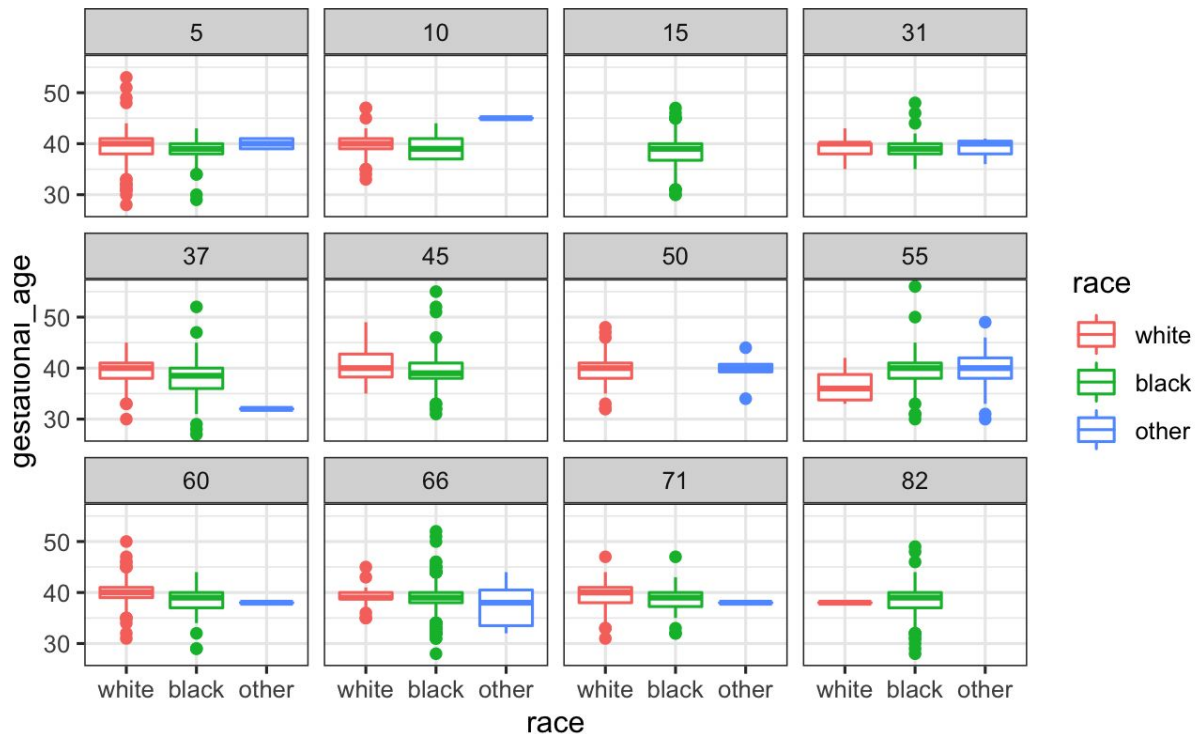


STA 723: Case Study #1

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Exploratory Data Analysis



Left: Gestational age by center and race

- Suggests differences across centers
 - Certain centers only treated specific races (i.e. 15, 45, 50, and 82)
- Distribution of races within each center seems to be really similar across centers

Materials & Methods

Checking Linear Model Assumptions

- Residuals not normally distributed with attempted linear models

Variable Selection (GLM BMA, BIC)

- Triglycerides, race, DDE, avg_pcb

Cross-Validation

- Training data with nearly equal dependent values

Random-Effect Intercept Logistic Model (<36 weeks, >= 36 weeks)

- Global coefficients, random effect intercept based on center

```
gest_age~  
  (1|center)+  
  triglycerides+  
  race+  
  DDE+  
  avg_pcb
```

Results

Model	BIC	Predictive Accuracy - MAE
No Random Effects	1676.2	0.810
Random Intercept	1631.3	0.815
Random Intercept + Random Slope	1665.5	0.812

<u>FINAL MODEL</u>	Estimates	Lower CI	Upper CI
Intercept	3.24*	2.64	3.85
Triglycerides (/100)	-0.17*	-0.33	0.006
DDE (/100)	-0.72*	-1.34	-0.07
Avg PCB	-0.52	-1.48	0.48
Race:black	-0.48*	-0.93	-0.013
Race:other	-0.81*	-1.49	-0.09
Σ_{center}	0.20		

**denotes significance*

Discussion

- The effect for avg_pcb is not significant, meaning there is evidence of no association between pcb and risk of preterm delivery
- ***Higher dde exposure is associated with higher risk of preterm delivery***
 - For dde, a one unit increase in dde is associated with a 0.72 decrease in the expected log odds of having a full-term pregnancy holding everything else fixed
- ***Higher triglycerides are associated with a higher risk of preterm delivery***
 - For triglycerides, a one unit increase is associated with a 0.17 decrease in the expected log odds of having a full-term pregnancy holding everything else fixed
- ***Being a black mother is associated with a higher risk of preterm delivery***
 - Black mothers are expected to have a 0.48 lower log odds of having a full-term pregnancy holding everything else fixed
- ***Mothers in other racial category is associated with a higher risk of preterm delivery***
 - Mothers in the other racial category are expected to have 0.81 lower log odds of having a full-term pregnancy holding everything else fixed