Biosecurity on Swedish livestock farms – attitudes and behaviours among farmers and professional visitors

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Nordic-Baltic seminar on experiences, training, motivation and economic aspects in biosecurity
May 7th, 2014, Stockholm
"Infection through the farm gate. Studies on movements of livestock and on-farm biosecurity"

Nöremark M
In-going and out-going contacts
In-going and out-going contacts

Live animals, Deadstock
Staff, Visitors
Feed, Manure
Equipment, Transports
Products
Application of biosecurity routines
"Application of routines that contribute to on-farm biosecurity as reported by Swedish livestock farmers"

Nöremark M, Frössling J, Lewerin SS

Questionnaire replies from 518 Swedish farmers

Four regions

Cattle, pigs, sheep, goats
"Application of routines that contribute to on-farm biosecurity as reported by Swedish livestock farmers"

Nöremark M, Frössling J, Lewerin SS

- Attitudes towards farm visits
- Protective clothing for visitors
- Equipment shared with other farmers
- Introduction of animals
- Transport of live animals and deadstock
- Between-herd contacts on pasture
Require visitors to wear protective clothing when entering stables.

Always or almost always:
- Pigs: 74%
- Cattle: 23%
- Sheep/goats: 7%
Allow transporters of live animals to enter stables

Always:
- Cattle 50%
- Sheep/goats 22%
- Pigs 9%
Introduction of new animals and use of quarantine

Directly entered into the herd:
- Cattle: 75%
- Sheep/goats: 62%
- Pigs: 8%
Self-assessment of biosecurity routines

Sufficient or very good:

- Pigs: 96%
- Cattle: 88%
- Sheep/goats: 88%
Some conclusions

• Considerable variation in biosecurity level

• Risky behaviour
  – Introduction of animals
  – Animal transporters

• Reasons for some routines were unclear

• Database not updated
Perceptions, opinions, attitudes
”Swedish livestock farmers’ perceptions of disease risk, communication and cost bearing”
Frössling J, Lewerin Sternberg S, Nöremark M

”Swedish livestock farmers’ attitudes towards requiring farm visitors so use protective clothing”
Nöremark M, Ernholm L, Frössling J
Focus groups
FOCUS GROUPS

Key questions on biosecurity and hygiene strategies

- Chairman
- Strict agenda (not shown to farmers)
- Observer
- Notes
- Recording
- Transcription
- Summary and analysis
What did they say?
What did they not say?
Disease control programmes

- Peer pressure to join programmes

- People are in general positive to join and want to join programmes

- Rules/legislation and inspections/control visits should be coordinated
Purchase of livestock

- Aware that, from a disease control perspective, introduction of animals from other herds should be avoided

- Safe to buy tested animals

- Ask for manual or check list to follow

- Written affirmation by the seller would be an efficient way to prevent disease spread
“The Swedish trust has remained for a thousand years”
Protective clothing

• In general positive
  - "inexpensive way" to contribute to the prevention of disease spread

• Tight time schedule may lead to transporters entering stables

• Difficult to correct "the ones that should know better"
General observations

• The Salmonella programme!
• Diseases that don’t have a named programme were seldom mentioned
• Some knowledge gaps when it comes to different routes of transmission and their different importance

• Economical aspects on biosecurity are of interest
• Demands from the banking system and their short follow-up periods
Focus groups

Questionnaire study

Stora delar av den sjukdomskontroll och rådgivning som genomförs i Sverige inom djurhälsoområdet baseras på antaganden om att ett visst smittskydd och hygienåtgärder inom och mellan gårdar förekommer. Tidigare har det saknats

För att kunna påverka smittskyddet i landet krävs information om hur djurägare föredrar att ta till sig fakta eller beslut och kommunicera med rådgivare och experter. Vi behöver även ta reda på mer om djurägares åsikter, rörande lokalberoende och djurförsörjning inom näringsorganisationer och myndigheter. Flera av dessa föreställningar och gissningar om vad som drar djurägare att agera på detta eller andra sätt.
Questionnaire

"Enkät om hygien och smittskydd i djurbesättningar"

A. The farm and your background
B. Contagious animal diseases
C. Risk communication and information
D. Buildings (sectioning, flow, cleaning)
E. Protective clothing for professional visitors
Questionnaire

Anonymous

Paper version, by post, incl. link to electronic version
Address database of the Swedish Board of Agriculture
Cattle, Pigs, Sheep, Goats
In total 4000, random sample, ~2000 replies

Electronic version
E-mail sent to members of the Swedish Dairy Association
Results
To keep the herd free from infectious diseases is very important to me

Don’t agree at all ____________________________________ Totally agree
There would be negative consequences [to me] if a contagious disease among my animals would spread to other herds.

Men versus Women: Odds Ratio = 0.7
If the animals are regularly exposed to infections they will become more resistant and have less disease.

Don’t agree at all - - - - - - - - Totally agree
If the animals are regularly exposed to infections they will become more resistant and have less disease

Don’t agree at all - - - - - - - - Totally agree

- Cattle, dairy
- Cattle, other
- Pigs, piglet prod.
- Pigs, fattening
- Sheep/Goats
- Mixed
Has the farm experienced an outbreak of infectious disease that seriously affected the animals or production?

- Education level
- Degree of making a living out of production
- Species and production type
- Region

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Odds Ratio</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Farm type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle, dairy</td>
<td>Baseline</td>
<td></td>
</tr>
<tr>
<td>Cattle, other</td>
<td><strong>0.34</strong></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pigs</td>
<td><strong>0.57</strong></td>
<td>0.002</td>
</tr>
<tr>
<td>Small ruminants</td>
<td><strong>0.27</strong></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mixed</td>
<td><strong>0.49</strong></td>
<td>&lt;0.001</td>
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</table>
Do you know how different infectious diseases spread and what you can to prevent introduction of infections into the herd?

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<tr>
<th>Explanatory variable</th>
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<th>P</th>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>Baseline</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.56</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Age

Gender

Education level

Degree of making a living out of production

Region
Do you think that you can influence whether infections are introduced into the farm or not?

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<td>Gender</td>
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<tr>
<td>Female</td>
<td>Baseline</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td><strong>0.60</strong></td>
<td>&lt;0.001</td>
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<tr>
<td>Future plan for the production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species and production type</td>
<td></td>
<td></td>
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<tr>
<td>Region</td>
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</table>
Equal compensation for all?

- About outbreaks of diseases for which the state offers financial compensation
Do you think that all affected farmers should get equal compensation levels whether they have routines present to prevent introduction of the diseases in question or not?

More negative

Species: Pigs, Sheep/Goats
Gender: Female
Education level: High
Future plan: Sustain or increase production
Suggested translation of gender effect

Link between:

- Perceived knowledge
- Motivation
- Expectations on yourself and others
Who do you listen to?

- How much do you care what Xxxxx thinks about what you do?

Not at all _____________________________ Very much
Swedish authorities
My close friends and family
The farm vets
Neighbours with livestock
Industry guidelines

Not at all _____________________________ Very much
Awareness and information
Lately, you have had diffuse problems with coughing in your herd and you decide that you want to find out more about potential causes.

How would you prefer to get access to this information?
"Disease awareness, information retrieval and change in biosecurity routines among pig farmers in association with the first PRRS outbreak in Sweden"

Nöremark M, Lindberg A, Vågsholm I, Sternberg Lewerin S

Outbreak of PRRS detected in July 2007
- Information letter to all animal owners with pigs from the Swedish Board of Agriculture
- Broad media coverage

One page questionnaire, January 2008
- Awareness of outbreak and PRRS
- Sources of information
- 130 pig farmers
11% were not aware the outbreak

26% altered their biosecurity routines due to the outbreak

Swedish Animal Health Service and the veterinary authorities were considered reliable sources of information
Biosecurity – the visitors’ perspective
"A survey of visitors on Swedish livestock farms with reference to the spread of animal diseases"

Nöremark M, Frössling J, Lewerin SS
BMC Vet Res 2013, 9:184
"Reported conditions for on-farm biosecurity by professionals visiting Swedish farms in their daily work”

Nöremark M, Lewerin SS
Acta Vet Scand 2014

Reported obstacles for on-farm biosecurity
Lack of water, soap, wash basin, paper towels
Inadequate equipment or lack of water to clean boots or equipment
Adequate protective clothing not available on the farm; non-existing, cold, dirty or wrong size
Summary
Summary 1(3)

- Biosecurity on Swedish farms varies and is far from perfect
- Peer pressure, social trust, responsibility
- Farmers want to collaborate
- Listen to their farm veterinarian
Summary 2(3)

- See through lack of biosecurity routines, sampling strategies or actions that does not make sense *etc*
- Link between perceived knowledge and motivation
- Gaps in knowledge
- Farmers want to be updated
Summary 3(3)

• Focus on programmes
• Less aware of diseases outside programmes
  (endemic disease outbreaks = accepted baseline?)
• Trust that they will have outbreak information from authorities
• Tend to ignore silent spread

• Expectations of farmers on visitors and *vice versa* shows that collaboration is needed in order to improve biosecurity
Other studies
On-going projects

PhD projects:

"Farmers perceptions and experiences with African Swine Fever outbreaks"
Erika Chenais

"Improving efficacy of salmonella control in Swedish dairy herds"
Estelle Ågren

Students’ degree projects:

"Geografiska kontaktmönster – en kartläggning av yrkesmässiga kontakter mellan svenska djurbesättningar"
Emelie Olofsson

“Disease control and biosecurity measures on Swedish feedlot farms”
Maria Wanhainen
Movement of animals and contact networks

A novel method to identify herds with an increased probability of disease introduction due to animal trade
Frössling J, Nusinovici S, Nöremark M, Widgren S, Lindberg A
Prev Vet Med 2014 (manuscript under revision)

EpiContactTrace: an R-package for contact tracing during livestock disease outbreaks and for risk-based surveillance.
Nöremark M, Widgren S
BMC Vet Res 2014, 10(1):71

Application of network analysis parameters in risk-based surveillance - examples based on cattle trade data and bovine infections in Sweden
Frössling J, Ohlson A, Björkman C, Håkansson N, Nöremark M

Network analysis of cattle and pig movements in Sweden: measures relevant for disease control and risk based surveillance
Nöremark M, Håkansson N, Sternberg Lewerin S, Lindberg A, Jonsson A

Widgren S, Frössling J

Estimation of distance related probability of animal movements between holdings and implications for disease spread modeling
Lindström T, Sisson SA, Nöremark M, Jonsson A, Wennergren U

Spatial and temporal investigations of reported movements, births and deaths of cattle and pigs in Sweden
Nöremark M, Håkansson N, Lindström T, Wennergren U, Sternberg Lewerin S
Acta Vet Scand 2009, 51:37
Thank you for your time!