

# Workshop 2

## Bayesian animal- and herd-level prevalence estimation in OpenBUGS

**Workshop organizer:** Nils Toft, Professor of Quantitative Epidemiological Decision Support, assisted by Torben Dahl Nielsen and Hisako Okura, PhD students  
Faculty of Life Sciences, University of Copenhagen.

The idea of this workshop is to introduce the participant to models for estimating the herd- and animal-level prevalence from data with misclassification, i.e. based on tests with less than perfect sensitivity and specificity.

There are no specific scientific prerequisites. Participants should bring a laptop preferable with OpenBUGS installed, power supply and adaptor, and should expect to work in pairs during the exercises.

After the workshop, the participant should be able to understand the potential application of Bayesian analysis to prevalence models. The participant should be able to run the OpenBUGS models, judge convergence and obtain the desired posterior information.

After a short introduction to Bayesian modeling, the basic idea of the model as presented in Branscum et al. (2004) is outlined. However, most attention is given to 2 recently published examples of modified/augmented uses of Bayesian prevalence estimation (Okura et al, 2010, Nielsen et al, 2011). Using data and models from the above publications we will use OpenBUGS to derive posterior estimates of the parameters. The OpenBUGS session includes a tutorial session, where the participant can get acquainted with modeling using OpenBUGS.

### **Program (order and approximate duration)**

**60 min**      Talk: Bayesian Analysis and prevalence estimation

**1 hour 45 min** Tutorial – Exercise: OpenBUGS (incl. coffee break)

**15 min**      Plenary Q&A summary

The participants will have slides, tutorials, OpenBUGS and additional materials (including literature) made available for download before the workshop.

### **References**

A.J. Branscum, I.A. Gardner, W.O. Johnson, Bayesian modeling of animal- and herd-level prevalences, Preventive Veterinary Medicine, Volume 66, Issues 1-4, 15 December 2004, Pages 101-112

T.D. Nielsen, L.R. Nielsen, N. Toft, Bayesian estimation of true between-herd and within-herd prevalence of Salmonella in Danish veal calves, Preventive Veterinary Medicine, Volume 100, Issues 3-4, 1 July 2011, Pages 155-162

H. Okura, S.S. Nielsen, N. Toft, Prevalence of Mycobacterium avium subsp. paratuberculosis infection in adult Danish non-dairy cattle sampled at slaughter, Preventive Veterinary Medicine, Volume 94, Issues 3-4, 1 May 2010, Pages 185-190