HERD-FACTORS AND E. COLI AMR PATTERNS IN SWEDISH PIGS
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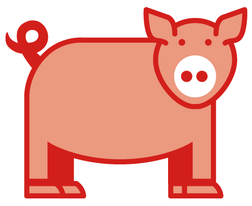
*Diseased

Herd-factors and *E. coli* AMR patterns in Swedish pigs

Aim: To investigate associations between herd-factors and AMR in *Eschericha coli* causing diarrhoea in Swedish pigs



DATA

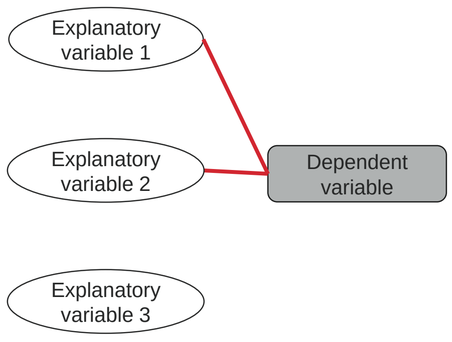
Herd information was collected via a questionnaire performed by the farm veterinarian. Sampling material was given to the farmers with instructions to collect samples from their next case of piglet diarrhoea and their next case of weaning diarrhea. Samples were cultured and *E.coli* strains were tested for hemolysis, enterotoxin production and antimicrobial resistances.

			Response alternatives	Proportion
Explanatory variables	Questionnaire data (n=83)	Addion of high dose ZnO to the feed?	*Ongoing*	0,41
			During the past year	0,02
			More than one year ago	0,19
			Never	0,37
		First choice antibiotic for piglet diarrhoea?	*Trim-Sulfa*	0,58
			Ampicillin	0,12
			Penicillin	0,05
			Enrofloxacin	0,01
			Other	0,24
		First choice antibiotic for weaning diarrhoea?	*Trim-Sulfa*	0,73
			Kolistin	0,05
			Neomycin	0,01
			Other	0,20
		First choice antibiotic for post-farrowing treatment?	*Trim-Sulfa*	0,70
			Penicillin	0,20
			Other	0,10
		Estimated proportion of sows recieving antibiotic treatment within the first week after farrowing?[4]	*<10%*	0,30
			10-19%	0,45
			20-29%	0,19
			≥30%	0,06
	Sample data (n=158)	Type of diarrhoea	*Piglet diarrhoea*	0,54
			Weaning diarrhoea	0,46
		Diarrhoea treated w. antibiotics		0,03
Dependent variables	*E-coli* isolate properties (n=158)	Hemolysis		0,16
		Enterotoxins produced		0,25
		Growth in Nalidixin		0,36
		Ampicillin resistance		0,30
		Cefotaxim resistance		0,00
		Colistin resistance		0,03
		Enrofloxacin resistance		0,08
		Gentamicin resistance		0,00
		Neomycin resistance		0,05
		Nitrofurantoin resistance		0,00
		Streptomycin resistance		0,37
		Tetracykline resistance		0,18
		Trimethoprim-Sulfonamide resistance		0,32

METHODS

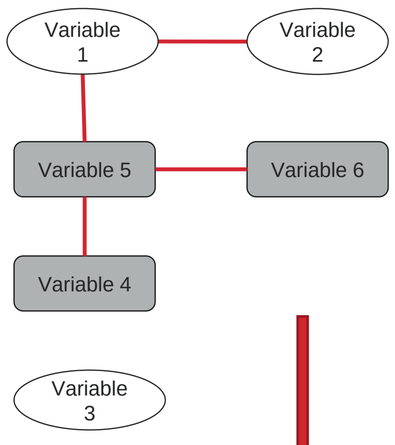
Regression analysis

Multivariable method investigating associations between several explanatory variables and one dependendent variable at a time.



ABN - Additive Bayesian Network modelling

Multivariate method investigating associations between all variables, including several eplanatory as well as several dependent variables.

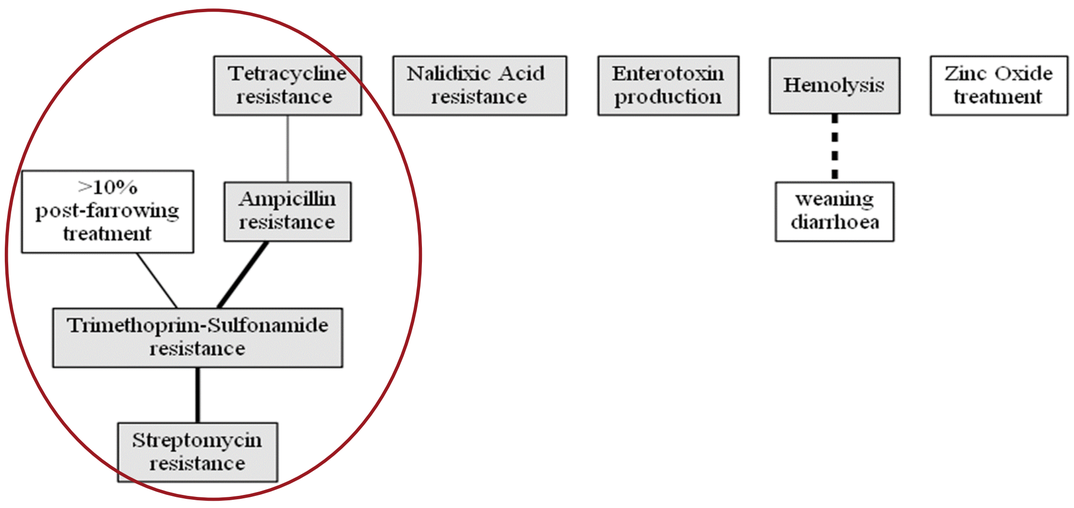


RESULTS REGRESSION

Random effect variable	Variance			
Herd	< 0.0001			
Fixed effect variables	**Category**	**OR**	**95% CI**	**P>z**
Estimated proportion of sows recieving antibiotic treatment within the first week after farrowing	*<10%*	*Ref*		
	10-19%	3.6	1.2-10.8	0.023
	20-29%	5.8	1.7-20.0	0.005
	≥30%	5.9	1.1-31.0	0.035
Type of diarrhoea	*Weaning diarrhoea*	*Ref*		
	Piglet diarrhoea	2.7	1.2-6.1	0.019

- ***E.coli* isolates were more likely to be resistant to trimethoprim-sulfonamide (TS) when collected in herds with a higher proportion of sows recieving post-farrowing antibiotic treatment (note that TS was used as first choice antibiotics for post-farrowing treatment in 70% of the herds (se data table)).**
- *E.coli* isolates were more likely to be resistant to TS in piglets with diarrhoea, compared to pigs with weaning diarrhoea.
- There was no clustering of TS resistance at herd level.
- None of the other explanatory variables showed significant association to TS resistance of isolates.

RESULTS ABN



Lines indicate associations, thickness of lines is proportional to link strength.

- **Trimethoprim-Sulfonamide (TS) resistance was directly associated to proportion of sows recieving post-farrowing antibiotic treatment.**
- **TS resistance was also directly associated to ampicillin and streptomycin resistance, and ampicillin was also directly associated to tetracycline resistance.**
- There were no isolates with hemolysis from piglets with weaning diarrhoea (negative direct association between these variables).

CONCLUSIONS

Trimethoprim-sufonamide (TS) treatment drives resistance to TS in *E.coli* causing diarrhoea in pigs. By co-selection, it also drives development of resistance to other antibiotics.

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