



71st Advisory Forum meeting  
Bucharest, Romania, 03-04.04.2019

# RAKIP-EFSA/BfR model repository

## Knowledge Junction

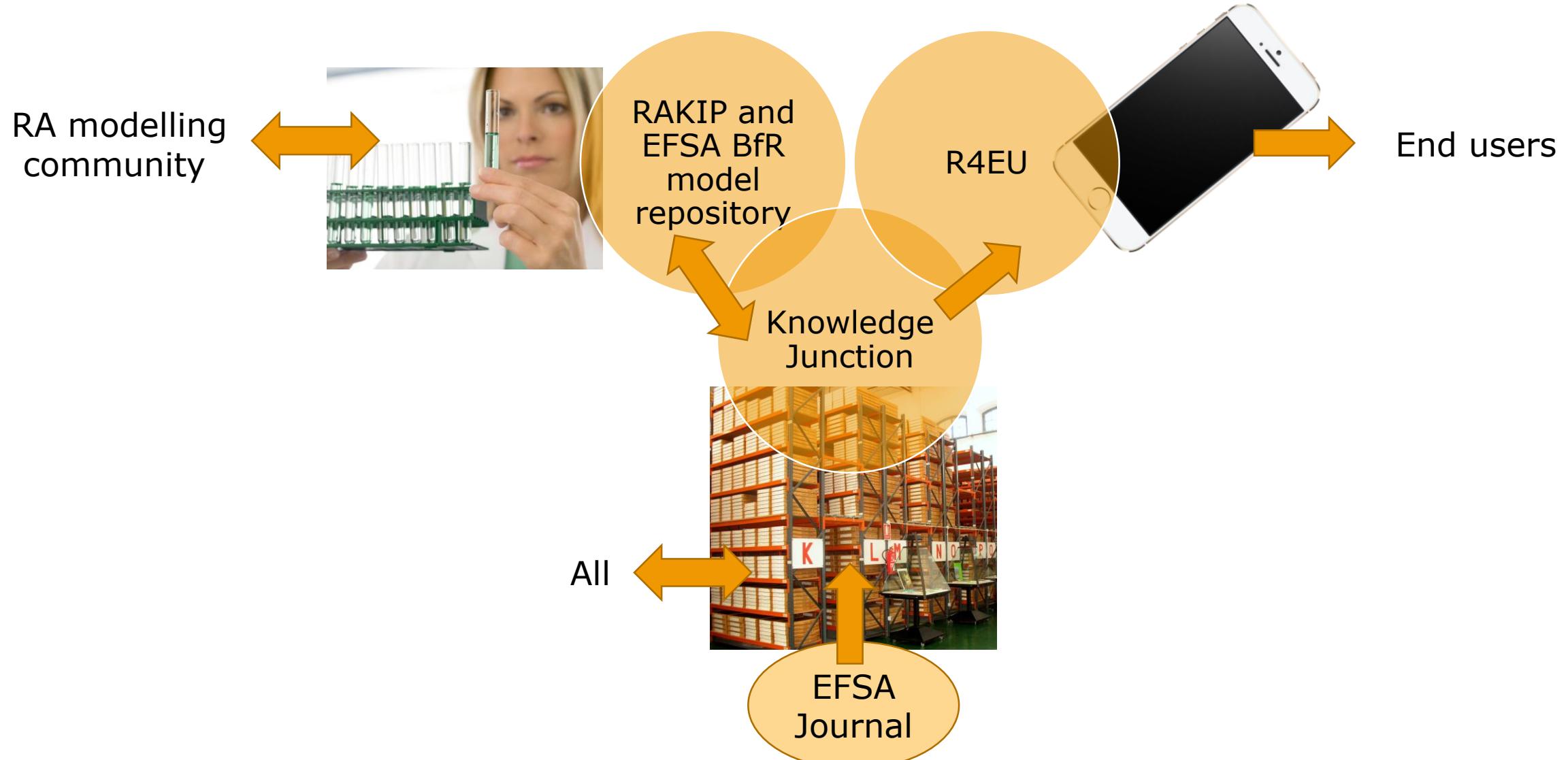
## R4EU

Didier Verloo

Head of Assessment and Methodological  
Support Unit

Trusted science for safe food

# Different scope yet thoroughly related



# Knowledge Junction

- **Community:** a curated, open repository for the exchange of evidence and supporting materials used in food and feed safety risk assessments.
- **Aim:** to improve transparency, reproducibility and evidence reuse.
- **Content:**
  - Evidence – reports, datasets, images, videos, laboratory outputs
  - Supporting materials – software, tools, models, code, protocols, appraisal schemes
  - Risk assessment – mandates, opinions, statements, guidance documents, annual and strategic plans provided by Member States



# FAIR PRINCIPLES IN PRACTICE

Accessible



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September 30, 2016

Software Open Access

## Campylobacter in broilers model on control options (CAMO)

Vose , David; Mintiens, Koen; Van Hauwermeiren, Michael; Raman, Daan; Alban, Lis; Sandberg, Marianne; Vaz, Yolanda; Fraqueza, Maria João; Leontidesm, Leonidas; Kostoulas, Polychronis

The model produced evaluates quantitatively the effect of interventions on the risk of campylobacteriosis from broiler meat in EU Member States (MS). The model uses many of the same principles of previous food safety risk assessment models, but takes a different mathematical approach to achieve its results. This provides the ability to investigate the effect of different combinations of interventions extremely quickly. It characterizes the variability of the level of contamination by the normalized central moments (mean, variance, skewness and kurtosis) of the log10 numbers and evaluates the effects of processing, interventions etc. by combining the raw moments of variables in the model using analytical mathematical equations. The model is normalized to current observations throughout the farm-to-fork continuum. The output is the change in the human incidence rate of campylobacteriosis, rather than the actual incidence rates before and after variations in the interventions applied. The advantage of this approach is that the model's outputs are less sensitive to any assumptions or statistical uncertainty in parameter estimates, leading to more robust quantitative results.

Microsoft Excel with the ModelRisk 3.0 add-in from Vose Software

Preview



Findable

Reusable

Interoperable

**Publication date:**  
September 30, 2016  
**DOI:**  
[DOI 10.5281/zenodo.247339](http://doi.org/10.5281/zenodo.247339)  
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Vose , David, Mintiens, Koen, Van Hauwermeiren, Michael, Raman, Daan, Alban, Lis, Sandberg, Marianne ... Kostoulas, Polychronis. (2016). Campylobacter in broilers model on control options (CAMO) [Data set]. Zenodo. <http://doi.org/10.5281/zenodo.247339>  
Start typing a citation style...

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## KNIME

- RAKIP model repository

- Uploading of models
- Downloading of models
- Modification of models

- EFSA-BfR model repository
  - Uploading of models
  - Downloading of models
  - Modification of models
  - Provision of DOI through Knowledge Junction – versioning through DOI
  - Transfer of models from repository to KJ - curation
  - Execution of models directly from the KJ
  - Linkage to many other types of objects (Scientific documents, Scientific Opinions etc.)



**bmd**  
benchmark dose modeling



**MDR**  
multi-drug resistance analysis



**MonteCarlo**  
risk assessment using Monte Carlo



European Food Safety Authority  
**MonteCarlo Comparison**  
compare risk assessment scenarios



**Database**  
Member states risk assessment activities



**ribess**  
risk based surveillance systems



**sampieator**  
sample size calculator



European Food Safety Authority  
**Expert Knowledge Elicitation**



**spatial**  
exploratory analysis for spatio-temporal epidemiology



**mss-to-excel**  
transform MSS files into Excel files



**Abstract Screening**



European Food Safety Authority  
**EU-RAA**  
EU Risk Assessment Agenda Projects and Partnering



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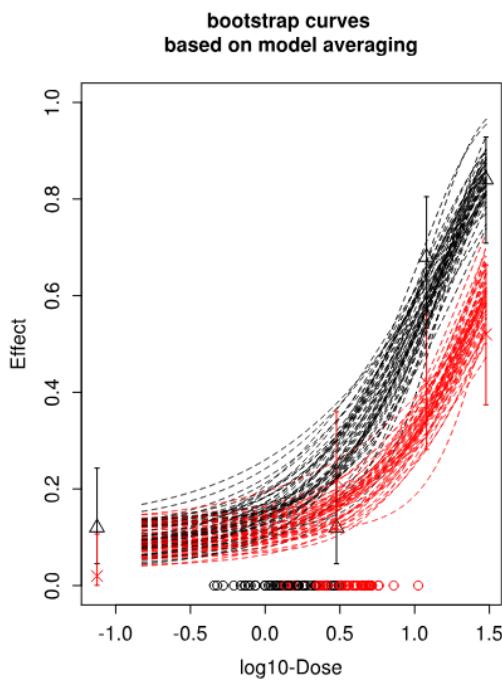
Back up slides



What is it for?

Pre-requisites?

Outputs?



- To estimate the dose corresponding to the benchmark response of interest. The software can apply model averaging.
- Extended PROAST data format
- BMD report
- R code available on <https://zenodo.org/record/889583>
- Manual (under update)
- In 2017, EFSA organised a workshop on BMD (not specific on the tool). Information available on <https://www.efsa.europa.eu/en/events/event/170301-0>

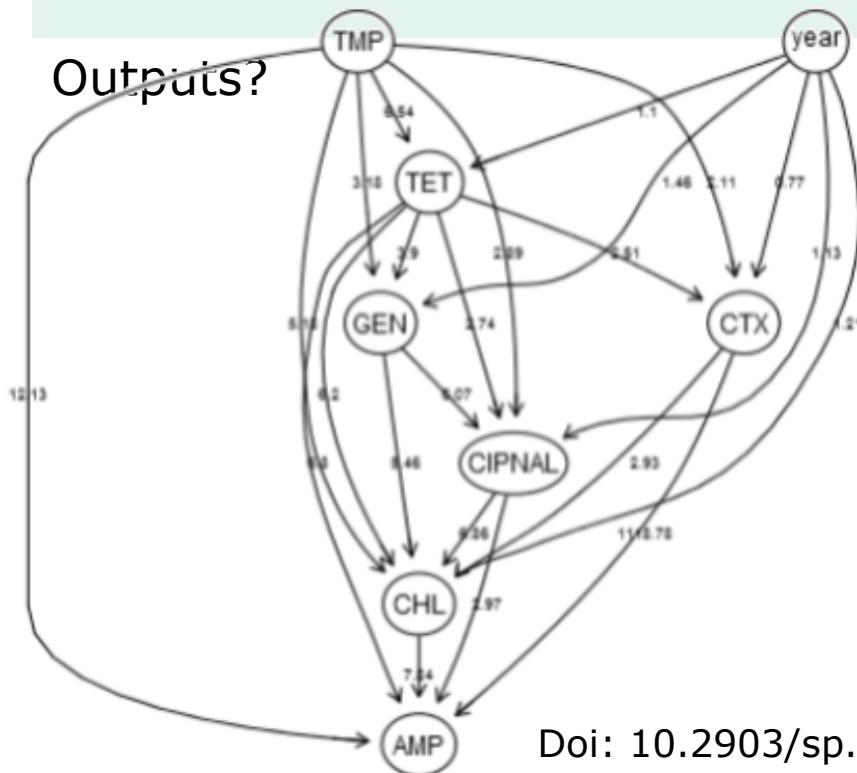


What is it for?

Pre-requisites?

Outputs?

- Analyse AMR data to indicate MDR
- AMR data (in the same format as used for the EC reporting)
- Data exploration under many different tools, e.g. Spatial analysis, Bayesian networks, Generalized Estimating Equation, Latent Class Analysis, etc.



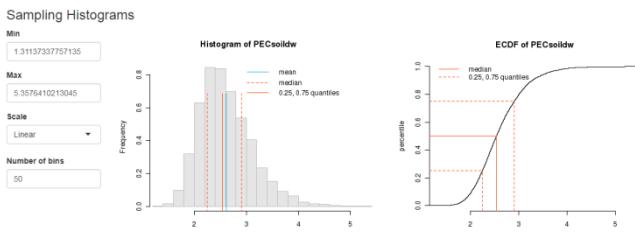


## What is it for?

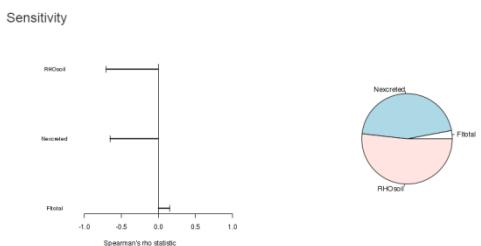
- A computational approach to model the probability of different outcomes in a process
- Mainly used, so far, for plant health RA
- Model equation
- Knowledge of the probability distribution for each of the input variables

## Pre-requisites?

## Outputs?



- Probability distribution of the output variable
- Sensitivity analysis for the input/output variables
- Uncertainty evaluations





## What is it for?

### Pre-requisites?

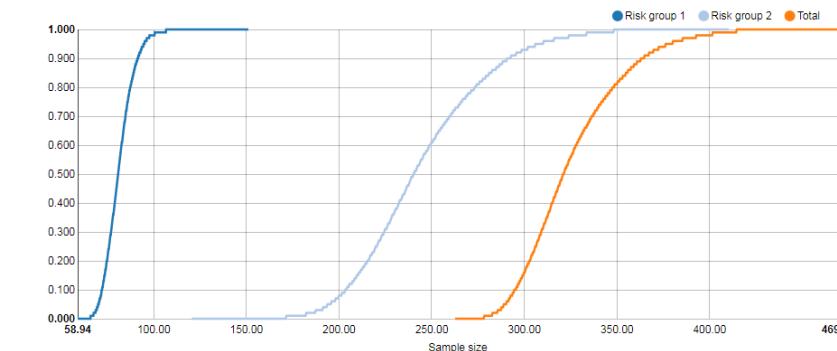
#### Finite population

Species	Population size	Sample size	Group sensitivity
1 Sheep	340.000	81.000	0.780
2 Others	660.000	240.000	0.776

Total sample size: 321

Global sensitivity: 0.95

[Download](#)



Estimation of the sample size, design prevalence, global sensitivity and probability of freedom from disease

- Population Size
- Design Prevalence/Samples taken
- Test sensitivity

Outputs can take into account Risk Factors with different relative risks and proportions in the populations

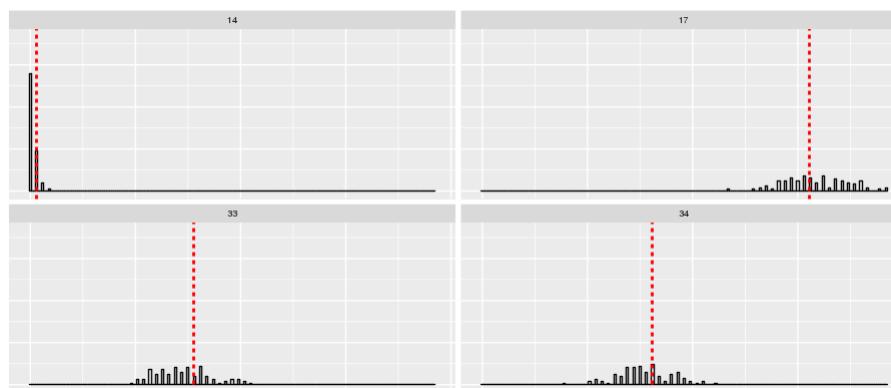


## What is it for?

Sample a dataset following a sampling strategy (random sampling, stratified sampling, multi-step sampling, measure change over time, etc.)

## Pre-requisites?

Sample size, desired difference to be tested for or power; Population to be sampled



Sample table; Sampelator can provide a visual indication of representativeness for the sampling performed

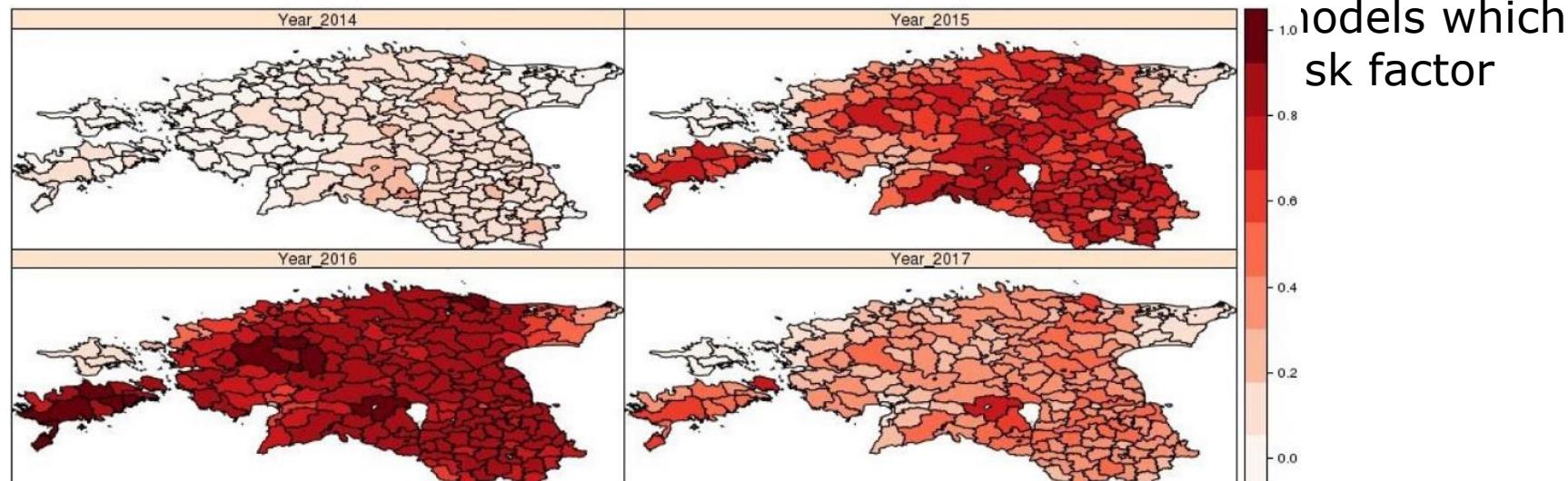


What is it for?

Exploring epidemiological scenarios using two model classes (Bayesian hierarchical models, Generalised additive models)

Pre-requisites?

Temporal and spatial data





What is it for?

Pre-requisites?

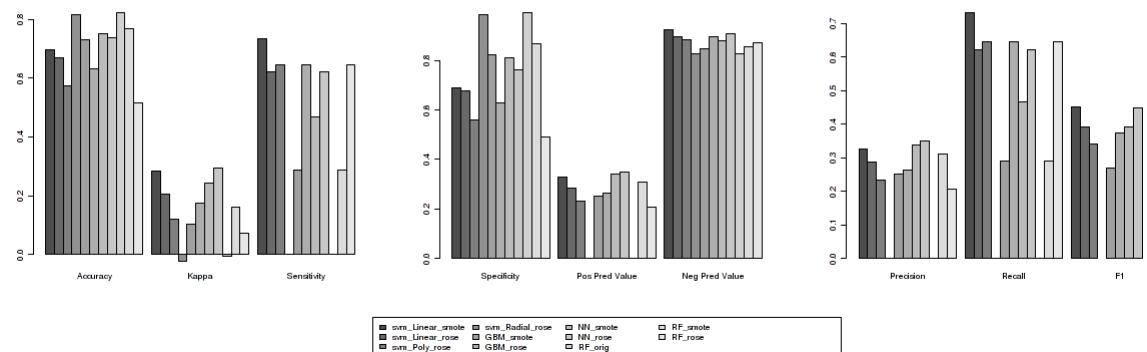
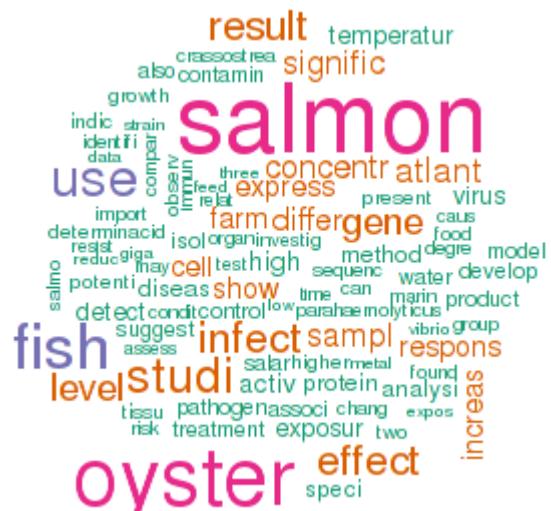
Outputs?

Selection of publications to be used in a systematic review (pilot phase)

Full-text articles or abstracts;  
Training data (~10%)

Inclusion prediction probabilities

Plot of the performance of the individual models in the ensemble



Doi: 10.2903/sp.efsa.2018.EN-1427



What is it for?	Compare different Montecarlo Scenarios	Facilitate EKE using the WEB to contact and gather expert replies	Database with MS Risk Assessment Agendas for the Delphi priorities
Pre-requisites?	Have used Montecarlo WEB app for each Scenario	Have a well formulated question and a group of experts to elicit	
Outputs?	Report with comparison of Scenarios using probability distribution and tables	Report with the EKE performed, providing a documented process for each expert	Report on MS proposals and graphical presentation of the information