

Day 3

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Which values for a prior beta distribution?

- ▶ Based on expert opinion
 - ▶ Betabuster <https://shiny.vet.unimelb.edu.au/epi/beta.buster/>
 - ▶ R package PriorGen 'Based on the available literature the mean value for the sensitivity of a test is expected to be 0.90 and we can be 95% sure that it is higher than 0.80.'

```
library(PriorGen)
findbeta(themean=0.90, percentile=0.95,
          lower.v=FALSE, percentile.value=0.80)
```

Beta(27.79, 3.09)

Model selection: inclusion of conditional dependencies between se and sp of different tests

- ▶ Pragmatic approach:
 - ▶ Look at 95% credibility intervals and histograms of posterior covariances: do they include a zero?
 - ▶ Are the other posteriors affected when including a covariance?
 - ▶ If either se or sp equal 1 (is perfect), then it will always be conditionally independent of the se or sp of the other test(s)
- ▶ Analytical approach:
 - ▶ DIC: deviance information criterion (Spiegelhalter, 2002)

Ex 8 Covariates

- ▶ Explore the data set 'echinococcus.xlsx' PCR for either *E. multilocularis* or *E. granulosus*, ELISA for both, eggs found by arecoline purgation, *Taenia* co-infection, age and sex
- ▶ Run classical 'risk factor analysis': is sex, *Taenia* co-infection or age a risk factor for echinococcus (PCR-prevalence, seroprevalence or purges)? Obtain p-values and ORs with confidence intervals.

Ex 9 Covariates

- ▶ Prepare the data set in the correct format (dump, add ones) for BLCM
- ▶ Run a model for three tests (assume a very high sensitivity for arecoline purgation)
- ▶ Try different priors
- ▶ Evidence of conditional dependencies?
- ▶ obtain dics
- ▶ Run models with covariates included
 - ▶ `'runjags_version_cestode_update.R'`, `'model.cestode.bug'`,
`'model_without_cestode.bug'`
- ▶ Is there evidence for a covariate effect on the prevalence?
- ▶ Compare your findings with Ex.8

Ex 10 Group work

- ▶ Please have a look at the paper from Kostoulas et al. 'STARD-BLCM: Standards for the Reporting of Diagnostic accuracy studies that use Bayesian Latent Class Models'
- ▶ Please discuss in your group for either the Bronsvoort, the Clothier or the Lahuerta paper if they comply with the STARD-BLCM guidelines.
- ▶ Please prepare a brief ppt, summarising the paper and assessing compliance with STARD-BLCM