My title*

My subtitle if needed

Wendy Yuan

November 29, 2024

First sentence. Second sentence. Third sentence. Fourth sentence.

1 Introduction

Overview paragraph

Estimand paragraph

Results paragraph

Why it matters paragraph

Telegraphing paragraph: The remainder of this paper is structured as follows. Section 2….

2 Data

2.1 Overview

We use the statistical programming language R (R Core Team 2023)…. Our data (Toronto Shelter & Support Services 2024)…. Following Alexander (2023), we consider…

Overview text

2.2 Measurement

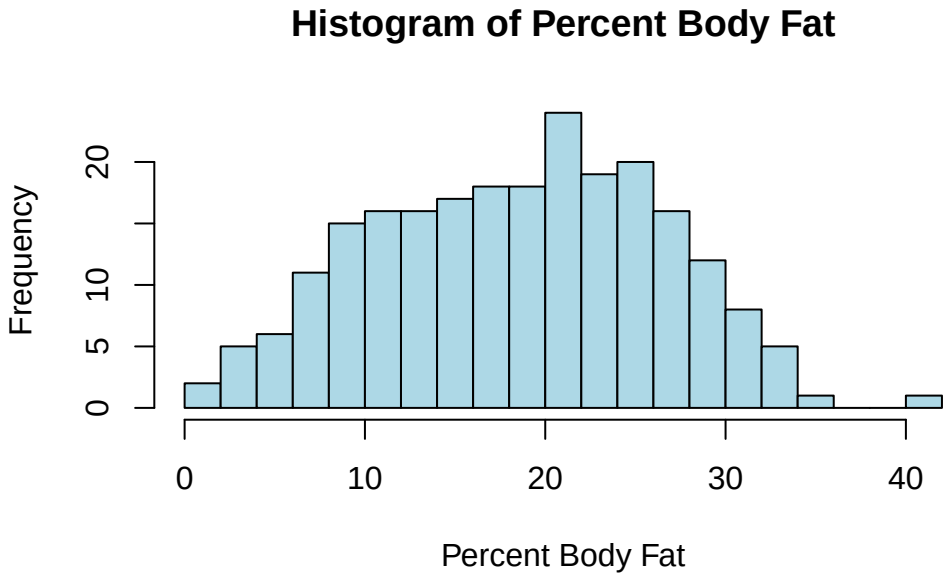
Some paragraphs about how we go from a phenomena in the world to an entry in the dataset.

*Code and data are available at: https://github.com/kiwindyy/Body-Fat

2.3 Outcome variables

Add graphs, tables and text. Use sub-sub-headings for each outcome variable or update the subheading to be singular.

Some of our data is of penguins (**?@fig-bills**), from Horst, Hill, and Gorman (2020).



Talk more about it.

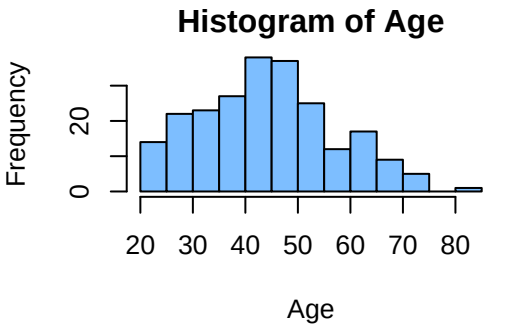
2.4 Predictor variables

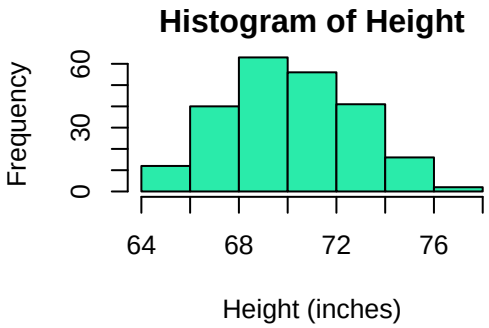
variables of interest: Age Height Abdomen Wrist

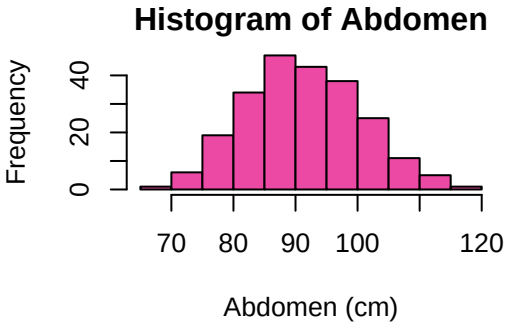
Reference appendix for how variables were picked using backward selection method

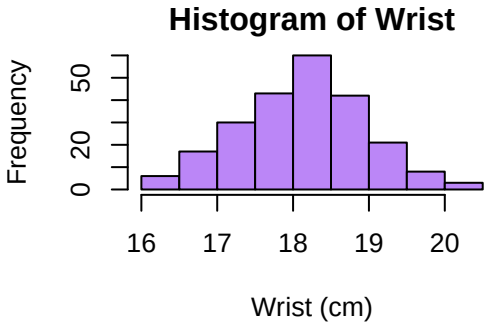
Add graphs, tables and text.

Use sub-sub-headings for each outcome variable and feel free to combine a few into one if they go together naturally.

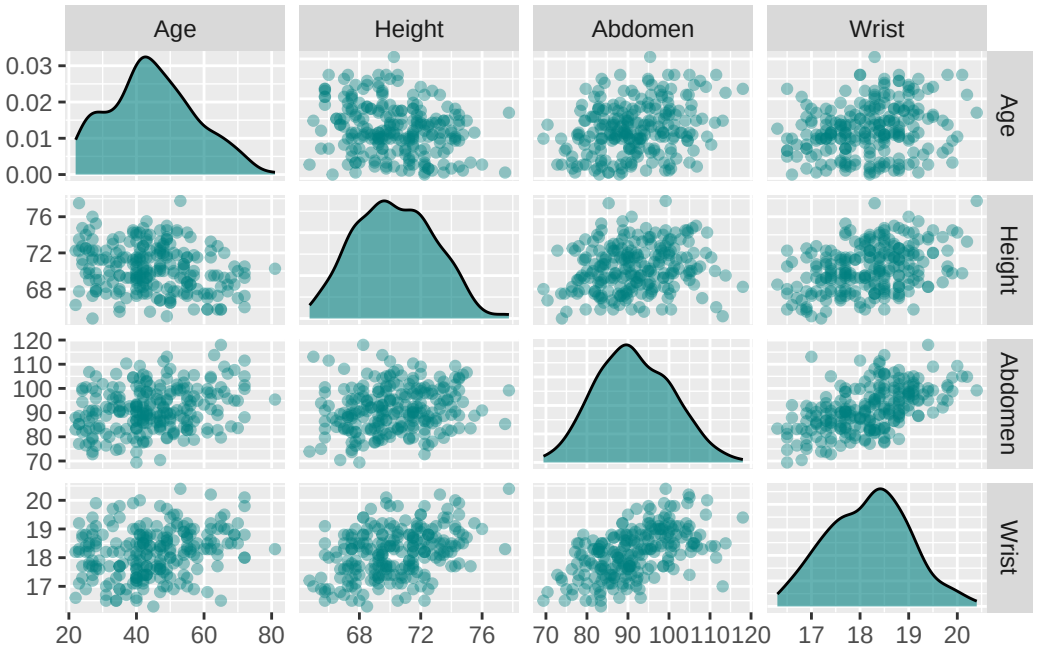








Multicollinear between picked vars



3 Model

The goal of our modelling strategy is twofold. Firstly,…

Here we briefly describe the Bayesian analysis model used to investigate… Background details and diagnostics are included in **?@sec-model-details**.

3.1 Model set-up

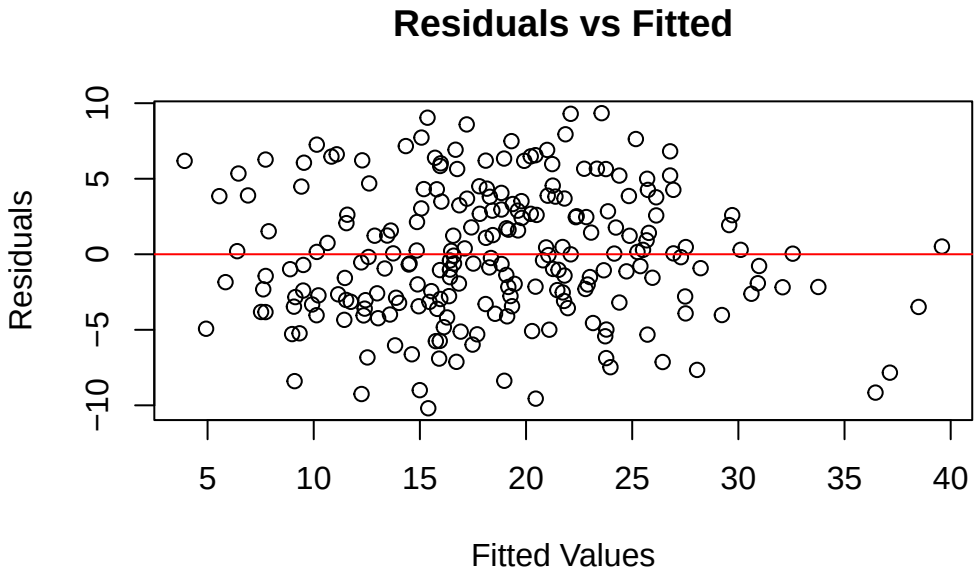
Define y_i as the number of seconds that the plane remained aloft. Then β_i is the wing width and γ_i is the wing length, both measured in millimeters.

$y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i}$

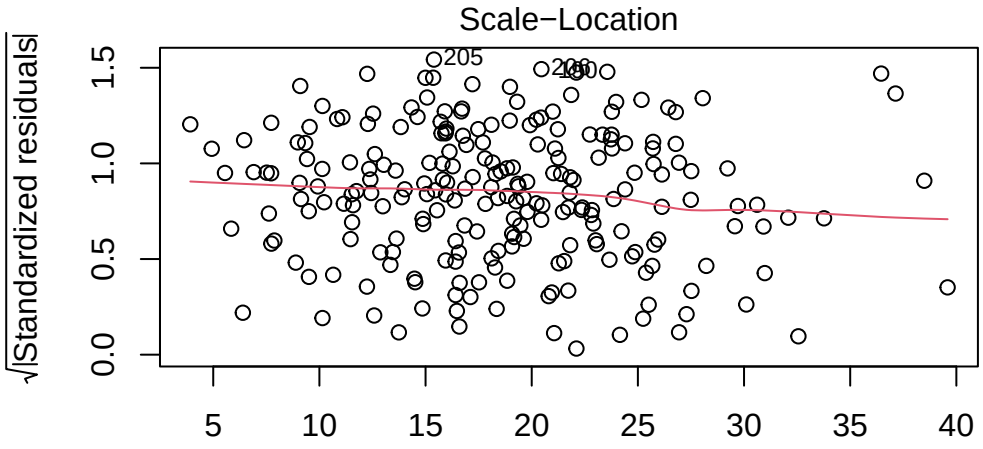
We run the model in R (R Core Team 2023) using the `rstanarm` package of Goodrich et al. (2022). We use the default priors from `rstanarm`.

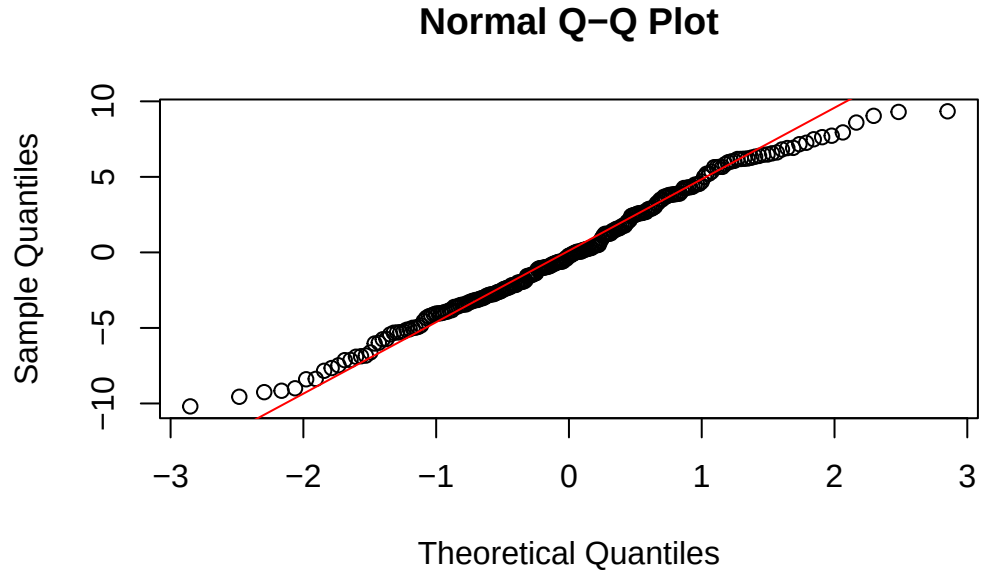
3.1.1 Model justification

Linear reg assumptions




```
lag Autocorrelation D-W Statistic p-value
  1        0.122919       1.75106   0.032
Alternative hypothesis: rho != 0
```



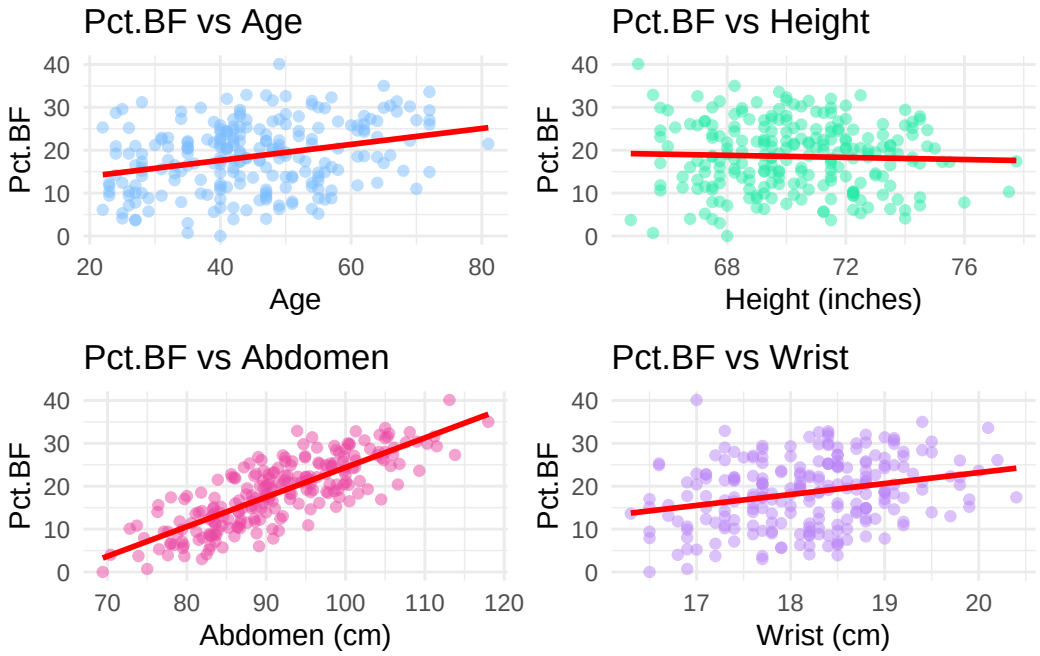


We expect a positive relationship between the size of the wings and time spent aloft. In particular…

We can use maths by including latex between dollar signs, for instance θ.

4 Results

Our results are summarized in **?@tbl-modelresults**.




```
Call:
lm(formula = Pct.BF ~ Age + Height + Abdomen + Wrist, data = data)

Residuals:
     Min       1Q   Median       3Q      Max
-10.1944  -3.0779  -0.2193   3.3052   9.3407

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.00737    8.81593   0.228   0.8201
Age          0.04605    0.02538   1.814   0.0709 .
Height      -0.31333    0.13020  -2.407   0.0169 *
Abdomen      0.78430    0.03784  20.727  < 2e-16 ***
Wrist       -1.94203    0.44994  -4.316 2.38e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.327 on 225 degrees of freedom
Multiple R-squared:  0.7033,    Adjusted R-squared:  0.698
F-statistic: 133.3 on 4 and 225 DF,  p-value: < 2.2e-16
```

5 Discussion

5.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

5.2 Second discussion point

Please don't use these as sub-heading labels - change them to be what your point actually is.

5.3 Third discussion point

5.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

```
AIC: 1333.481

Variables: Age Height Abdomen Wrist
```

References

Alexander, Rohan. 2023. *Telling Stories with Data*. Chapman; Hall/CRC. https://tellingstorieswithdata.com/.

Goodrich, Ben, Jonah Gabry, Imad Ali, and Sam Brilleman. 2022. "rstanarm: Bayesian applied regression modeling via Stan." https://mc-stan.org/rstanarm/.

Horst, Allison Marie, Alison Presmanes Hill, and Kristen B Gorman. 2020. *palmerpenguins: Palmer Archipelago (Antarctica) penguin data*. https://doi.org/10.5281/zenodo.3960218.

R Core Team. 2023. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Toronto Shelter & Support Services. 2024. *Deaths of Shelter Residents*. https://open.toronto.ca/dataset/deaths-of-shelter-residents/.