Hands-on training session 3

Hui-Walter models with more than two diagnostic tests

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Introduction

Overview

Date/time:

- 20th February 2020
- 14.00 - 15.30

Teachers:

- Matt Denwood (presenter)
- Giles Innocent
- Sonja Hartnack

Recap

Important points from sessions 1 and 2

Session 3a: Hui-Walter models for multiple tests with conditional indepdendence

What exactly is our latent class?

What do we mean by “conditionally independent?”

Example: three antibody tests

Rabbits and hats 2

Model specification

Extreme care with multinomial tabulation

Use autohuiwalter!

Missing data in test results

Use autohuiwalter!

GLM specification

Combining Hui-Walter part with template.jags

Will likely be included in template.jags in future

Exercise

Simulate data from 3 or 4 tests and analyse

Session 3b: Hui-Walter models for multiple tests with conditional depdendence

Branching of processes leading to test results

Example: two antibody tests and one antigen test

Or three antibody tests where one has a different target to the others

Model specification

Use autohuiwalter!

Exercise

Simulate data with a dependence between 2 tests

Model assuming conditional independence biases the estimates

Model with conditional depdendence has bigger CI but unbiased

Session 3c: Model selection

Methods of selecting models

DIC works fine for hierarchical normal models

Bayes factors work well if you can count them

WAIC works better for a wide range of models

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* Probably won't work for Hui-Walter though due to lack of
  ↪  independent data
* Could be useful if using the GLM version (untested!)
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Models tend to be sensitive to priors

Simulating data and testing that your model recovers the parameters is a good idea

Discussion and free practical time