

# Some practical uses of models

Top model seminar 2012-09-24

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# What we want....



# What we usually have...



tegrus, reja

papill degeneration ?? Stas papill ?

amnes, status

Tidigare väsentligen frisk. Går 2 gånger till Växjö Lasarett - hnd klin - för PUVA be-  
 = (ultraviolett ljusbehandling) pga här anfall. In-  
 Efter som haft epilepsi liknande anfall. Vid  
 Neurologisk bort fall symptom. pat är utskrivn, n  
 en neurologisk utredning. pat har huvudvärk.

ar  
 nam Handläggare

Tackom om ni kallar pat polyklinisk  
 ögon undersökning.

Vänliga Hälsning  
 Håkan

Totalfalsk remiss medicinkliniken  
 Ljungby Lasarett dat 1986  
 (nygjord 2005-06)

är god se bifogad kopia som remissvar.

lgormott LL 86-07-23

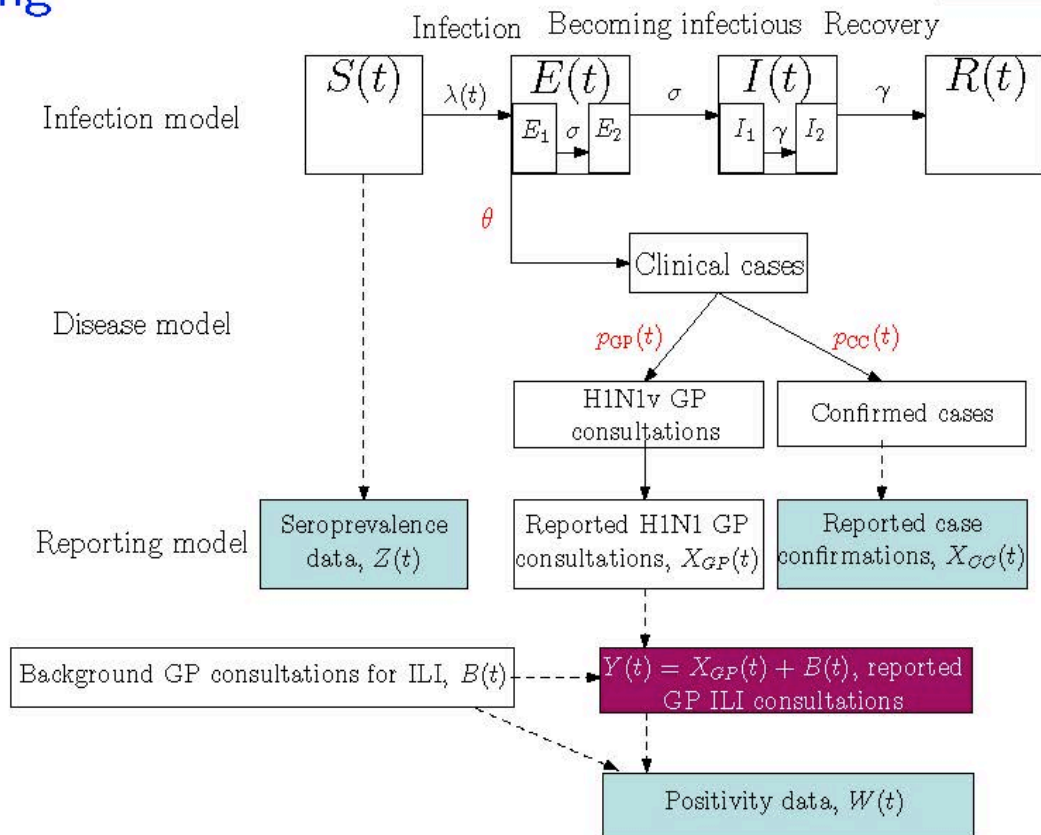


# Modelling in an outbreak

A few examples

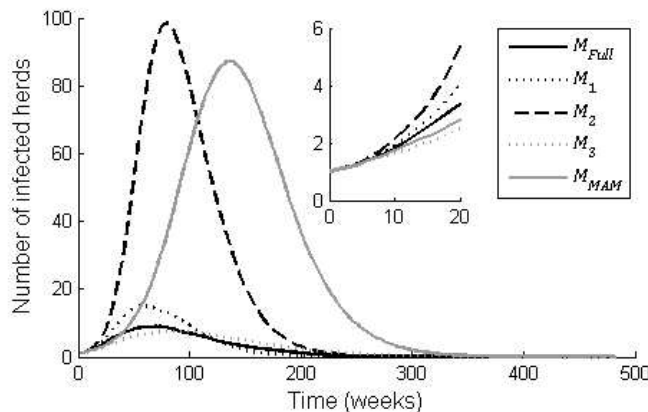
## Integrated model for transmission and reporting

MRC | funded by UK



# From lab to computer and back again

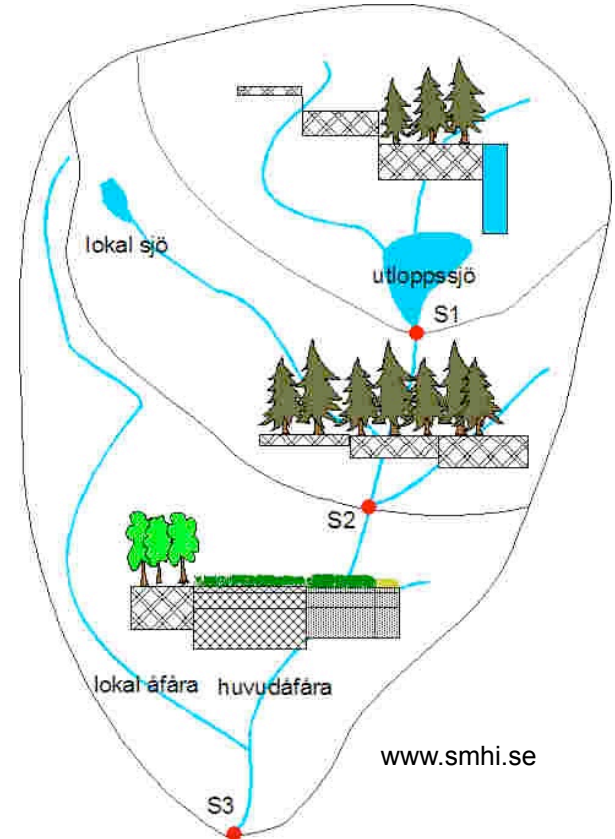
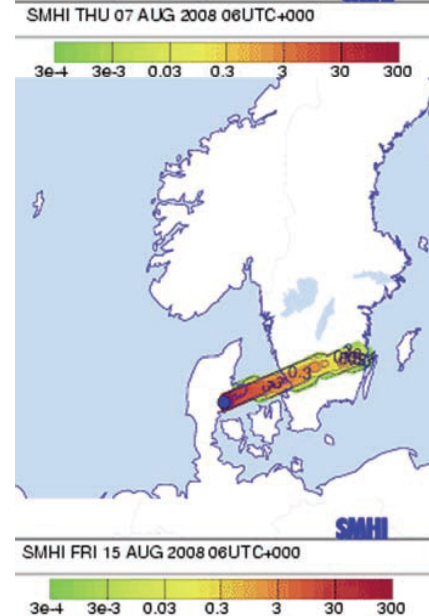
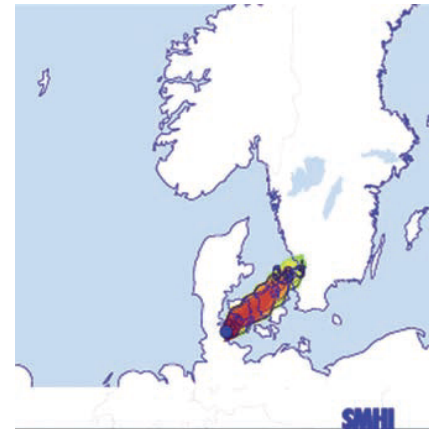
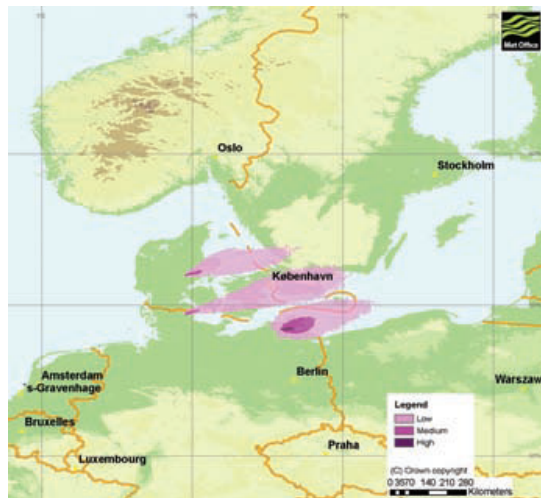
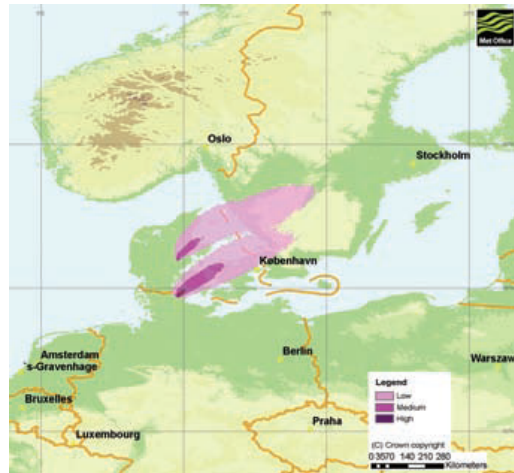
- Not all experiments are practically feasible
- Some complex systems may need separate studies as well as comprehensive studies
- Maybe all of life's aspects can be described mathematically – and maybe not....



$$\begin{aligned}
 &P(\mathbf{v}|\mathbf{h}, \mathbf{U}, \mathbf{R}, \mathbf{e}, \mathbf{s}) \\
 &\propto \prod_{t=1}^T \prod_{l=1}^K \prod_{j=1}^K (P(e_t, s_t|\mathbf{v}, \mathbf{R}, I_t, J_t) P(I_t, J_t|\mathbf{v}, \mathbf{h}, \mathbf{R}))^{U_{ljt}} P(\mathbf{v}) \\
 &= \prod_{t=1}^T \prod_{l=1}^K \prod_{j=1}^K P(e_t, s_t|\mathbf{v}, \mathbf{R}, I_t, J_t)^{U_{ljt}} \prod_{t=1}^T \prod_{l=1}^K \prod_{j=1}^K P(I_t, J_t|\mathbf{v}, \mathbf{h}, \mathbf{R})^{U_{ljt}} P(\mathbf{v}) \tag{1}
 \end{aligned}$$



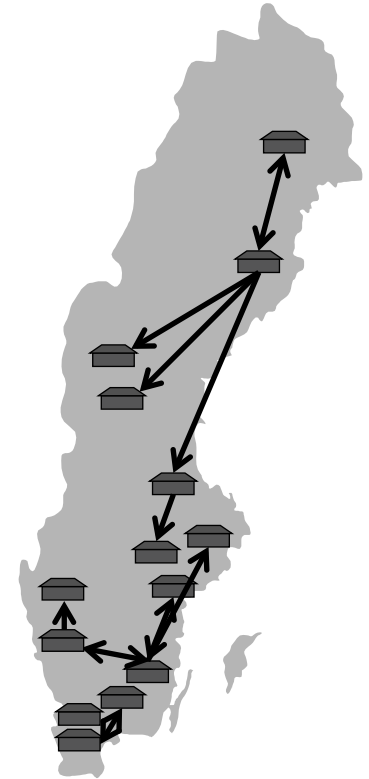
# Meteorological, hydrological and spatial models



[www.smhi.se](http://www.smhi.se)

# Between-farm contacts

- Animals
- Professionals  
(veterinarians, AI technicians, hoof-trimmers etc)



# From experimental data to deeper understanding

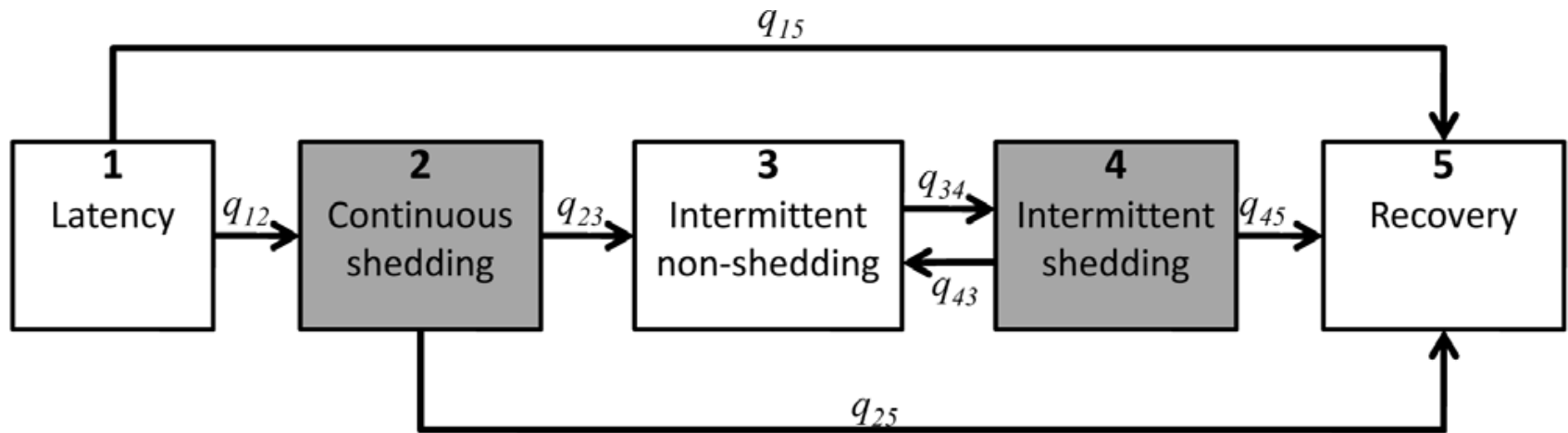
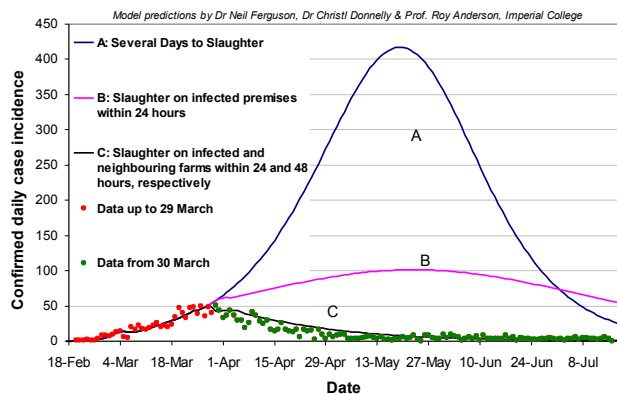


Figure 1. A multistate model describing transition of pigs through the states of shedding following challenge.



# Modelling infectious diseases

- Adds to and develops data from direct studies
- Different scenarios may be tested
- Different interventions may be tested
- Data needs may be identified
- Prognoses...



Telegraph April 2001

