My title*

My subtitle if needed

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

1 Introduction

Why it matters paragraph

Overview paragraph

Results paragraph

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

1.1 Estimand

Estimand paragraph

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

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

2.2 Measurement

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

cleaned data with normalized measurement

Table 1: Part 1: Columns 1-8

Density	Pct.BF	Age	Weight	Height	Neck	Chest	Abdomen
1.0708	12.3	23	69.96	172.08	36.2	93.1	85.2
1.0853	6.1	22	78.58	183.51	38.5	93.6	83.0
1.0414	25.3	22	69.85	168.27	34.0	95.8	87.9
1.0751	10.4	26	83.80	183.51	37.4	101.8	86.4
1.0340	28.7	24	83.57	180.97	34.4	97.3	100.0
1.0502	20.9	24	95.36	189.86	39.0	104.5	94.4
1.0549	19.2	26	82.10	177.16	36.4	105.1	90.7
1.0704	12.4	25	79.83	184.15	37.8	99.6	88.5
1.0900	4.1	25	86.63	187.96	38.1	100.9	82.5
1.0722	11.7	23	89.92	186.69	42.1	99.6	88.6

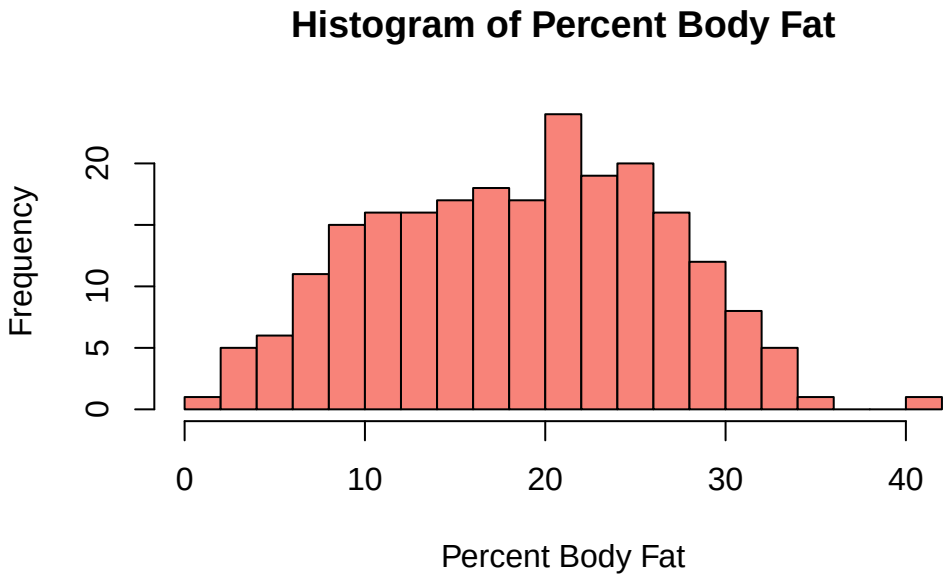
Table 2: Part 2: Columns 9-16

Waist	Hip	Thigh	Knee	Ankle	Bicep	Forearm	Wrist
85.2	94.5	59.0	37.3	21.9	32.0	27.4	17.1
83.0	98.7	58.7	37.3	23.4	30.5	28.9	18.2
87.9	99.2	59.6	38.9	24.0	28.8	25.2	16.6
86.4	101.2	60.1	37.3	22.8	32.4	29.4	18.2
100.0	101.9	63.2	42.2	24.0	32.2	27.7	17.7
94.4	107.8	66.0	42.0	25.6	35.7	30.6	18.8
90.7	100.3	58.4	38.3	22.9	31.9	27.8	17.7
88.5	97.1	60.0	39.4	23.2	30.5	29.0	18.8
82.5	99.9	62.9	38.3	23.8	35.9	31.1	18.2
88.6	104.1	63.1	41.7	25.0	35.6	30.0	19.2

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

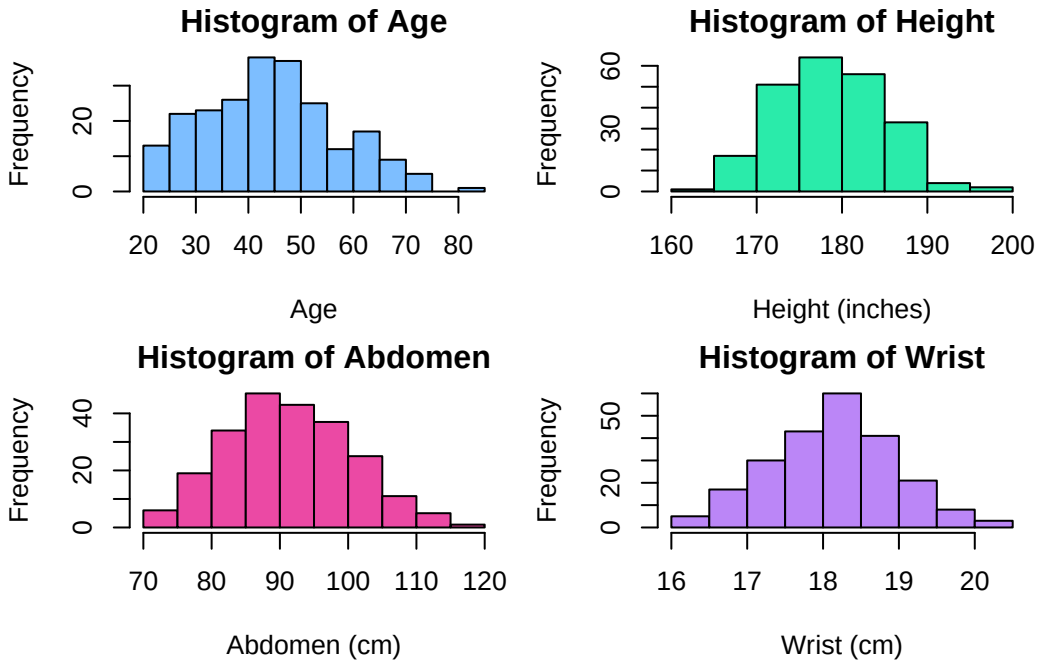
Reference appendix for how variables were picked using backward selection method

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.

```
AIC: 1322.269
```

```
Variables: Age Height Abdomen Wrist
```




```
     Age   Height  Abdomen    Wrist
1.266260 1.346920 1.450437 1.695735
```

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

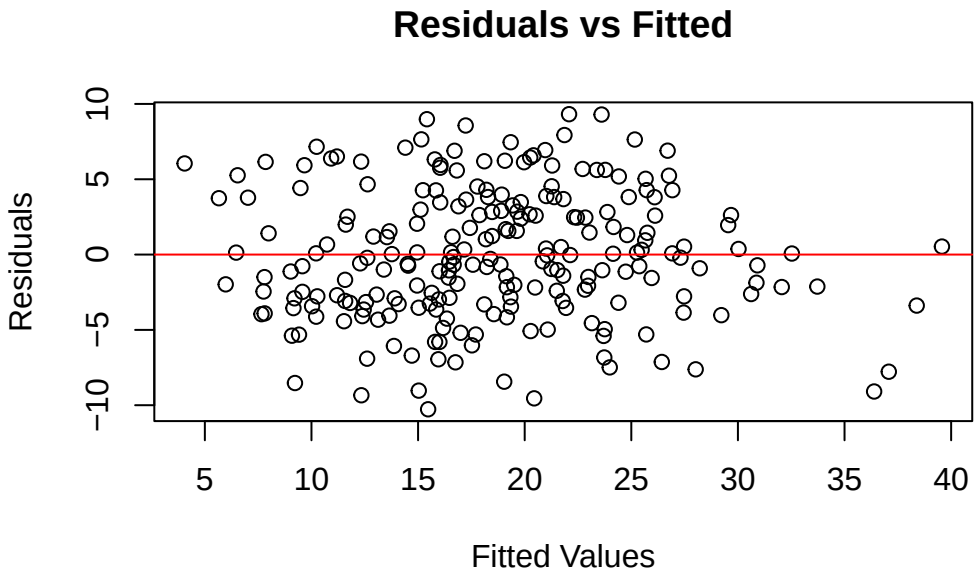
Define y_i as the number of seconds that the plane remained aloft. Then β_i is the wing width and γ_i is the wing length, both measured in millimeters.

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

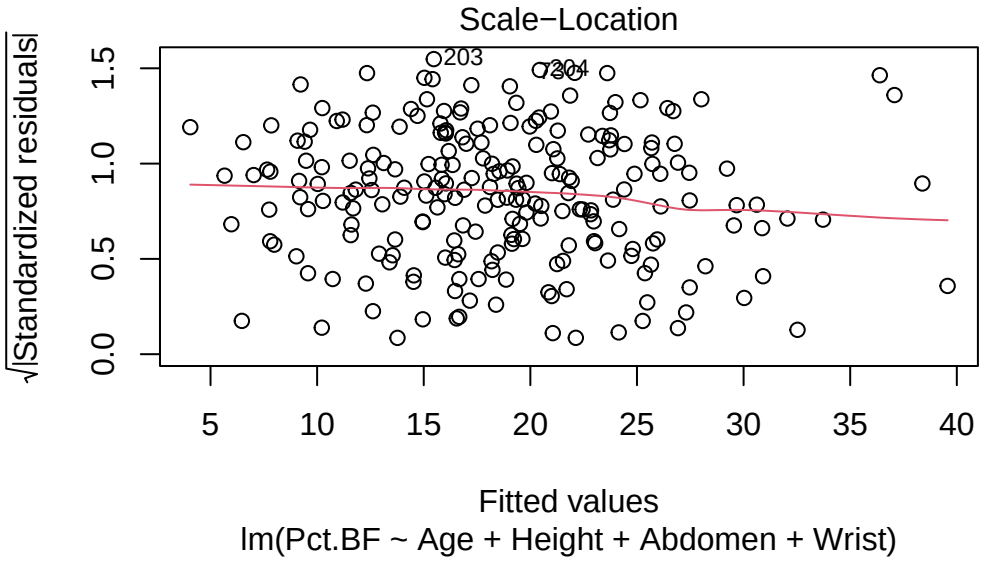
We run the model in R (R Core Team 2023) using the `rstanarm` package of Goodrich et al. (2022). We use the default priors from `rstanarm`.

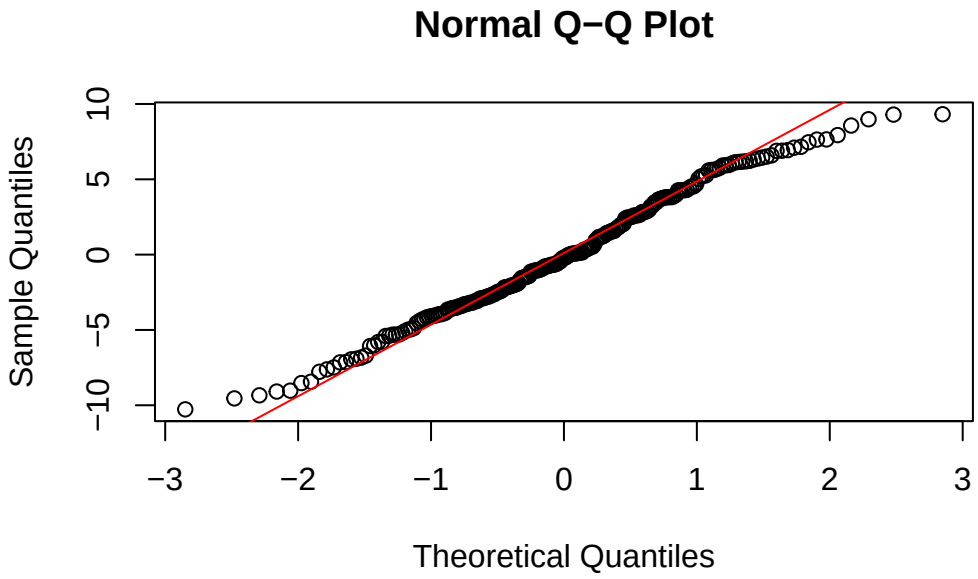
3.1.1 Model justification

Linear reg assumptions




```
lag Autocorrelation D-W Statistic p-value
  1       0.1289908      1.738681   0.056
Alternative hypothesis: rho != 0
```





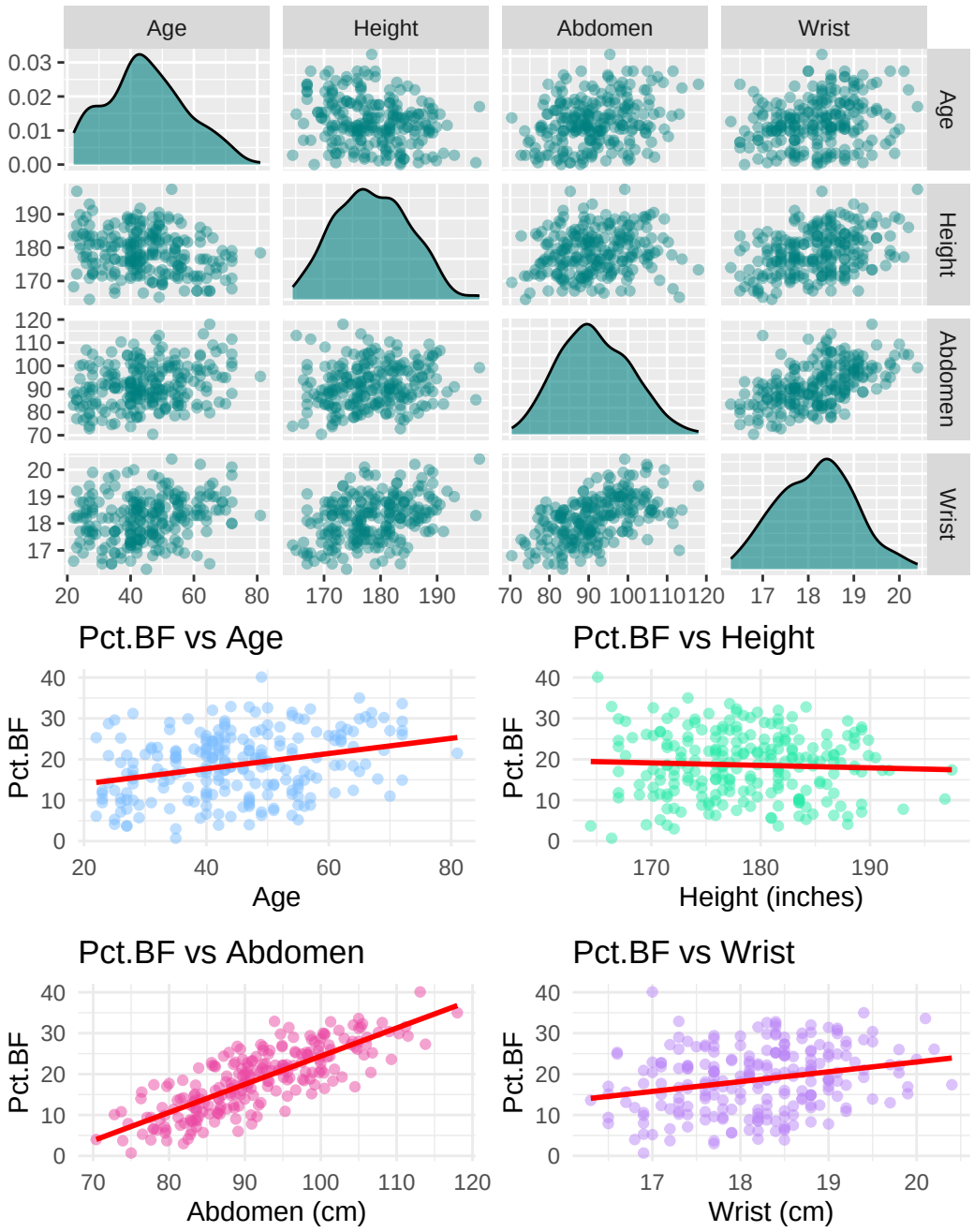
We expect a positive relationship between the size of the wings and time spent aloft. In particular…

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

4 Results

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

Multicollinear between picked vars




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

Residuals:
```

```
     Min       1Q   Median       3Q      Max
-10.2708  -3.0998  -0.2117   3.3125   9.3195

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.79763    8.86682   0.316   0.7527
Age          0.04491    0.02559   1.755   0.0806 .
Height      -0.12353    0.05130  -2.408   0.0168 *
Abdomen      0.78091    0.03816  20.463  < 2e-16 ***
Wrist       -1.96214    0.45097  -4.351 2.06e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.33 on 223 degrees of freedom
Multiple R-squared:  0.6982,    Adjusted R-squared:  0.6927
F-statistic: 128.9 on 4 and 223 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.

6 Conclusion

Appendix

Table 3: Part 1: Columns 1-8

V1	V2	V3	V4	V5	V6	V7	V8
Density	Pct.BF	Age	Weight	Height	Neck	Chest	Abdomen
1.0708	12.3	23	154.25	67.75	36.2	93.1	85.2
1.0853	6.1	22	173.25	72.25	38.5	93.6	83
1.0414	25.3	22	154	66.25	34	95.8	87.9
1.0751	10.4	26	184.75	72.25	37.4	101.8	86.4
1.034	28.7	24	184.25	71.25	34.4	97.3	100
1.0502	20.9	24	210.25	74.75	39	104.5	94.4
1.0549	19.2	26	181	69.75	36.4	105.1	90.7
1.0704	12.4	25	176	72.5	37.8	99.6	88.5
1.09	4.1	25	191	74	38.1	100.9	82.5

Table 4: Part 2: Columns 9-16

V9	V10	V11	V12	V13	V14	V15	V16
Waist	Hip	Thigh	Knee	Ankle	Bicep	Forearm	Wrist
33.543307	94.5	59	37.3	21.9	32	27.4	17.1
32.677165	98.7	58.7	37.3	23.4	30.5	28.9	18.2
34.606299	99.2	59.6	38.9	24	28.8	25.2	16.6
34.015748	101.2	60.1	37.3	22.8	32.4	29.4	18.2
39.370079	101.9	63.2	42.2	24	32.2	27.7	17.7
37.165354	107.8	66	42	25.6	35.7	30.6	18.8
35.708661	100.3	58.4	38.3	22.9	31.9	27.8	17.7
34.842520	97.1	60	39.4	23.2	30.5	29	18.8
32.480315	99.9	62.9	38.3	23.8	35.9	31.1	18.2

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/.