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Factor analysis of biosecurity data from 140 Danish pig herds

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Background

Biosecurity is a measure incorporating a plethora of different aspects. Detailed data describing individual biosecurity measures are in general multi-correlated, which inhibits ordinary statistical analyses

Objective

To evaluate whether factor analysis is a suitable way of analysing biosecurity data through identification of underlying patterns

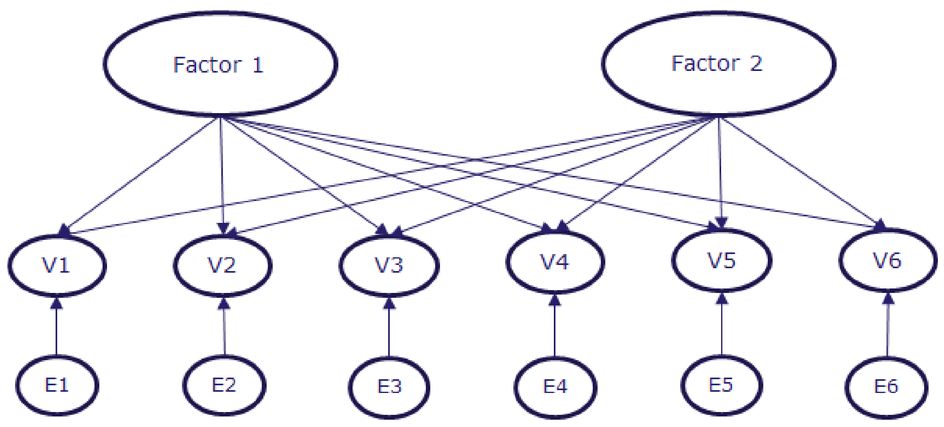
Materials & Methods

Data representing biosecurity in 140 Danish sow herds

- Obtained using Biocheck.ugent ®
- Data consisted of answers (and scores) on questions regarding external and internal biosecurity measures and procedures in each farm
- See poster no. 35 for more information

Factor analysis

- Specific answers from 64 questions were transformed into numerical data and used as variables
- The factors identified were characterized by the herds scoring high on the factor



Correlation analysis

- Correlations between scores from Biocheck (internal and external scores) and the factors derived from the factor analysis

Results

4 factors were chosen (Eigen value > 2.7), explaining 21% of variation in data.

Factor 1: Integrated farms

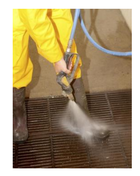
- Many finishers
- Transport of finishers

Factor 2: Herds with high external biosecurity

- Much focus on foreign employees and access to farm
- Hygienic measures related to material supply

Factor 3: Herds with high internal biosecurity

- Newer facilities, many weaners, no finishing pigs
- Wash of footwear and hands between compartments



Factor 4: Large herds with good water hygiene

- Many employees and newer facilities
- Checking and cleaning of the internal water system

Table 1 Correlations between internal and external scores from Biocheck.ugent ® and the four factors derived from factor analysis of biosecurity data

Score from Biocheck		Factor 1	Factor 2	Factor 3	Factor 4
External	Corr.coeff.	-0.06	0.24	0.47	0.28
	p-value	0.49	**0.004**	**<0.0001**	**0.0009**
Internal	Corr.coeff.	0.073	0.51	0.23	0.39
	p-value	0.39	**<0.0001**	**0.006**	**<0.0001**

Correlation analysis showed that:

- Factor 1 was not correlated with the Biocheck scores
- Factor 2,3, and 4 were strongly correlated with external and internal Biocheck scores

Discussion and conclusion

- Factor analysis is useful in describing underlying structures in multi-correlated data such as biosecurity measures
- These underlying structures could potentially be used to identify risk herds represented by specific characteristics regarding housing and management - which need special attention in veterinary authority herd inspections

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