STATS 201 Lab Class 2

#Haemoglobin levels in athletes

Haeomoglobin concentration in the blood is a measure of how efficiently athletes can deliver oxygen to muscles during exercise. The aim of the study below was to generate reference values of haemoglobin concentration for athletes of different body sizes, against which blood samples from future athletes could be compared to inform their training programmes. The study measured haemoglobin concentration from 113 randomly selected Australian athletes, all of whom were performing at national level in their respective sports, and various body-size measurements for predictor variables.

Each row in **athletes.csv** corresponds to an athlete. The variables are

- **Hconc**: Haemoglobin concentration in blood (grams per decalitre).
- **Sex**: Sex, either M for male or F for female.
- **Height**: Height (cm).
- **Weight**: Weight (kg).
- **LBM**: Body mass other than fat (kg).

Conduct a full analysis, and include **Methods and Assumption Checks** along with an **Executive Summary**. In particular, we are interested in addressing a few questions of interest in the **Executive Summary**:

- What are the predicted haemoglobin concentration levels for a male and a female athlete, both with height 170 cm, weight 70kg, and lean body mass 60 kg?
- Is the relationship between haemoglobin concentration and height different for males than it is for females?

Hints

General comments

- Your assignment should be written using R Markdown in RStudio. It should include the code you used and its output, including plots.
- There are many examples of **Methods and Assumption Checks** and **Executive Summaries** in your course book. It is a good idea to find a case study with a similar analysis, and use this to guide you, but remember to write things in your own words. Additionally, each data set may have its own specific questions of interest, so do not only base your answers on examples from other case studies.
- There are some more specific guidelines for the **Methods and Assumption Checks** and **Executive Summaries** below.

Methods and assumption checks

Unless told otherwise, this should include the following:

- A brief comment on any plots of the data.
- A brief description of how you arrived at your final model. For example, if you fitted multiple models, you may comment on what changes you made, and why.
- A brief description of any concerns with the model assumptions. If you have no concerns then it is enough to say "All model assumptions appear to be satisfied."
- The model equation, making sure to define all model terms.
- Reporting the R-square of the model.

Executive Summary

Unless told otherwise, this should include the following:

- A brief statement summarising what your analysis was investigating, and the model that was used.
- Interpretations of the important findings. For example, was there evidence to suggest that your explanatory variables were related to the response variable? Where appropriate, use confidence intervals to express the magnitude of the relationship.
- Answers to any specify research questions.
- This should be written without too much technical detail. An intelligent person who is *not* a statistician should be able to understand what your findings were. Imagine that you are trying to explain the results of your analysis to a friend who is not taking this course.