



# EDENext models for public health: two cultures, one goal. Case study of hantavirus disease in Germany

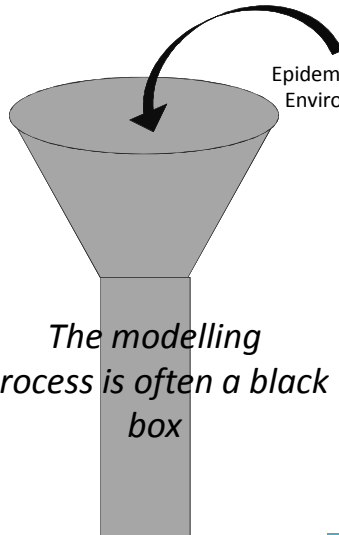
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## The problem

Many spatial models of disease risk have been produced during EDEN/EDENext, but their use by the Public Health system has been limited. To improve the take up we used focus groups to ask how PH practitioners perceive the risk maps and looked at how they might be modified to take PH perspectives into account.

## Barriers to producing risk models for the PH Arena



### The methods are not transparent.

#### Modellers

- Use increasingly complex methods
- May produce ambiguous outputs : what is risk?
- May be constrained by:
  - lack of data
  - restrictions in data use
  - inability to find appropriate predictors

### The outputs may not be fit for purpose.

#### PH practitioners

- Use and knowledge about models is limited
- Need specific best/worst case scenarios
- Need factors included that models may lack.
  - population density
  - risk factors perceived by public
  - regional influences

## Barriers to using risk models for the PH Arena

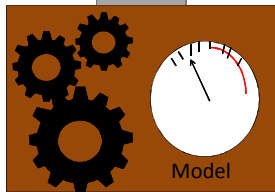
### Current issues with model outputs :

- Modelling terminology can be ambiguously used (e.g.: niche, risk, suitability,...)
- Uncertainties are not stated
- Biological foundation weak

### Filters to the use of models by public health practitioners:

- Challenges of translation
- Publishing pressure in academic world
- Lack of funding or of emphasis on translation
- Lack of application of current legislation

→ leading to scarcely usable model outcomes



Model outputs may not be appropriate for Public Health

### Hantavirus in Germany : models answering to questions of the general public

Focus group discussion of populations living in endemic areas in Germany helped identifying the questions exposed populations may have as well as their own empirical experience of the issue. We here highlight recurrent items to which models can contribute.

« How far away from bank vole habitat is far enough to prevent human infections? » « Is the forest determinant? How dense and how far away it is? »

Models investigating environmental determinants can bring specific answers to these question. However, the specificity of answers can be limited by the spatial detail in the epidemiological data accessible to modellers. Zeimes et al. (in review) identified for Germany a role of forest and of the presence of built-up areas in the vicinity of forest, both for bank vole presence and for human incidence.

« Is the virus really everywhere? » « Where are endemic areas? »

This is an important question from the citizen's point of view. It can be answered by basic mapping; however, in this particular case, a clear answer requires compiling several years of data. This is less straightforward, and is not allowed by the online data layout tools.

### Hantavirus in Germany : models answering to practitioners questions

Typical model outputs were presented to public health practitioners along with questions trying to pinpoint the needs of public health. Many significant points arose. Models complement each other (e.g fine vs. coarse scale, static and dynamic). PH practitioners are data literate and have a good comprehension of issues related to e.g. the interpretation of absences. They are used to complex system and information and therefore are able to understand complex model outcomes, but these should be specified (complexity and vagueness being different). Most did not feel they should be trained in the methods used by modellers, meaning that translation is necessary and both modellers and public health practitioners should be involved in specifying needs, constraints, and operational definitions.

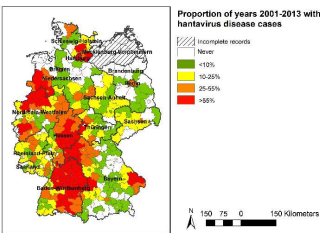
## Improvements to the process

### Model production:

- From the onset: communication between the various groups on needs and constraints
- Ensure more involvement in joint activities
- More multidisciplinary basis needed for models
- Provide funding for joint familiarisation

### Model use and dissemination

- Dialogue around model outcomes
- If needed adjustment of model outcomes for ease of PH use
- Preparation of diverse model outcomes for diverse audiences
- Communication of model uncertainties
- Joint publications



## Conclusion: modelling and risk communication

Models contribute to risk assessment and estimation. They could and should also be used to contribute to risk management and communication, but both modellers and public health practitioners are currently ill-equipped to do this. Improved conceptual frameworks for both disciplines would help PH practitioners to extract take-home messages of models, and modellers to tuning their production to the needs of public health. There is a crucial need for funders to accommodate the need of communication between producers and users if research is to have a meaningful impact on society.