

Identification of disease transmission pathways between Swiss pig premises using the Mental Models Approach

Francesco Galli¹, Brian Friker¹, Angela Bearth², Salome Dürr¹

¹Veterinary Public Health Institute, University of Bern; ²Department of Health Sciences and Technology, ETH Zurich

Background

- In Switzerland, the spread of pig infectious diseases represents a danger for the agricultural sector. The most concrete threats are African Swine Fever (ASF), Porcine Reproductive and Respiratory Syndrome (PRRS) and Enzootic Pneumonia (EP).
- Livestock trade networks are often considered the most important disease spread mechanism. However, several latent contact pathways between premises are known to exist.
- Identifying latent contact pathways using farmers' knowledge may be challenging because of the sensitive nature of the information.

Research aim

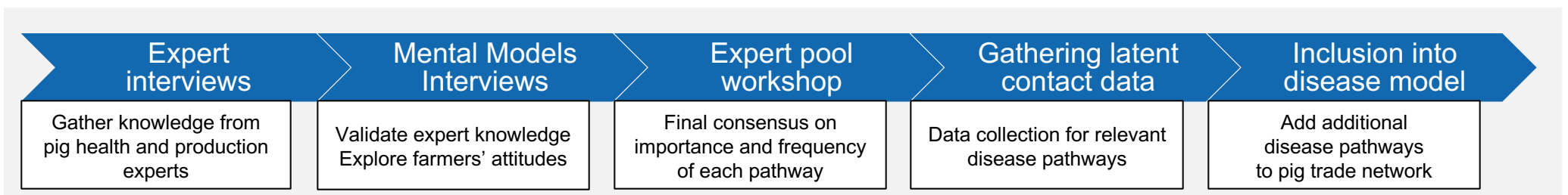
- Uncover contact pathways for disease transmission between pig farms
- Classify pathways by frequency of occurrence and by relevance for the spread of ASF, PRRS and EP

Challenge: Find the right method to gather farmers' knowledge

- Farmers might not remember
- Farmers might not want to reveal
- Questionnaire can only comprise known pathways

→ **Mental Models Approach**

The adapted Mental Models Approach



Expert pool assessment of disease pathways between Swiss pig farms for ASF, PRRS and EP

Area	Potential disease pathway	Relevance	Relevance	Relevance	Disease spread likelihood	Contact frequency
		ASF	PRRS	EP		
Pig transport	Transport from farm X to farm Y	9	9	9	3	3
	Contact in the lorry: no barrier	4	6	6	6	6
	Contact in the lorry: let-through barrier	6	9	9	9	9
	Contact in the lorry: isolating barrier	1	2	2	2	2
	Lorry contamination: traces from other pigs	6	6	6	6	6
	Lorry is not washed at the slaughterhouse	2	3	3	3	3
	Contamination via lorry driver	3	9	6	6	6
	Contamination via lorry tires	2	4	2	2	2
	Sharing of boars	2	3	3	3	3
	Transport done by farmer self	4	6	6	6	6
Farmer encounters	Farmer encounters on the premises	1	2	2	2	2
	Farmer encounters outside the premises	3	3	3	3	3
	Sharing of pig farming tools	2	3	2	2	2
	Sharing of other farming tools	3	6	3	3	3
	Going to the carcass collection point	3	6	3	3	3
	Manure trade between farms	3	6	3	3	3
External collaborators	Collection of carcasses on the premises	6	6	3	3	3
	Veterinarians	2	4	4	4	4
	Feed advisors	3	6	6	6	6
	Other official farm visits	3	6	3	3	3
Environment / other	External visitors	1	2	1	1	1
	Pets (cats, dogs)	1	2	1	1	1
	Wild boar	4	6	6	6	6
	Other wild animals	2	4	2	2	2

What we learned

- The Mental Models Approach proved to be an effective tool to gather sensitive information from pig farmers in a short time frame.
- Twenty-four contact pathways were revealed, highlighting the potentially high risk of disease transmission between pig premises.
- Disease models for the spread of ASF may solely focus on pig transport-related pathways, while for EP, and more importantly for PRRS, not considering further disease pathways will result in an underestimation of the disease spread potential.

Reference

Risk communication: a mental models approach. M. Granger Morgan *et al.*, 2001, Cambridge University Press

Contact

Francesco Galli, MSc Epi, PhD candidate
francesco.galli@vetsuisse.unibe.ch