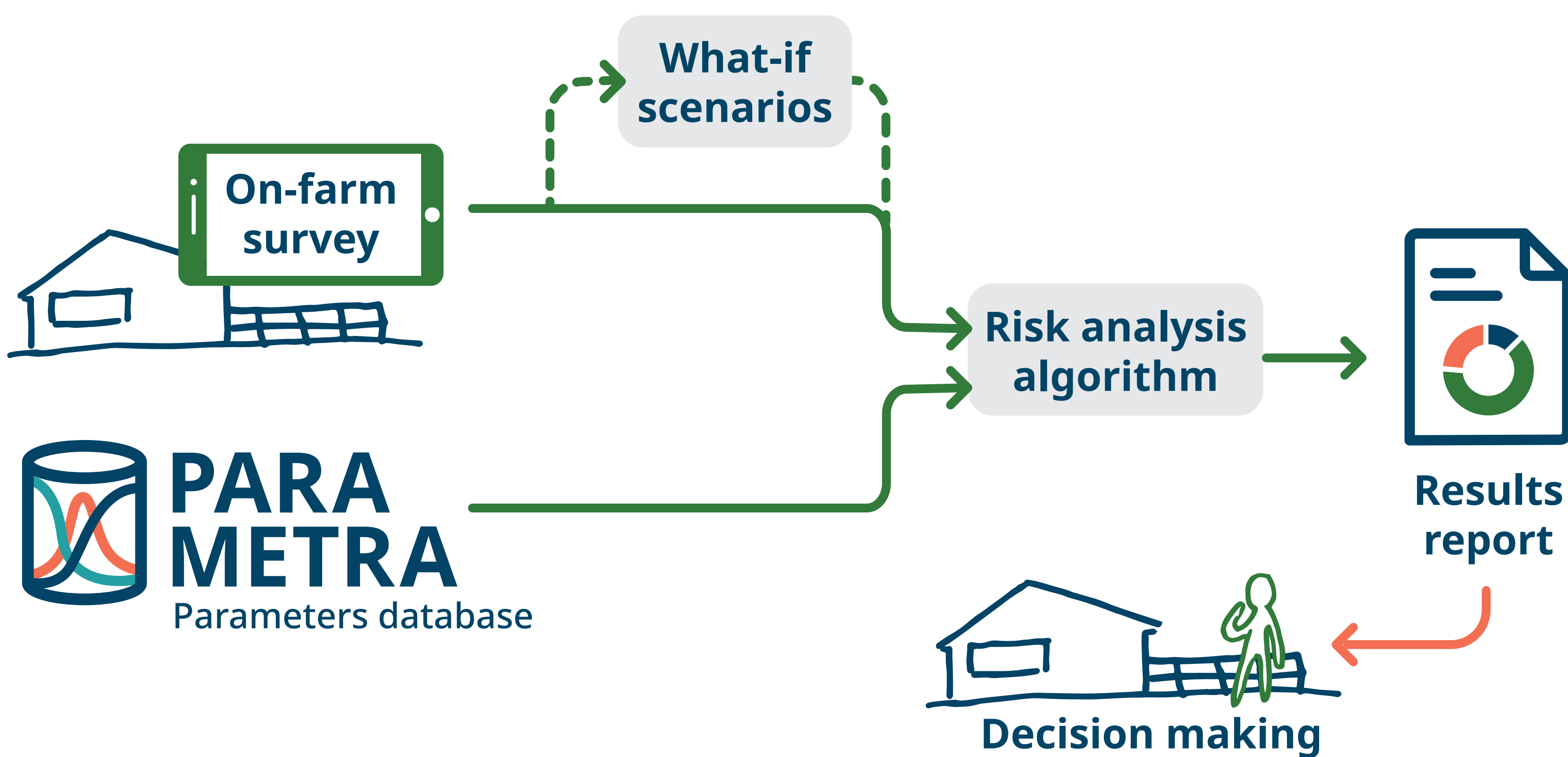


# Tailoring external farm biosecurity through quantitative risk analysis

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## 1. Objective

To assess biosecurity and provide disease-specific, farm-specific recommendations through quantitative risk analysis.



## 2. Methods

We carried out **on-site biosecurity assessments** at 5 dairy farms.

We ran a stochastic **risk assessment algorithm** to calculate the probability of pathogen introduction to these farms using their **survey data**, pathogen **transmission parameters** (PARAMETRA database) and scientific literature. The risk is evaluated for each of the introduction pathways, and then aggregated to get the overall risk.

**What-if scenarios** in which new biosecurity measures were implemented on each farm were simulated and compared with the original scenario to identify the best biosecurity measures.

The tools needed for the analysis are collected in the farmrisk R package (under development).

Reports with **user-friendly visualisations** were used to present the results to farmers and support their decision-making.

## 3. Results: IBR entry into 5 dairy cattle farms

**How do different pathways contribute to the overall risk of pathogen introduction?**

IBR annual entry risk median (CI 95%)

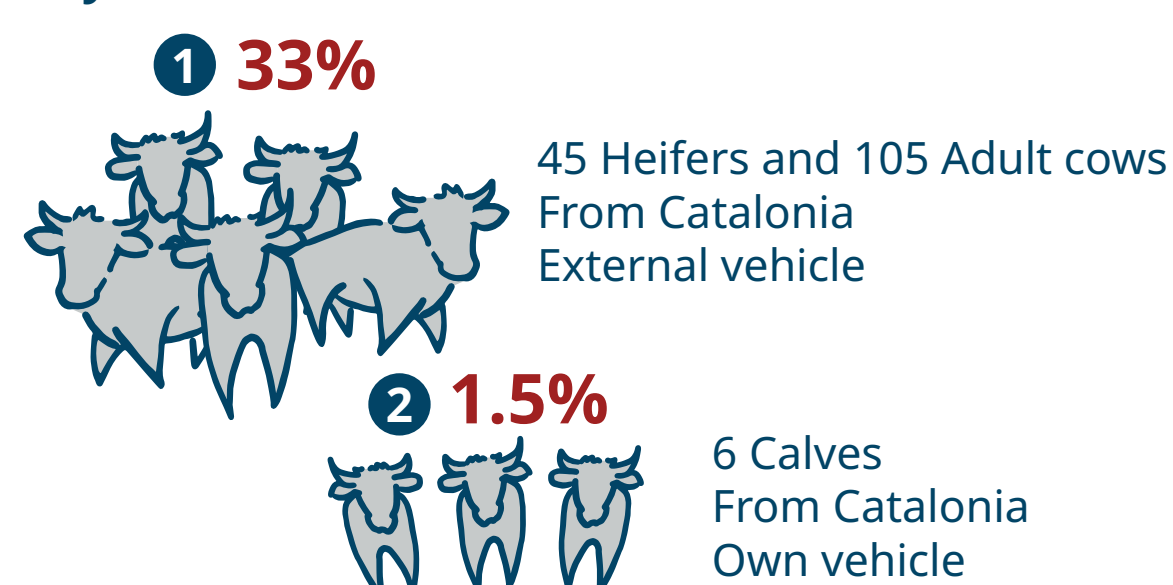
Farm	Total IBR	Cattle entries	Cattle transport	People visits	Vehicle visits	Neighbours
Dairy 1	0.9% (0.6-1.7%)	0.0003% (0.00004-0.0005%)	0.23% (0.15-0.3%)	0.005% (0.003-0.008%)	0.7% (0.36-1.4%)	
Dairy 2	5.3% (3.4-7.9%)	0.0001% (0.00005-0.0003%)	1.3% (0.88-1.7%)	0.1% (0.07-0.2%)	3.9% (2.0-6.5%)	0.004% (0.0002-0.01%)
Dairy 3	0.3% (0.2-0.5%)			0.02% (0.007-0.04%)	0.3% (0.1-0.5%)	0.004% (0.0002-0.01%)
Dairy 4	40% (27.9-48.9%)	34% (23-43%)	5.0% (1.7-11%)	0.02% (0.008-0.05%)	1.2% (0.6-2.0%)	0.004% (0.0002-0.01%)
Dairy 5	0.4% (0.2-0.7%)			0.005% (0.002-0.009%)	0.4% (0.2-0.7%)	0.008% (0.0005-0.03%)

**Which biosecurity measures should be prioritised to reduce risk?**

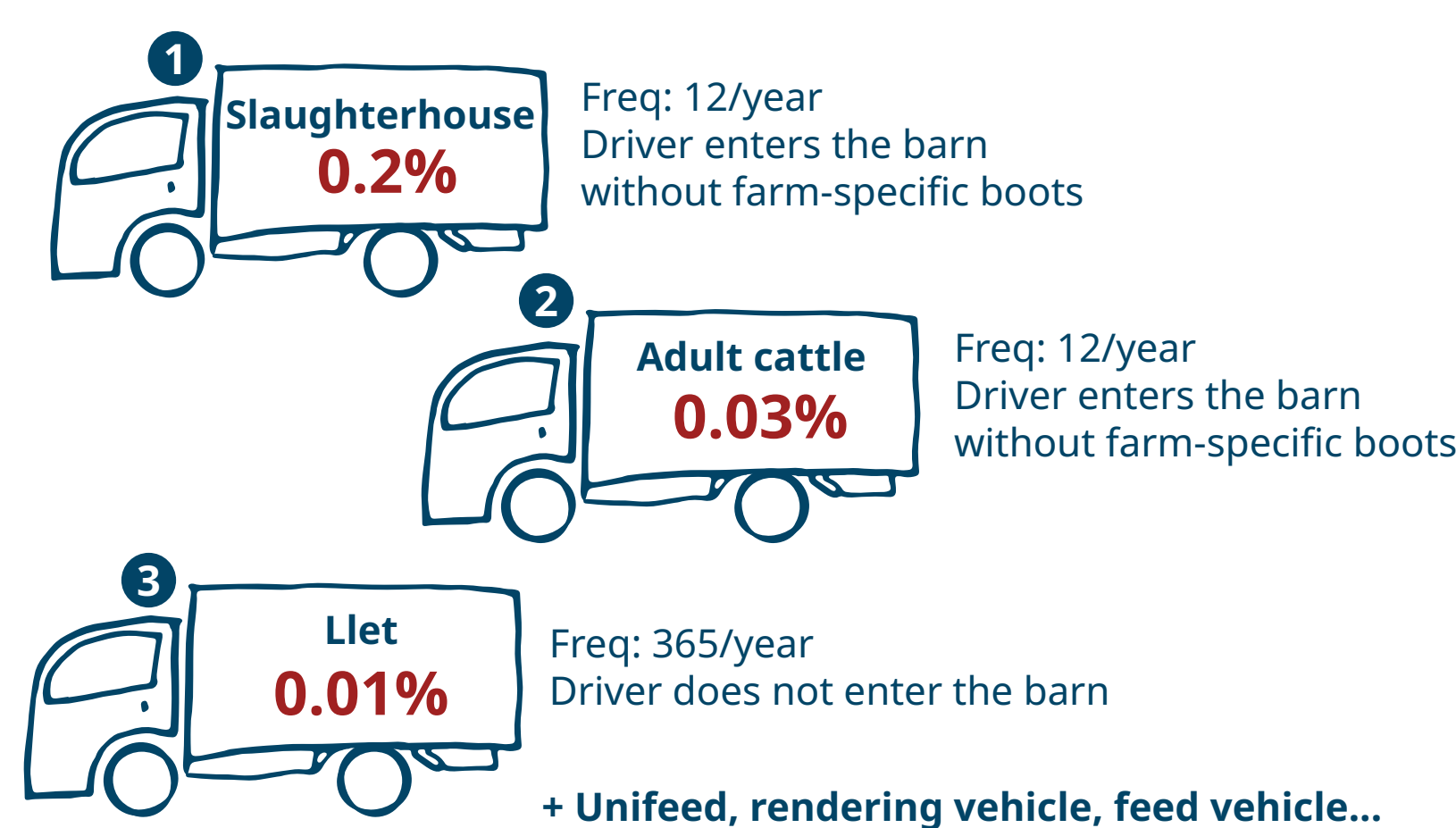
IBR relative risk reduction median

Farm	No shared rearing	Screening herds before rearing	Test before transport	Own vehicle	No shared transport	Vehicle disinfection	Quarantine (with test)	No vehicle entry	Boots for drivers	Boots for visitors	No shared equipment
Dairy 1			-1.40%	-12.50%	-4.30%	-8.20%	-20.30%	-42.70%	-36.80%	0.54%	-0.16%
Dairy 2	-0.72%	0.79%		-9.20%	-5.40%		-18.70%	-30.40%	-43.30%	0.29%	-2.50%
Dairy 3								-65.10%	-32.50%		-7%
Dairy 4			0.19%			-1.70%	-67%	-1.50%	-0.91%	-0.13%	-0.29%
Dairy 5								-80.50%	-16.10%		-0.09%

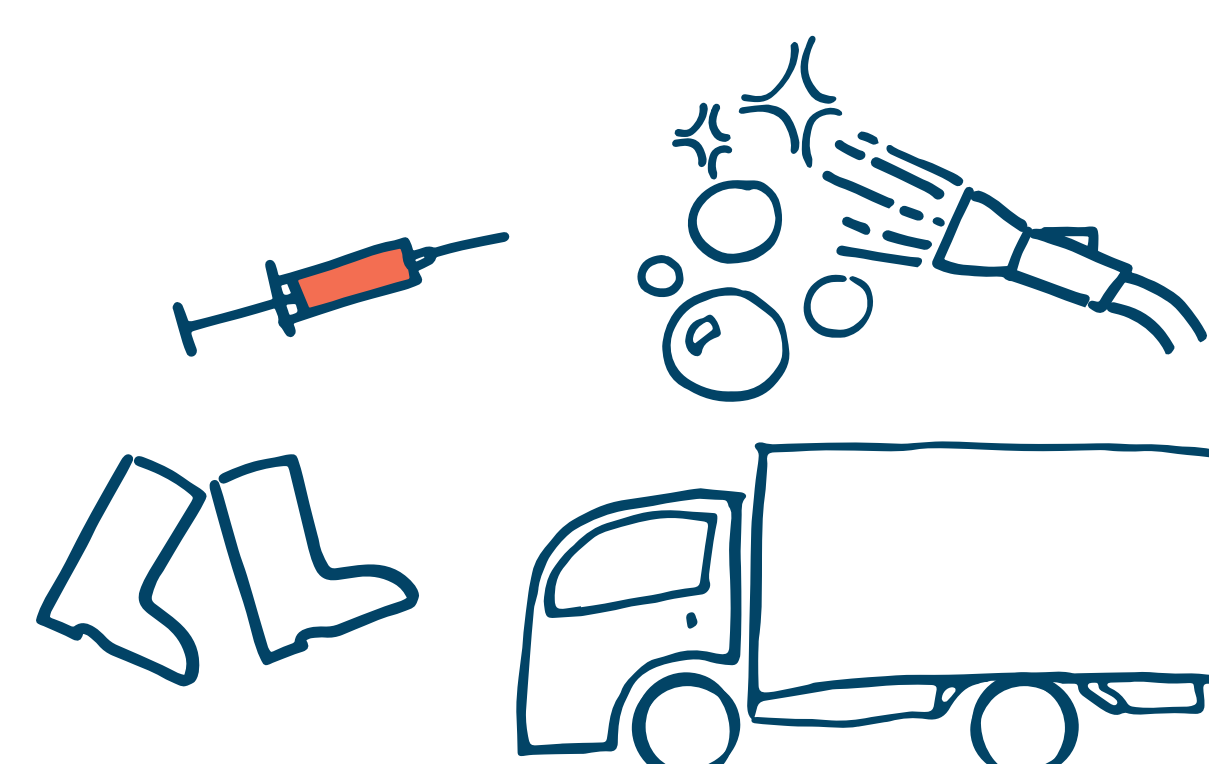
Dairy 4 - Cattle entries



Dairy 5 - Vehicle visits



**The most effective measures are different for each farm!**



**Wanna try it?**

FARMRISK will soon be openly available.

[farmrisk.eu](http://farmrisk.eu)



## 4. Discussion

Quantitative risk assessment provides a method to evaluate the risk of pathogen introduction and the effectiveness of biosecurity measures. This approach evaluates the **effectiveness of biosecurity measures based on each farm's specific context and risks**, helping veterinarians to discuss biosecurity with farmers and provide tailored recommendations that better address their particular challenges.

We are currently testing and validating the algorithm for IBR, BVD, and tuberculosis in cattle farms, with plans to implement it in an online platform and expand it to other diseases and species.

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