Cost effective prediction of bodyfat

An example of project presentation slides

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Measuring bodyfat percentage

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[Nice figures here]

Measuring bodyfat percentage

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- Relatively accurate way to measure bodyfat is to weight a person in air and immersed in water
  - proportion of body fat can be derived from body density with Siri's (1956) formula
  - water immersion requires a big tub for the water and harness system for lowering a person to water

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Measuring bodyfat percentage

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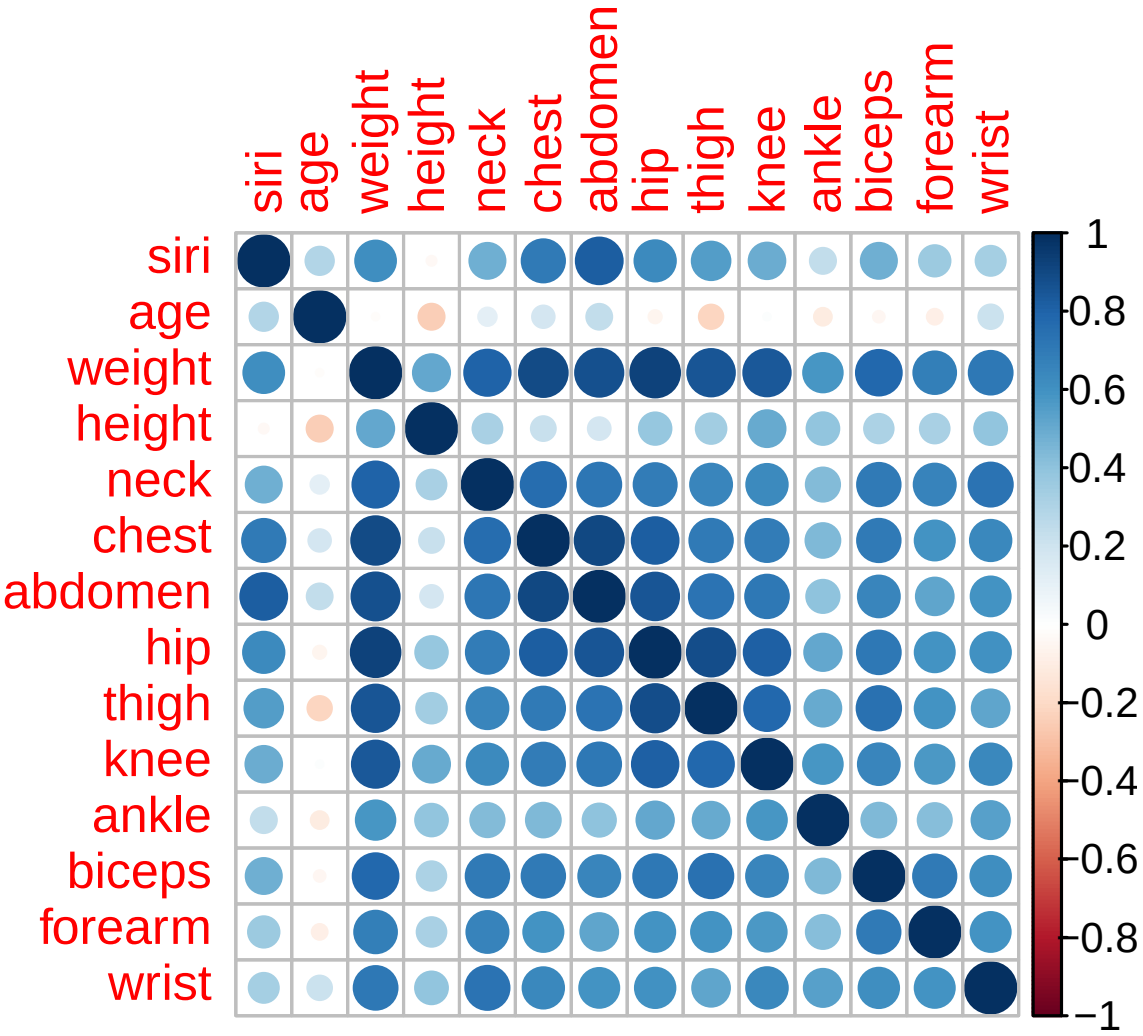
- Relatively accurate way to measure bodyfat is to weight a person in air and immersed in water
  - proportion of body fat can be derived from body density with Siri's (1956) formula
  - water immersion requires a big tub for the water and harness system for lowering a person to water
- Can we estimate the bodyfat percentage with faster and a smaller equipment?
  - with just a scale and measure tape?

[Nice figures here]

Measuring bodyfat percentage

- With just a scale and measure tape?



Bodyfat predictive model

- Gaussian linear regression model with regularized horseshoe prior ($p_0 = 5$) on coefficients

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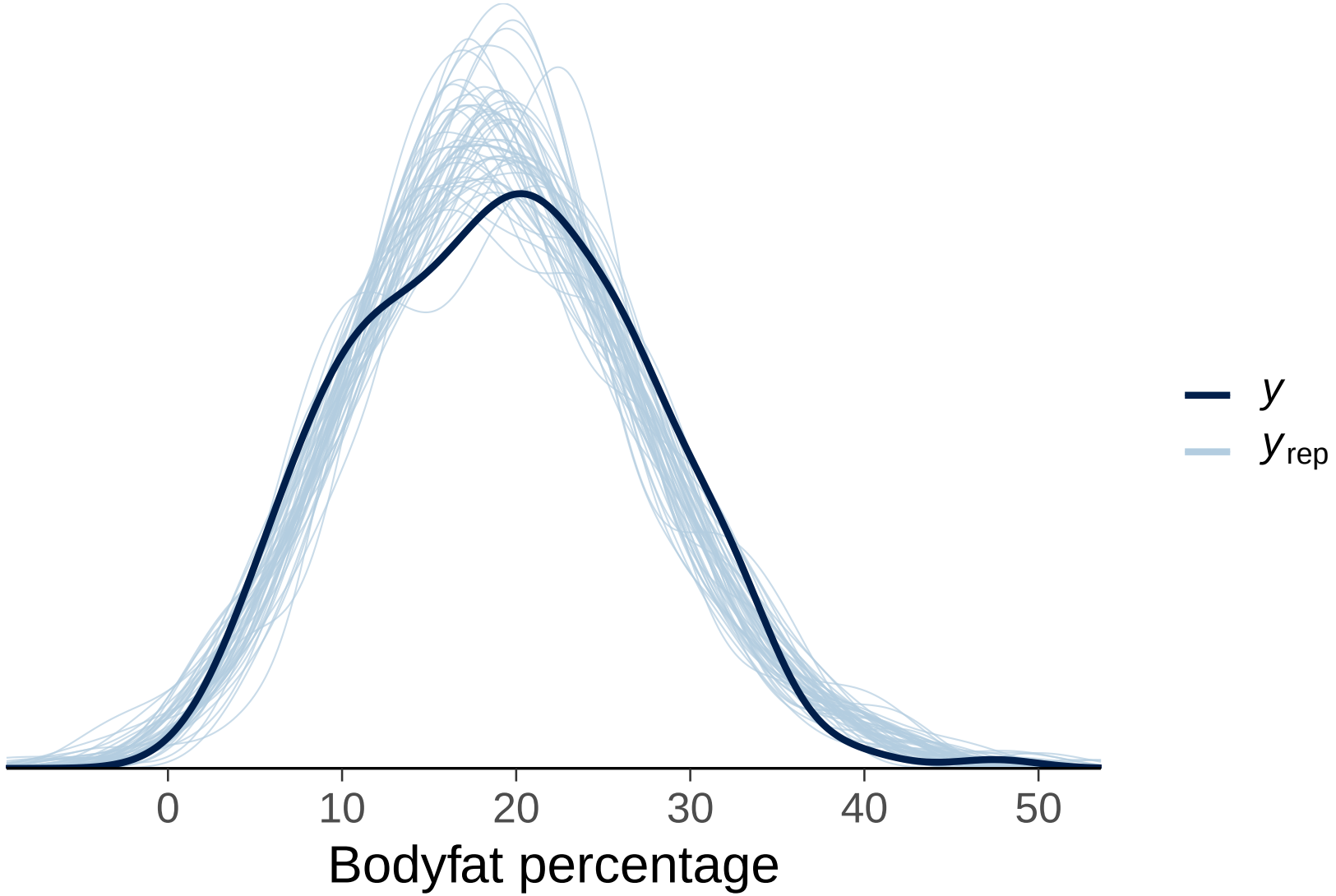
- Model build with `rstanarm` and inference run with Stan
  - all convergence diagnostics were good

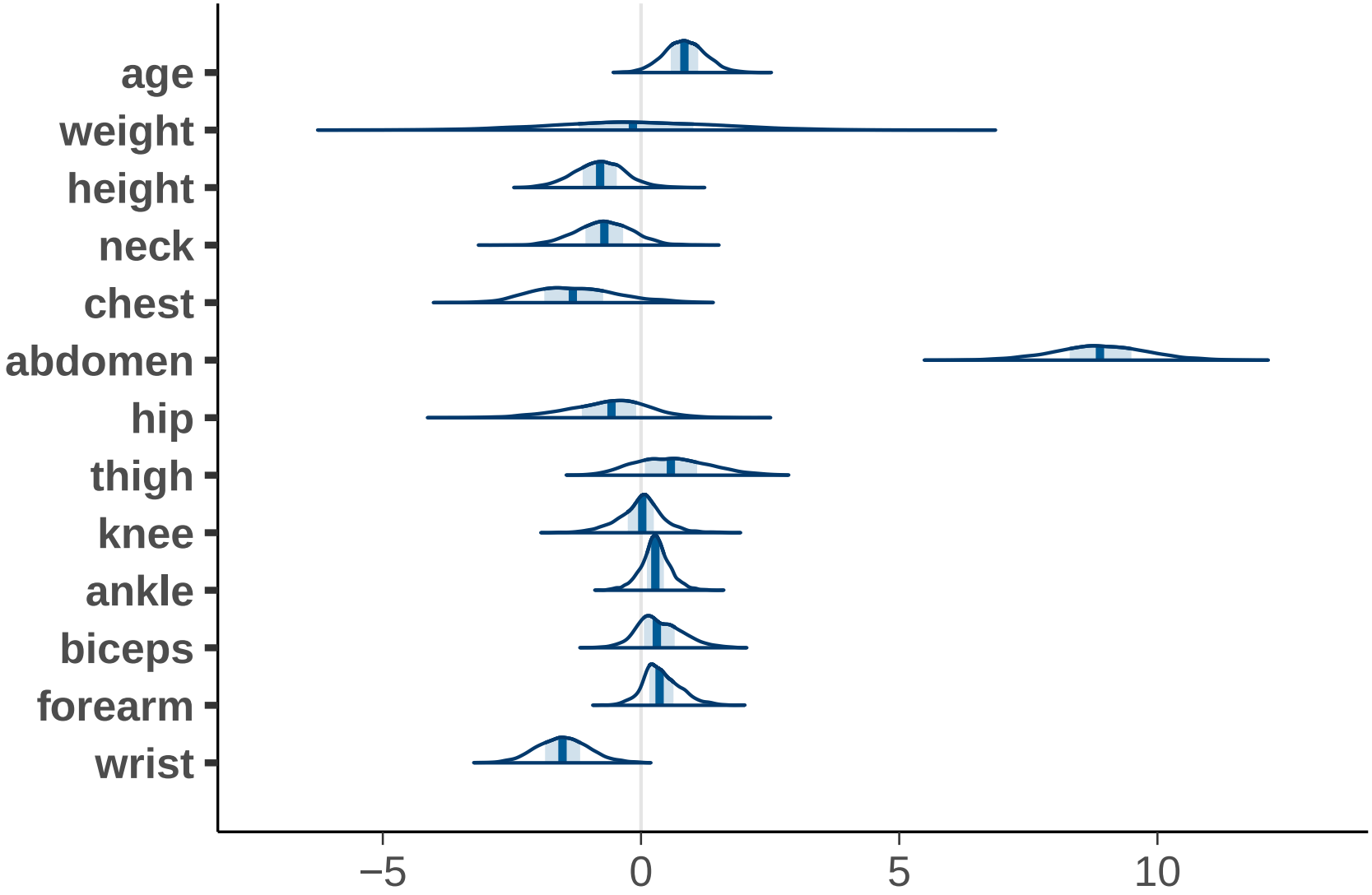
Bodyfat model checking

Posterior predictive checking



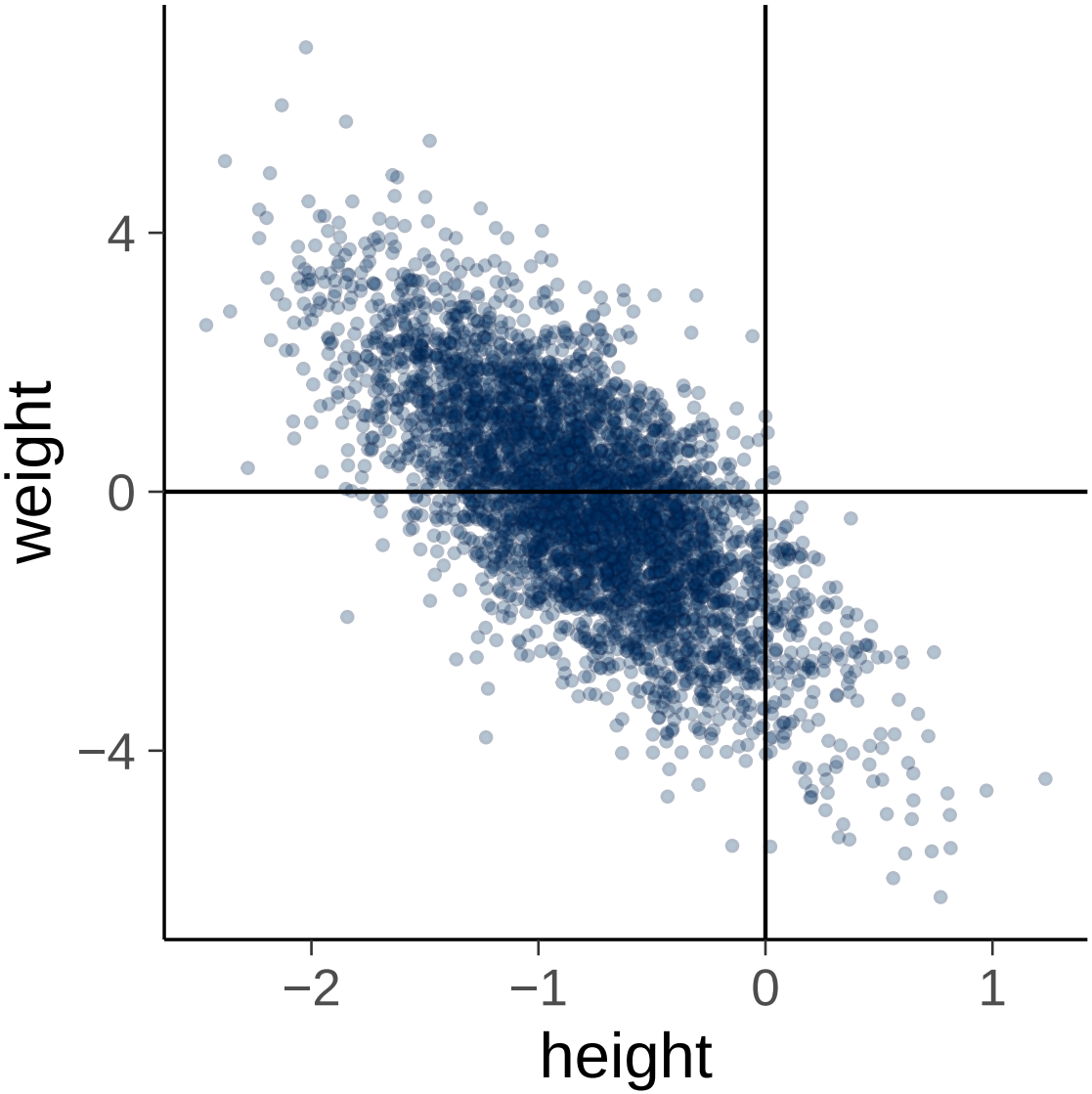
Bodyfat

Marginal posteriors of coefficients



Bodyfat

Bivariate marginal of weight and height



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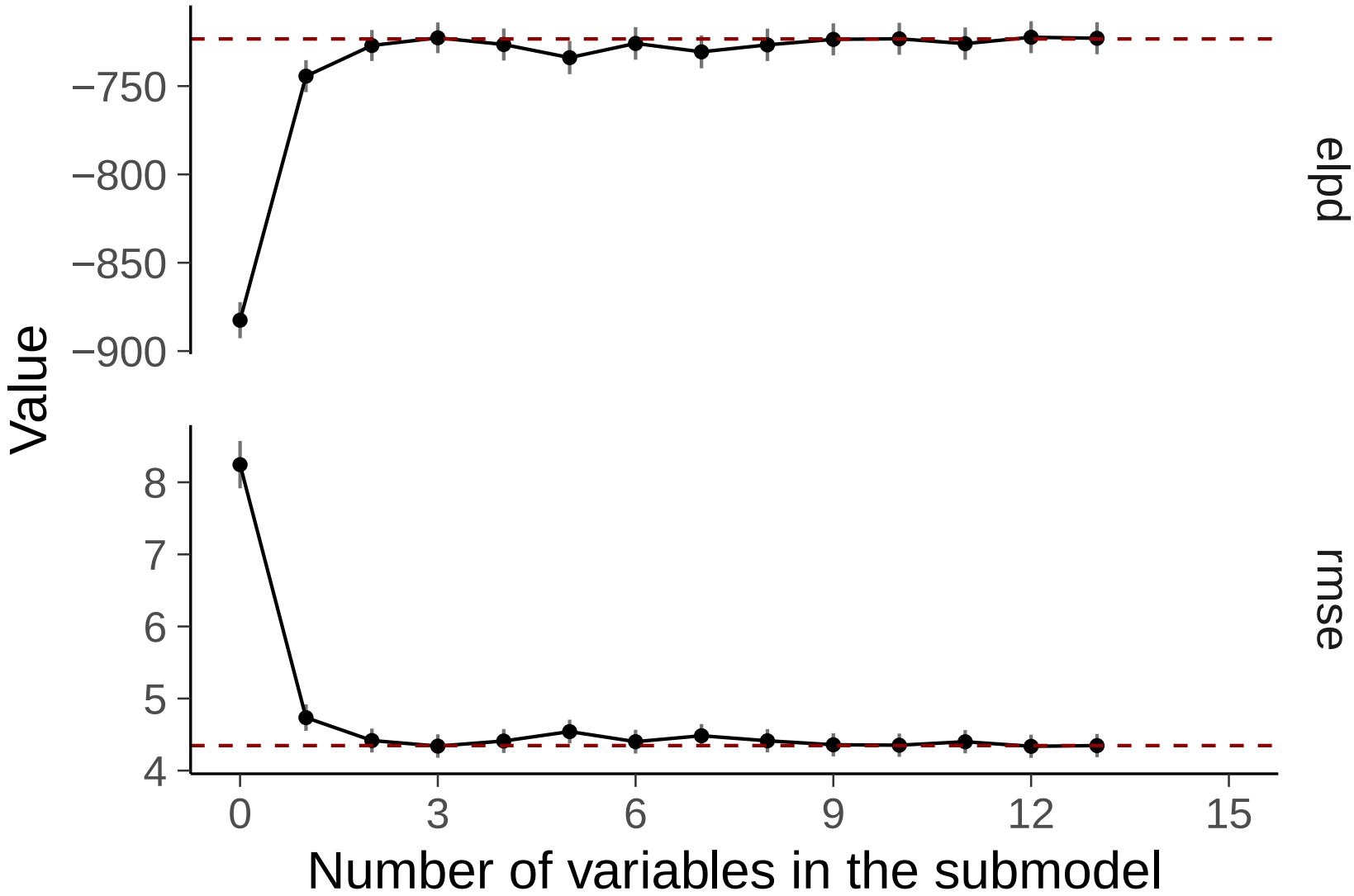
- We use projection predictive variable selection implemented in `projpred` package

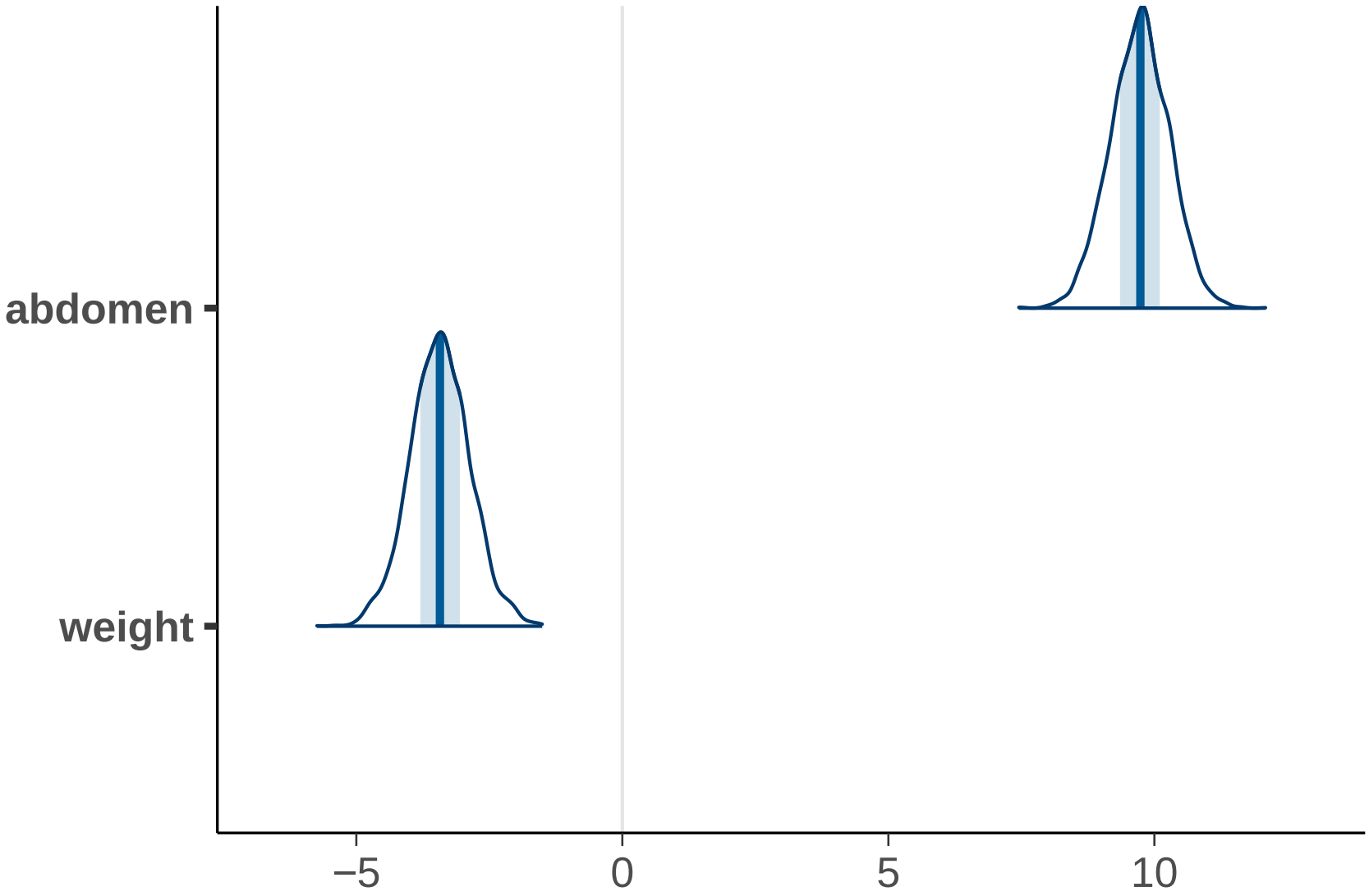
Bodyfat

The predictive performance of the full and submodels



Bodyfat

Marginals of projected posterior



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THANKS!

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- Leave the conclusion slide or contact information slide

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Additional information

- You can have additional slides after the conclusion for supporting material to answer questions
  - for example, in this course, include Stan code and additional convergence and model checking results

```
p0 <- 5 # prior guess for the number of relevant variables
tau0 <- p0/(p-p0) * 1/sqrt(n)
rhs_prior <- hs(global_scale=tau0)
fitrhs <- stan_glm(formula, data = df, prior=rhs_prior,
                   QR=TRUE, seed=SEED, refresh=0)
```