

## Problem set 5: Kids' BMIs

S670 Spring 2019

**Upload your submission to Canvas by 5 pm, Friday 1st March.**

Research questions: **How does average BMI vary with height and age for children 17 and under? Is BMI a good measure of body mass for children?**

While controversial for some purposes, BMI — weight (in kilograms) divided by height (in meters) squared — is often justified as a measure of body mass relative to height for adults because the average BMI doesn't vary much by height. Is the same true for children?

Return to the NHANES data set in the package of the same name. The variables of interest here are **BMI**, **Age**, and **Height**. (Note that many other variables could have predictive value, but we omit them here as they are not part of the research questions.)

1. Fit a model that estimates average BMI as a function of height and age. Note that a purely linear model is unlikely to be adequate. Write down the line of code you used to fit your model.
2. Draw a graph faceted by age that shows how, according to your model, average BMI varies with height.
3. Draw a graph which uses color to denote age that shows how, according to your model, average BMI varies with height. Your color-scheme must be legible and reasonably color-blind friendly.
4. Draw a graph that uses contours to show how average BMI varies with both height and age.
5. Write a paragraph answering the research questions.

Your write-up should consist of one line of code, three graphs, and one paragraph. Put all other junk in an appendix if you must.