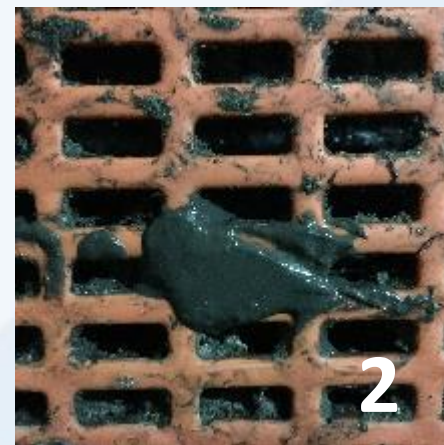
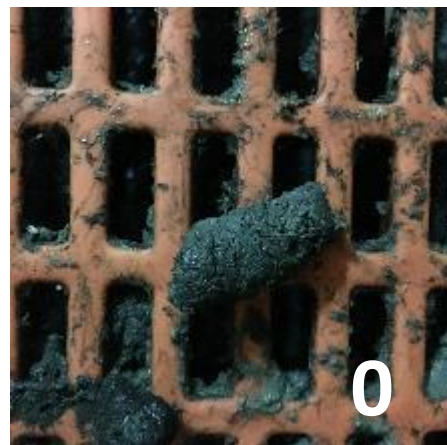
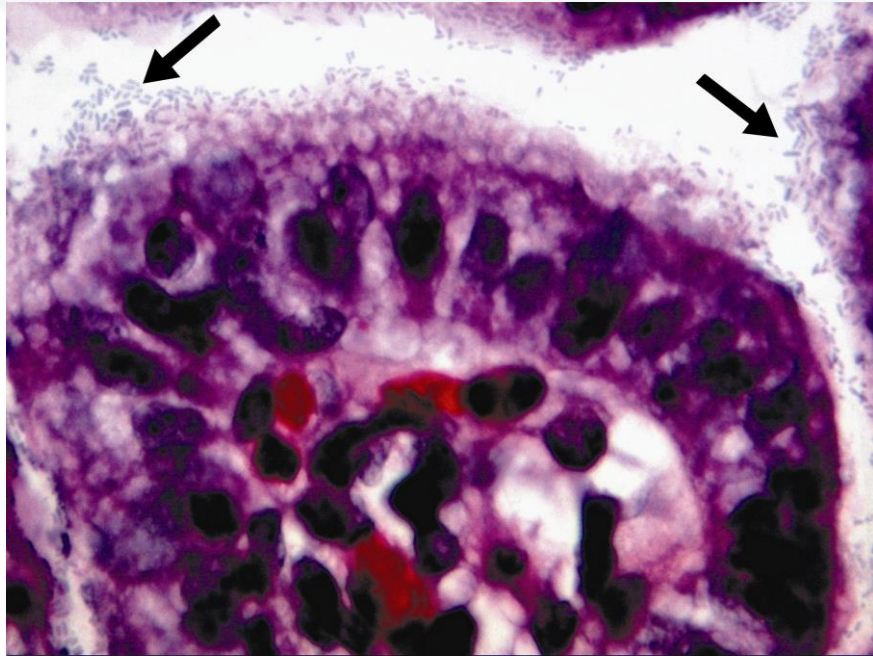
- Introduction
 - *E. coli* post-weaning diarrhea
 - Coliprotec[®] F4F18
- Materials & Methods
- Results
 - Fecal score
 - Average daily gain
 - Mortality
 - Antibiotic use
- Discussion & Conclusions

Introduction

Introduction – *E. coli* post-weaning diarrhea



Introduction – *E. coli* post-weaning diarrhea



Introduction - Coliprotec[®] F4F18

- Live, avirulent *E. coli* strains with fimbriae F4ac and F18ac
- Oral immunization at least 7 days before the clinical signs of post-weaning diarrhea
 - Administration from 18 days
 - Claim
 - Reduction of incidence of moderate and severe *E. coli* post-weaning diarrhea
 - Reduction of fecal excretion of F4-ETEC and F18-ETEC in infected piglets

Introduction – Coliprotec® F4F18

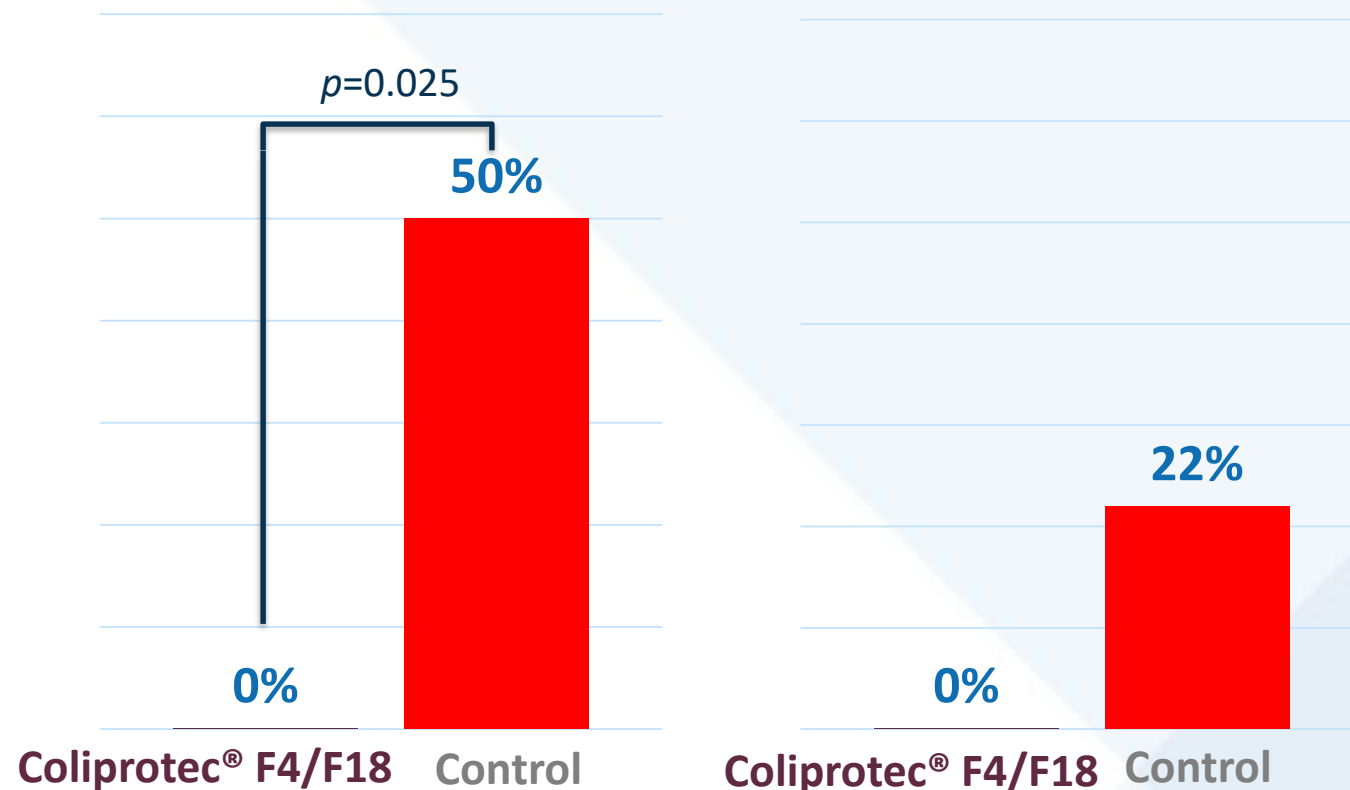
Reduction of incidence of moderate and severe diarrhea in piglets post-challenge

Nadeau et al., 2017. The Veterinary Journal. 226:32-39

F4-ETEC challenge

Ool-studie

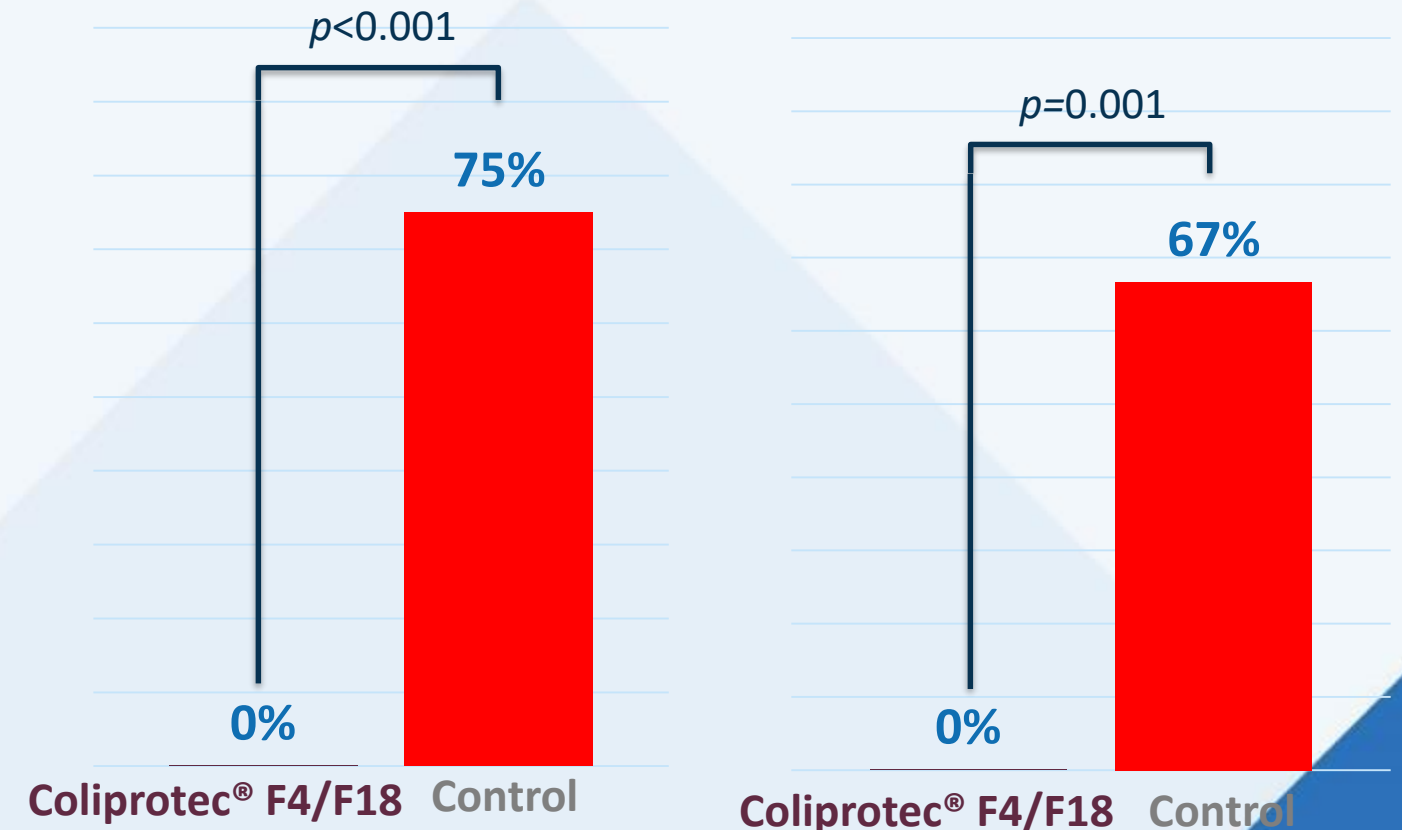
Dol-studie



F18-ETEC challenge

Ool-study

Dol-study



Introduction – Coliprotec® F4F18

Reduction of fecal shedding of F4-ETEC and F18-ETEC in infected pigs

Nadeau et al., 2017. The Veterinary Journal. 226:32-39

F4-ETEC challenge

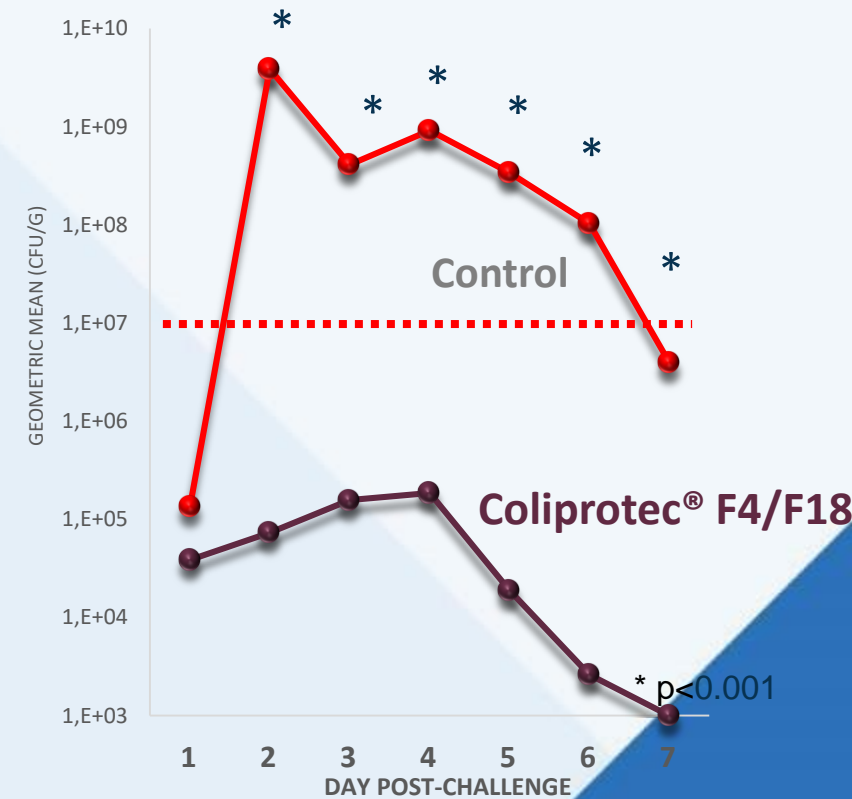
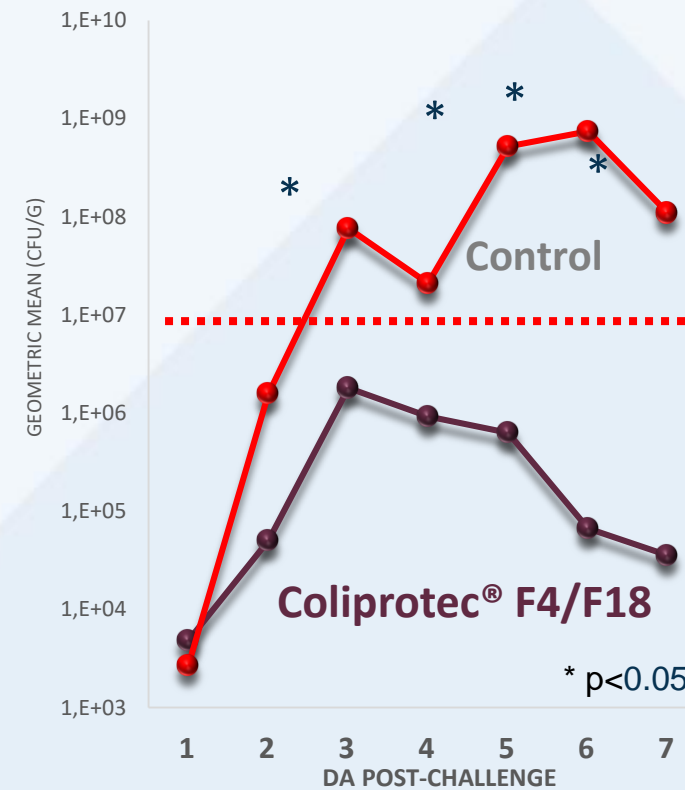
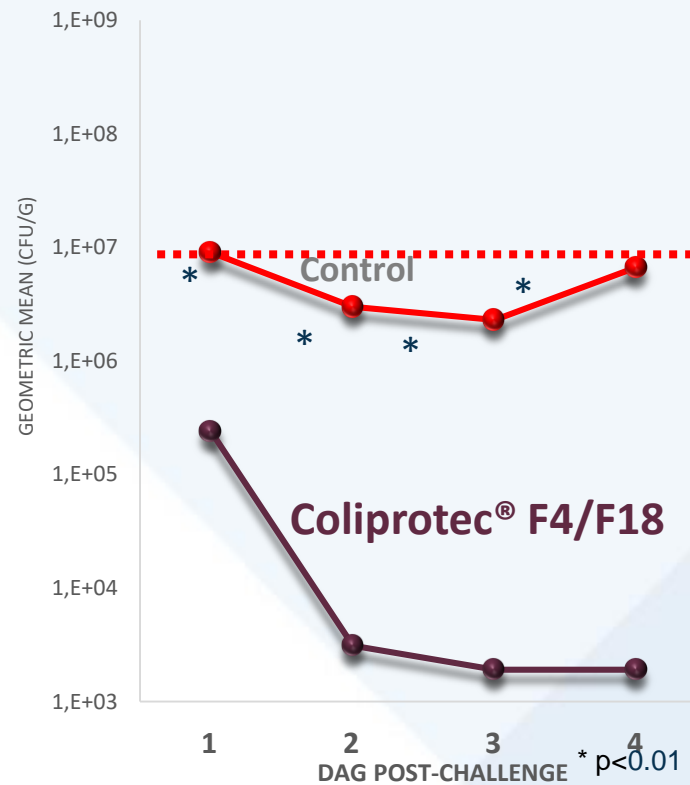
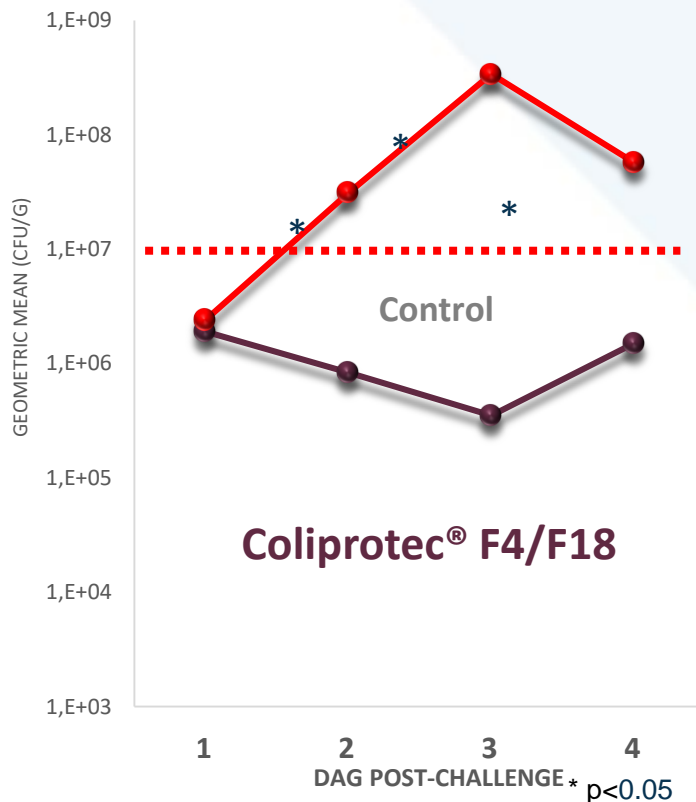
F18-ETEC challenge

Ool-studie

Dol-studie

Ool-study

Dol-study



F4-ETEC 99.90% reduction on 3 dpc
F4-ETEC 97.37% reduction on 4 dpc

F4-ETEC 99.97% reduction on 4 dpc

F18-ETEC 99.97% reduction on 7 dpc

F18-ETEC 99.97% reduction on 7 dpc

Materials & Methods

M&M - farm description

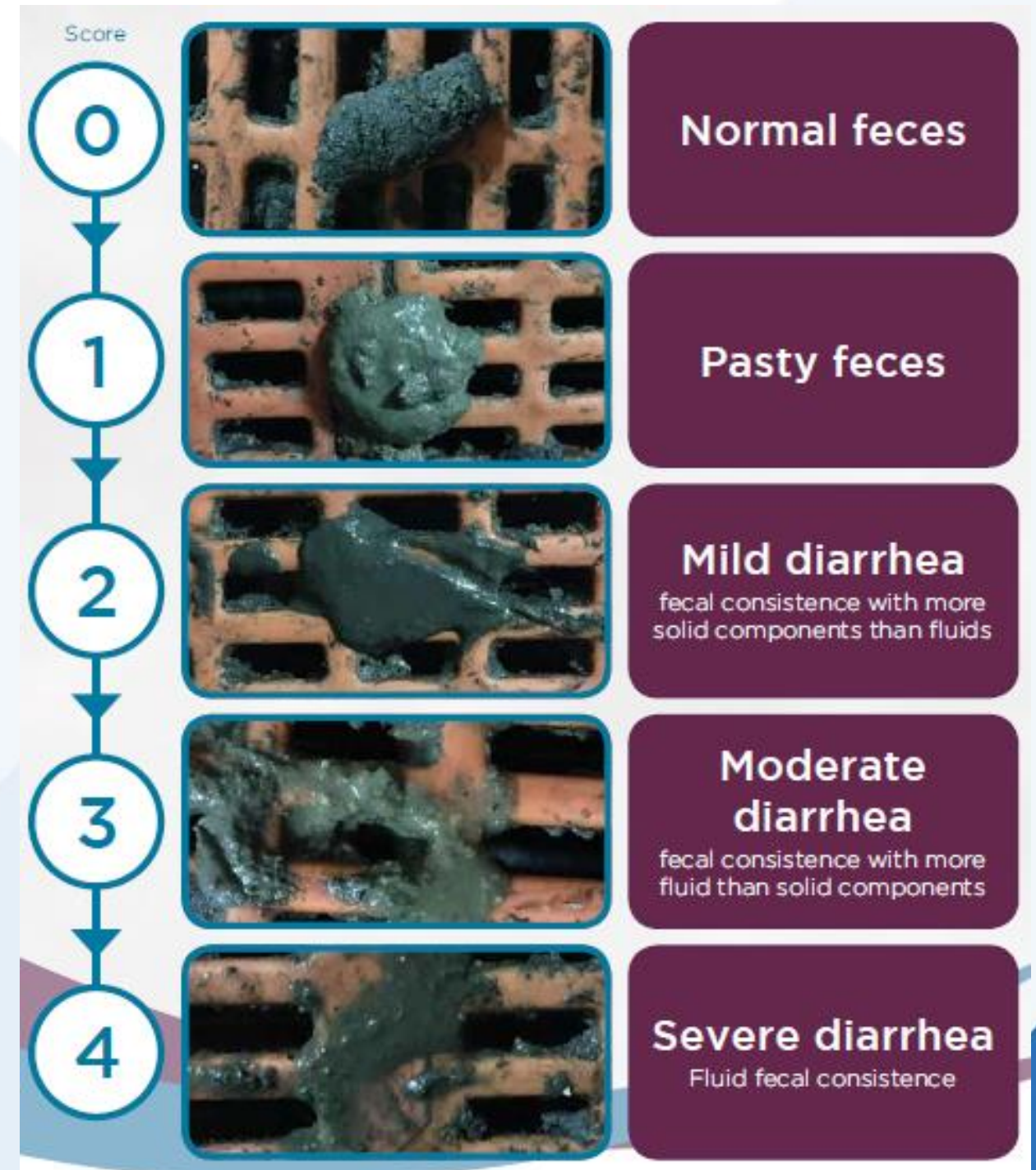
- **Anamnesis:**
 - 600 DanBred sows
 - 4-week-BMS
 - Weaning age: 3 weeks
 - Weaning weight: 5-6 kg
- **Recurrent problems with PWD**
 - Ideal for feed trials with specific supplements for intestinal 'health'
 - Unwanted antibiotic use
- **Diagnosis**
 - Bacteriology: hemolytic *E. coli*
 - Adhesins: F4 (K88)
 - Toxins: enterotoxins: STa – STb – LT



- **Trial compartment**
 - 20 feeders
 - 2 pens per feeder
- **Coliprotec[®] – test**
 - 5 groups
 - 4 feeders per group
 - 8 pens per group

Parameters

- ✓ Clinical fecal score (0-4) based on fecal consistency of 5 fecal droppings per pen per day
- ✓ Weight (kg) >> average daily weight gain
 - ✓ weaning (d0)
 - ✓ 1^e phase (d21)
 - ✓ end (d50)
- ✓ Feed conversion rate (kg/kg)
- ✓ Mortality (day / kg)
- ✓ Treatment incidence



Experimental design

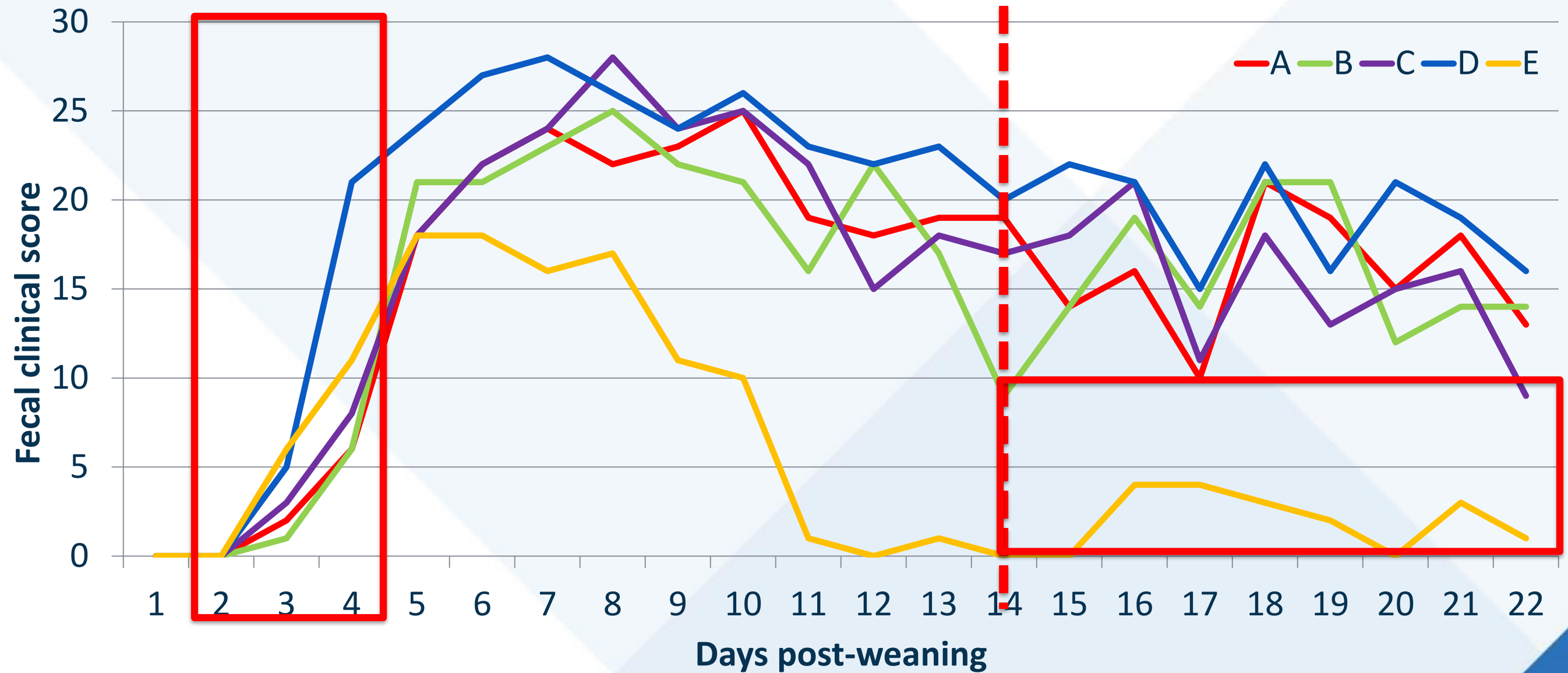
	A	B	C	D	E
<i>Name</i>	<i>1-phase / vaccine</i>	<i>2-phase / vaccine</i>	<i>3-phase / vaccine</i>	<i>Standard / nutriceutical</i>	<i>Standard + ZnO</i>
<i>Weaning starter</i>		2 kg	5 kg	5 kg	5 kg
<i>Starter</i>			8 kg	8 kg	8 kg
<i>Grow starter</i>		
<i>ZnO (14d)</i>	-	-	-	-	+
<i>In-feed acids</i>	-	-	-	+	-
<i>Coliprotec[®]</i>	+	+	+	-	-

Vaccination with Coliprotec[®]

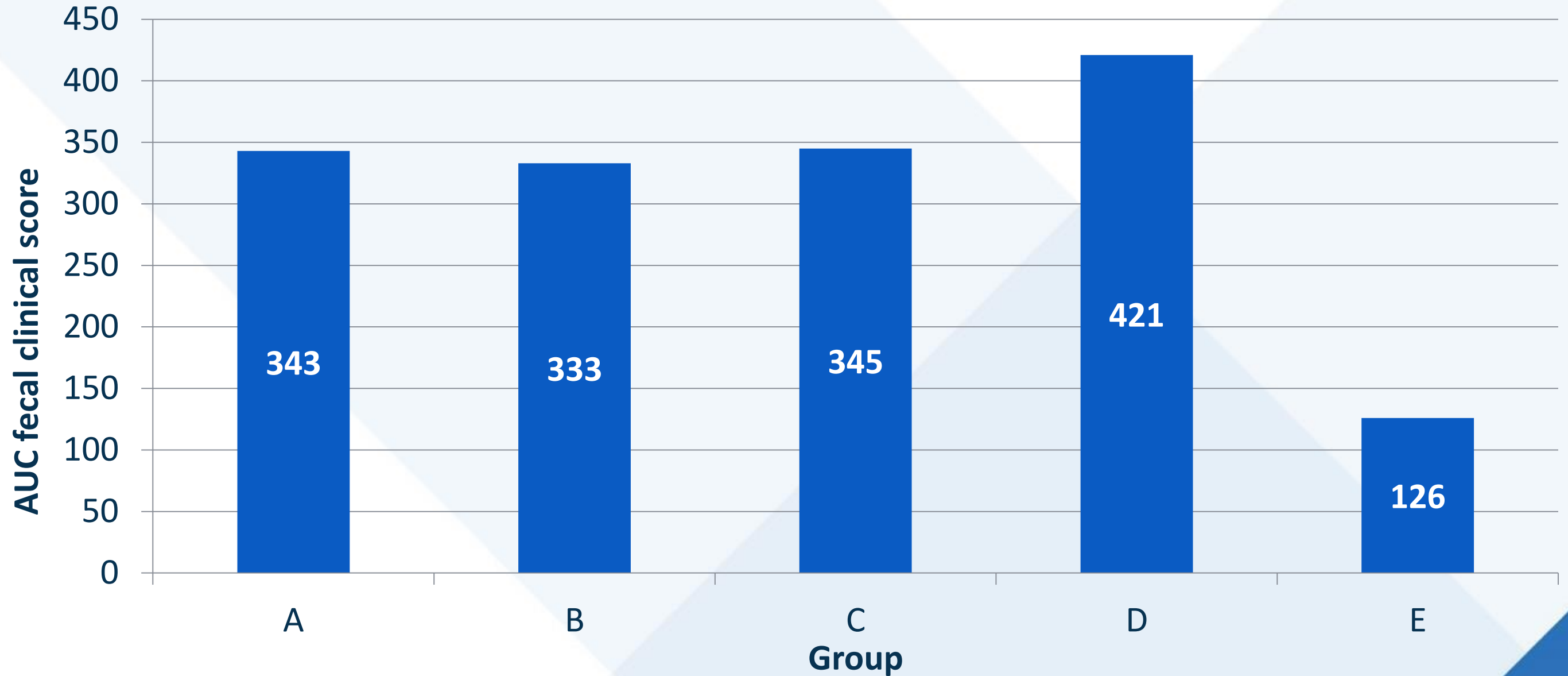
- Vaccine administration
 - 7 days before clinical signs of diarrhea
 - Diarrhea occurs at d3 post-weaning
 - Vaccination at 17-18 days during lactation
 - Individual drenching of 2 mL of vaccine solution
 - No antibiotics from 3 days before until 3 days after vaccination
- Unvaccinated control group

Results

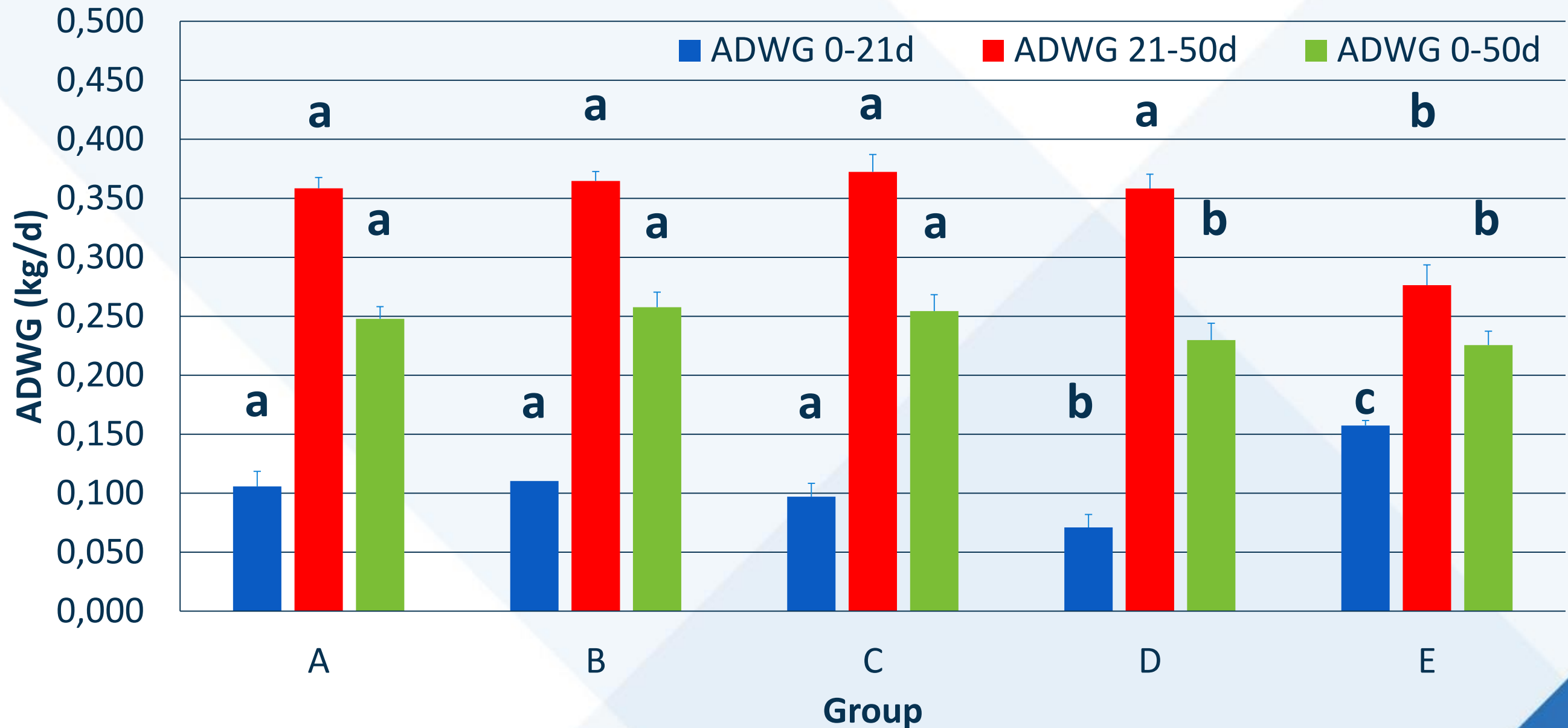
Fecal clinical score 0-21 d



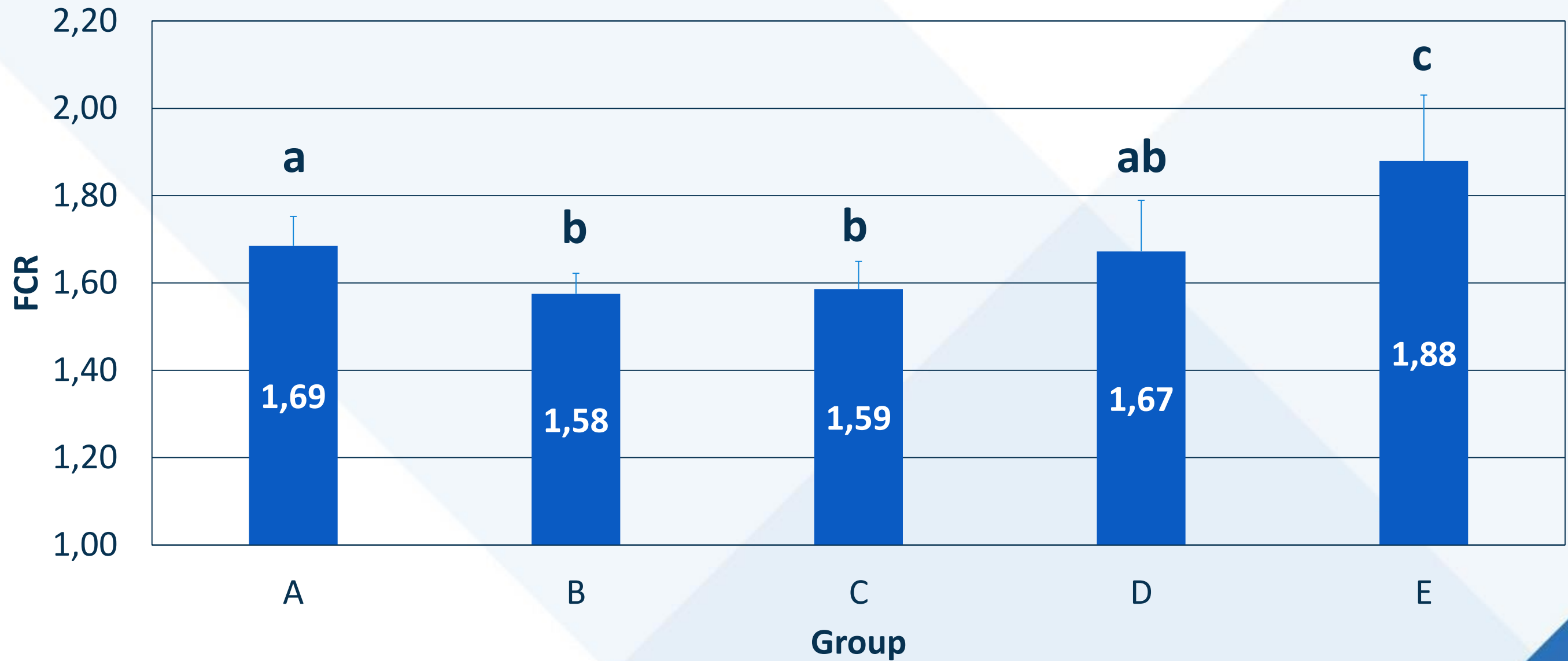
AUC fecal clinical score 0-21 d



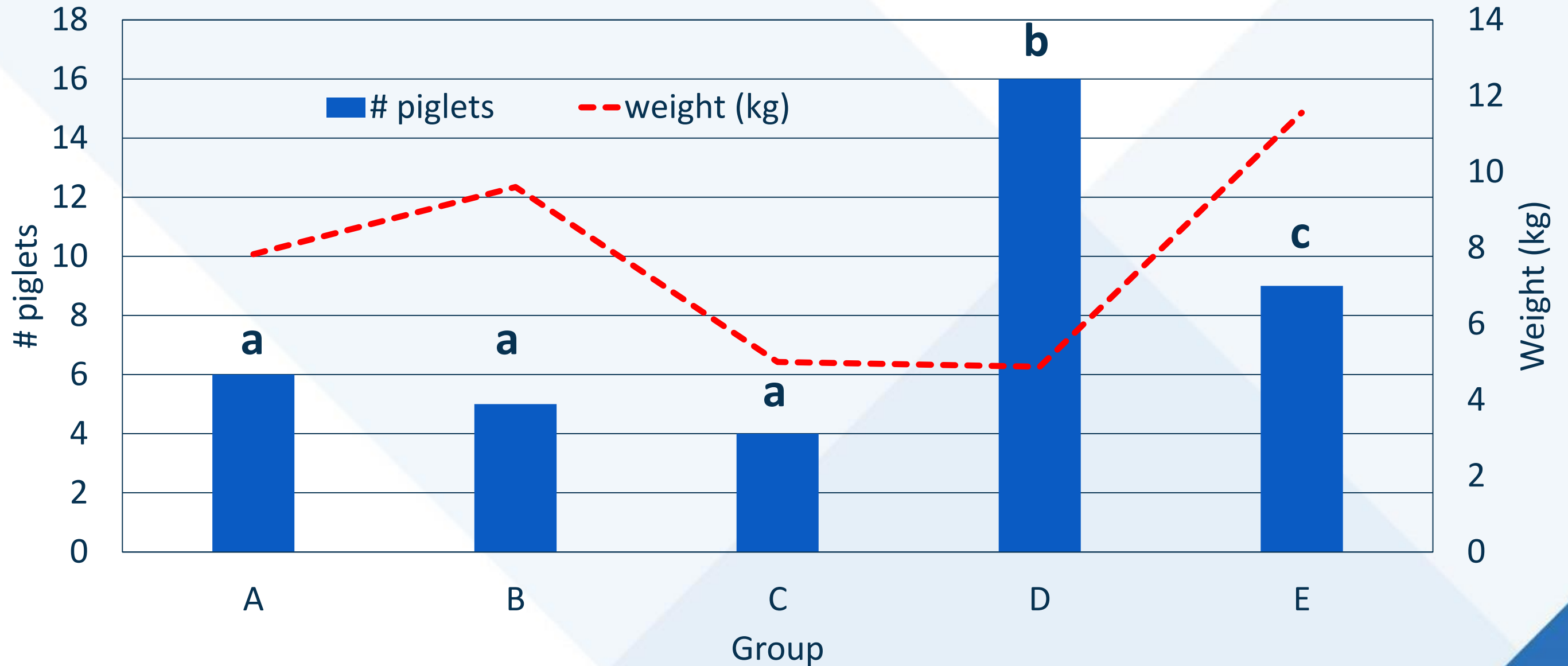
Average daily weight gain



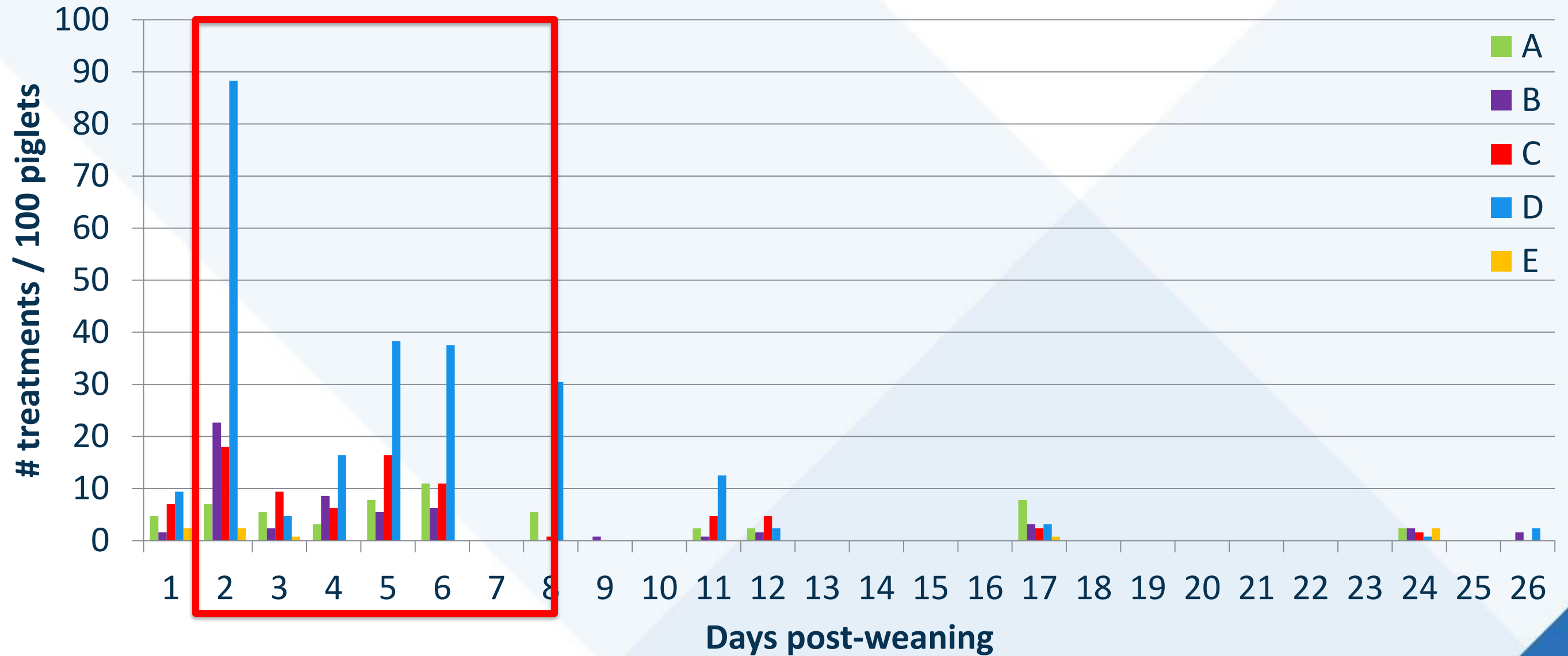
Feed conversion rate



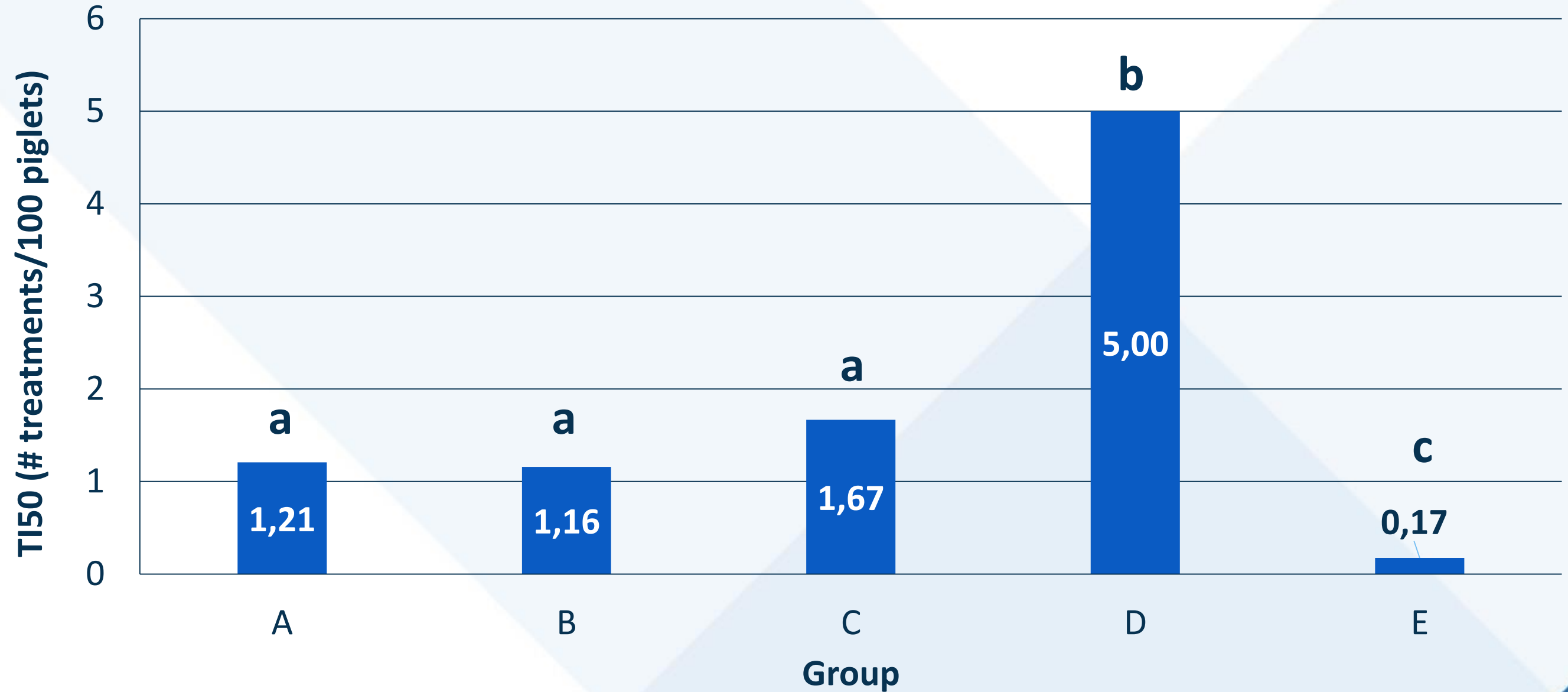
Results - Mortality



Treatment incidence by day



Treatment incidence over 50 day post-weaning period



Discussion & conclusions

Discussion & conclusions

- ZnO supplementation and safe feed are both perceived in practice as the standard approaches to cope with post-weaning *E. coli* diarrhea
 - ZnO supplementation does not results in maximal piglet performance, but farmers only have one group in their barn and do not perform regular comparison with other approaches
 - Safe feed does not protect against heavy infection pressure resulting in clinical diarrhea with increased antibiotic use and mortality

Discussion & conclusions

- Vaccination with Coliprotec[®] before weaning (17-18 days of age) resulted in:
 - Improvement of fecal clinical score <> control
 - Higher average daily weight gain <> ZnO & control
 - Lower feed conversion rate <> ZnO
 - Lower post-weaning mortality <> ZnO & control
 - Lower treatment incidence <> control
- Vaccination is a valuable alternative to prevent post-weaning *E. coli* diarrhea under field conditions

Acknowledgements

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