

Body Weight Data Report

Howard

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- Introduction
- Data Exploration
 - Data Cleaning
 - Exploratory Analysis
- Data Analysis
 - Summary Statistics
 - Data Visualization
 - Bootstrapping
 - Power Analysis

Introduction

In this report, I will summarize my findings of KOMP's historical data of mice Body Weight. The data is from measurements from 2012-06-18 to 2017-10-02 on mice that were between 4 and 18 weeks old. Given somewhat raw data, I will do data exploration and visualization to assess the initial quality of the data and look for data drift or abnormal patterns, then data evaluation to find summary statistics, bootstrap for 2.5% to 97.5% ranges, and complete a power analysis.

Data Exploration

Data Cleaning

Initial data cleaning was necessary for some variables, and there were some other abnormalities.

Mouse.ID

There were a good number of cases where there was a mouse (ID'ed by Mouse ID) that had multiple body weight measurements for a single week. I first removed all duplicate rows (~200). There were still 49 cases of non-distinct Mouse ID and Week. Eight of those cases had non duplicate data and were removed. The remaining cases looked like the week measurement was misidentified as 4 or 18 instead of Week 19, and all occurred on 2015-08-10. These cases were removed.

Date of Birth

There was one mouse with NA Date of Birth, and now data. The row was removed.

JR#, Strain, Genotype

The number of 5304 JR Number, C57BL/6NJ Strain, and Control Genotype mice should all match, since they are the markers for control mice. However, there are 4 more Control Genotype mice than 5304 JR# and C57BL/6NJ Strain mice. The 5304 and C57BL/6NJ mice are the same. All 5304 and C57BL/6NJ mice are marked as Control

Genotype. However, there are 13 Control Genotype mice without matching JR Number and Strain, as seen below. These rows were removed.

Room Origin

There were 18 mice with NULL Room Origin. I changed it to NA.

Exit Reason

There are 5907 NULL Exit Reasons. I changed them to NA.

Week

There were 3 rows with “Experimenter” in Week. They had no data and were removed.

Body Weight

There were 11 mice with NA Body Weight. They were removed.

Exploratory Analysis

Now that the data has been initially cleaned, it's time to do some exploratory analysis.

With Shiny

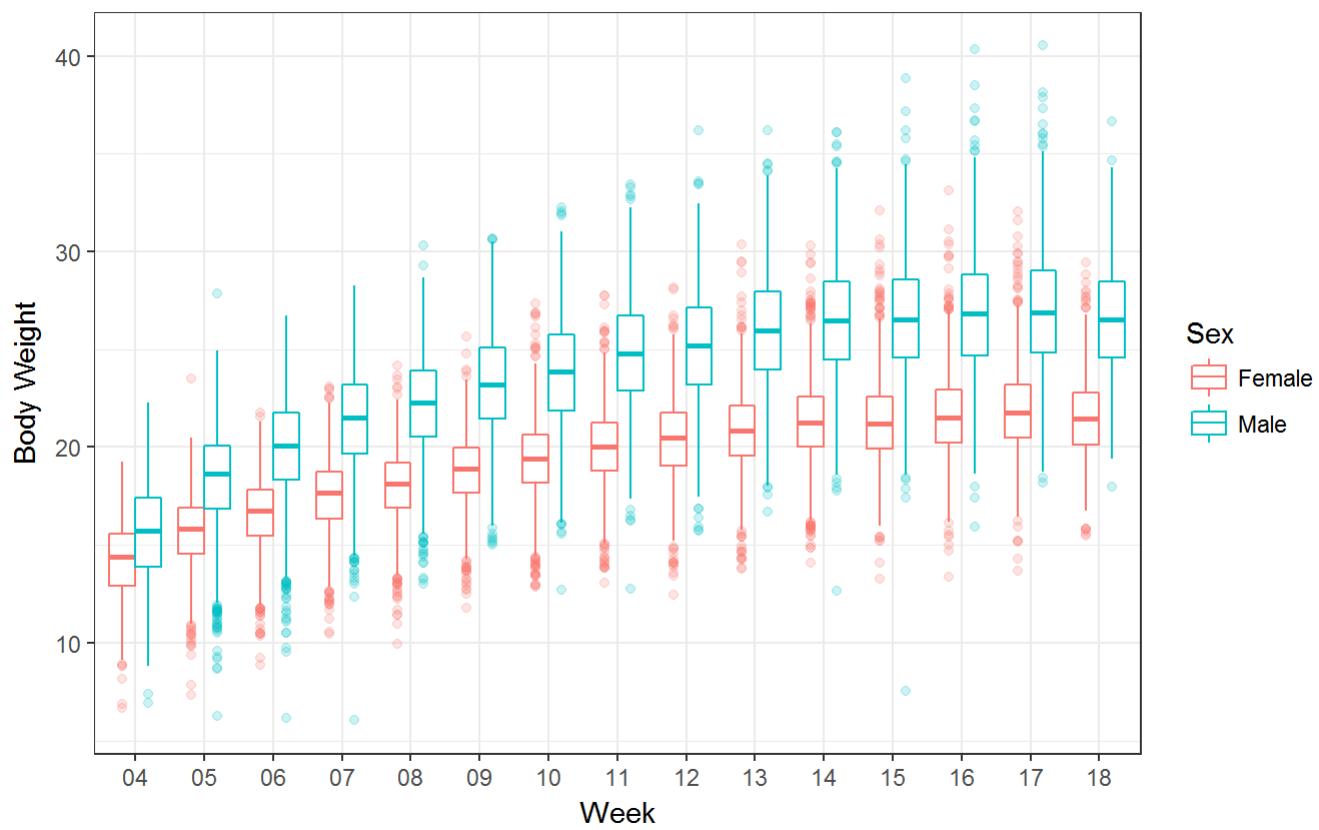
A shiny app was created for an easy way to explore the relationship between the metadata and the data. Apps are a little slow to display data due to the size of the data, and were not included in the print report. I used the app for exploratory analysis.

Investigation of Week Interaction with Body Weight

Though there are some outliers, the overall data seems reasonable.

Boxplots of Body Weight over Week

Body weight over week overall behaves as expected.



*data from control mice

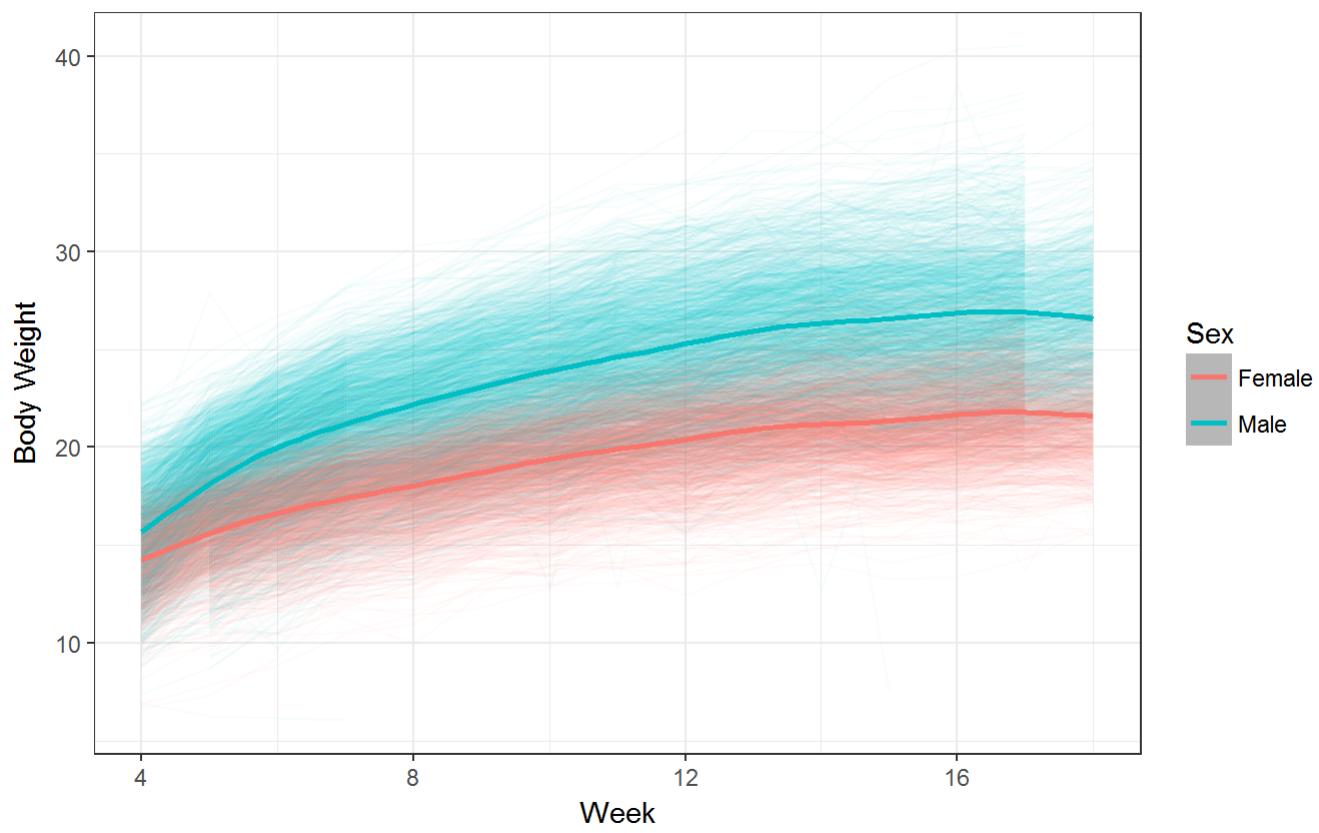
(One Body Weight data point >75 was removed for illustrative effect)

One thing that seems strange to me is that mouse weight has a slight decrease in week 18.

Let's separate and visualize individual mice growth:

Individual Mouse Body Weight over Week

Body weight over week has a drop off at week 18.



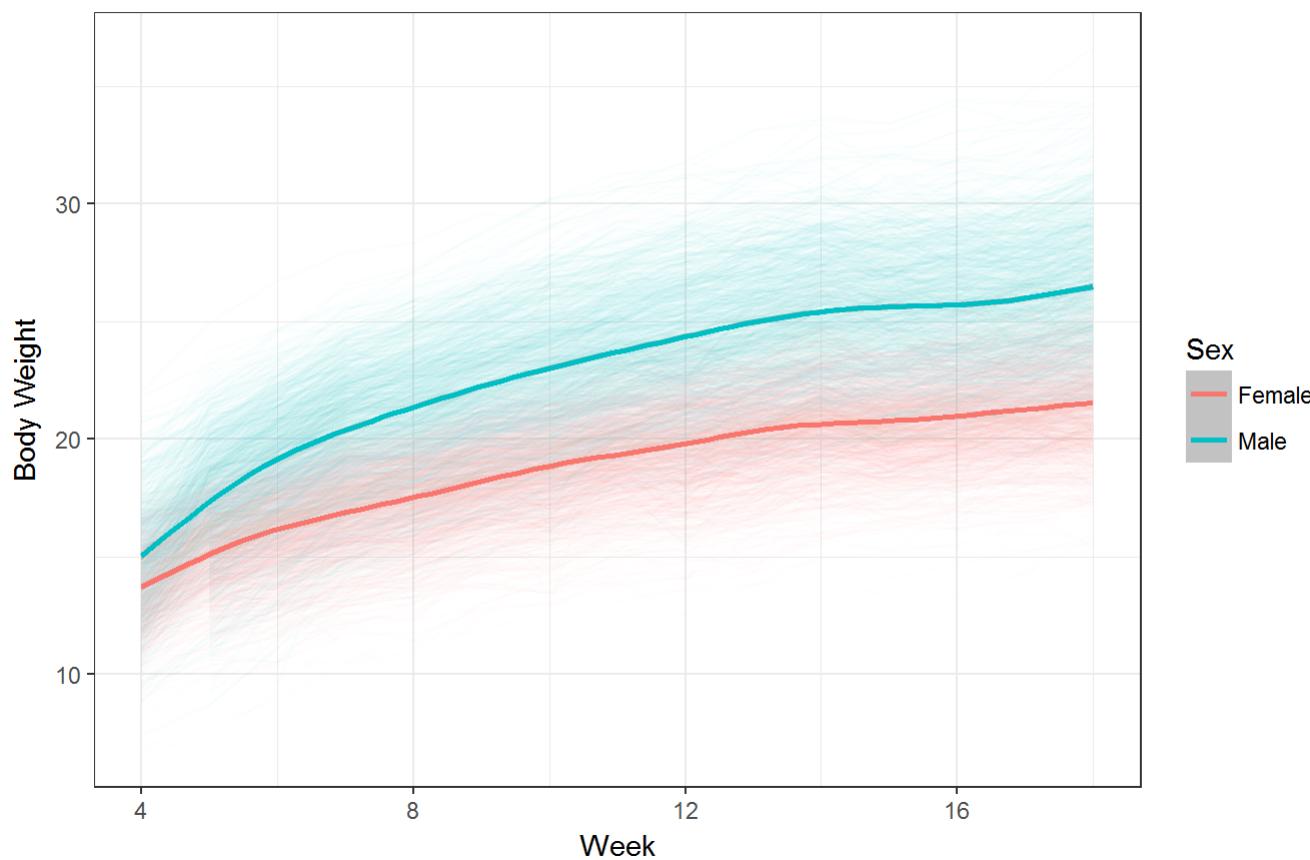
(One Body Weight data point >75 was removed for illustrative effect)

There's a strange dropoff in week 18.

Let's separate the mice that had measurements on week 18 with the rest of the mice.

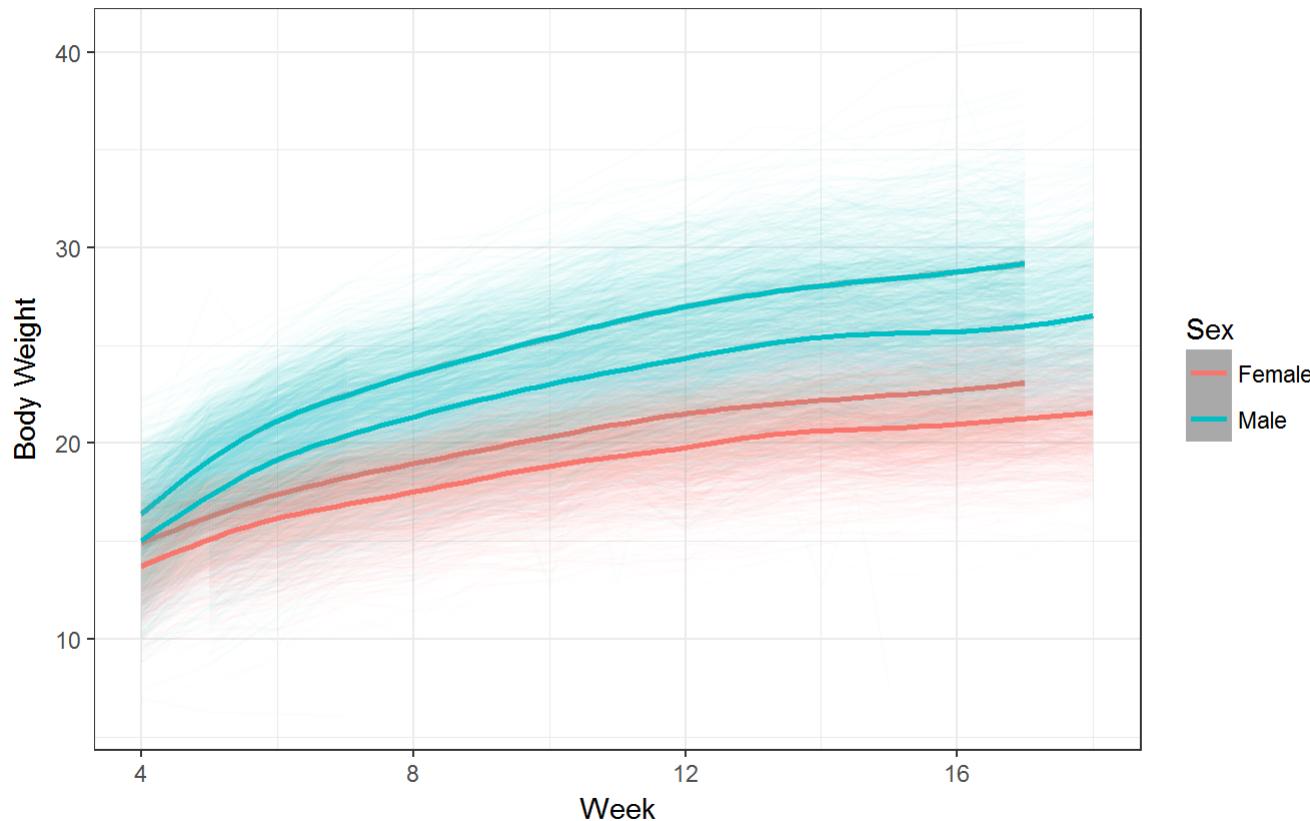
Body Weight over Week

Body weight over week for control mice that were measured on week 18, seperated by sex



Individual Mouse Body Weight over Week

Separating mice that had measurements in week 18, they consistently had lower body weight.



*data from control mice

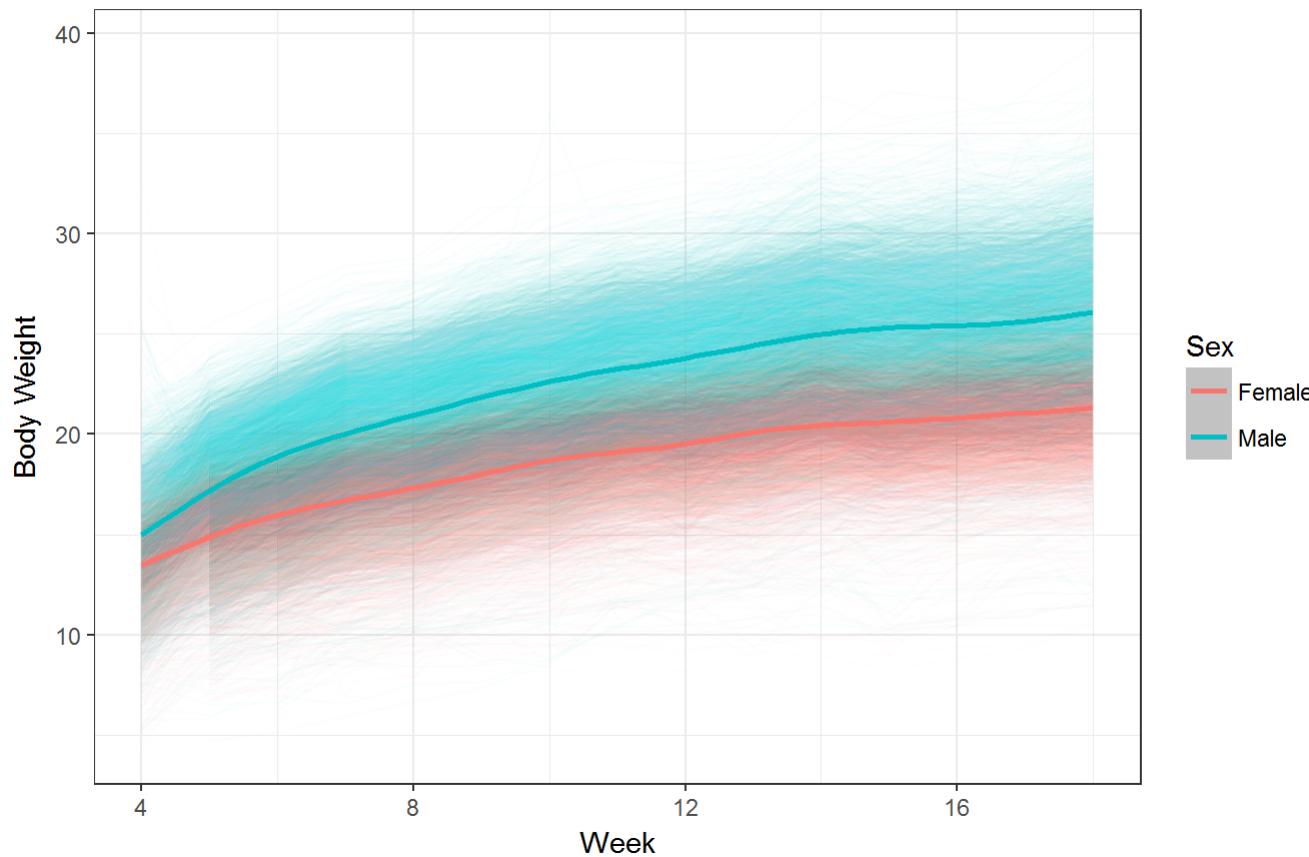
(One Body Weight data point >75 was removed for illustrative effect)

Somehow, the mice that had measurements in week 18 have lower body weight throughout their life.

Let's look at mutant mice:

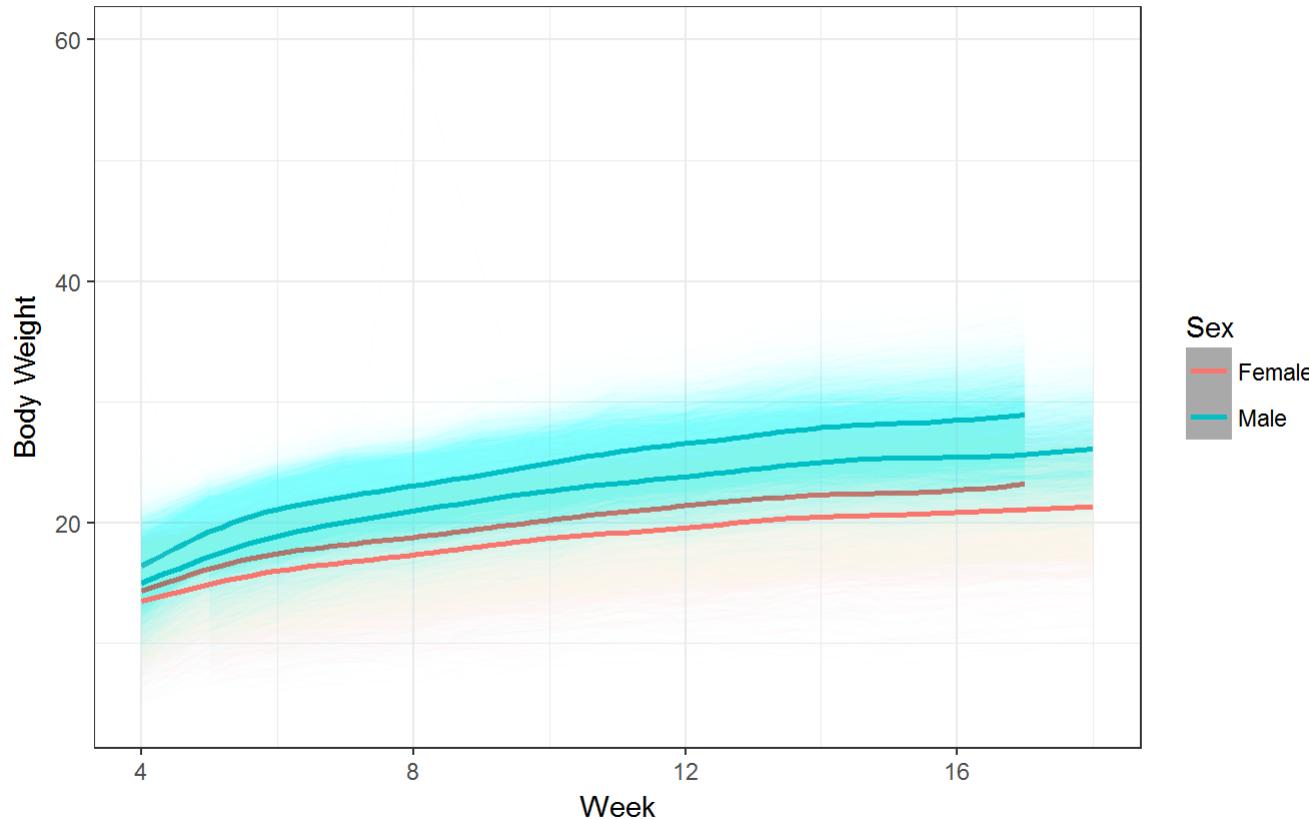
Body Weight over Week

Body weight over week for mutant mice that were measured on week 18, seperated by sex



Individual Mouse Body Weight over Week

Week 18 measured mutant mice also have lower body weight.



*data from mutant mice

(One Body Weight data point >75 was removed for illustrative effect)

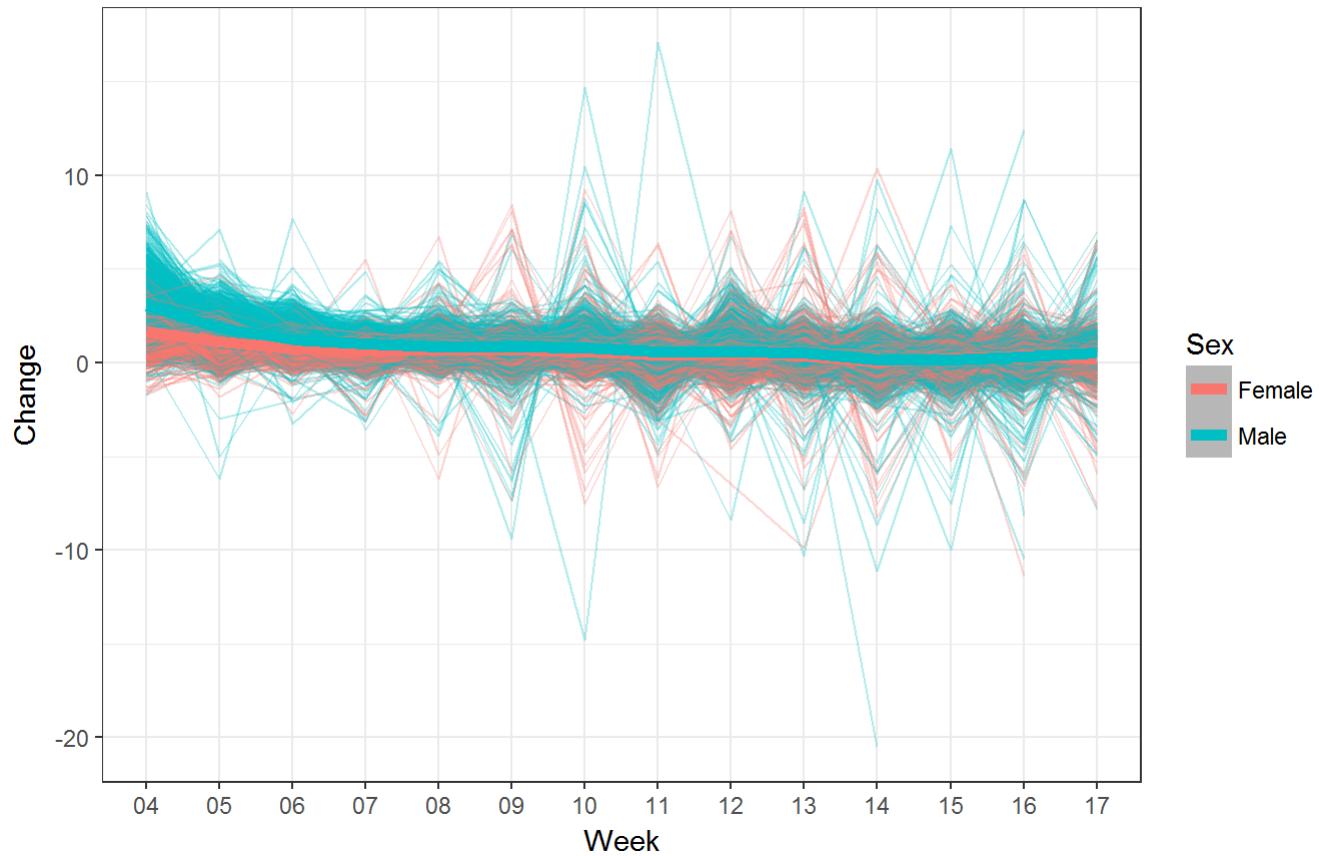
Mutant mice show the same trend.

Weekly Change

Let's look at how the mice's body weight changes weekly.

Individual Mouse Weight Change over Week

Body weight change over week for control mice, separated by sex

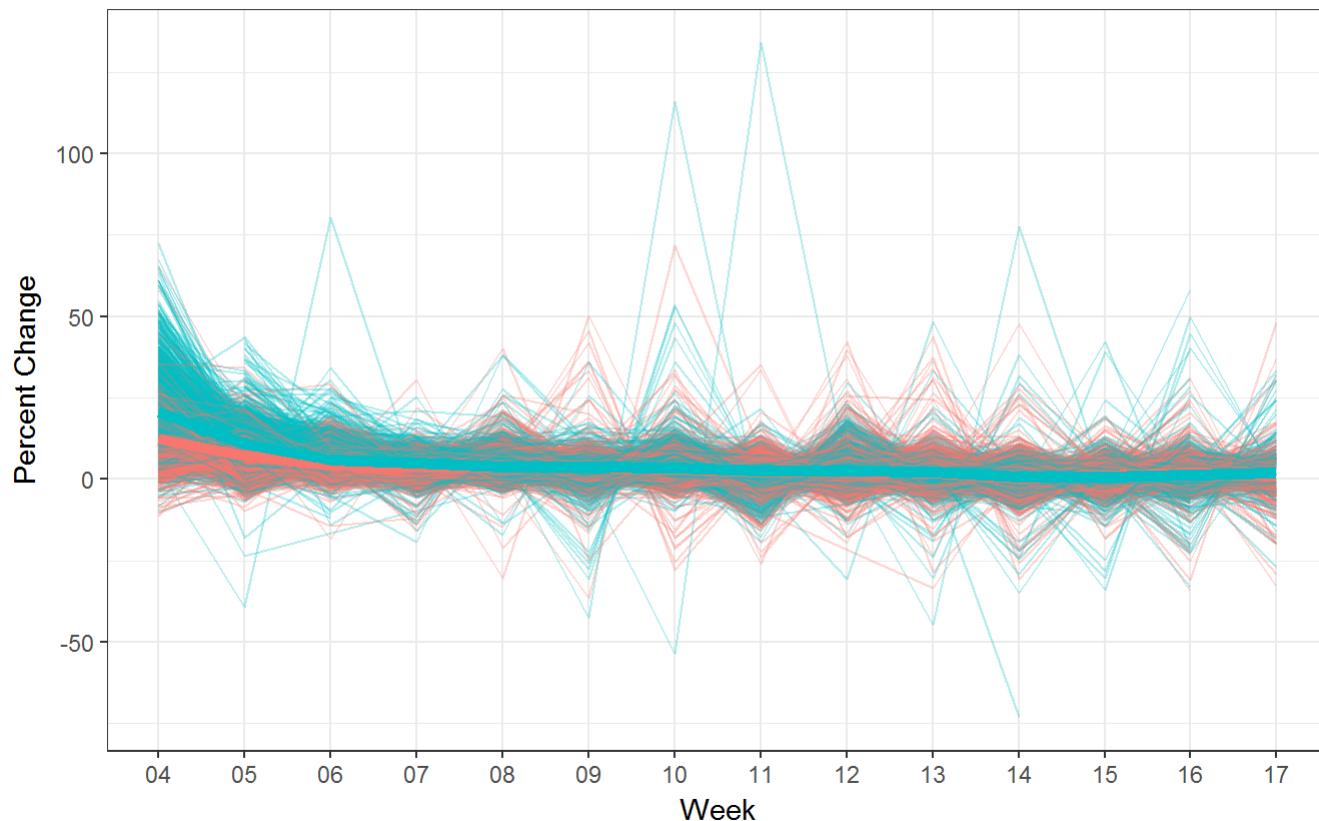


(One Change data point >60 was removed for illustrative effect)

It may be more meaningful to look at the change in terms of percent to the next week.

Individual Mouse Percent Weight Change over Week

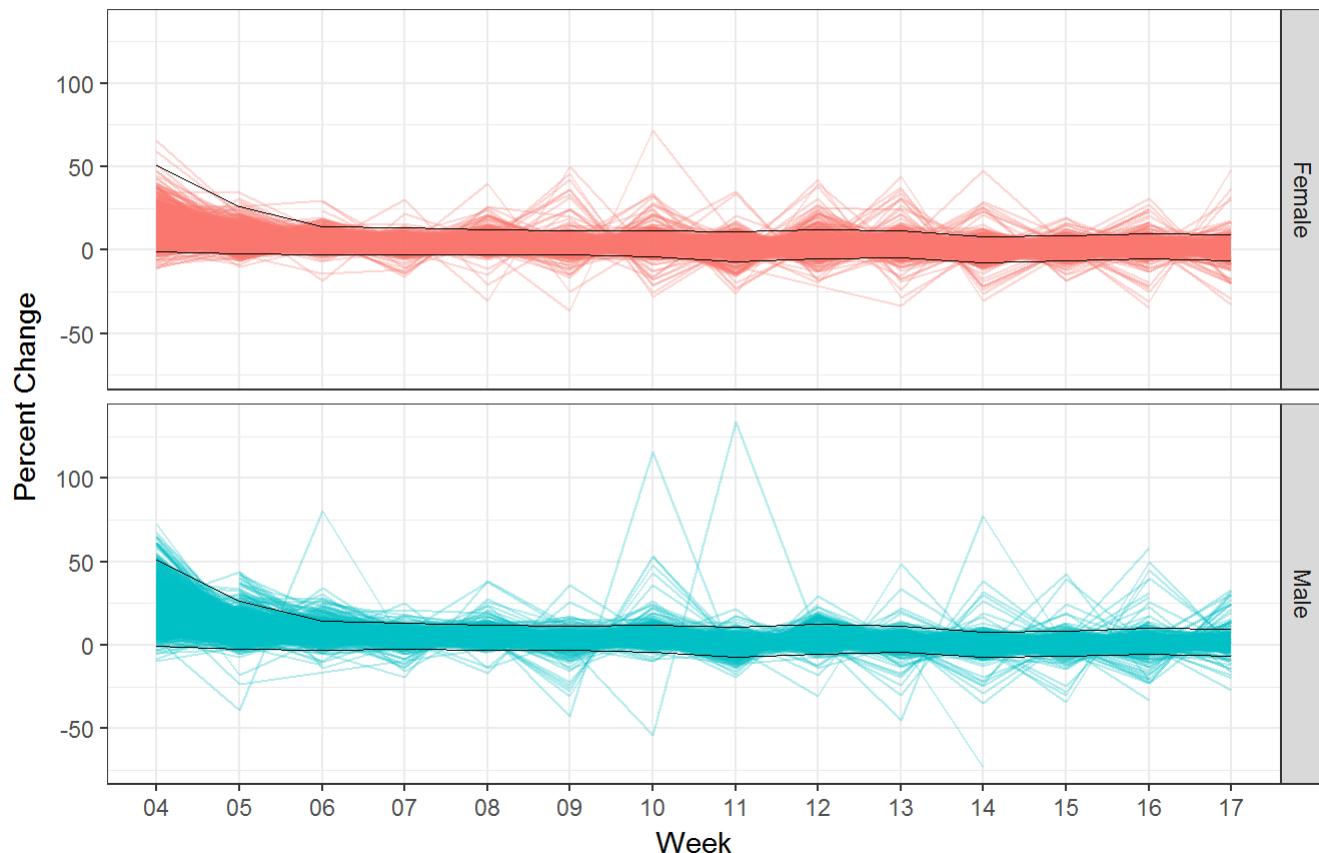
Percent body weight change over week sees some outliers, but is relatively well behaved.



*data from control mice

Individual Mouse Percent Weight Change over Week

Percent body weight change over week with 2.5% and 97.5% indicators.



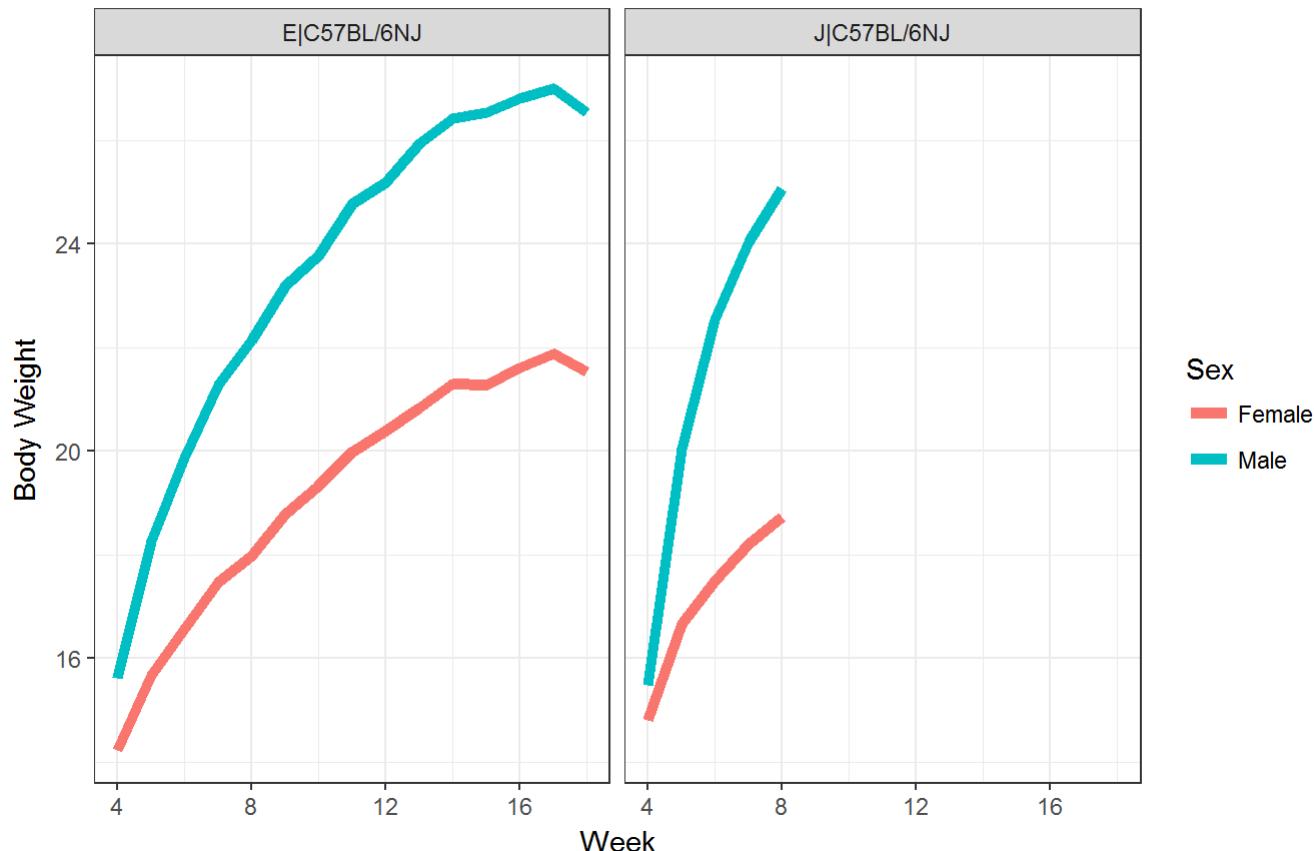
(One Percent Change value > 200 was removed for illustrative effect)

Comparison with jax.org Data

We can compare the experimental data with body weight data for strain C57BL/6NJ, though the Jax data is limited to weeks 4 - 8 and only contains 20 mice per week.

Body Weight over Week

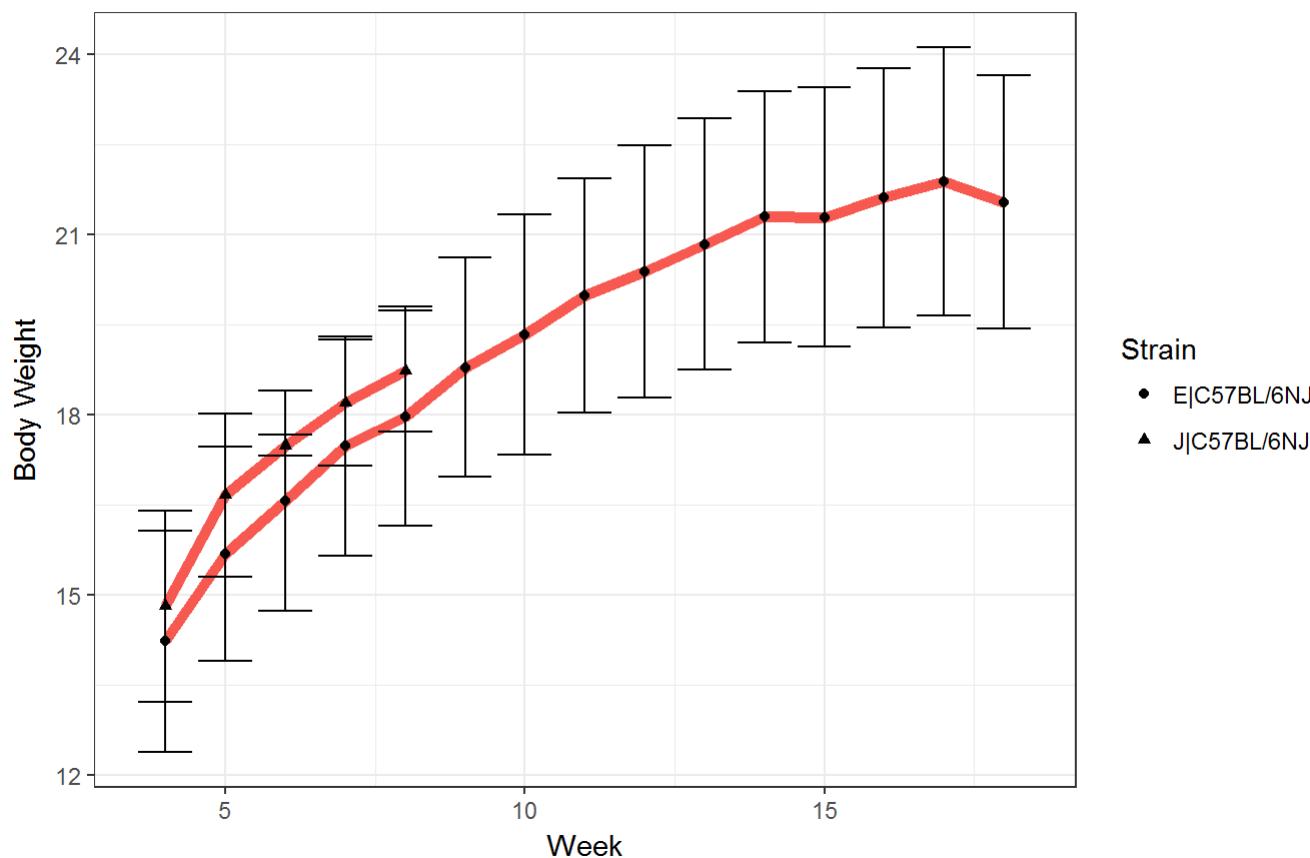
Body weight by week for control mice, separated by sex and faceted by strain



The weights for the data from jax.org seem to be slightly different. Let's plot them with SD and SE bars.

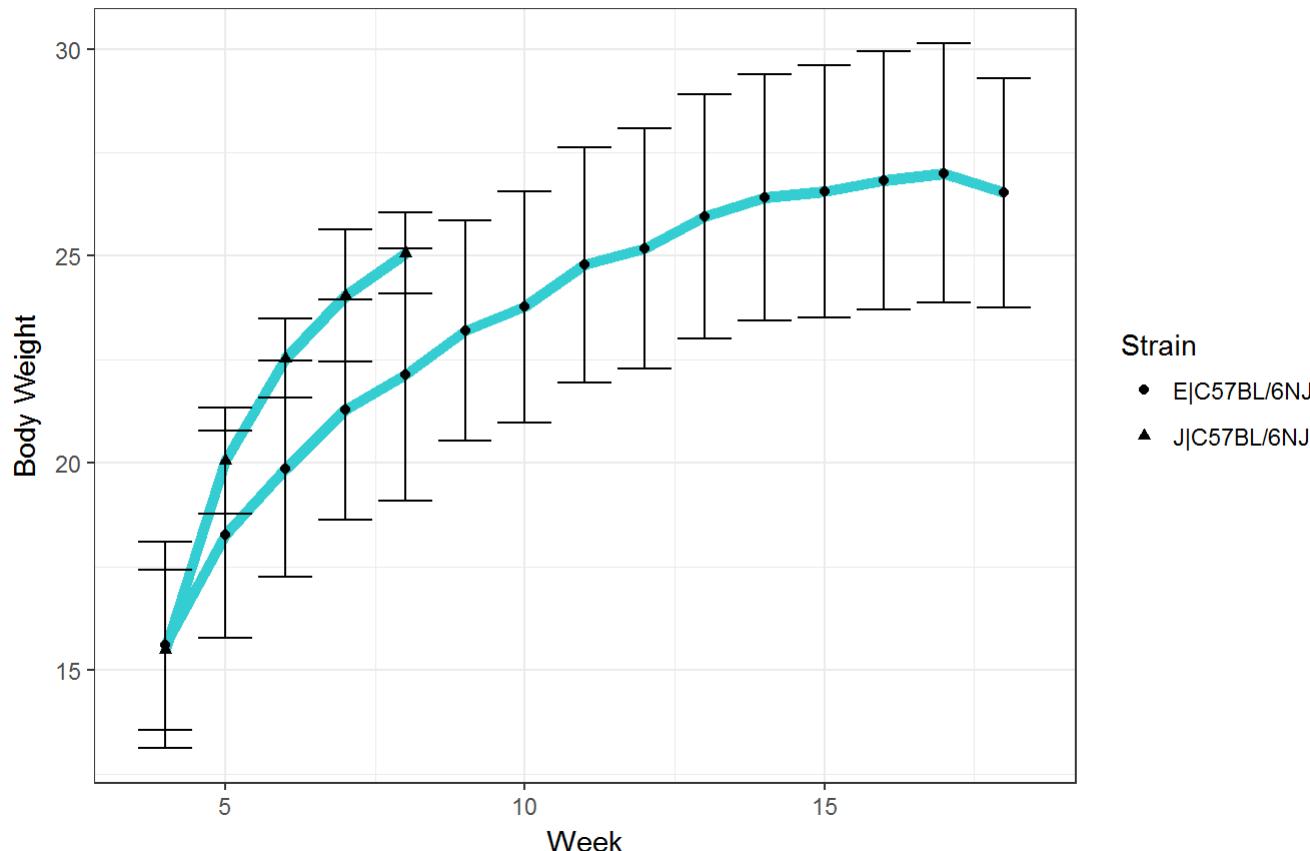
Female Body Weight over Week

Body weight by week for female control mice, faceted by strain with SD error bars



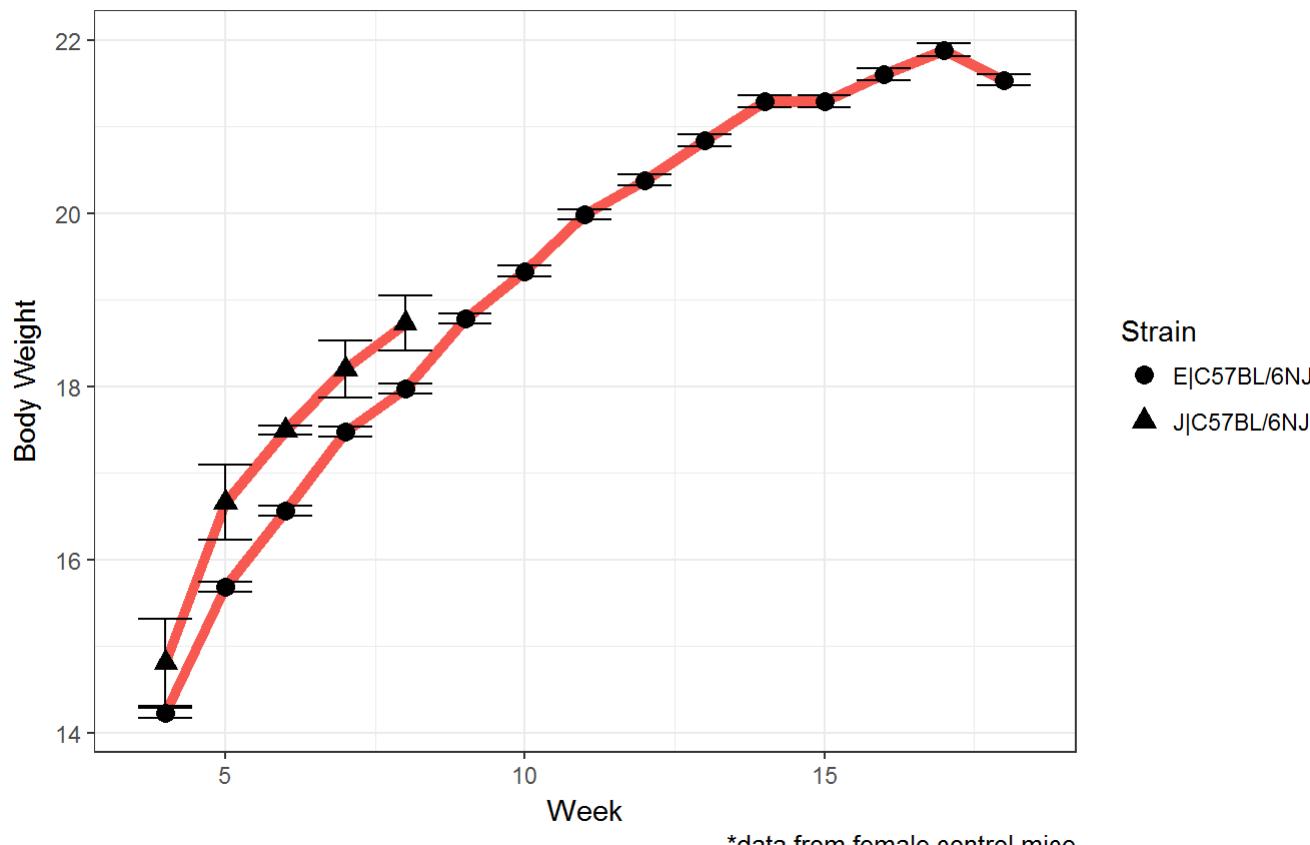
Male Body Weight over Week

Body weight by week for male control mice, faceted by strain with SD error bars



Female Body Weight over Week with SE Bars

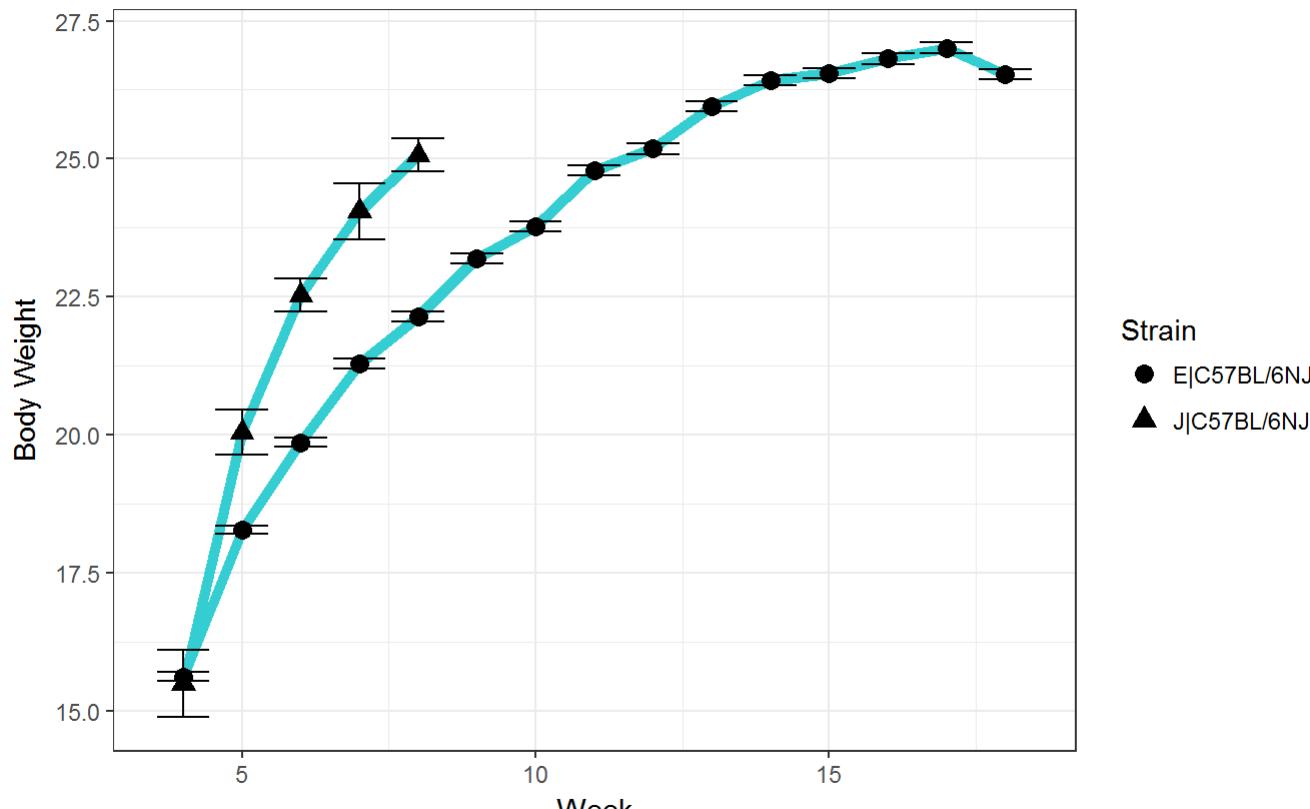
KOMP experimental mice have consistently lower body weight.



*data from female control mice

Male Body Weight over Week with SE Bars

KOMP experimental mice have consistently lower body weight.

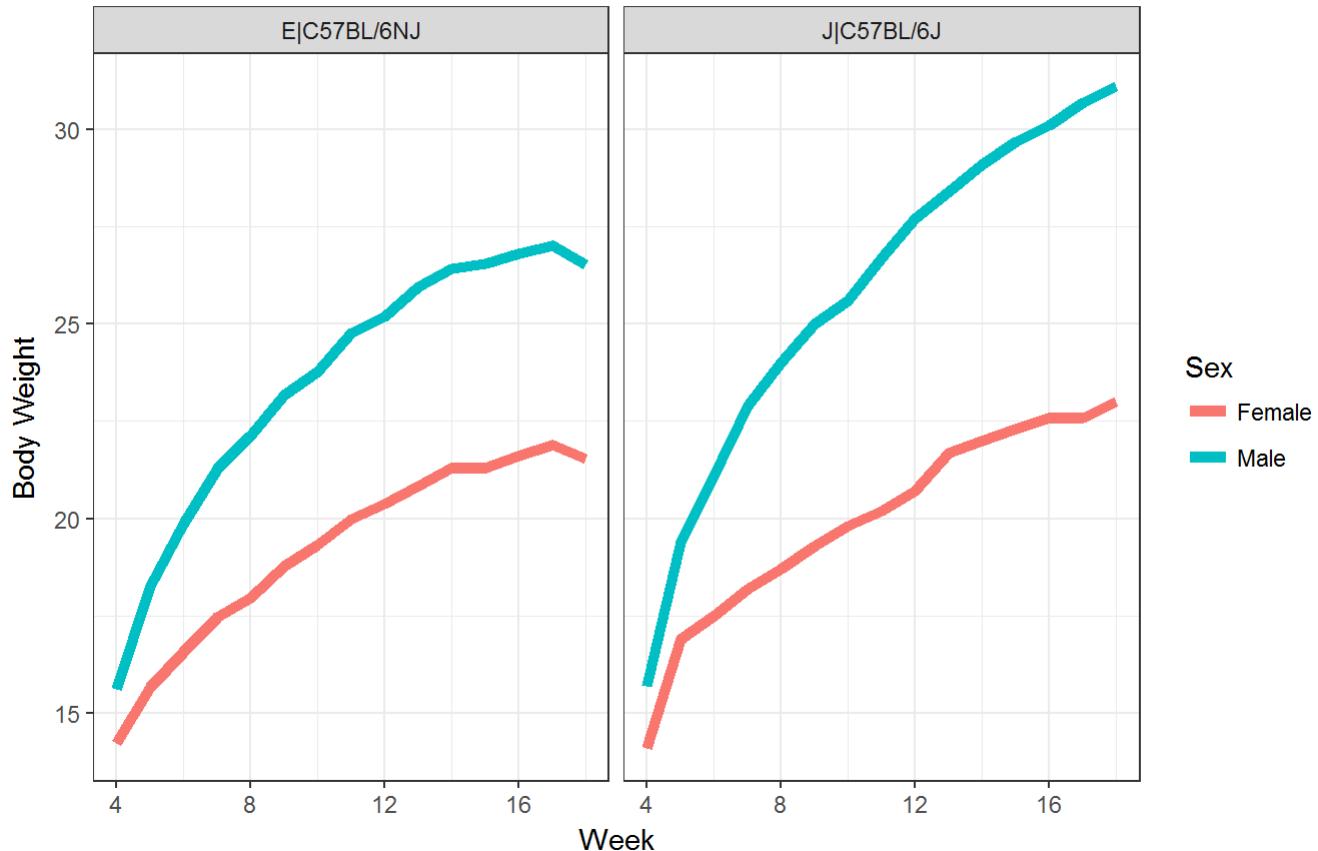


*data from male control mice

We can also plot data for the C57BL/6J strain. Even though it is a different strain, jax.org has data on body weight for 400-500 mice per week and has data from week 4 to 18.

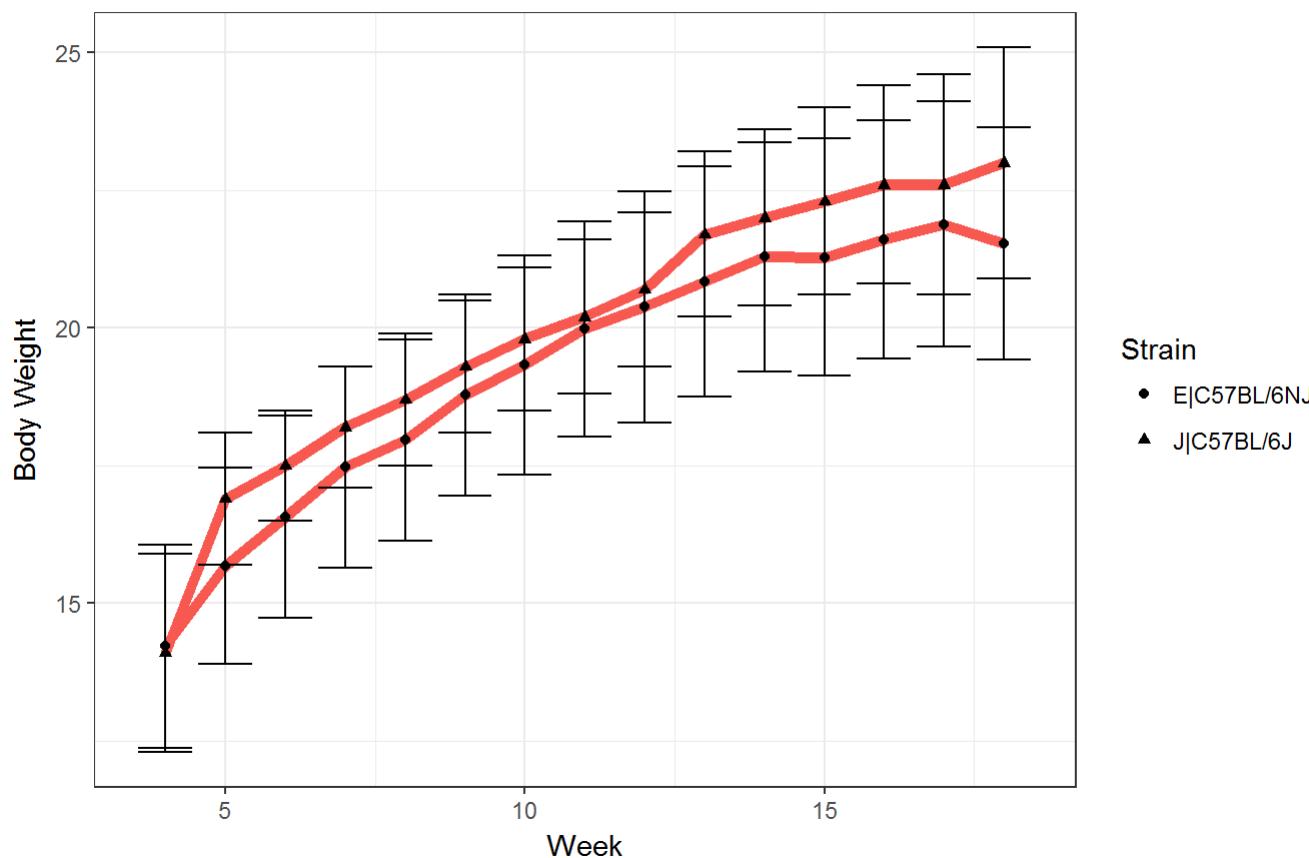
Body Weight over Week

Body weight by week for control mice, separated by sex and faceted by strain



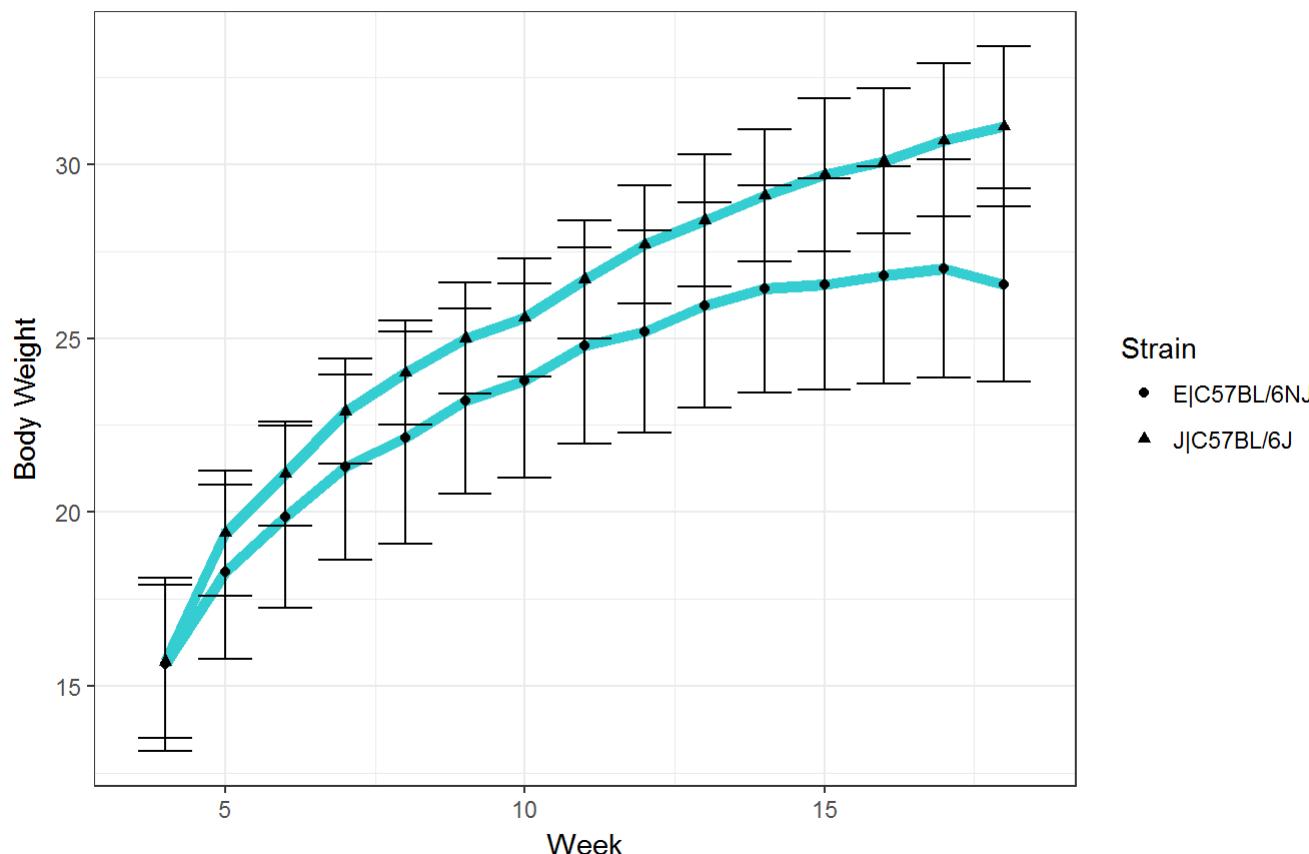
Female Body Weight over Week

Body weight by week for female control mice, faceted by strain with SD error bars



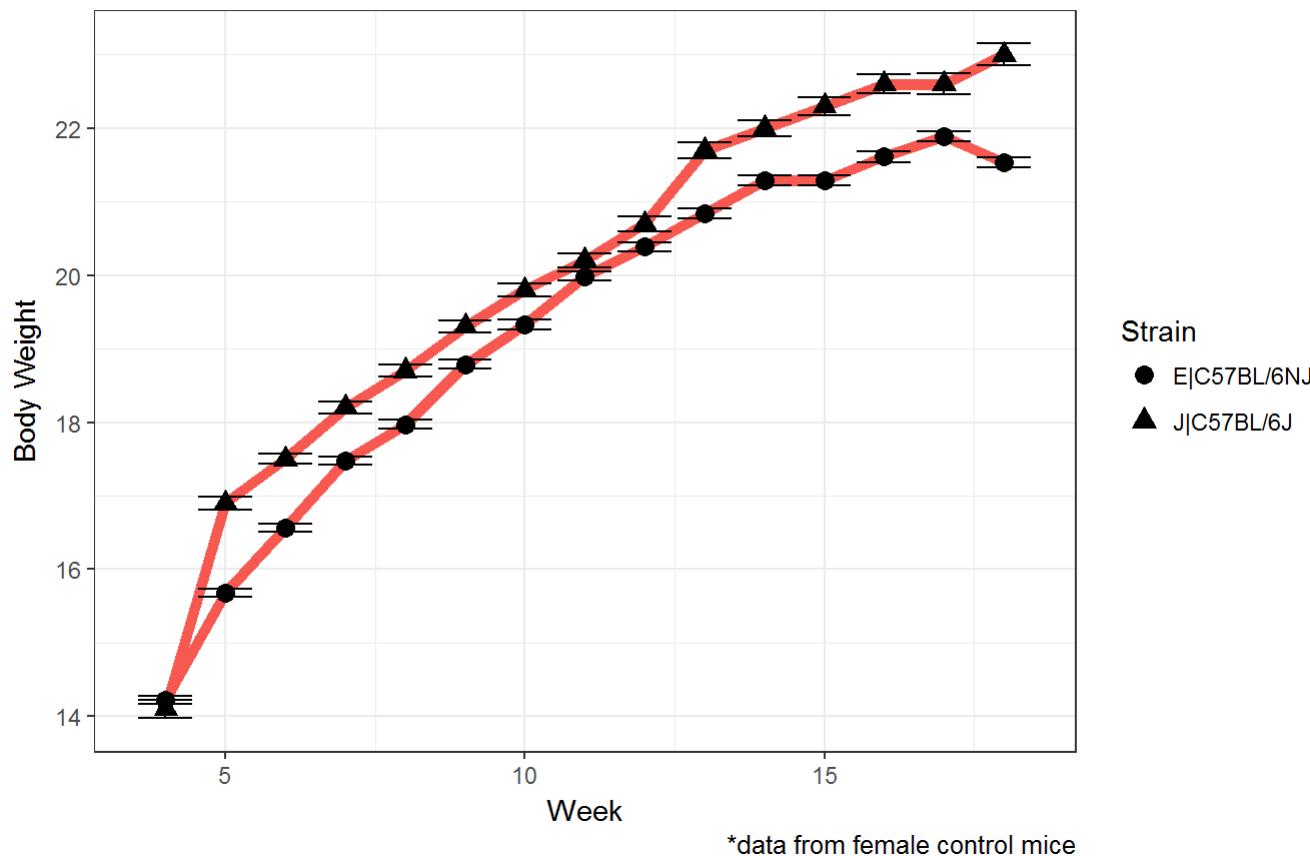
Male Body Weight over Week

Body weight by week for male control mice, faceted by strain with SD error bars



Female Body Weight over Week with SE Bars

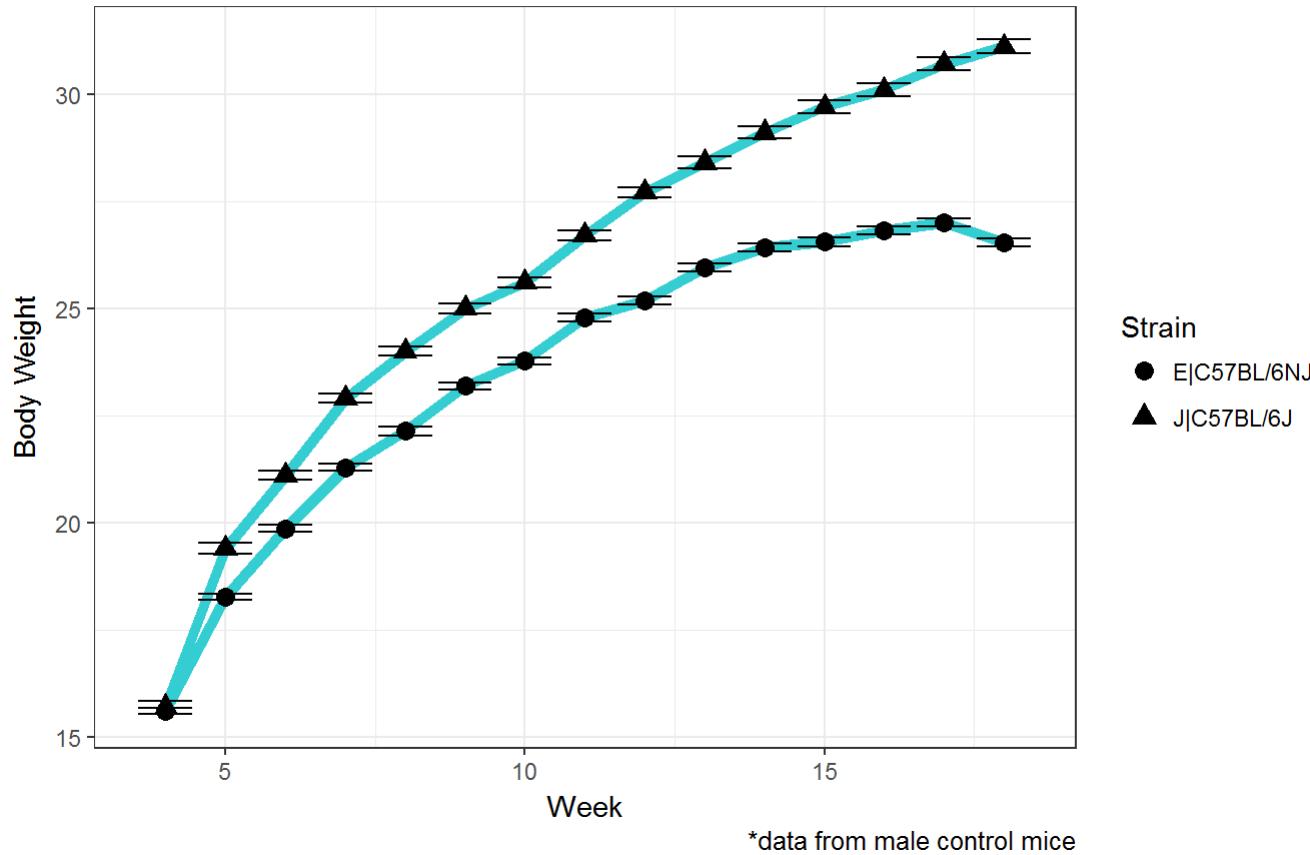
KOMP experimental mice have consistently lower body weight.



*data from female control mice

Male Body Weight over Week with SE Bars

KOMP experimental mice have consistently lower body weight.



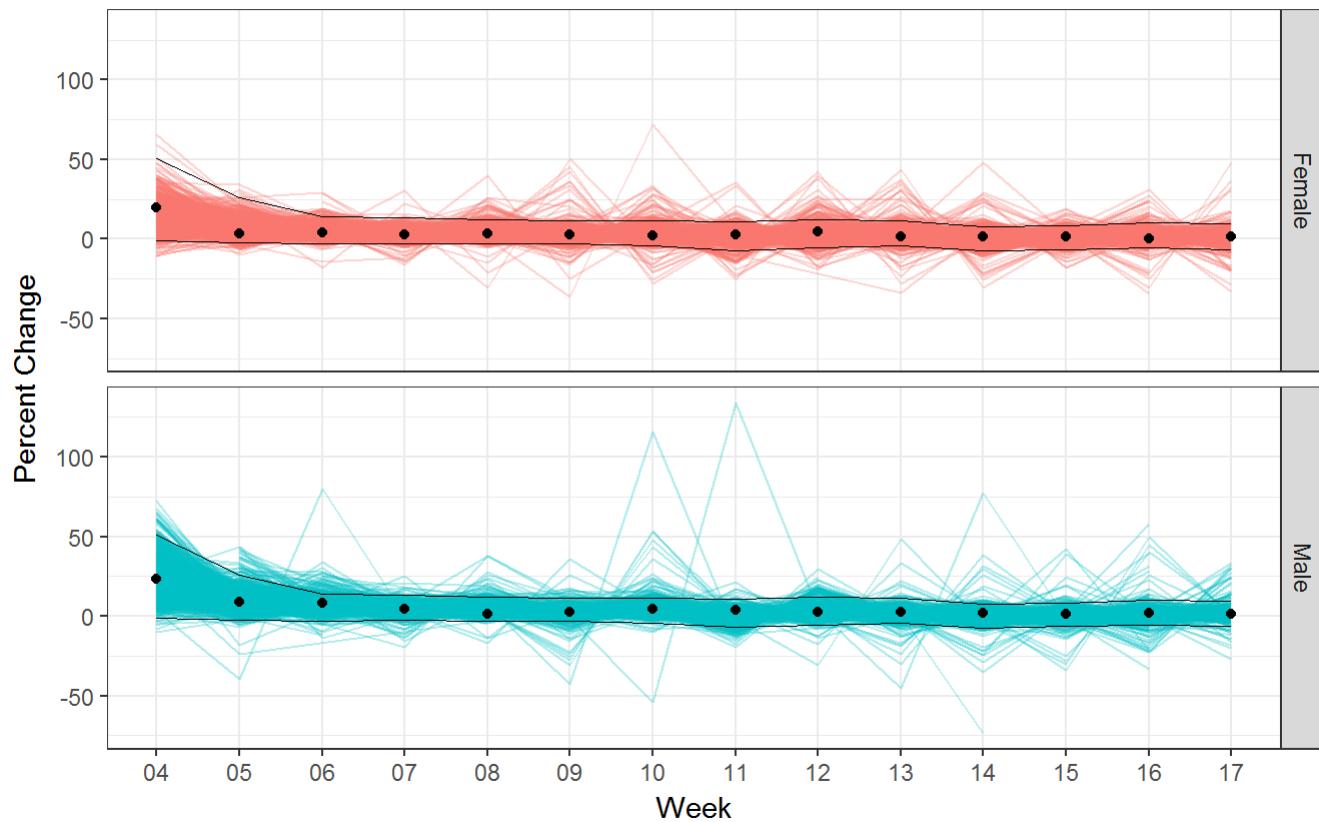
*data from male control mice

Again, our experimental data seems to have lower body weight than what is listed on jax.org. This may be due to the fact that experimental mice are undergoing weekly tests, and the stress causes a decreased body weight.

Let's look again at percent body weight change, this time including the values for J|C57BL/6NJ

Percent Change over Week with J|C57BL/6J Indicators

KOMP experimental mice have similar rate of growth to Jax|C57BL/6J



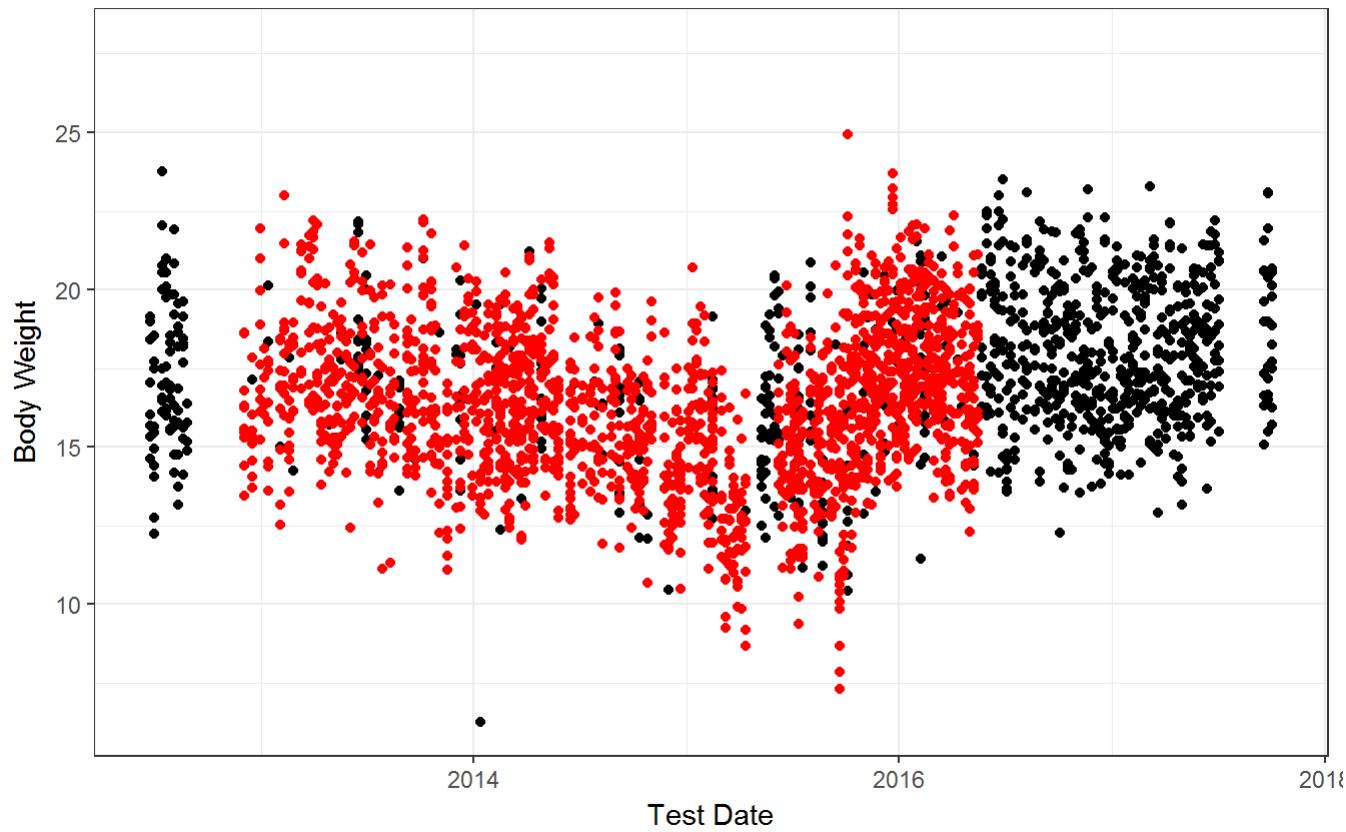
*data from control mice

It looks very similar.

Other Observations

Body Weight at Week 5 over Test Date

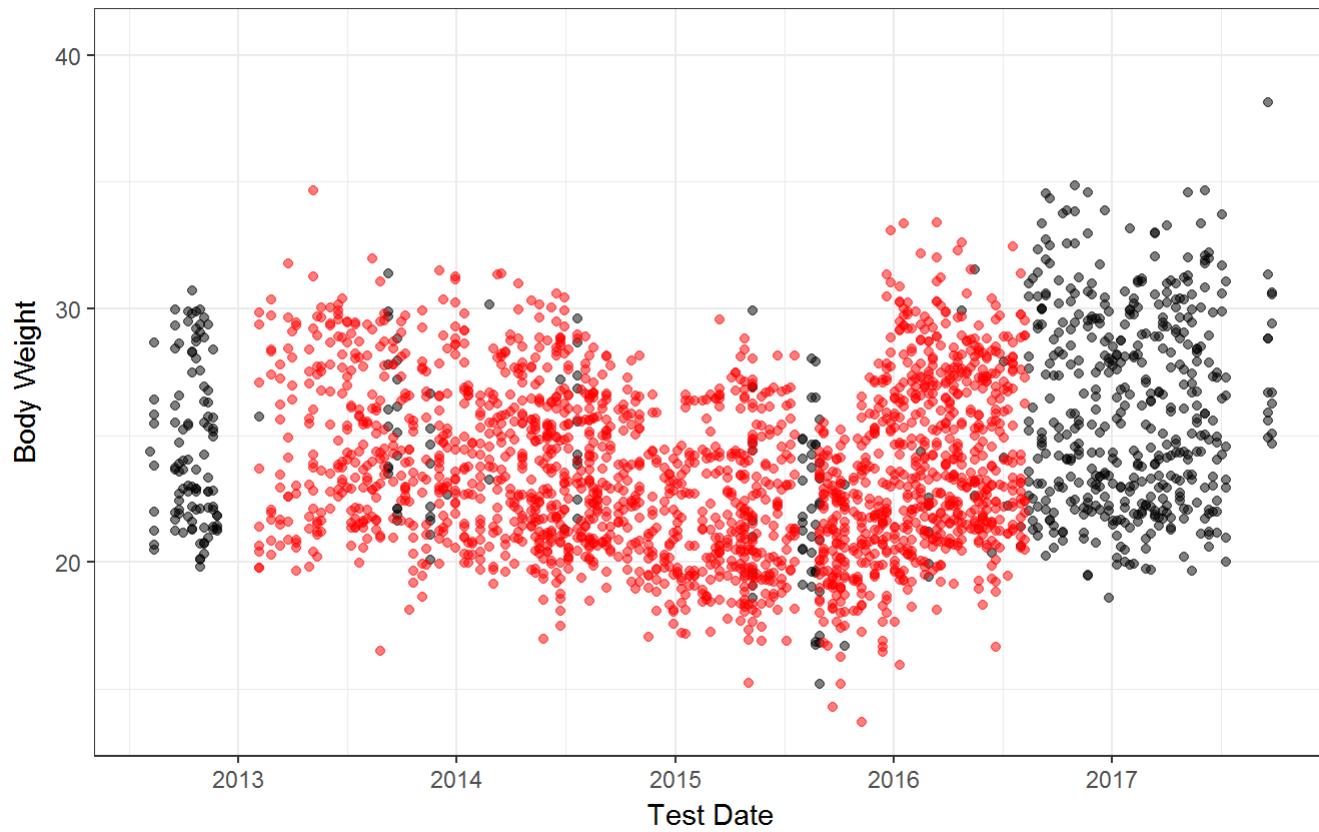
Week 18 mice are 5 weeks old between 2013 and mid-2016.



*data from control mice

Body Weight at Week 17 over Test Date

Week 18 mice are 17 weeks old between 2013 and mid-2016.

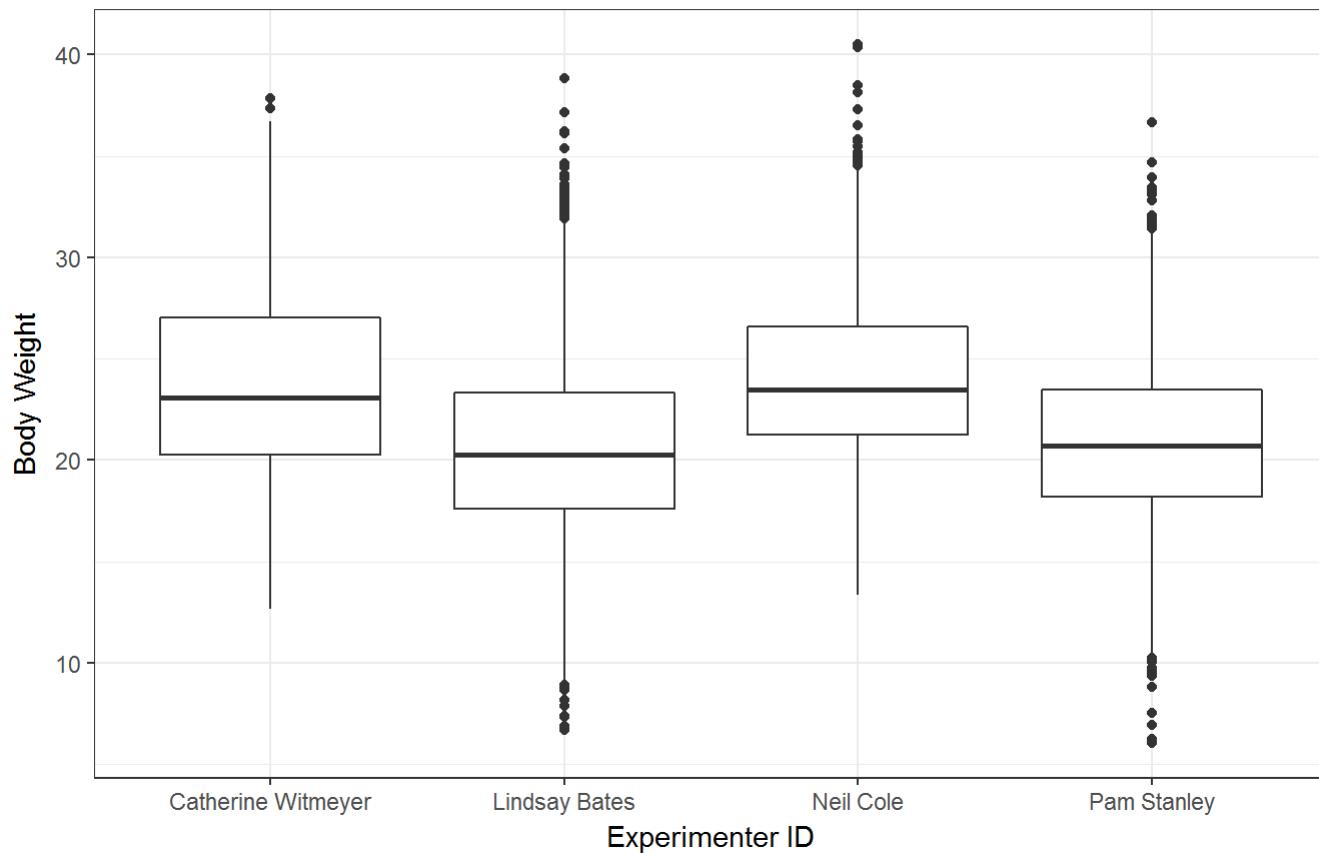


*data from control mice

Body weight by experimenter:

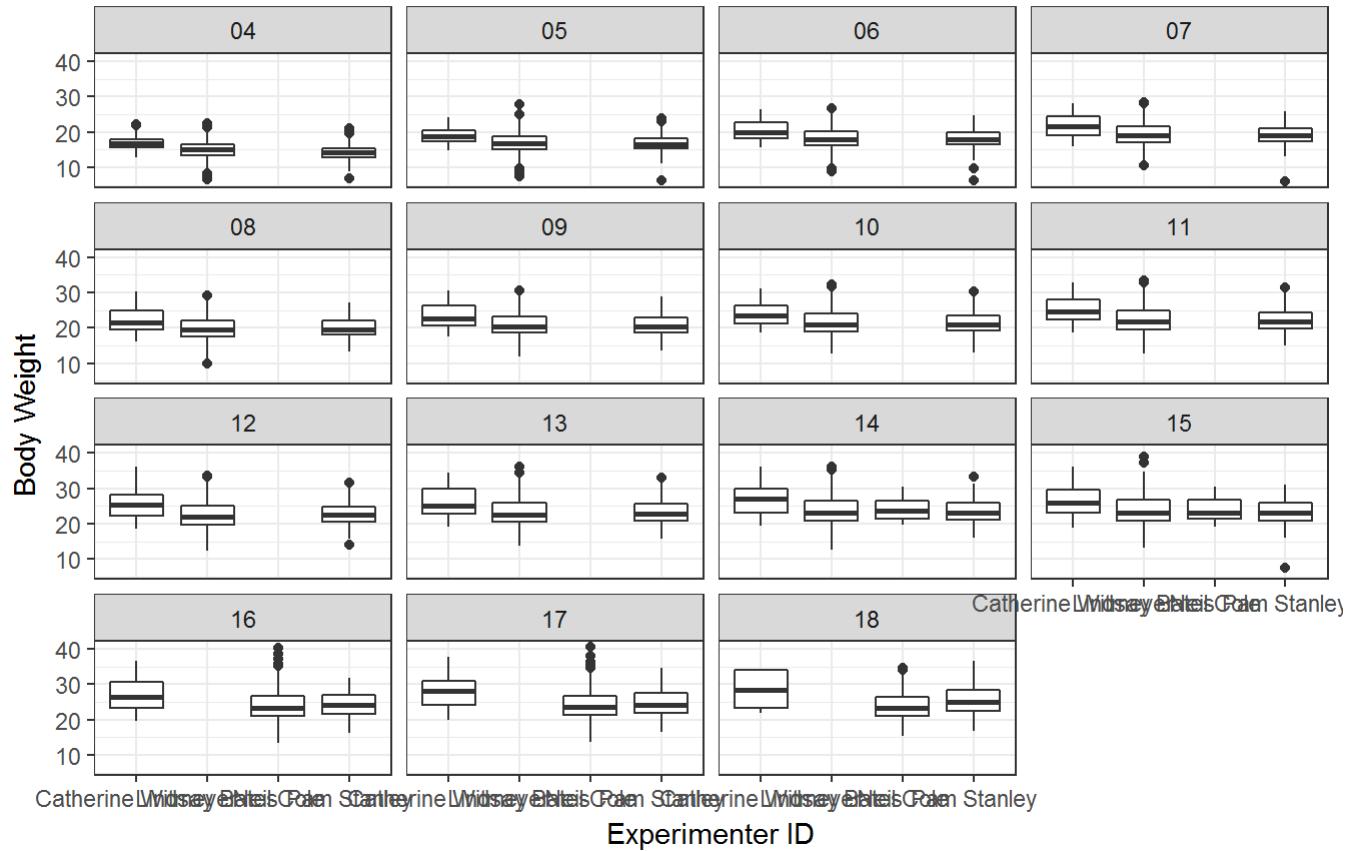
Body Weight over Experimenter ID

Body weights by experimenter

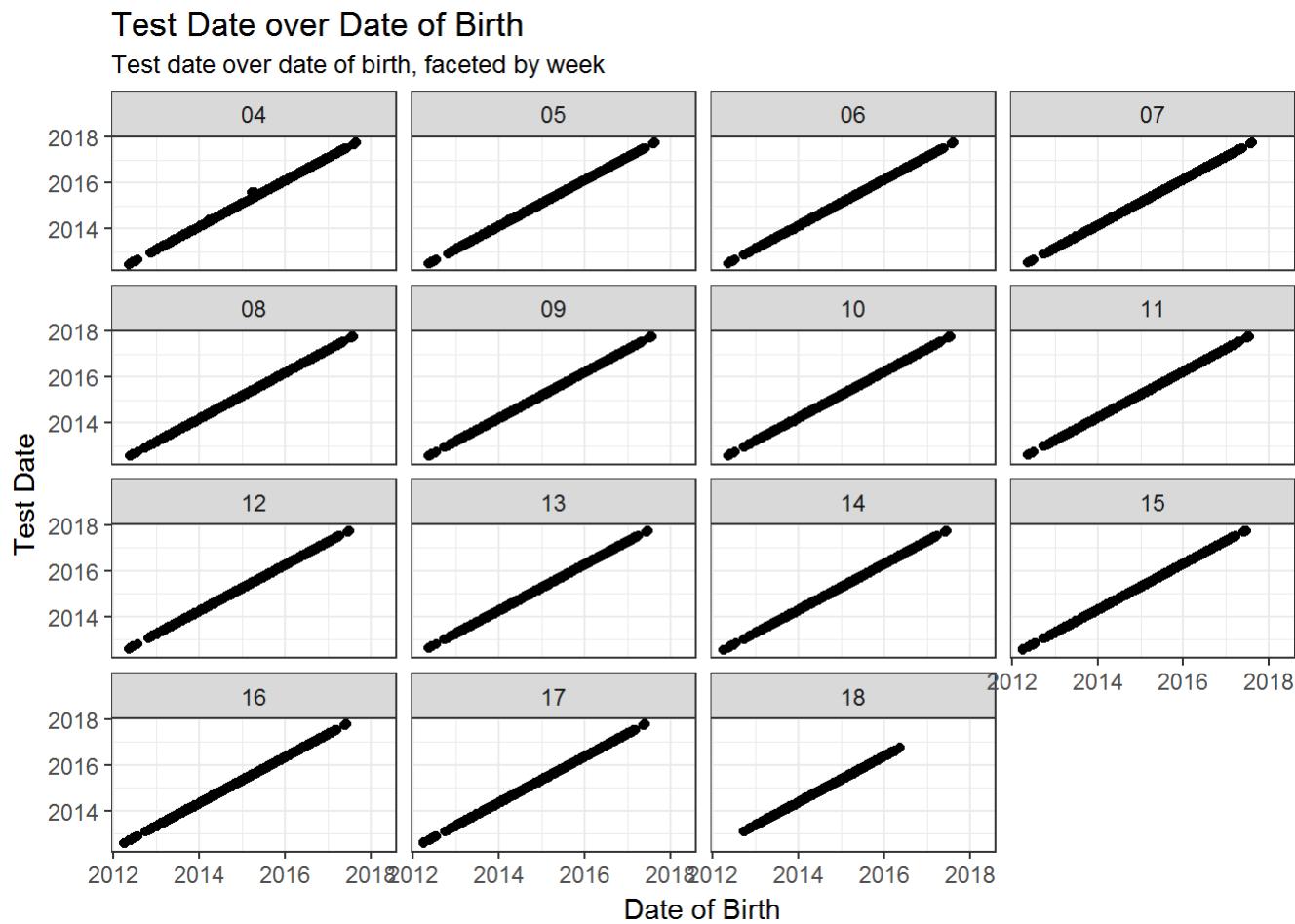


Body Weight over Experimenter ID

Body weights by experimenter, faceted by week



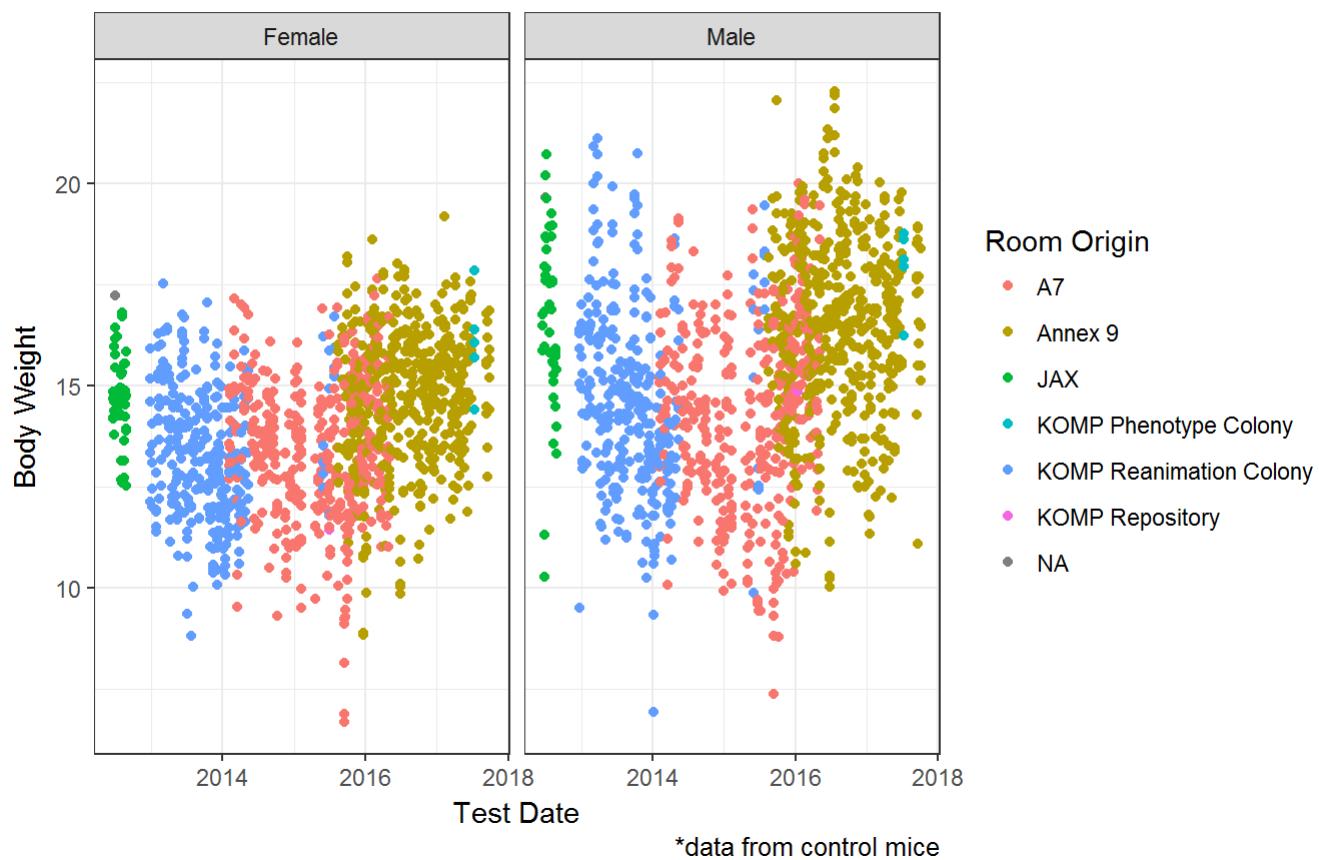
Test date over date of birth:



Week 4 and 17 over Test Date:

Body Weight at Week 4 over Test Date

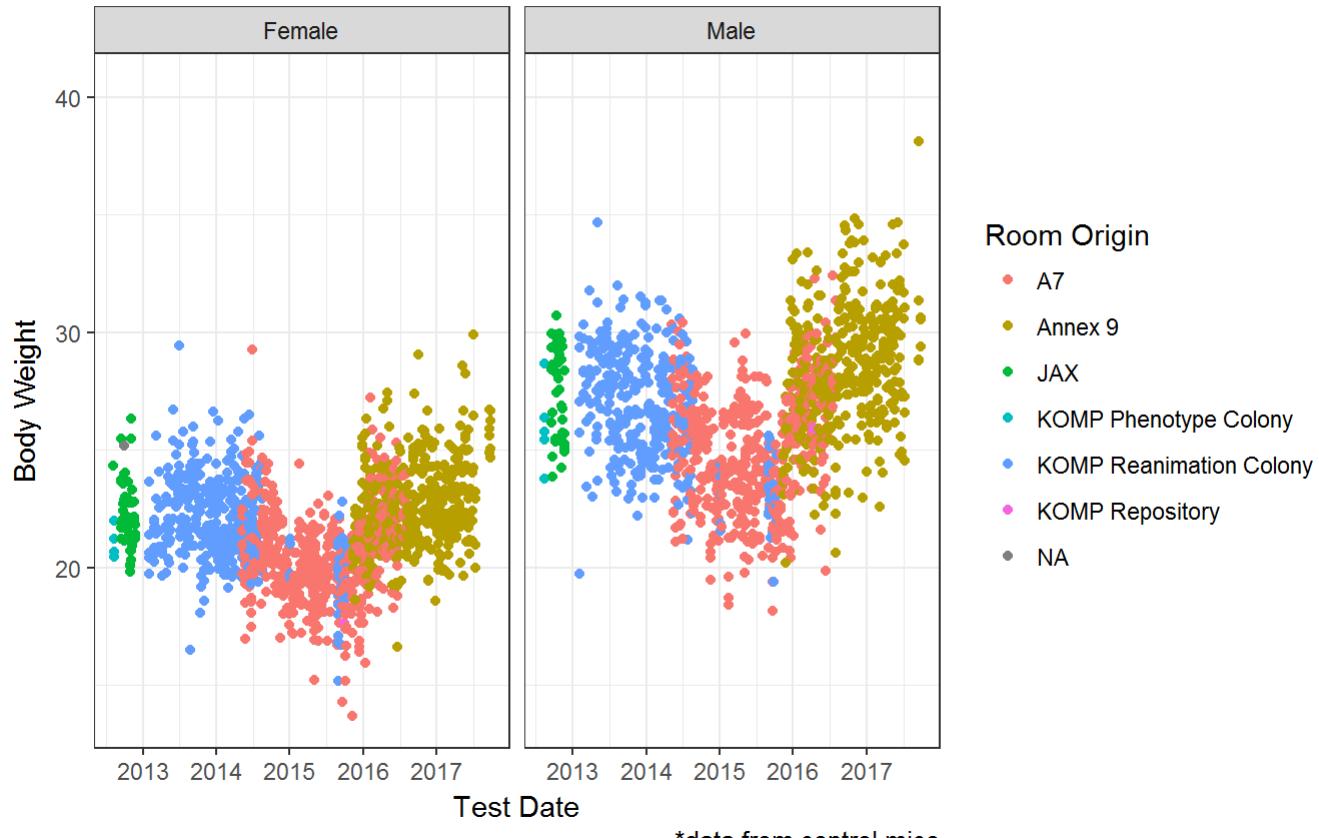
Trend to body weight over test date that is reflected in other experiments



*data from control mice

Body Weight at Week 17 over Test Date

Trend to body weight over test date that is reflected in other experiments



*data from control mice

There may be some effect of experimenter or room origin on weight measurement.

Data Analysis

After some initial data cleaning, we can perform some analysis on the data.

Summary Statistics

Week 4 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	14.22	14.38	1.84	11	17	12.96%
Male Control Body Weight	15.61	15.71	2.49	11	20	15.96%

Week 5 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	15.68	15.85	1.78	12	19	11.33%
Male Control Body Weight	18.28	18.62	2.50	12	22	13.7%

Week 6 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	16.57	16.75	1.84	12	20	11.11%
Male Control Body Weight	19.86	20.08	2.62	14	24	13.19%

Week 7 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	17.47	17.65	1.82	13	21	10.44%

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Male Control Body Weight	21.29	21.52	2.65	15	26	12.46%

Week 8 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	17.97	18.15	1.83	14	21	10.17%
Male Control Body Weight	22.14	22.26	3.05	16	27	13.76%

Week 9 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	18.79	18.92	1.83	15	22	9.72%
Male Control Body Weight	23.19	23.22	2.66	18	28	11.45%

Week 10 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	19.33	19.41	2.00	15	23	10.33%
Male Control Body Weight	23.77	23.87	2.79	18	29	11.75%

Week 11 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	19.99	20.05	1.95	16	24	9.77%
Male Control Body Weight	24.78	24.79	2.83	19	30	11.43%

Week 12 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	20.38	20.46	2.11	16	24	10.33%
Male Control Body Weight	25.18	25.20	2.91	19	31	11.55%

Week 13 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	20.84	20.86	2.09	17	25	10.05%
Male Control Body Weight	25.95	25.98	2.94	20	32	11.34%

Week 14 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	21.29	21.24	2.09	17	26	9.8%
Male Control Body Weight	26.42	26.48	2.97	21	32	11.25%

Week 15 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	21.29	21.2	2.16	17	26	10.13%
Male Control Body Weight	26.55	26.5	3.04	21	33	11.47%

Week 16 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	21.61	21.52	2.16	18	26	9.99%
Male Control Body Weight	26.81	26.81	3.12	21	33	11.62%

Week 17 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	21.89	21.76	2.23	18	27	10.2%
Male Control Body Weight	27.00	26.88	3.13	21	33	11.6%

Week 18 Body Weight

Data	Mean	Median	Standard Deviation	2.5%	97.5%	Coefficient of Variation
Female Control Body Weight	21.54	21.47	2.11	18	26	9.81%
Male Control Body Weight	26.53	26.52	2.77	22	32	10.44%

Data Visualization

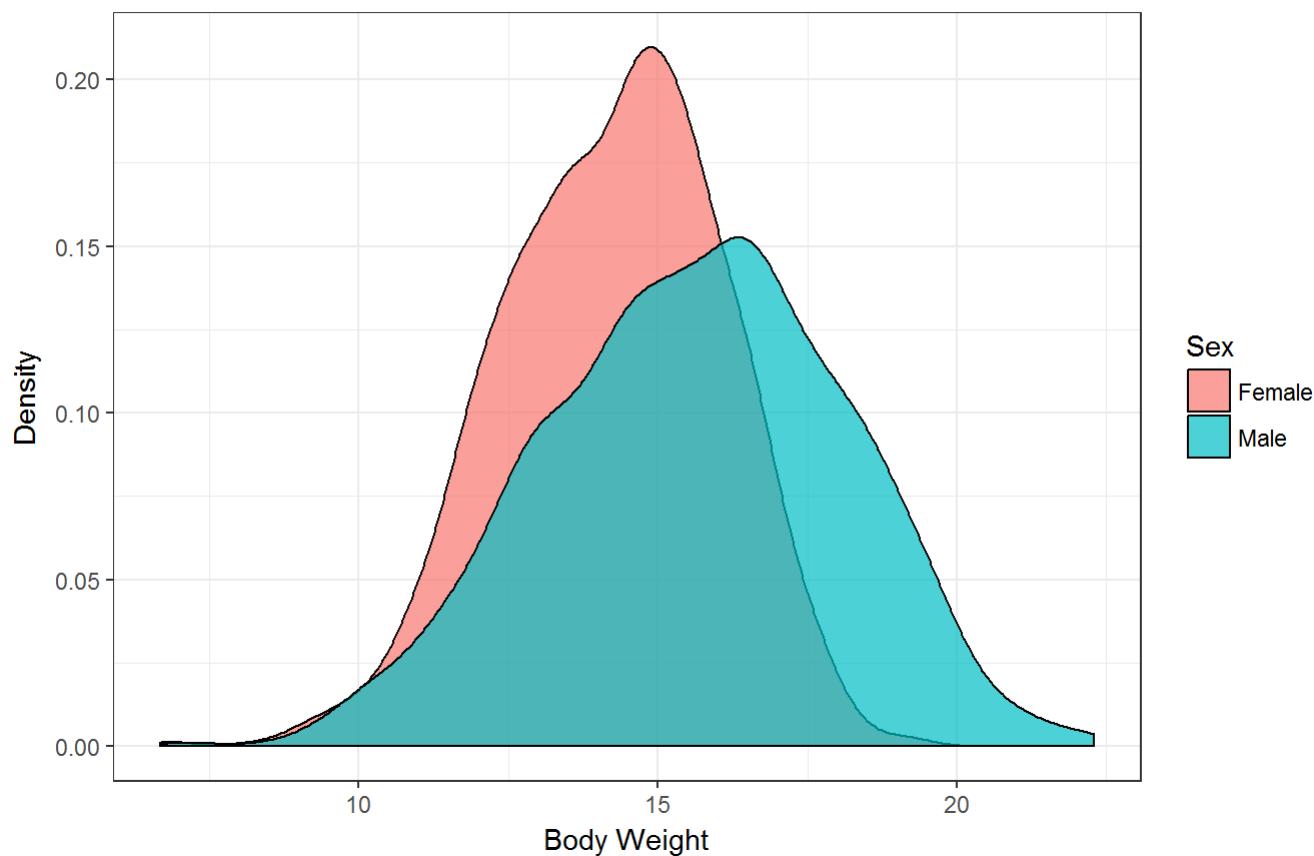
Basic density graphs showing female and male controls with the range indicators.

Week 4 Body Weight

```
## [[1]]
```

Density Plot

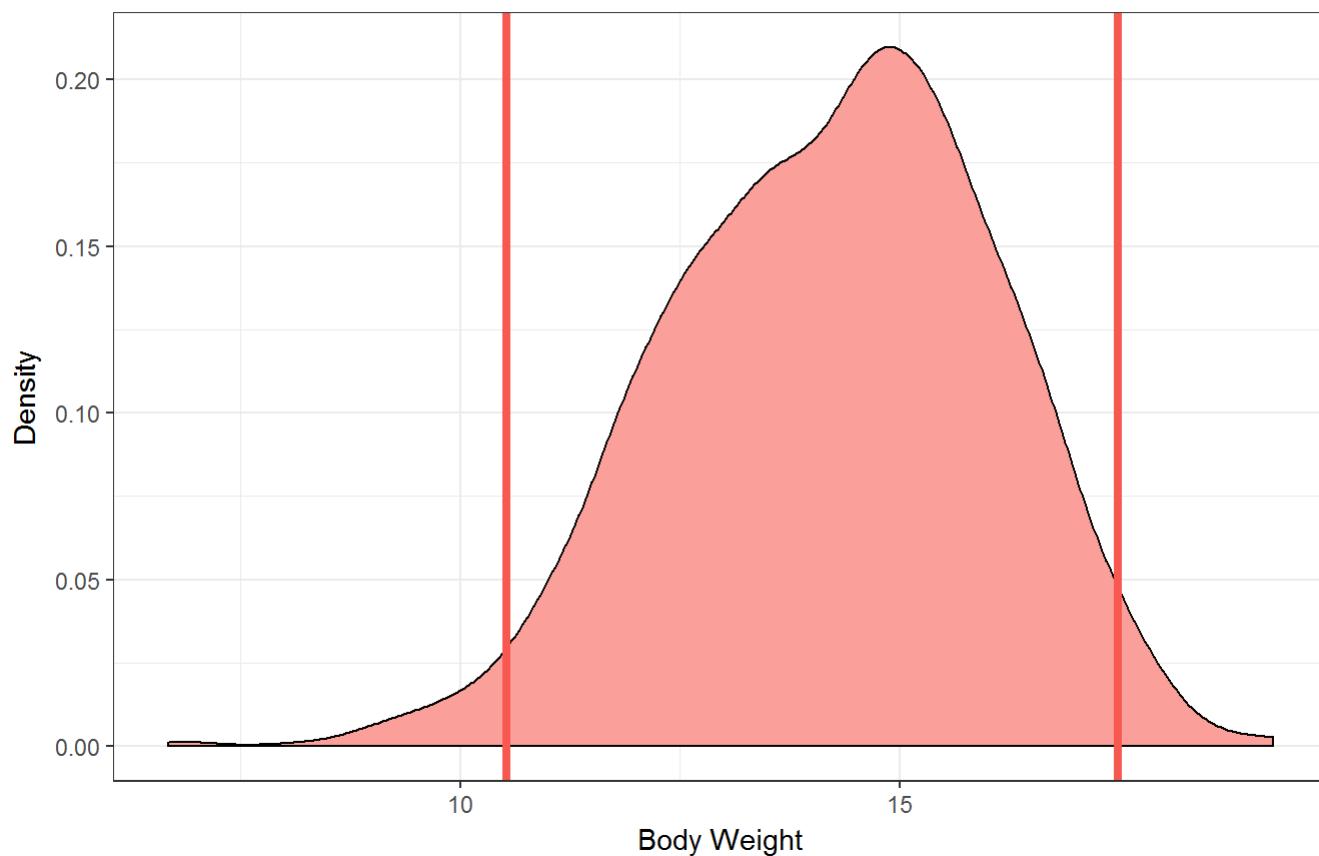
Body Weight by sex for control mice



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##  
## [[2]]
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Female Mice Density Plot

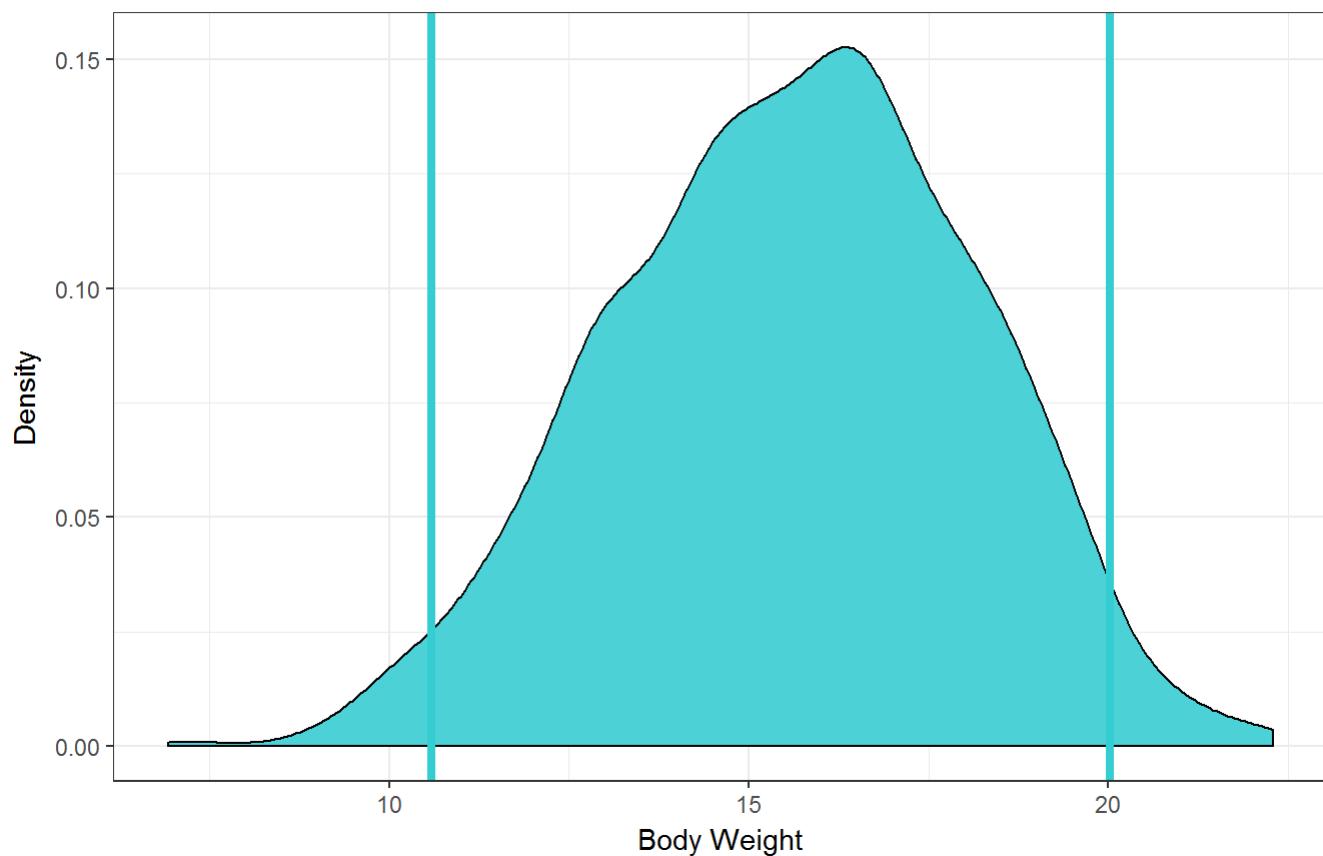
Body Weight with 2.5% (10.524) and 97.5% (17.4795) indicator for control mice



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##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (10.59375) and 97.5% (20.0225) indicator for control mice

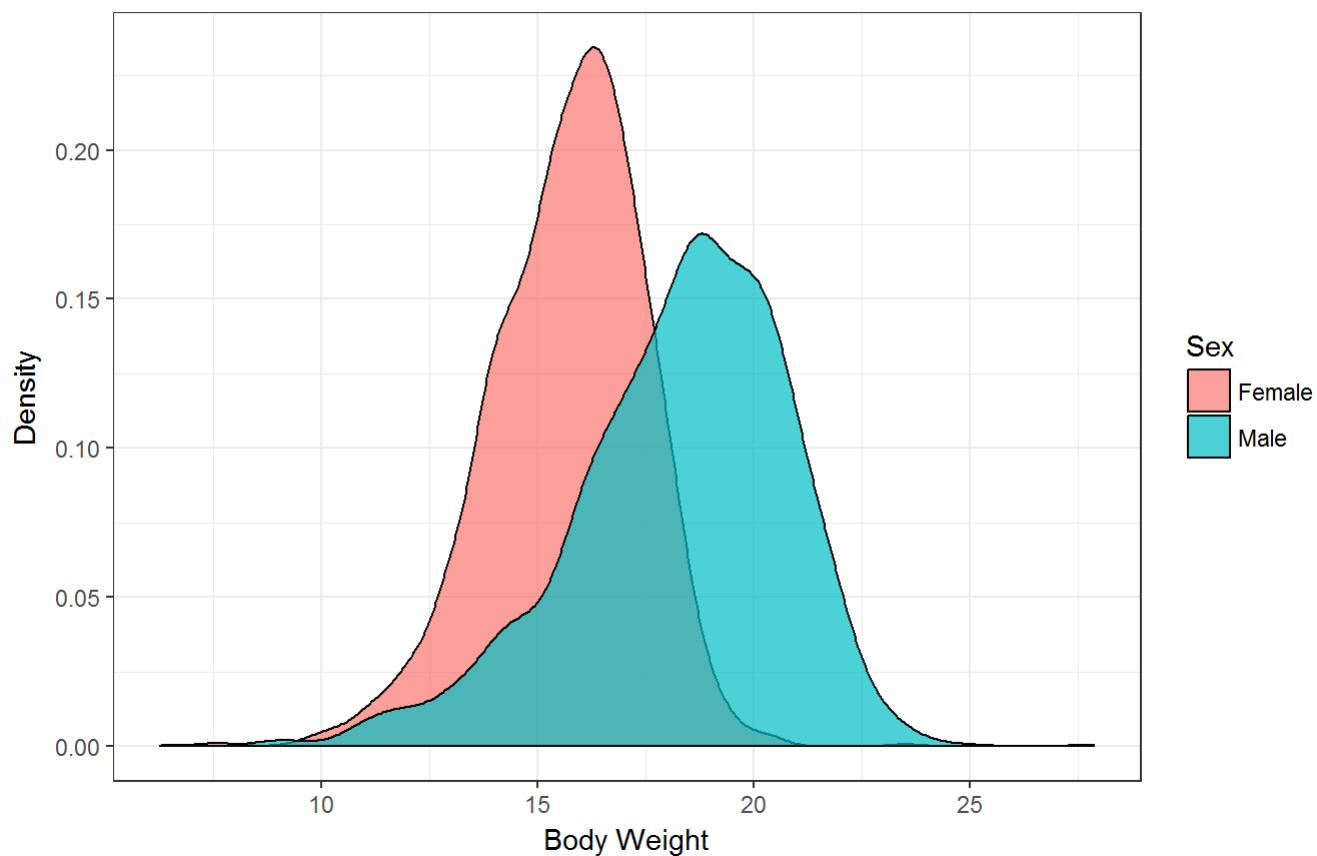


Week 5 Body Weight

```
## [[1]]
```

Density Plot

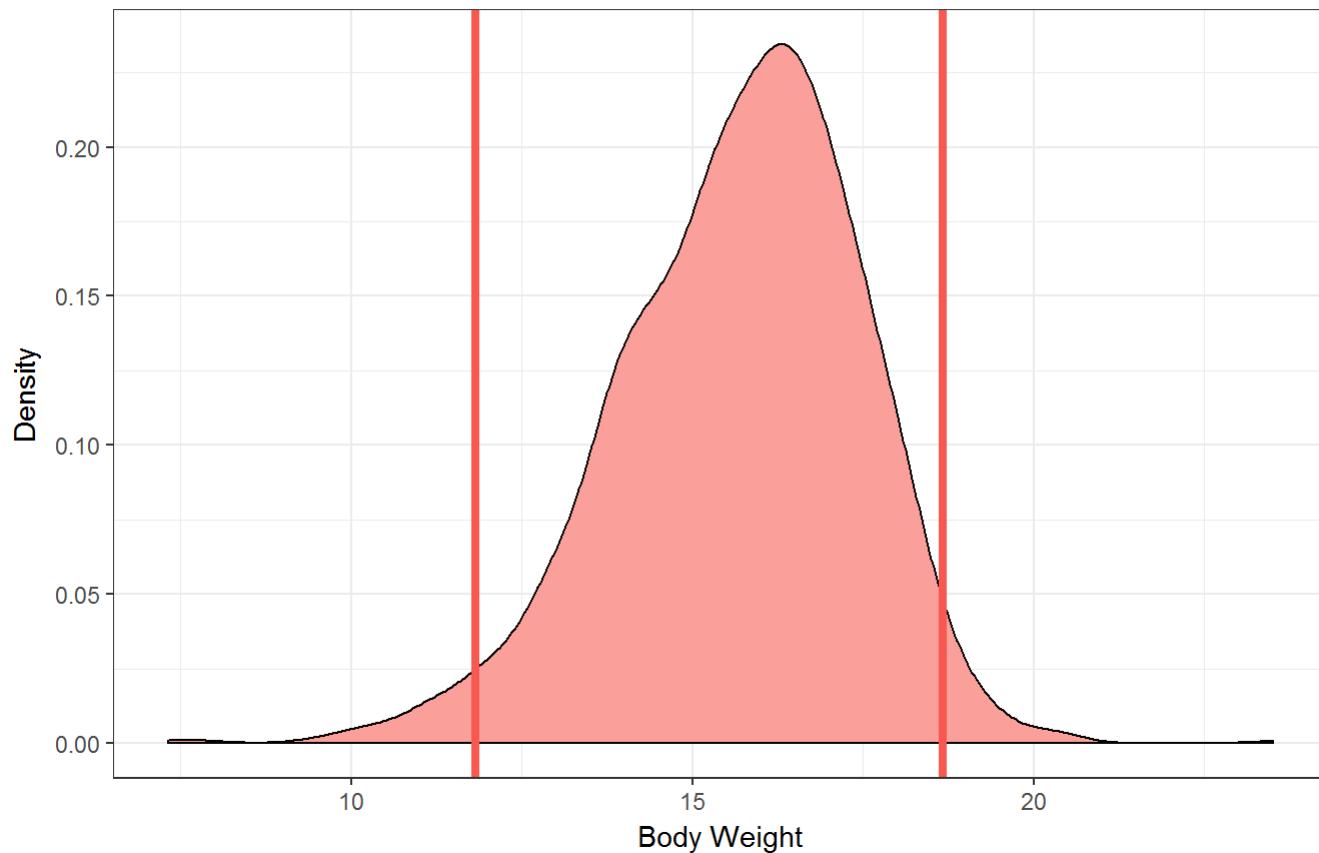
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

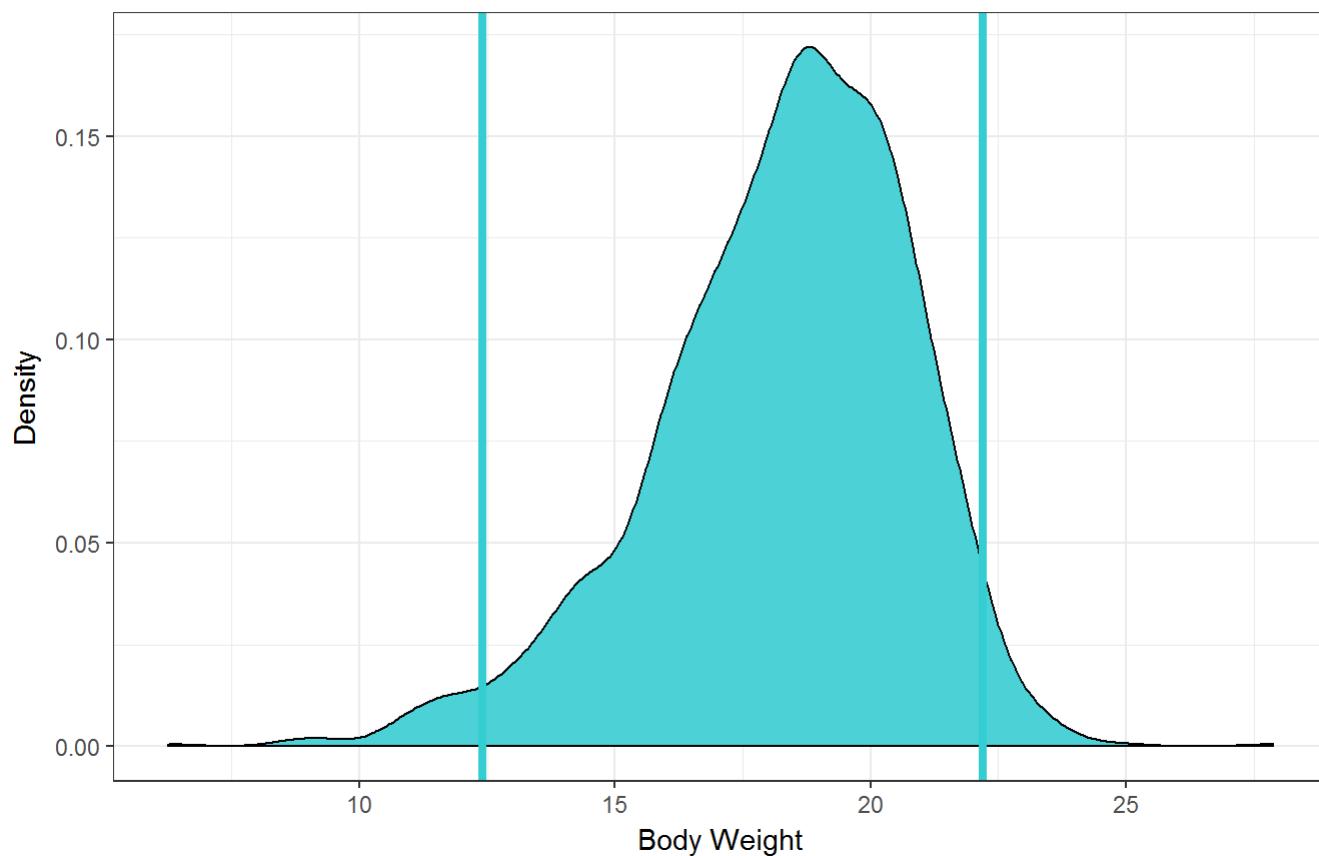
Body Weight with 2.5% (11.81875) and 97.5% (18.67) indicator for control mice



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##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (12.39925) and 97.5% (22.19825) indicator for control mice

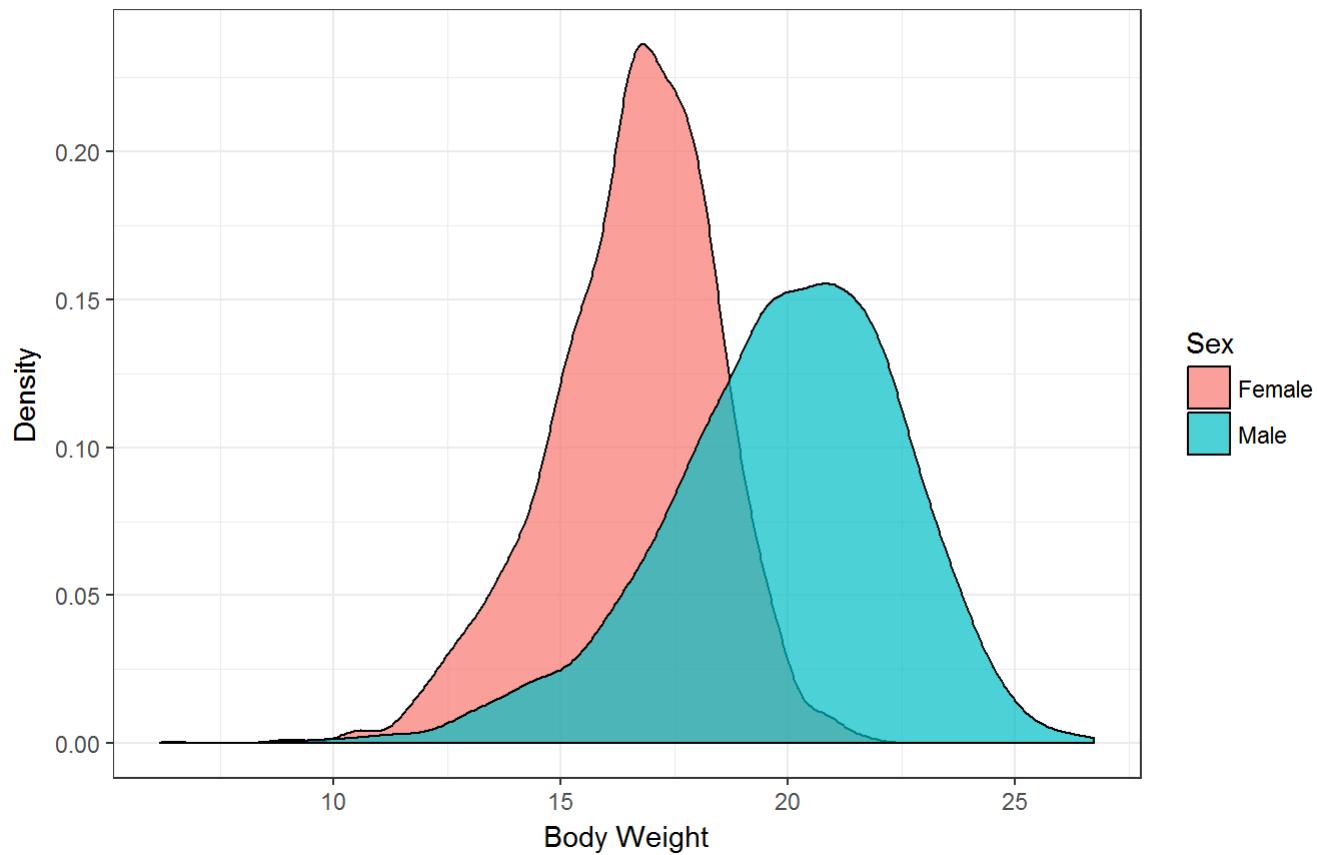


Week 6 Body Weight

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## [[1]]
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Density Plot

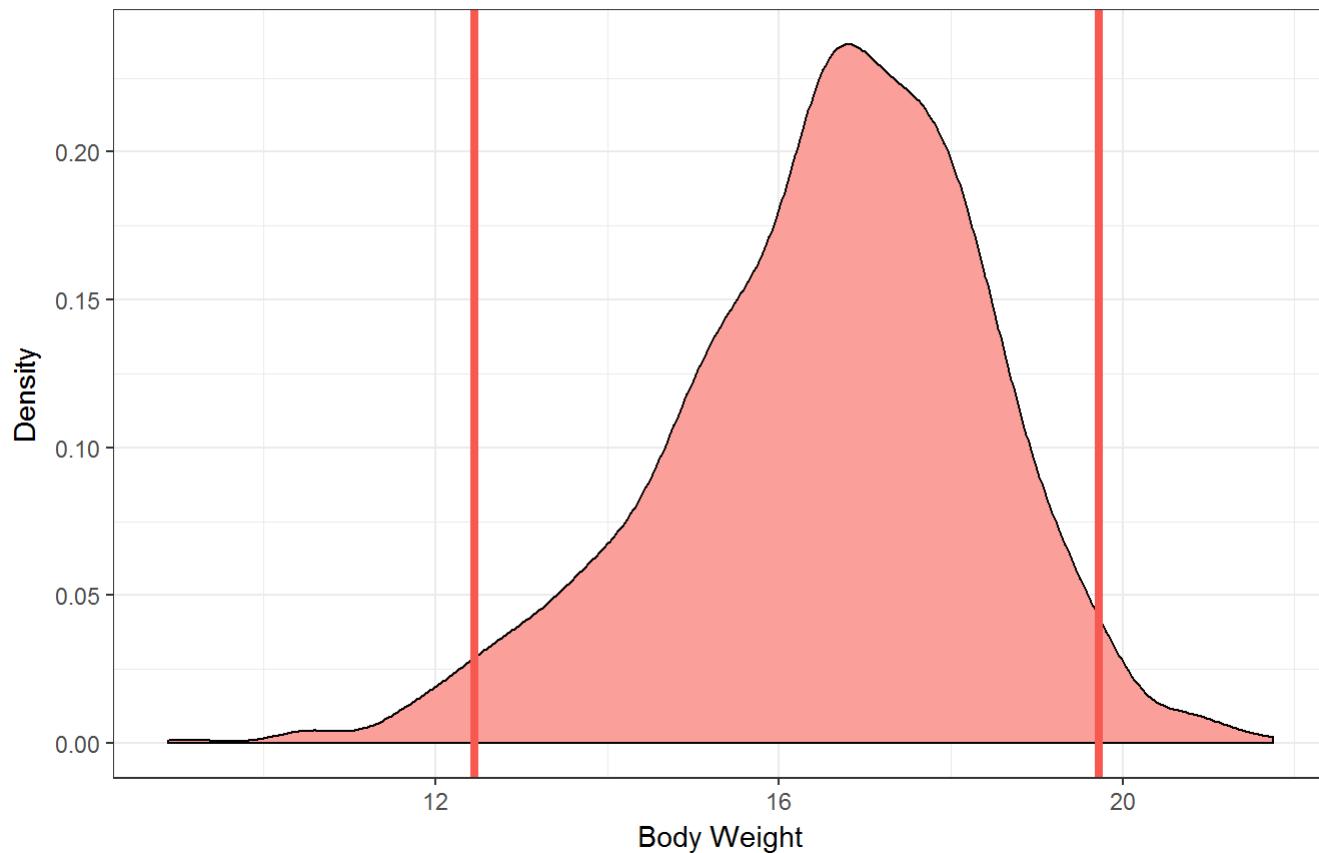
Body Weight by sex for control mice



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##  
## [[2]]
```

Female Mice Density Plot

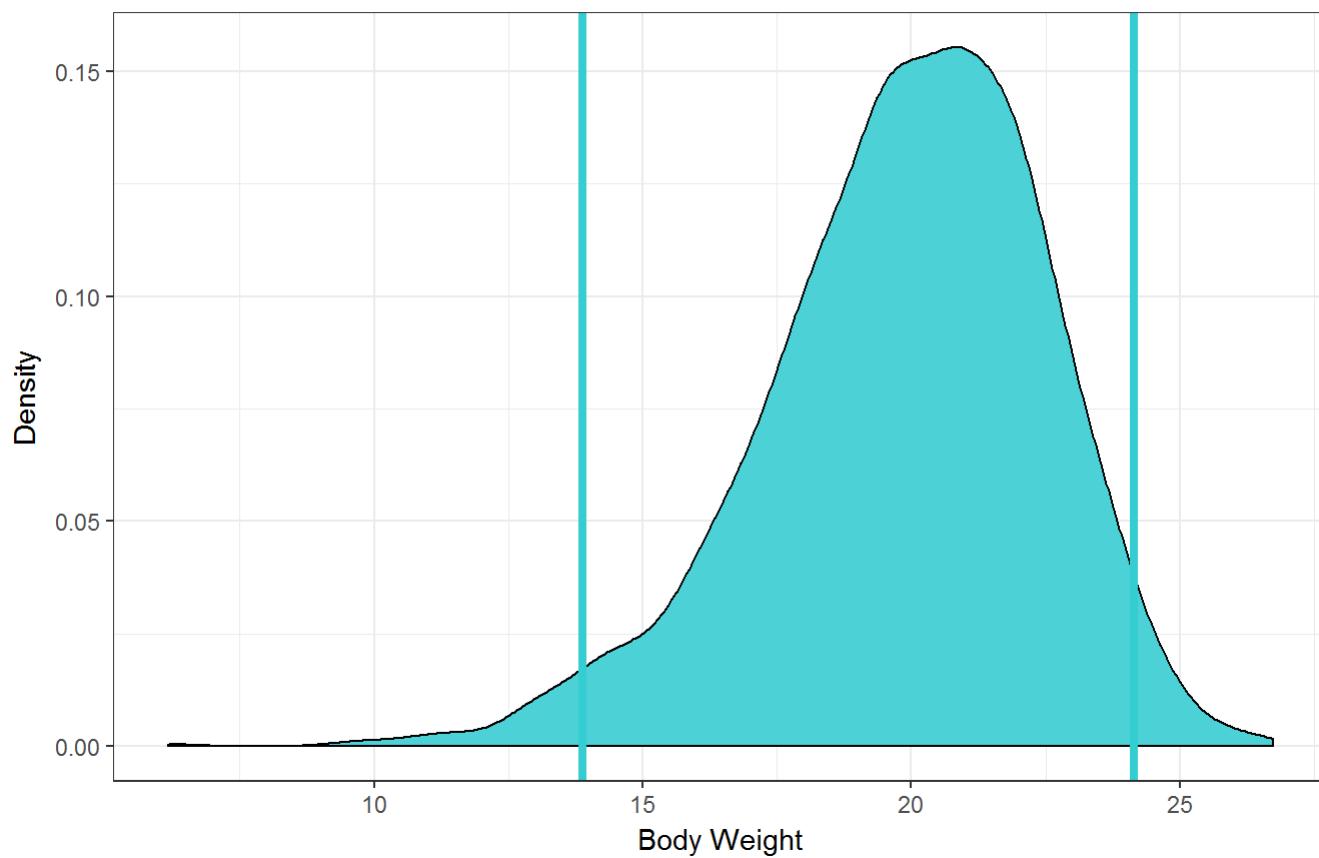
Body Weight with 2.5% (12.45475) and 97.5% (19.72525) indicator for control mice



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##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (13.87425) and 97.5% (24.1515) indicator for control mice

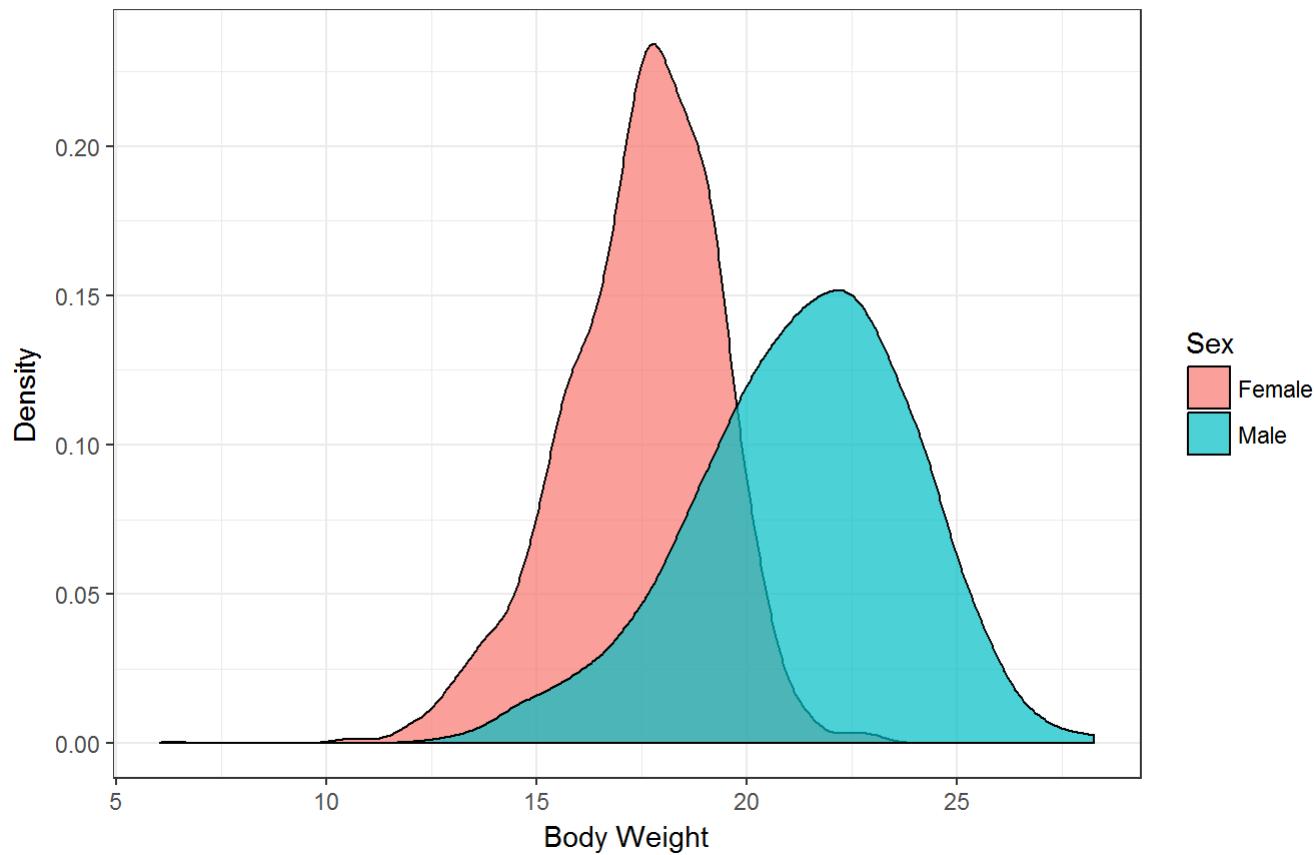


Week 7 Body Weight

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## [[1]]
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Density Plot

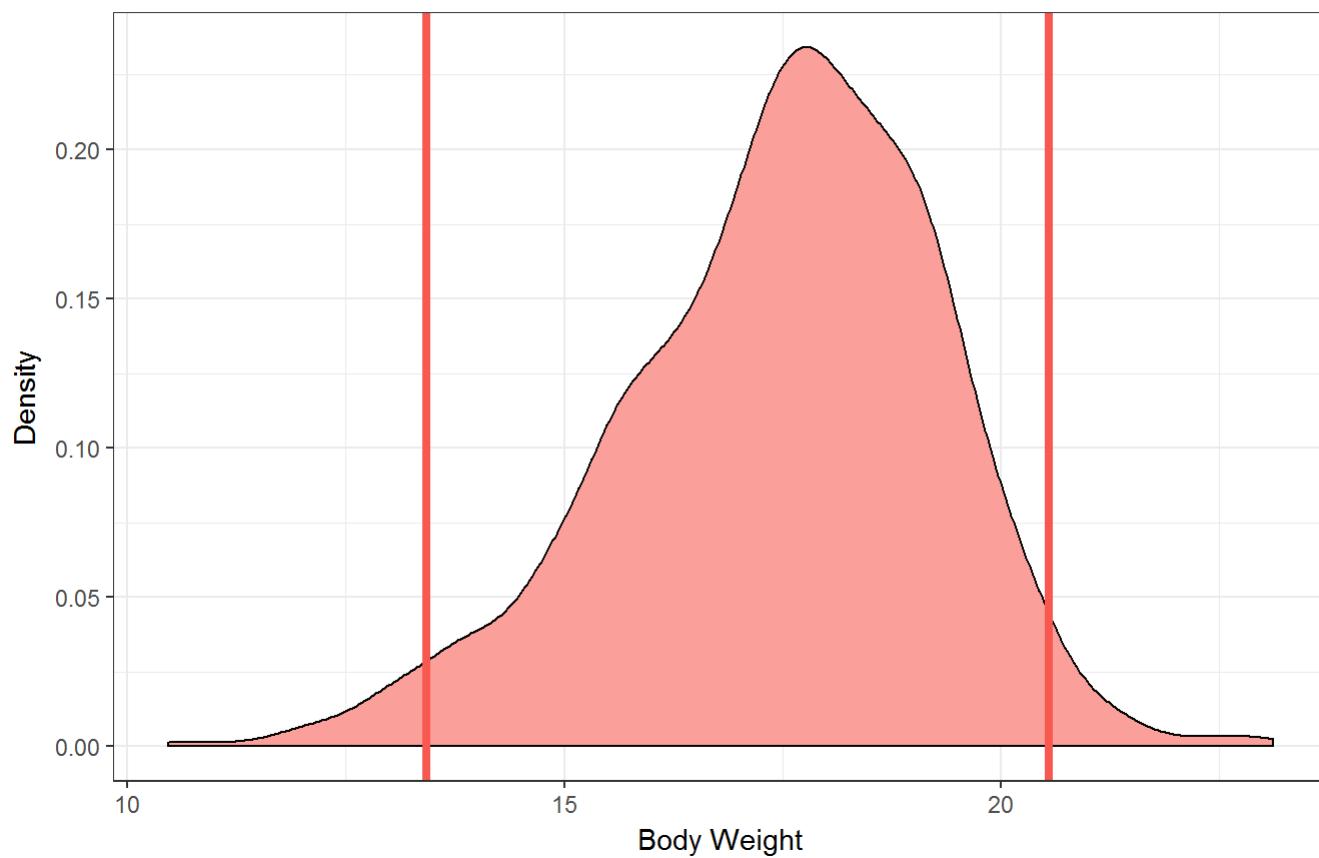
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

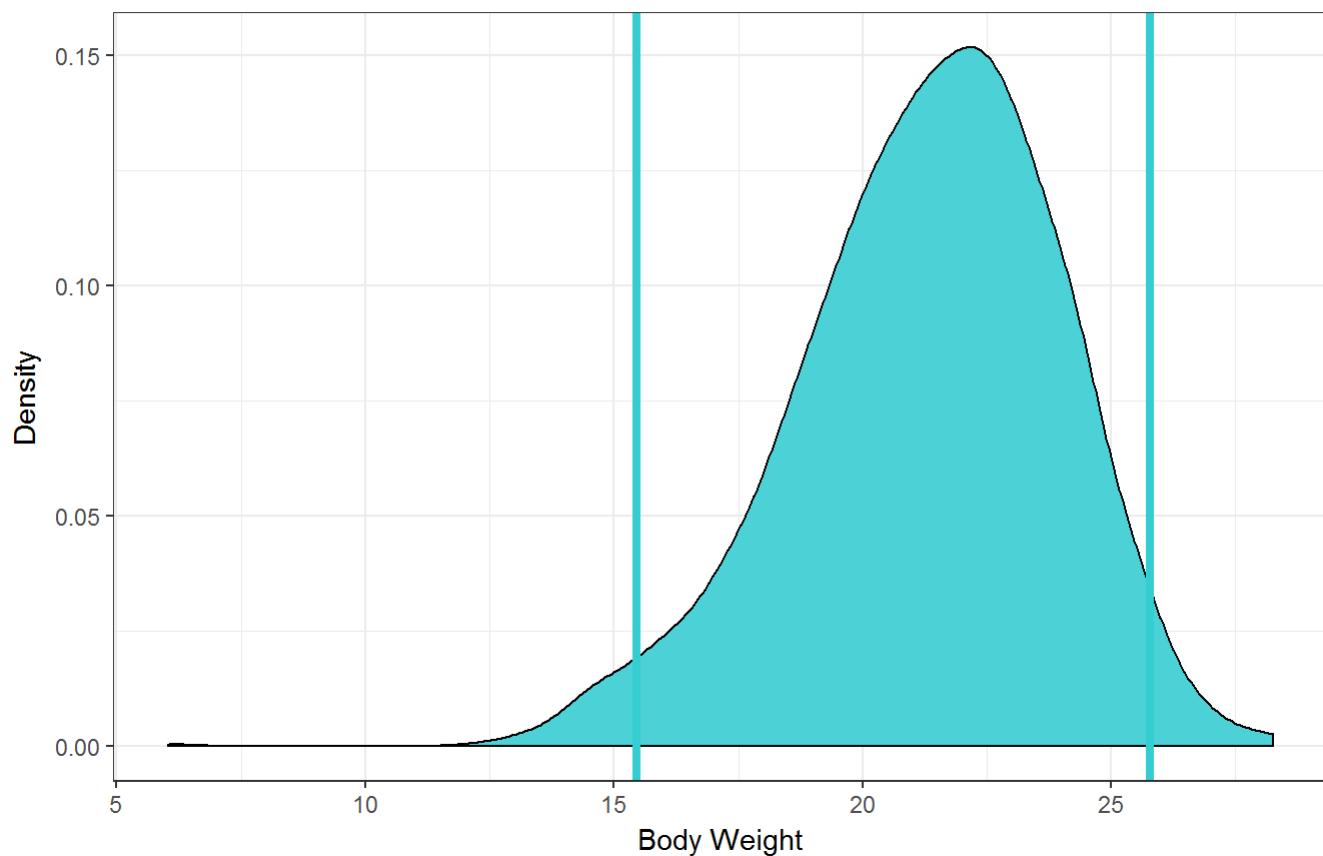
Body Weight with 2.5% (13.42375) and 97.5% (20.5425) indicator for control mice



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##  
## [[3]]
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Male Mice Density Plot

Body Weight with 2.5% (15.4665) and 97.5% (25.78) indicator for control mice

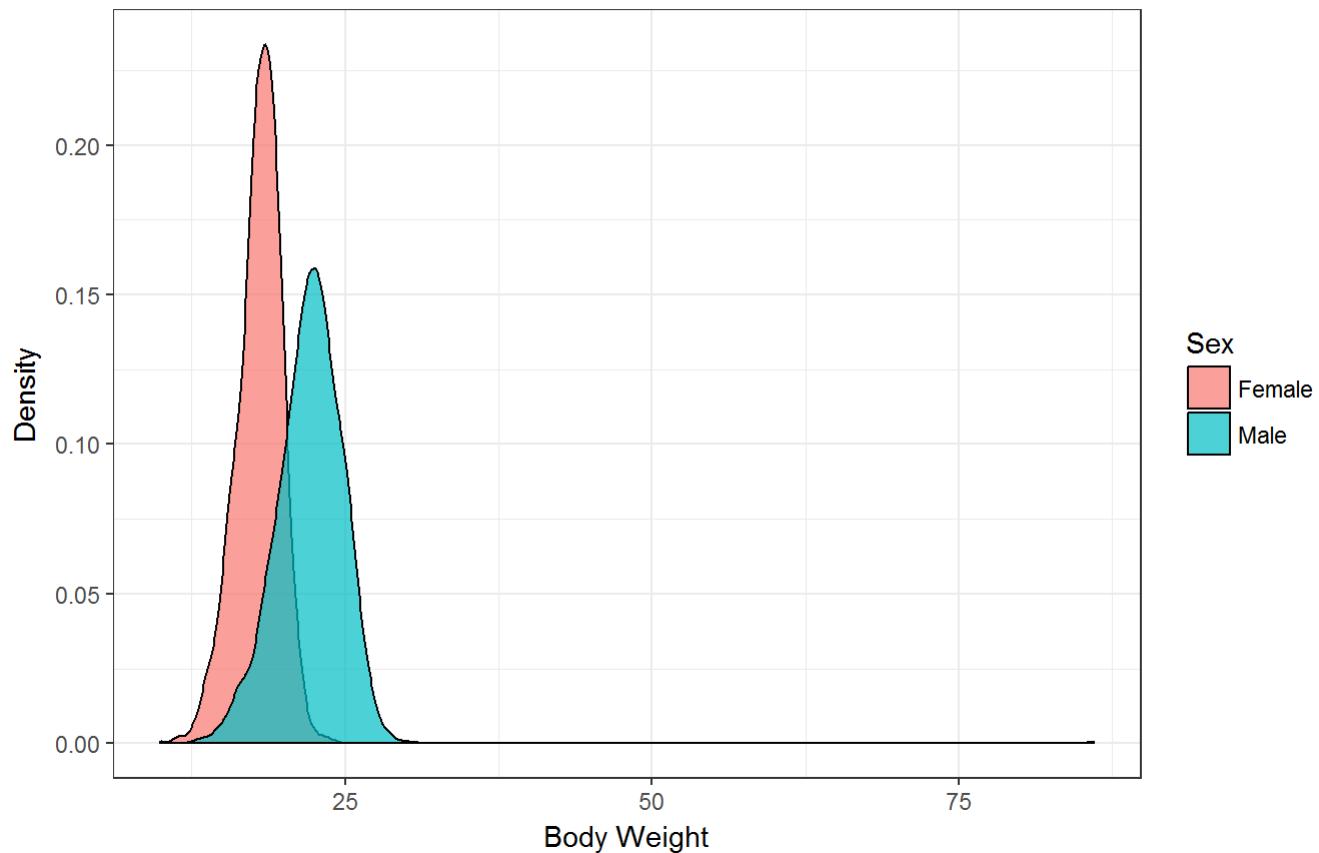


Week 8 Body Weight

```
## [[1]]
```

Density Plot

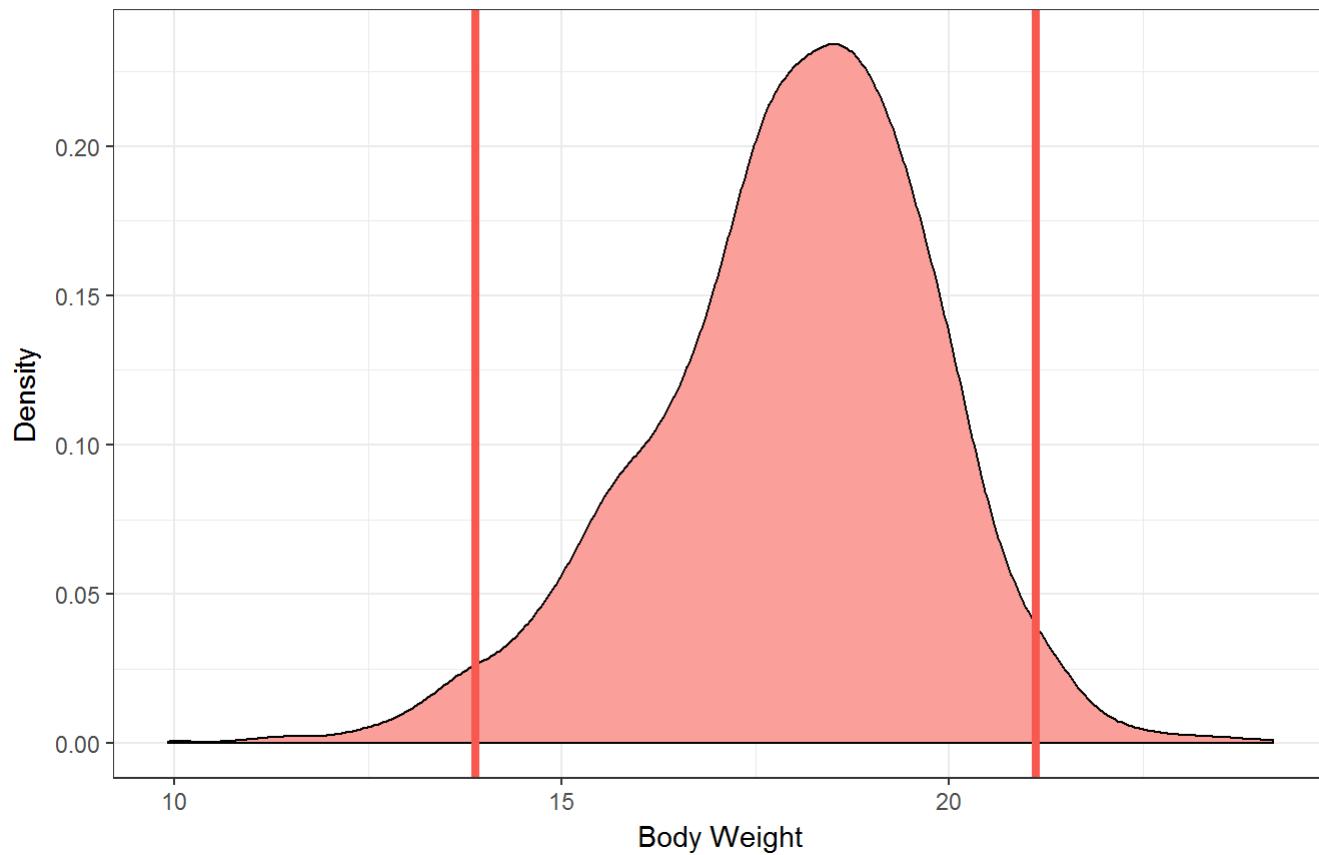
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

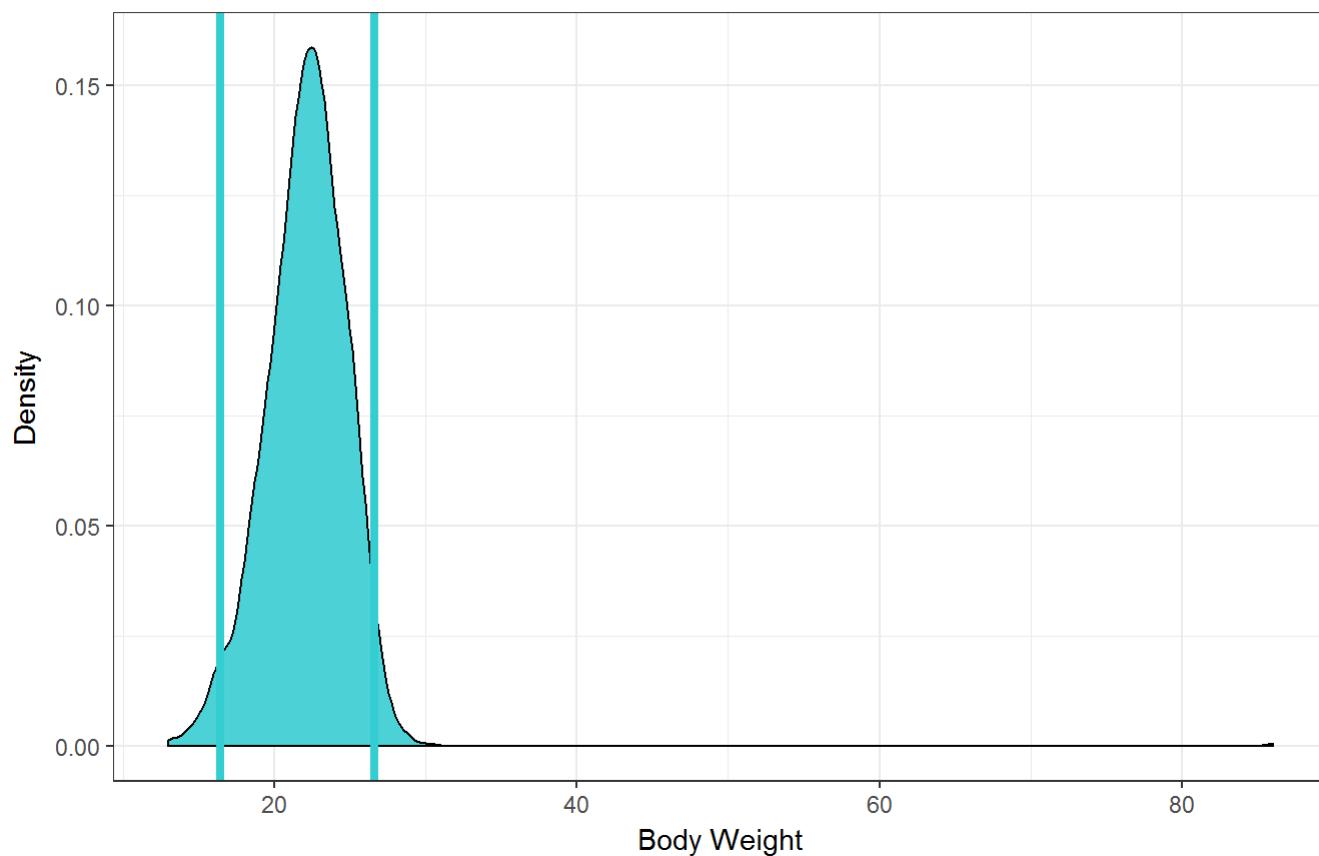
Body Weight with 2.5% (13.89) and 97.5% (21.12) indicator for control mice



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##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (16.429) and 97.5% (26.6615) indicator for control mice

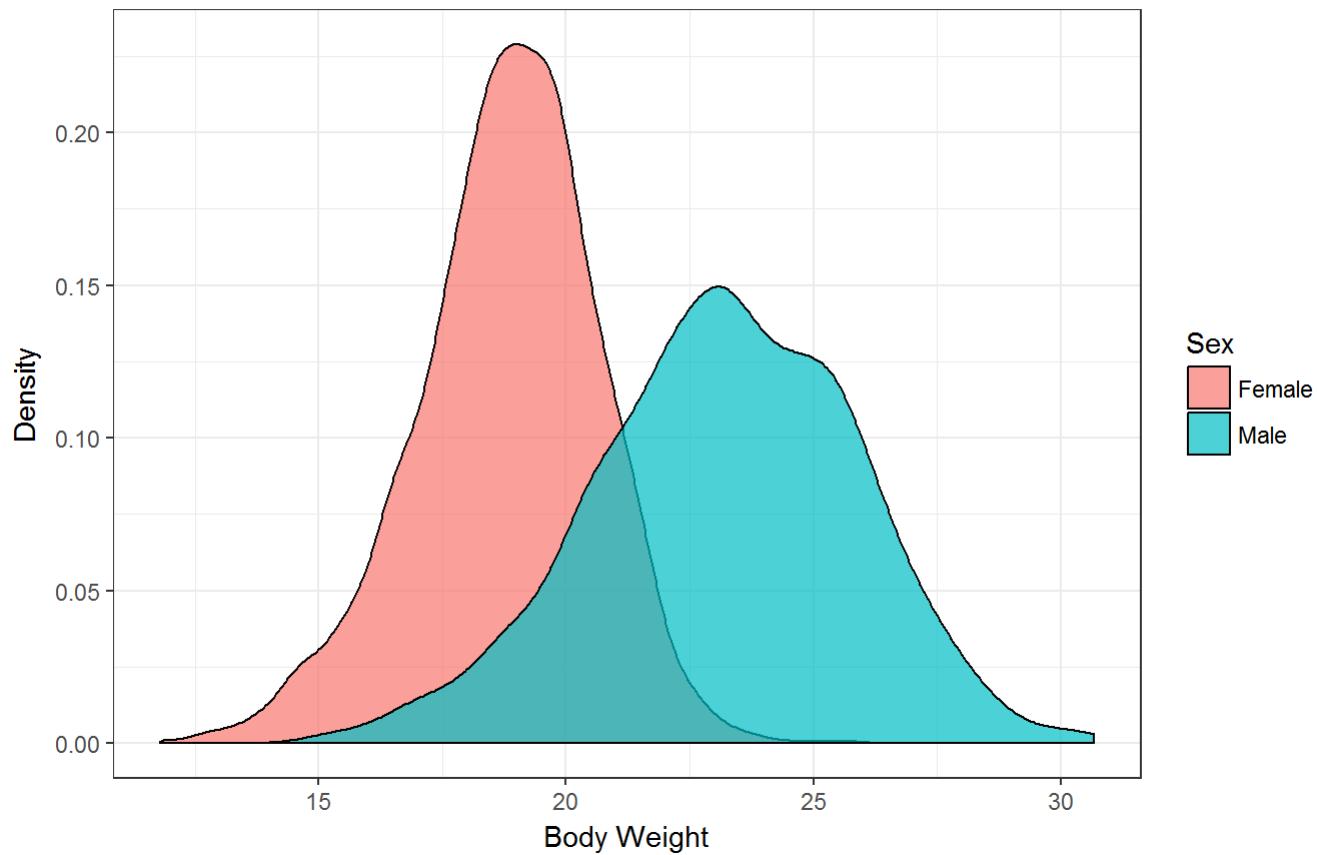


Week 9 Body Weight

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## [[1]]
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Density Plot

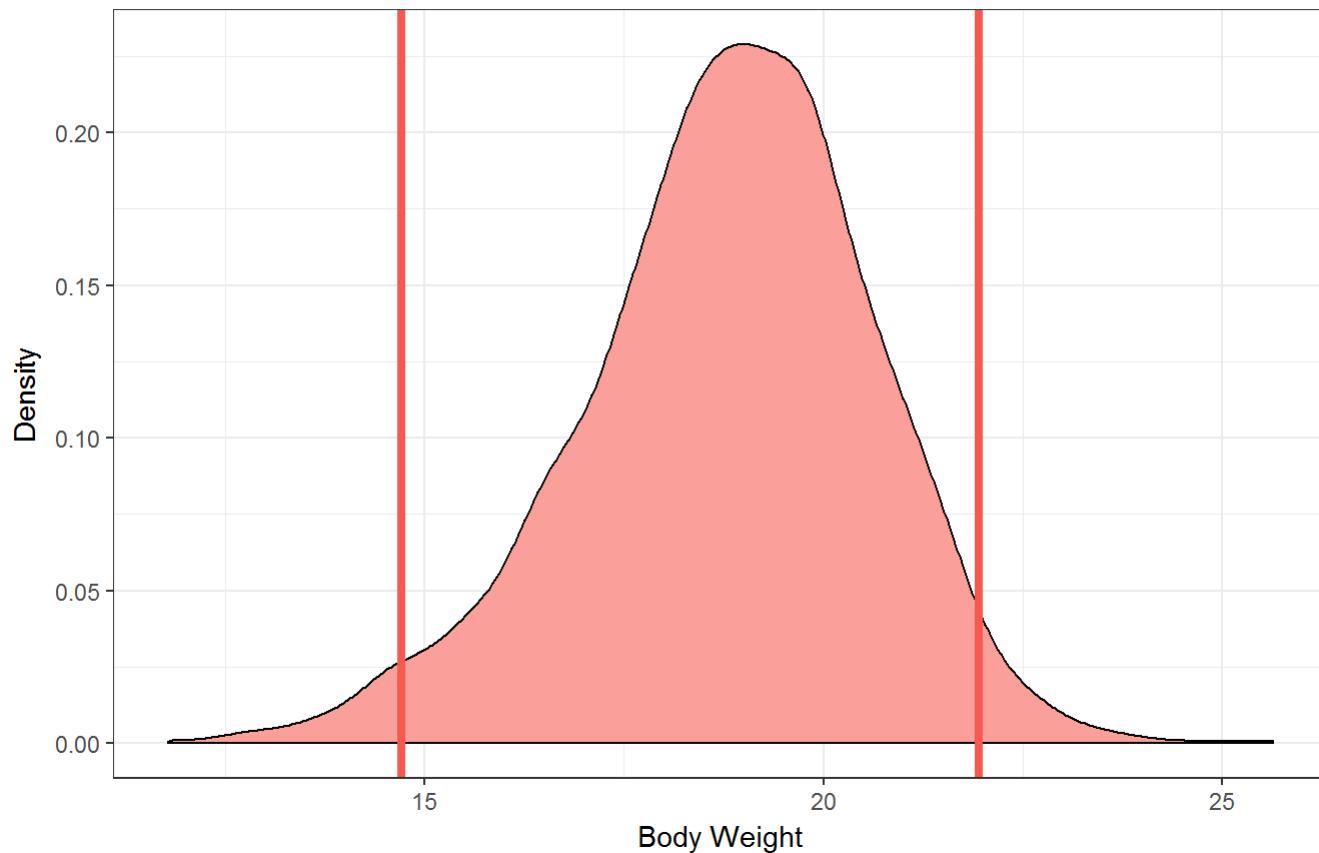
Body Weight by sex for control mice



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##  
## [[2]]
```

Female Mice Density Plot

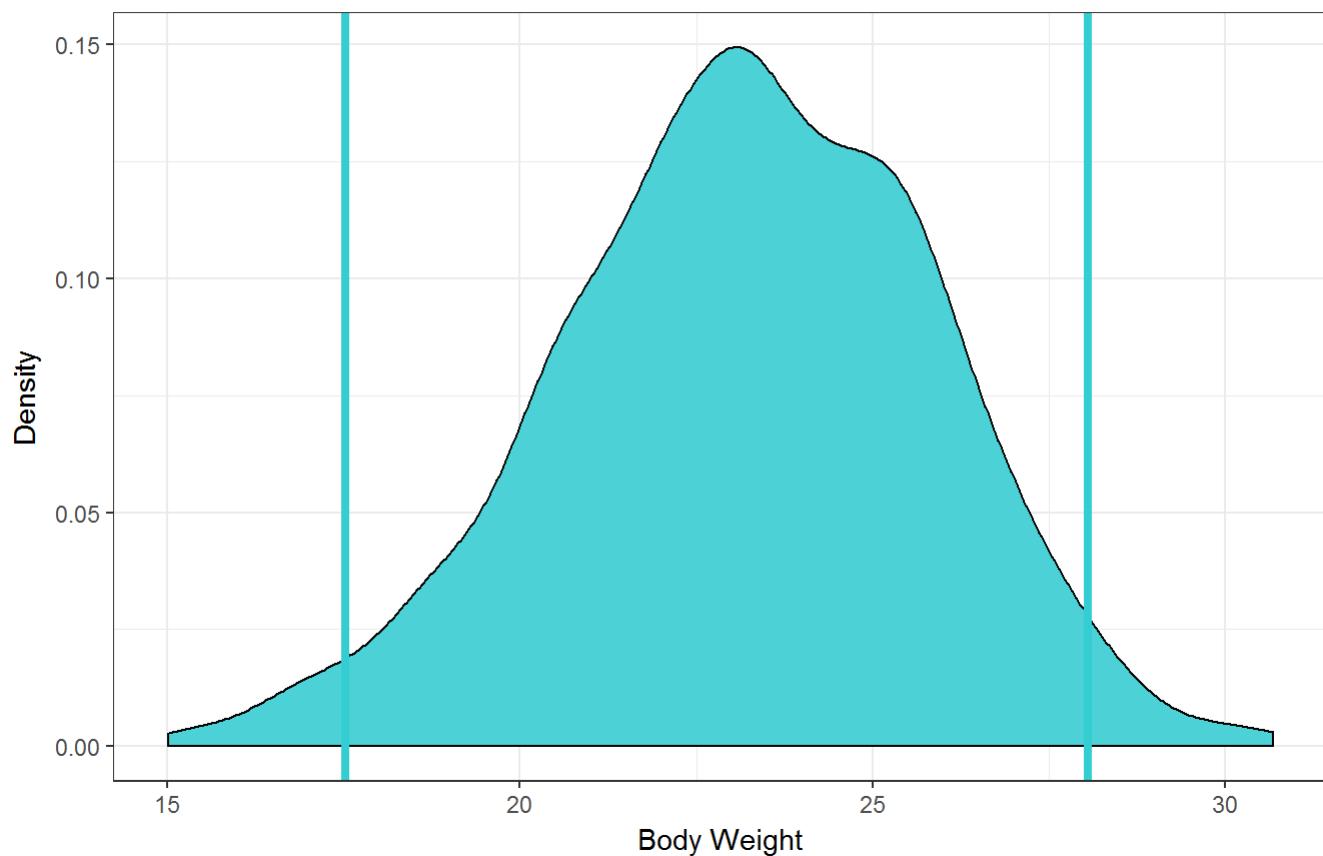
Body Weight with 2.5% (14.7135) and 97.5% (21.941) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (17.5275) and 97.5% (28.05375) indicator for control mice

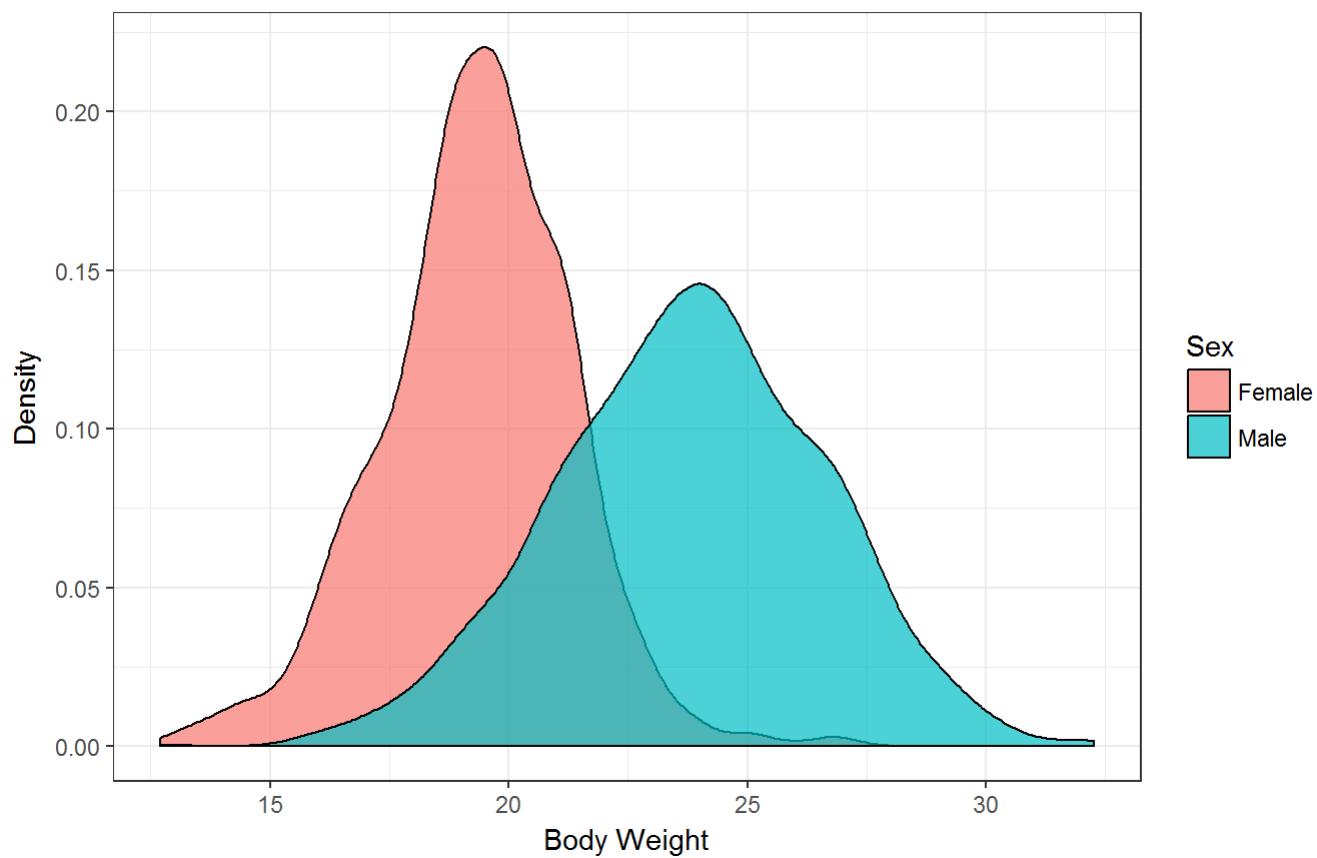


Week 10 Body Weight

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## [[1]]
```

Density Plot

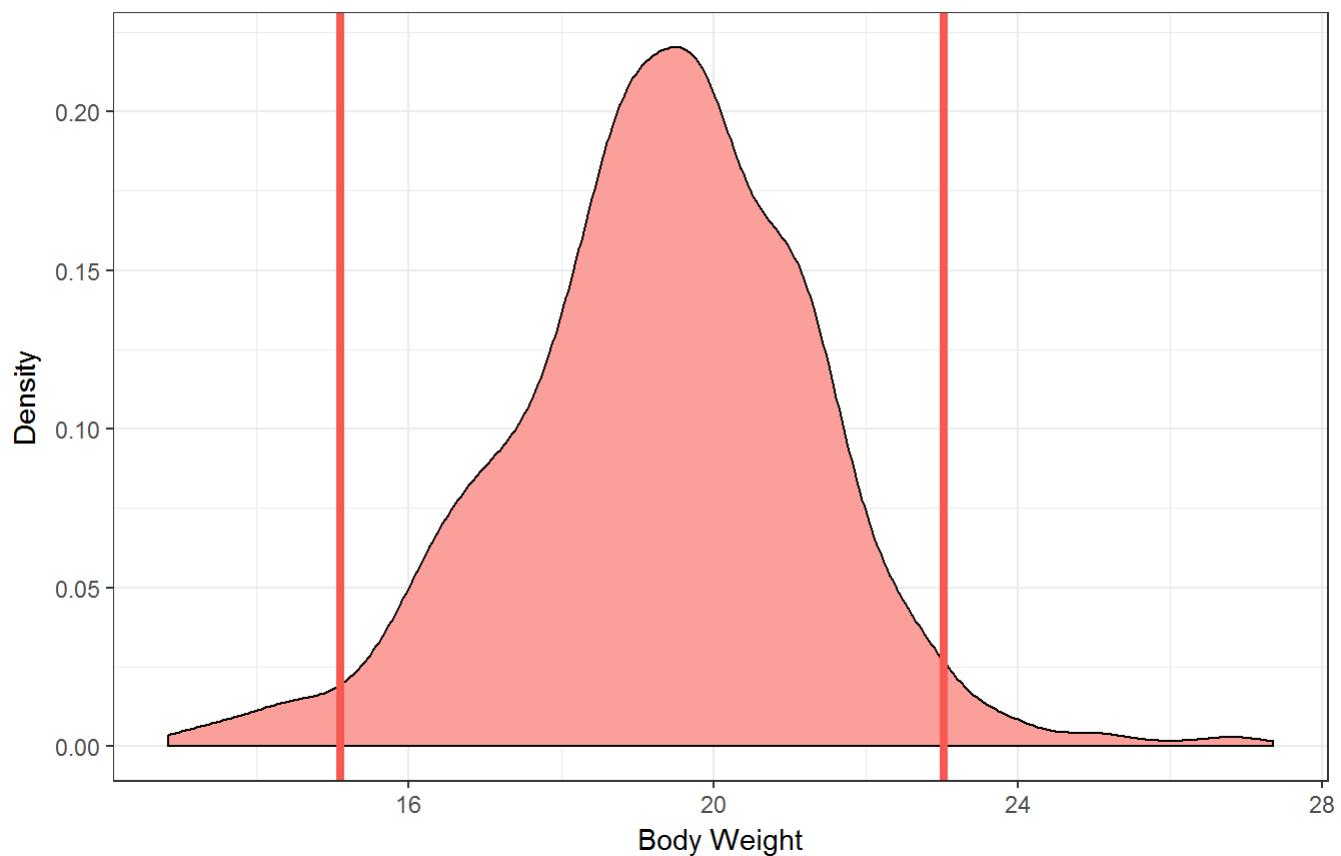
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

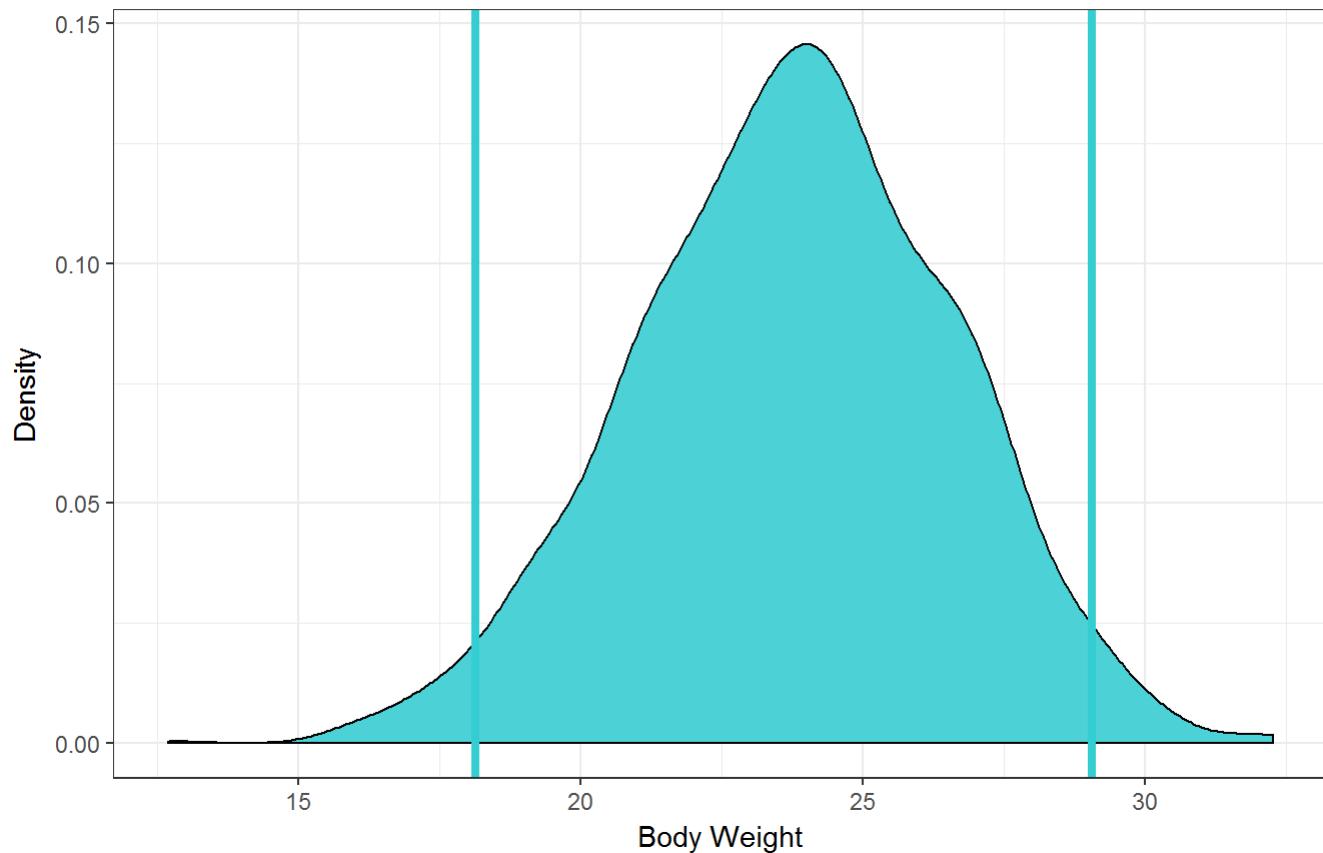
Body Weight with 2.5% (15.0975) and 97.5% (23.0225) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (18.135) and 97.5% (29.06) indicator for control mice

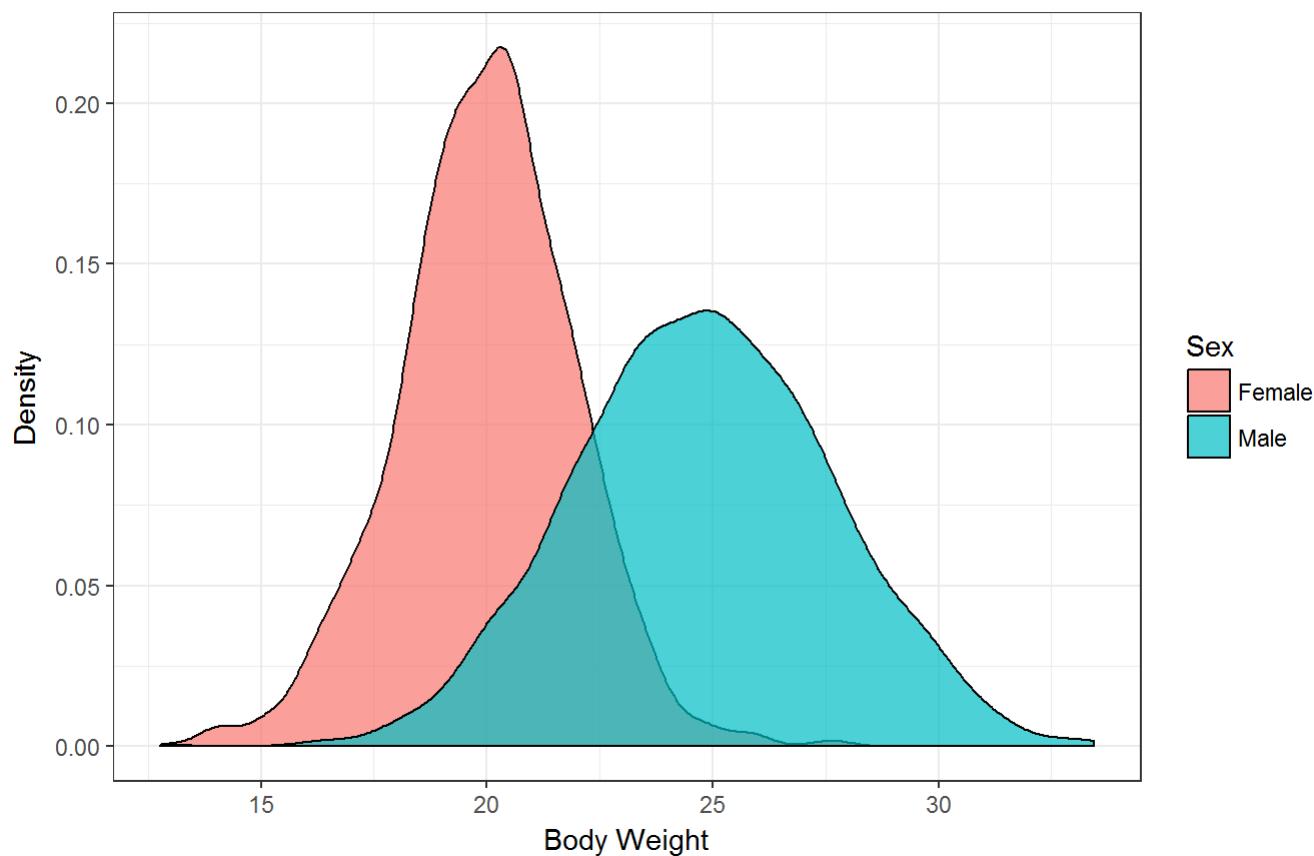


Week 11 Body Weight

```
## [[1]]
```

Density Plot

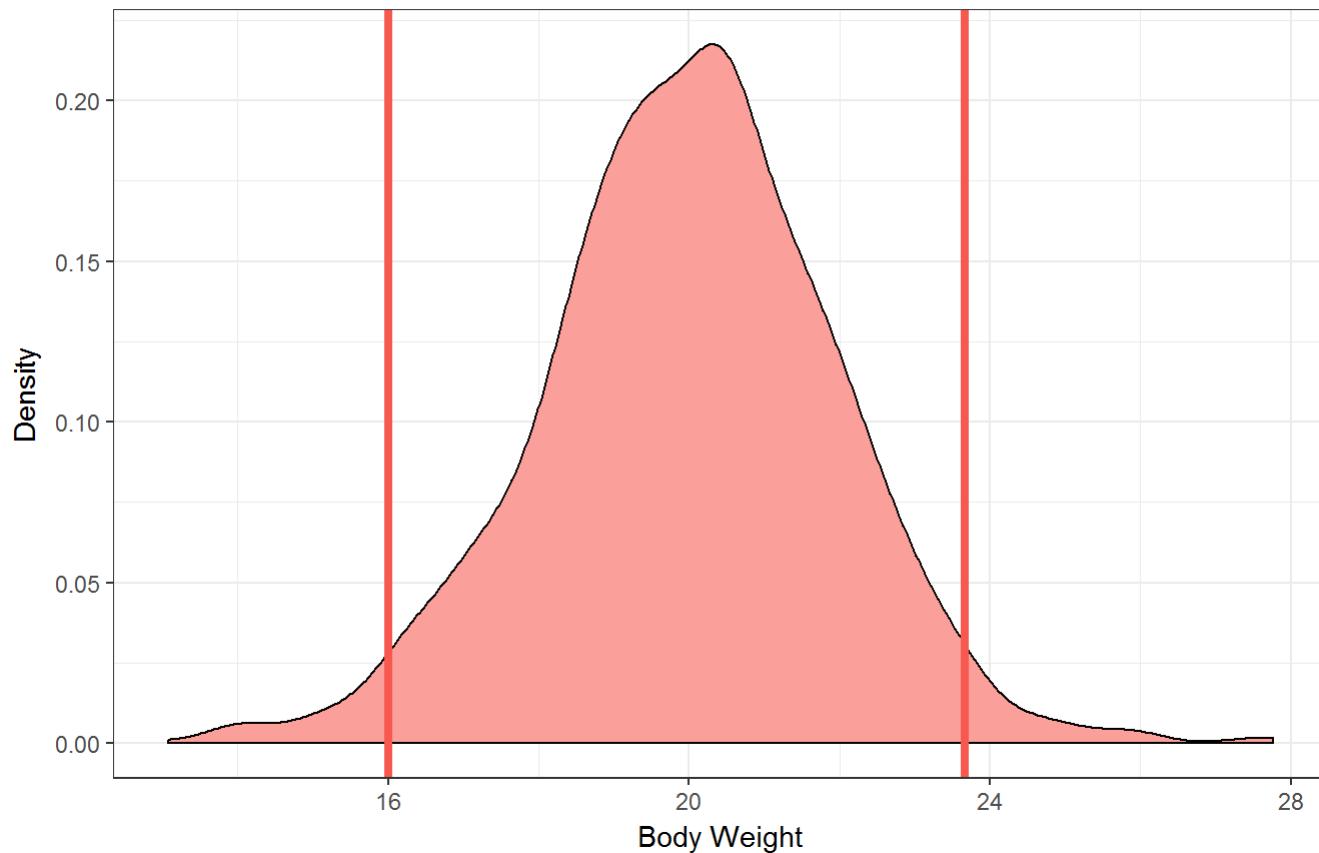
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

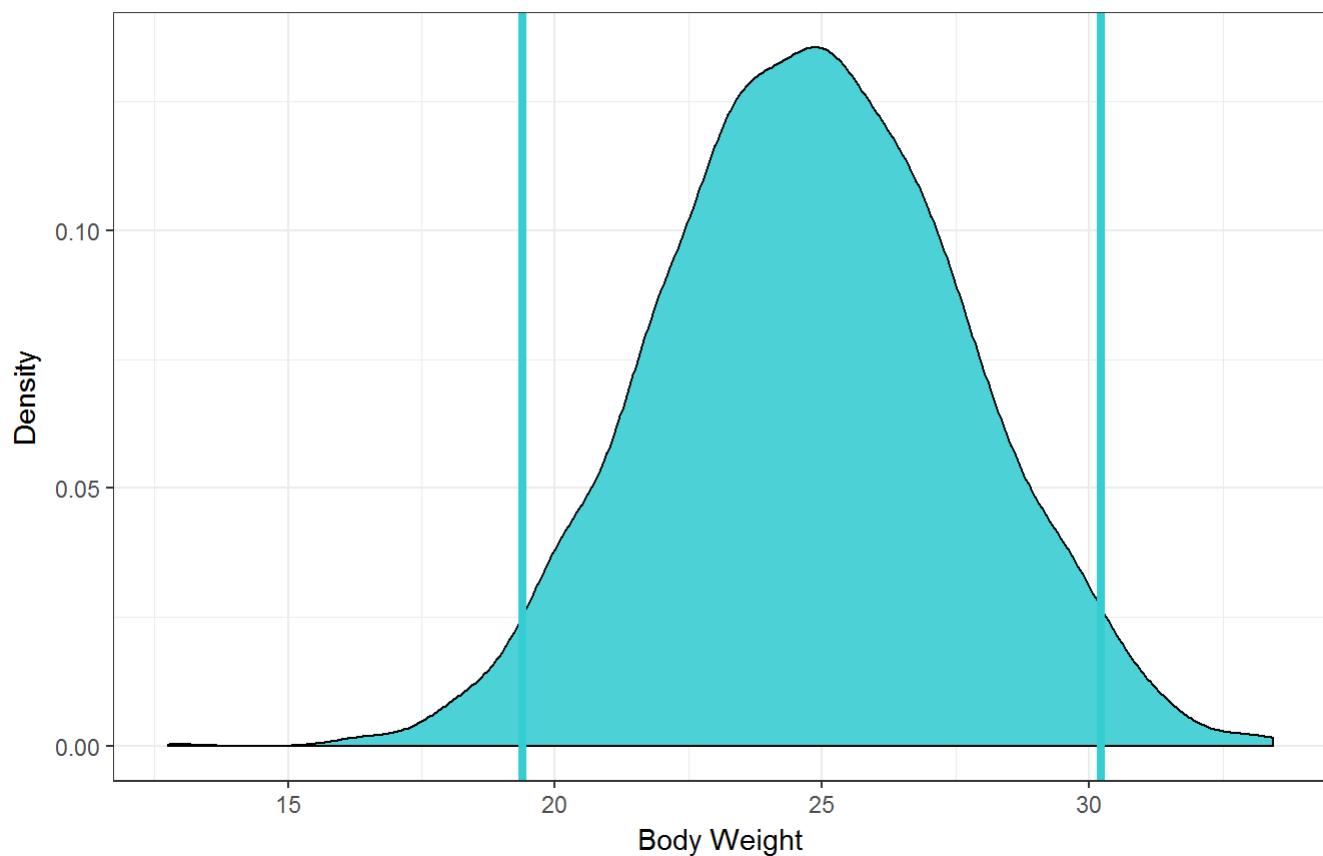
Body Weight with 2.5% (16.00475) and 97.5% (23.66175) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (19.386) and 97.5% (30.2285) indicator for control mice

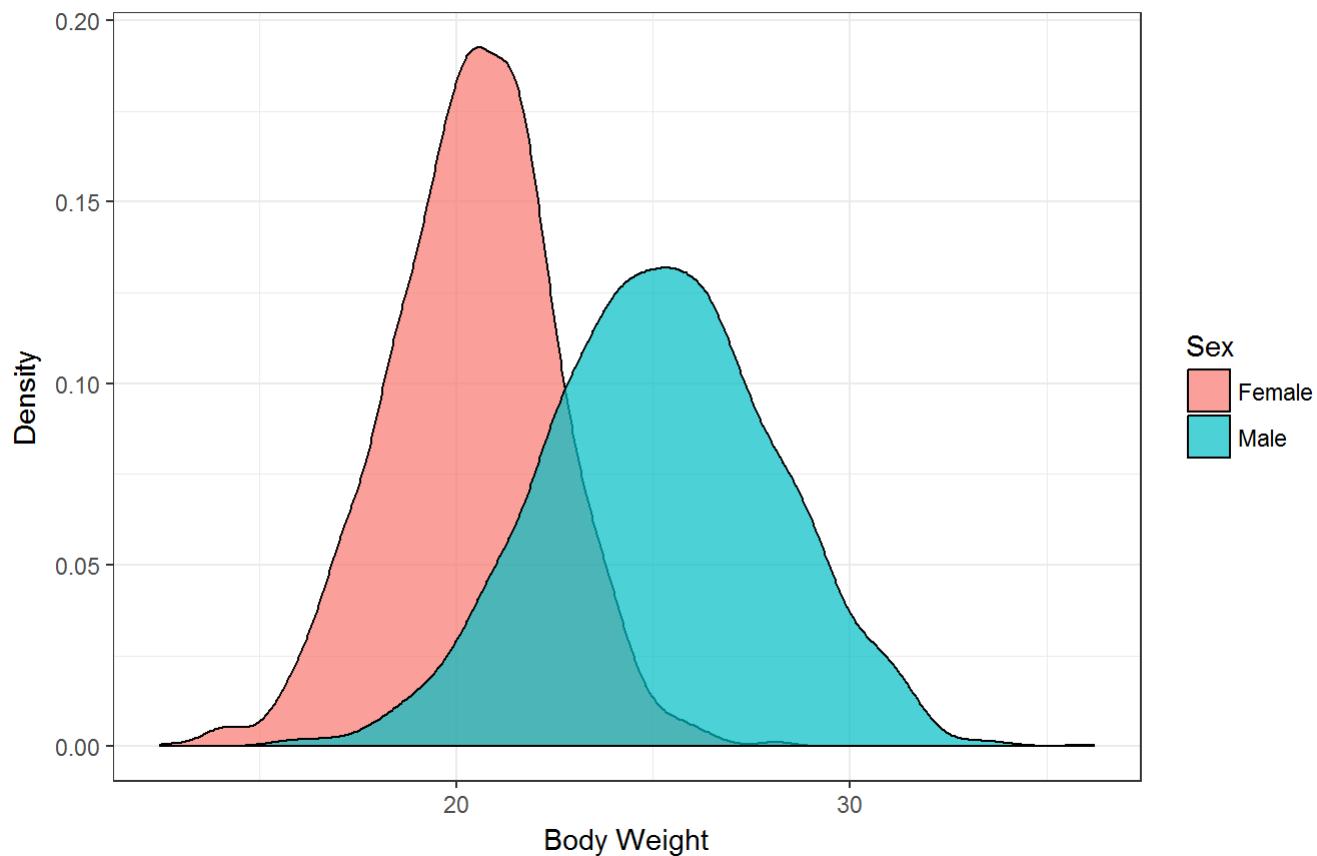


Week 12 Body Weight

```
## [[1]]
```

Density Plot

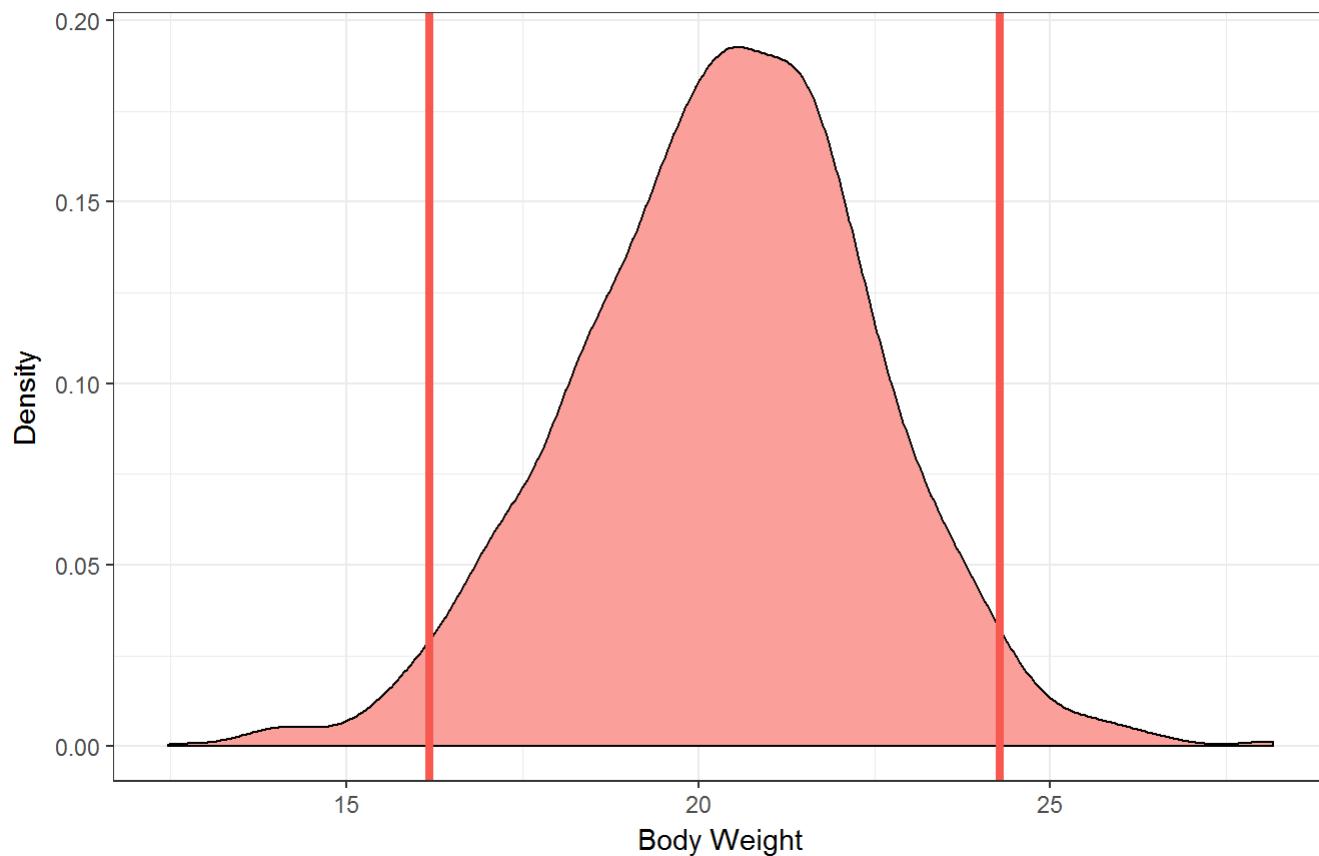
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

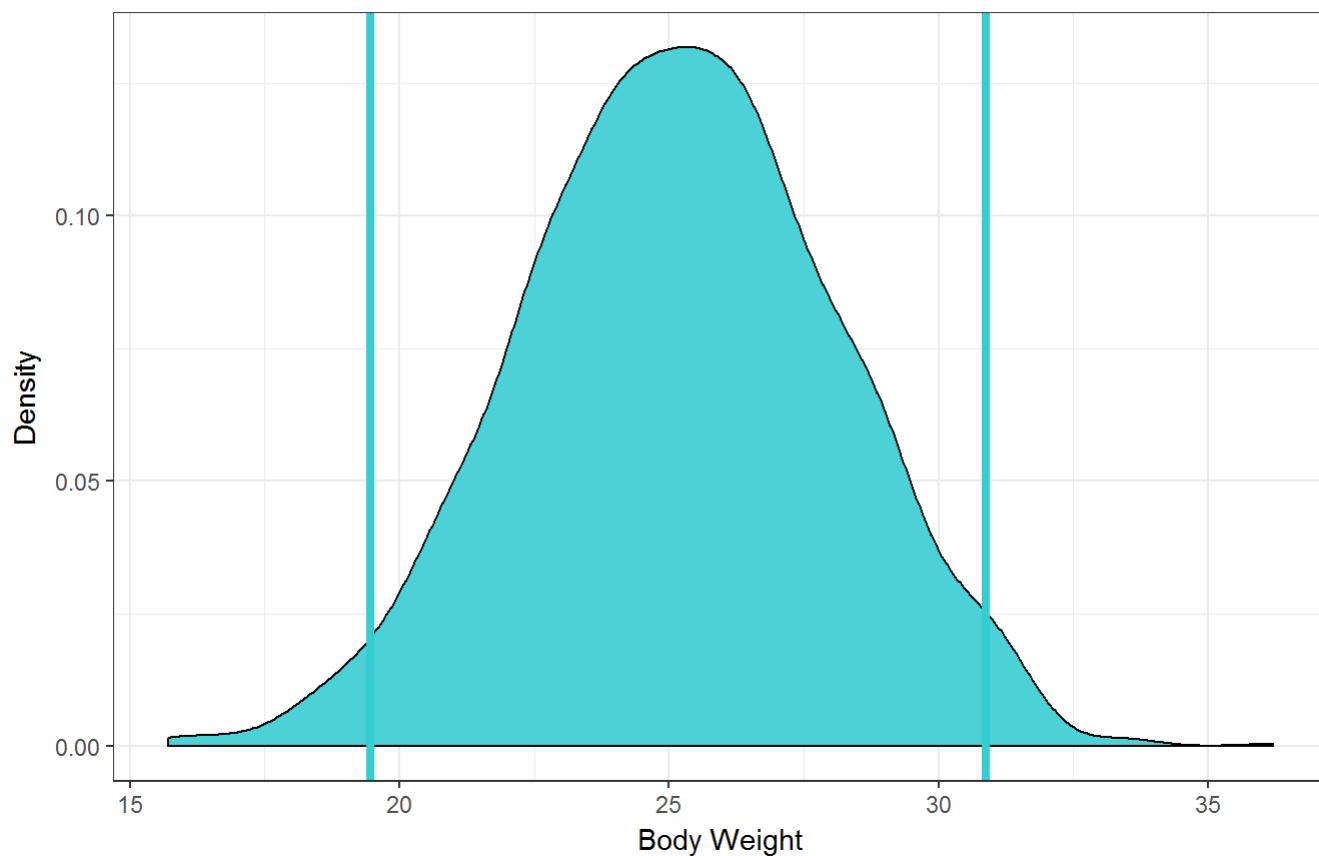
Body Weight with 2.5% (16.185) and 97.5% (24.29) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (19.46) and 97.5% (30.87) indicator for control mice

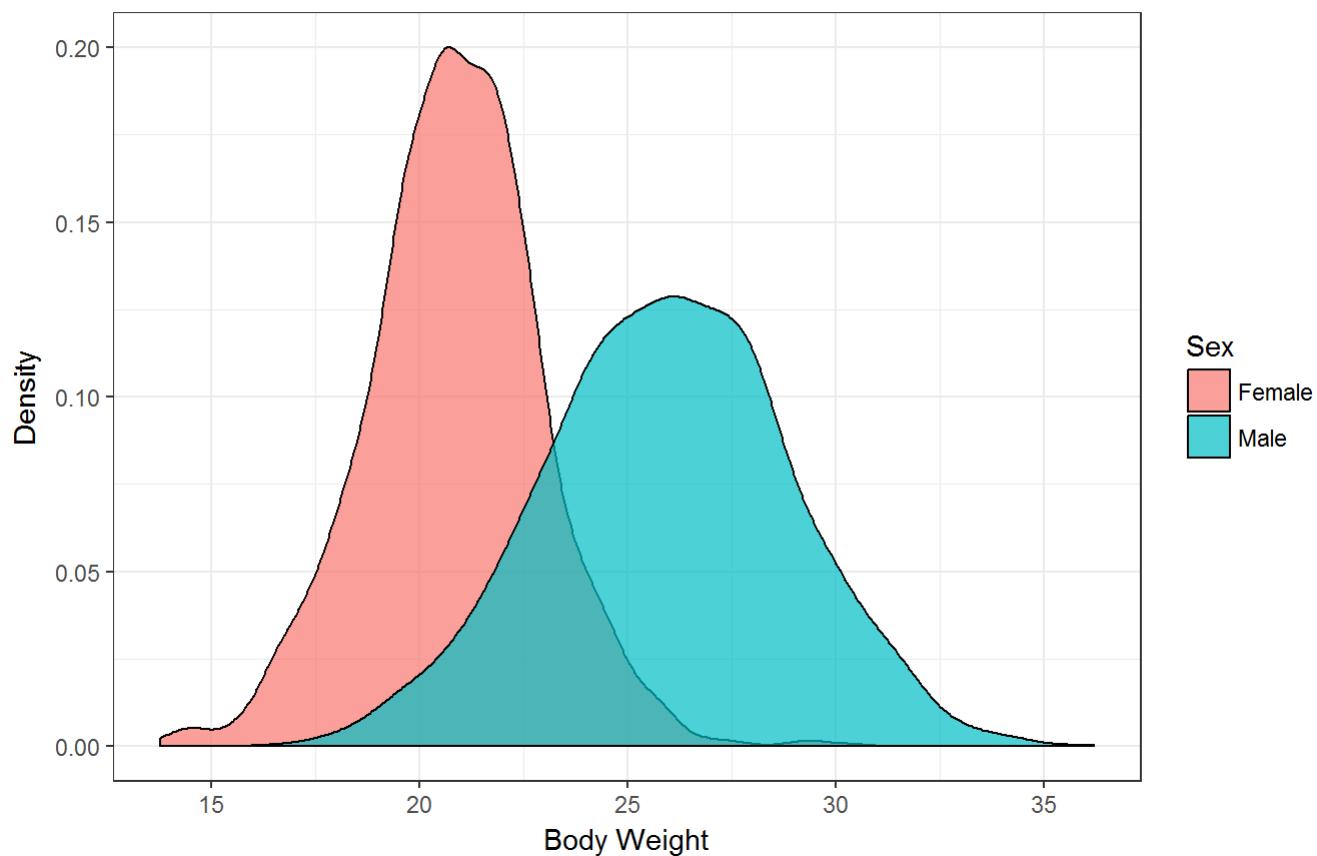


Week 13 Body Weight

```
## [[1]]
```

Density Plot

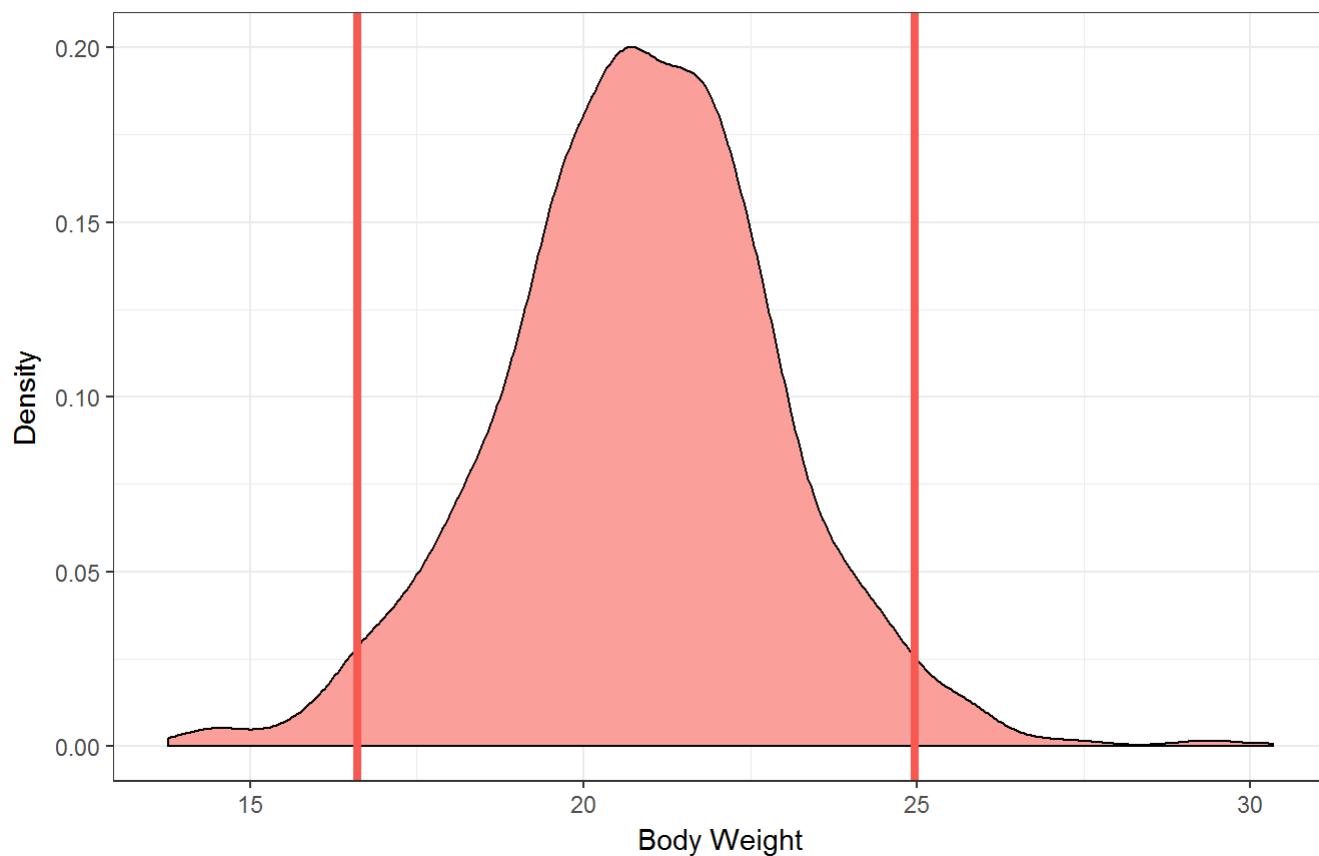
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

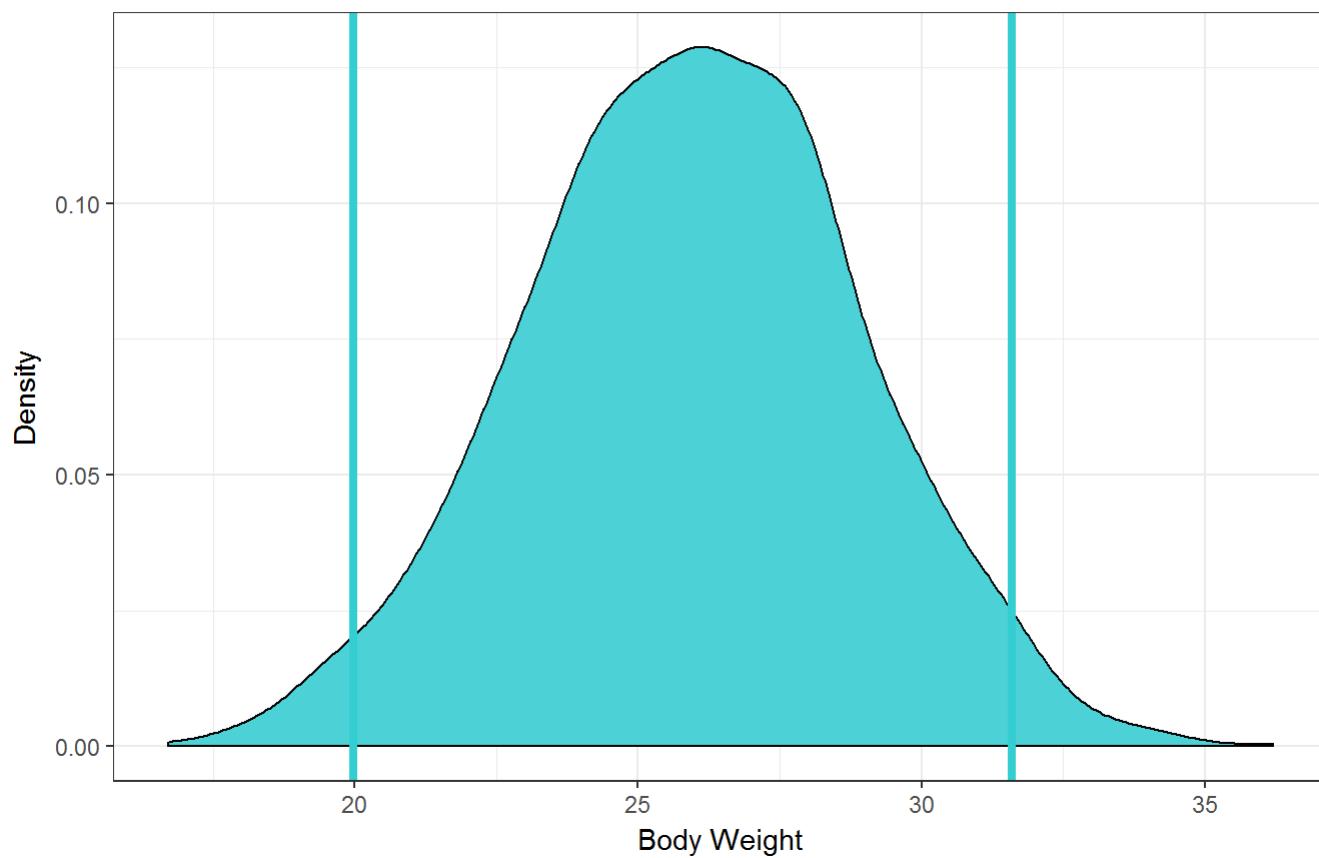
Body Weight with 2.5% (16.6) and 97.5% (24.962) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (19.98) and 97.5% (31.603) indicator for control mice

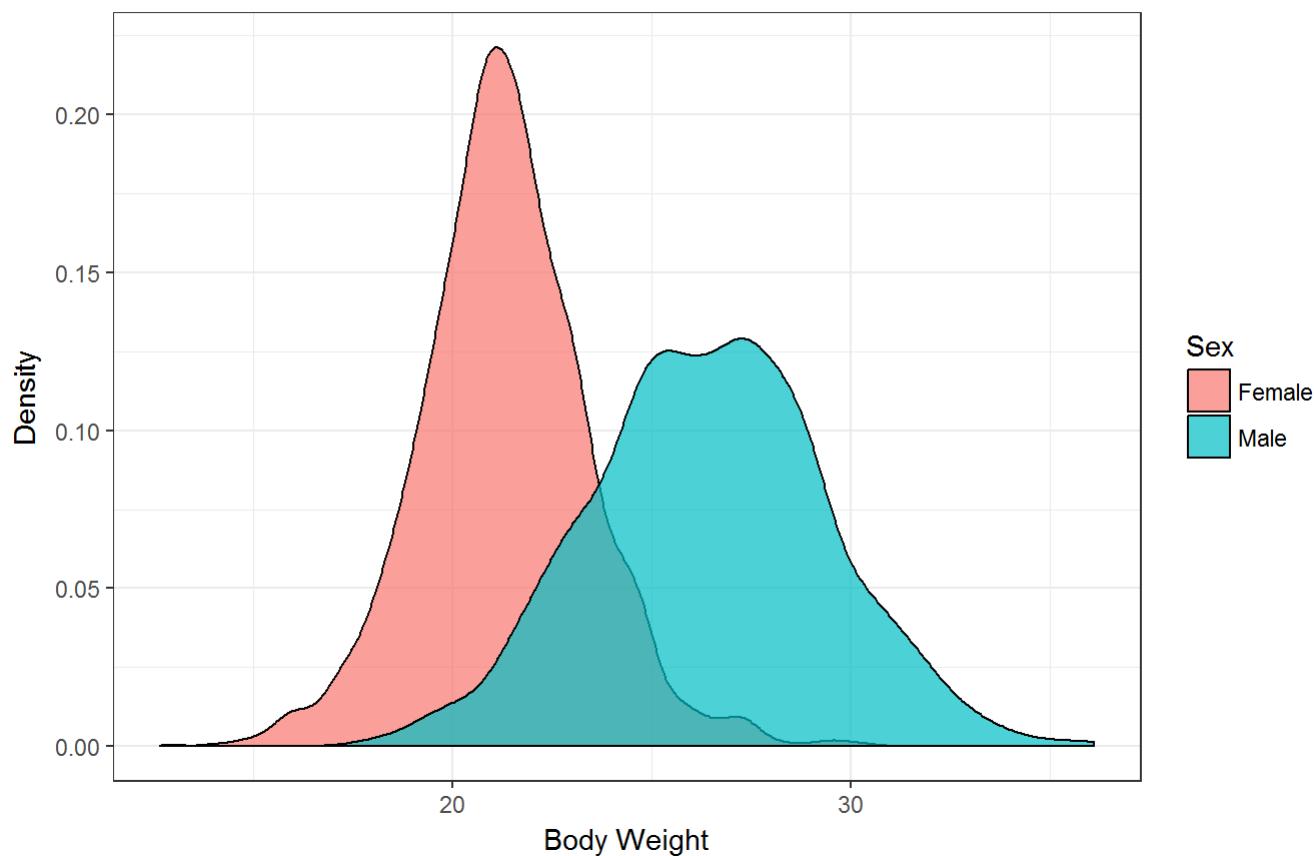


Week 14 Body Weight

```
## [[1]]
```

Density Plot

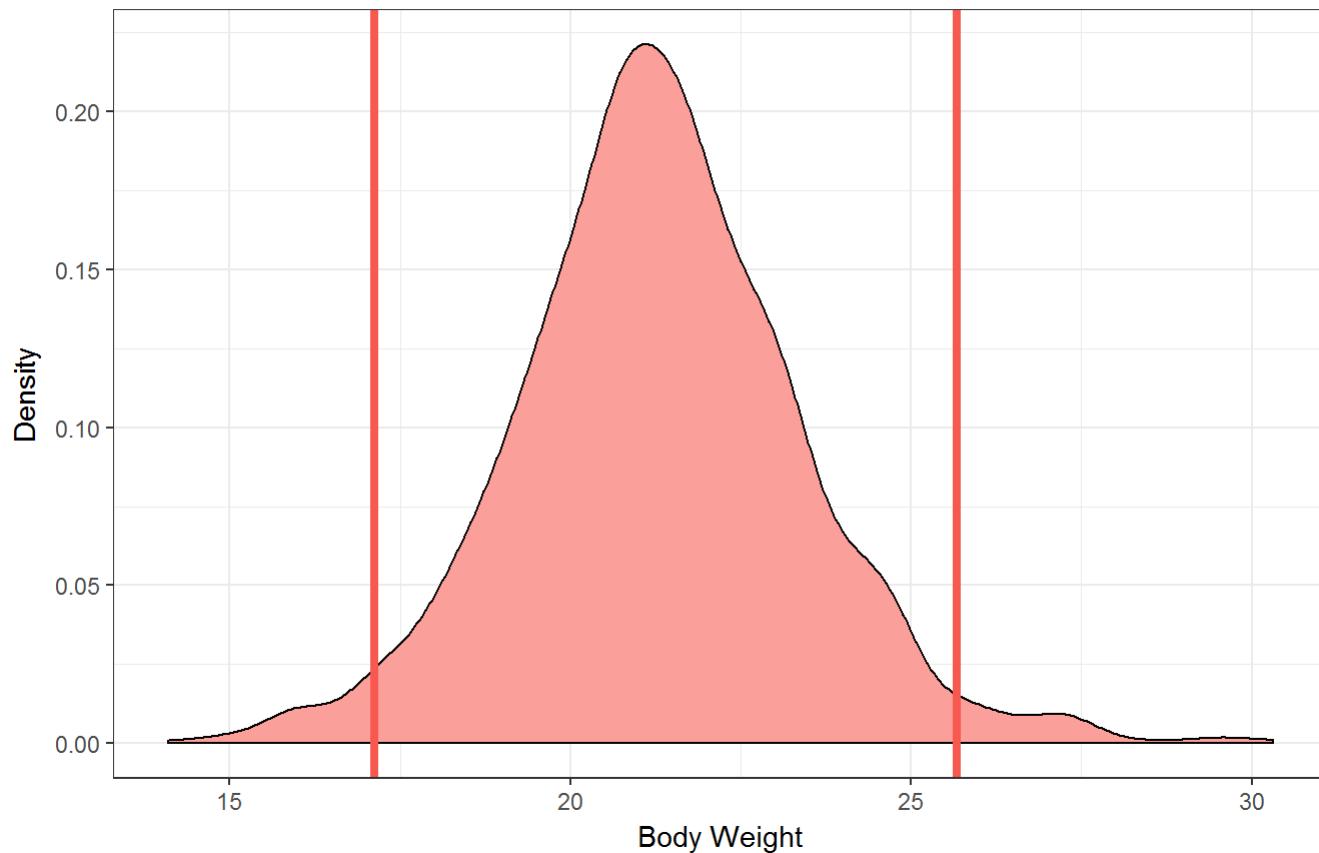
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

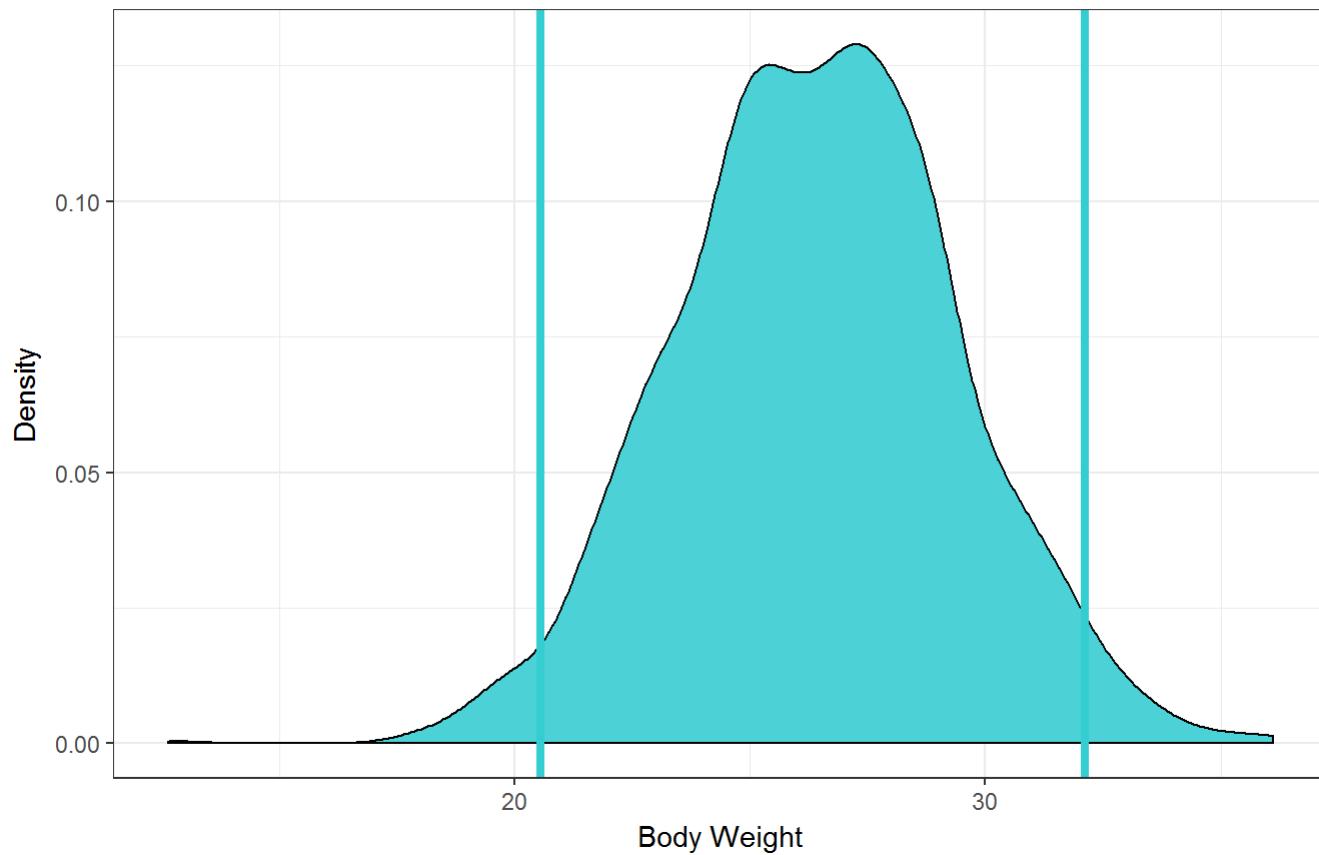
Body Weight with 2.5% (17.13125) and 97.5% (25.66625) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (20.5445) and 97.5% (32.1125) indicator for control mice

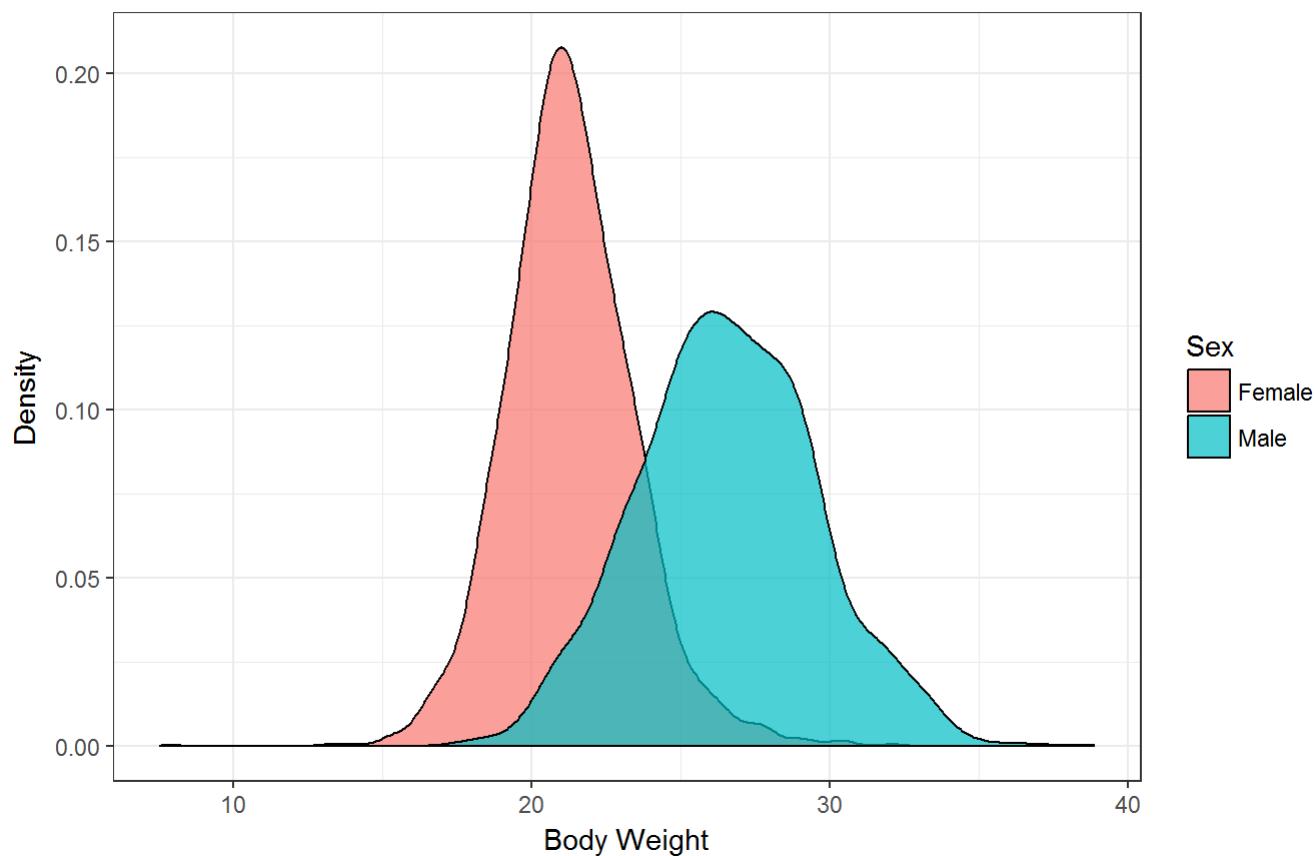


Week 15 Body Weight

```
## [[1]]
```

Density Plot

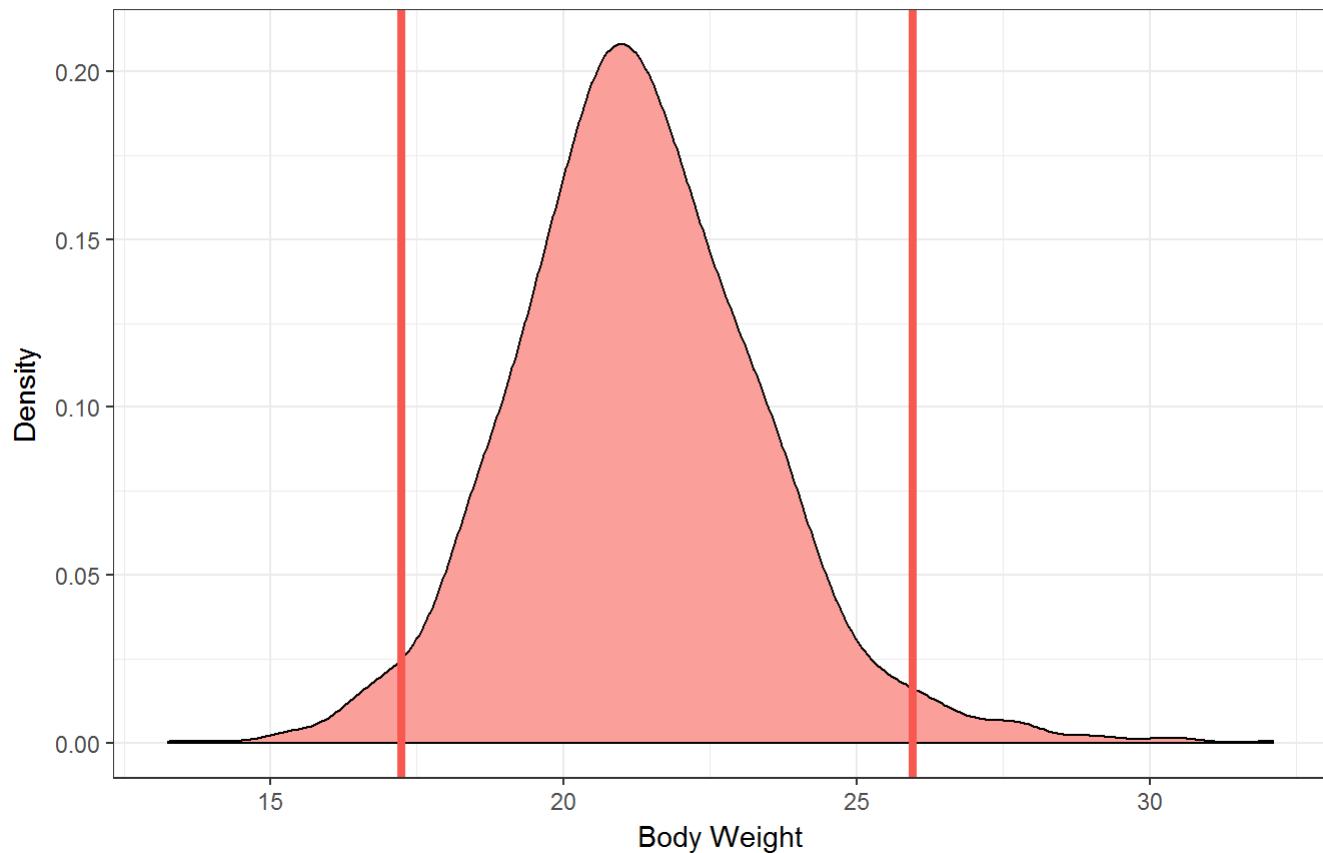
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

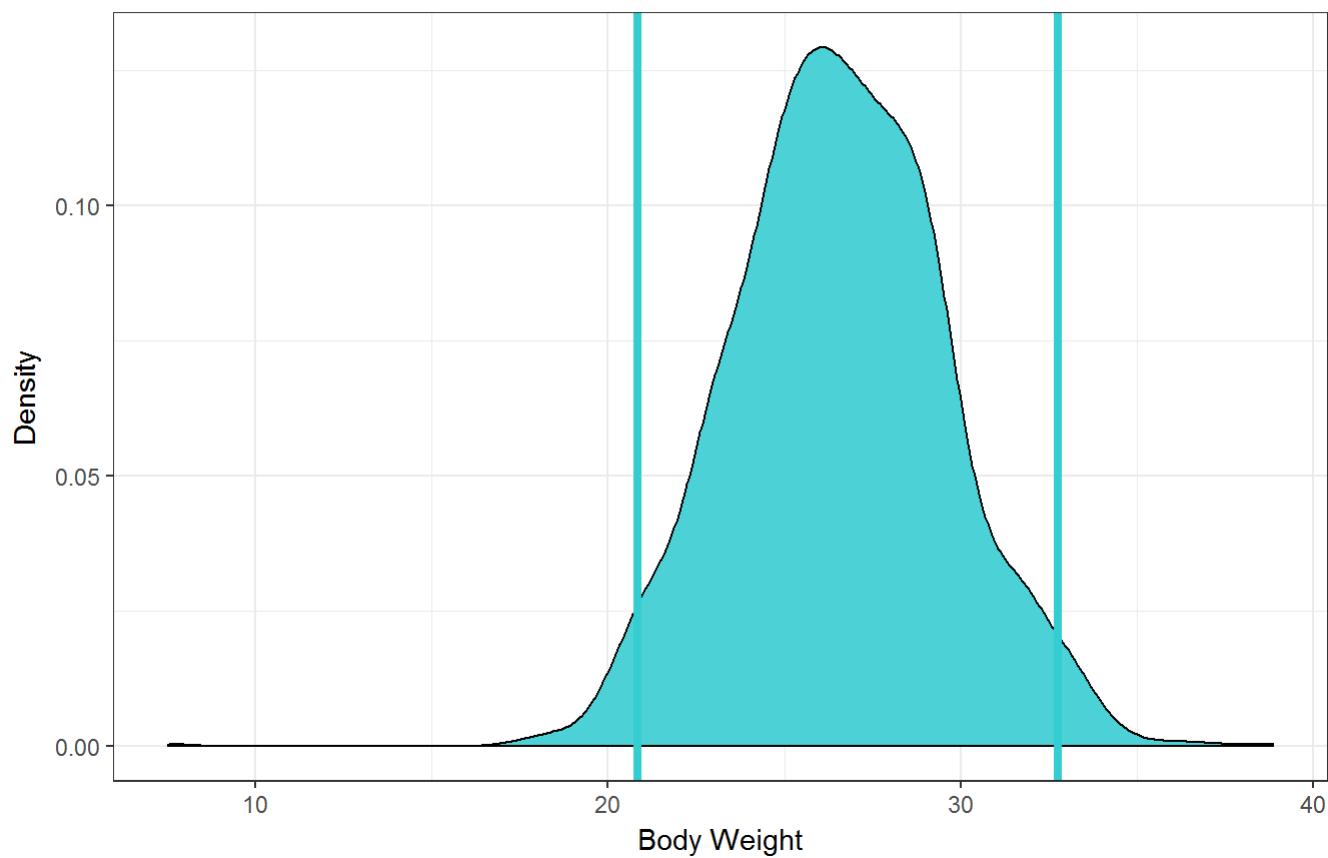
Body Weight with 2.5% (17.2295) and 97.5% (25.9635) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (20.827) and 97.5% (32.743) indicator for control mice

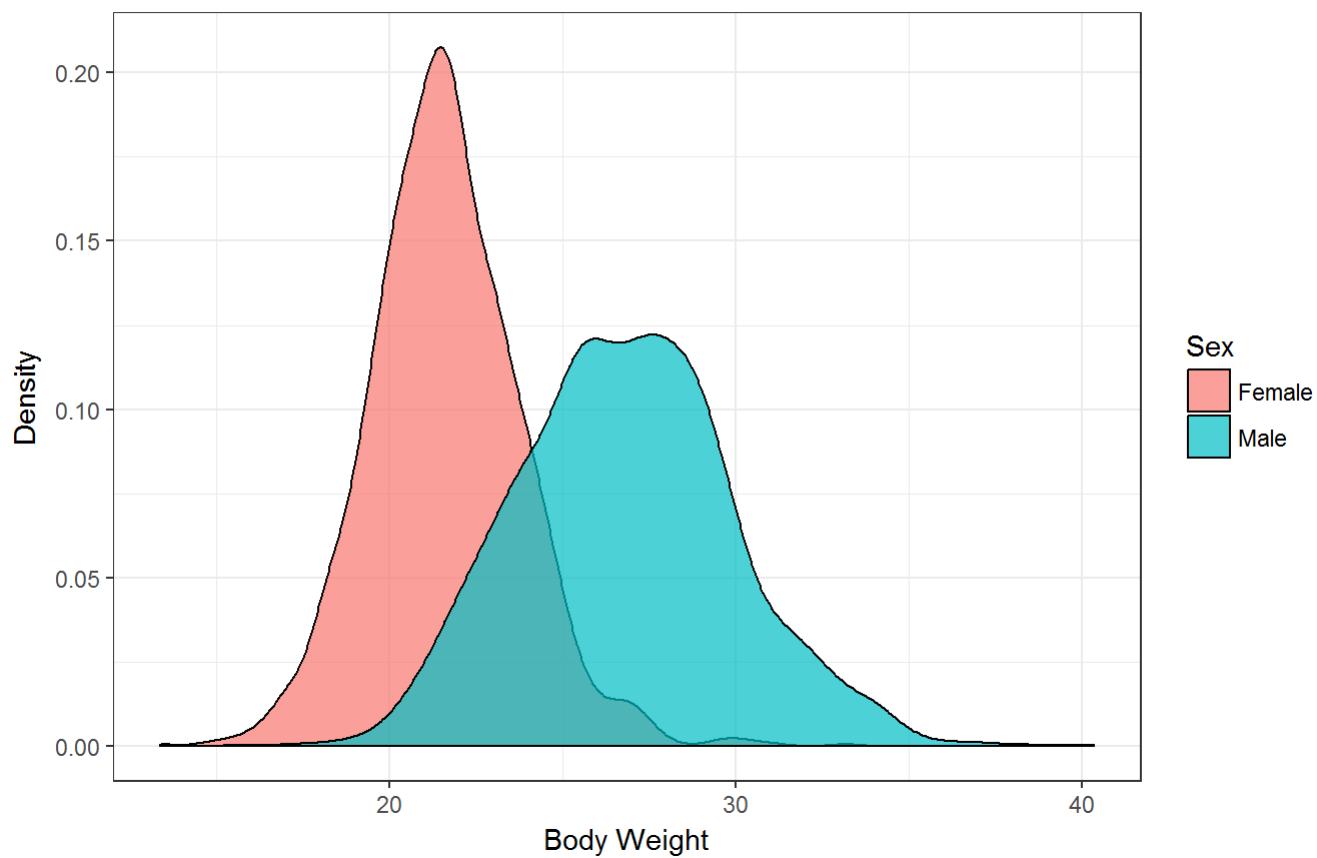


Week 16 Body Weight

```
## [[1]]
```

Density Plot

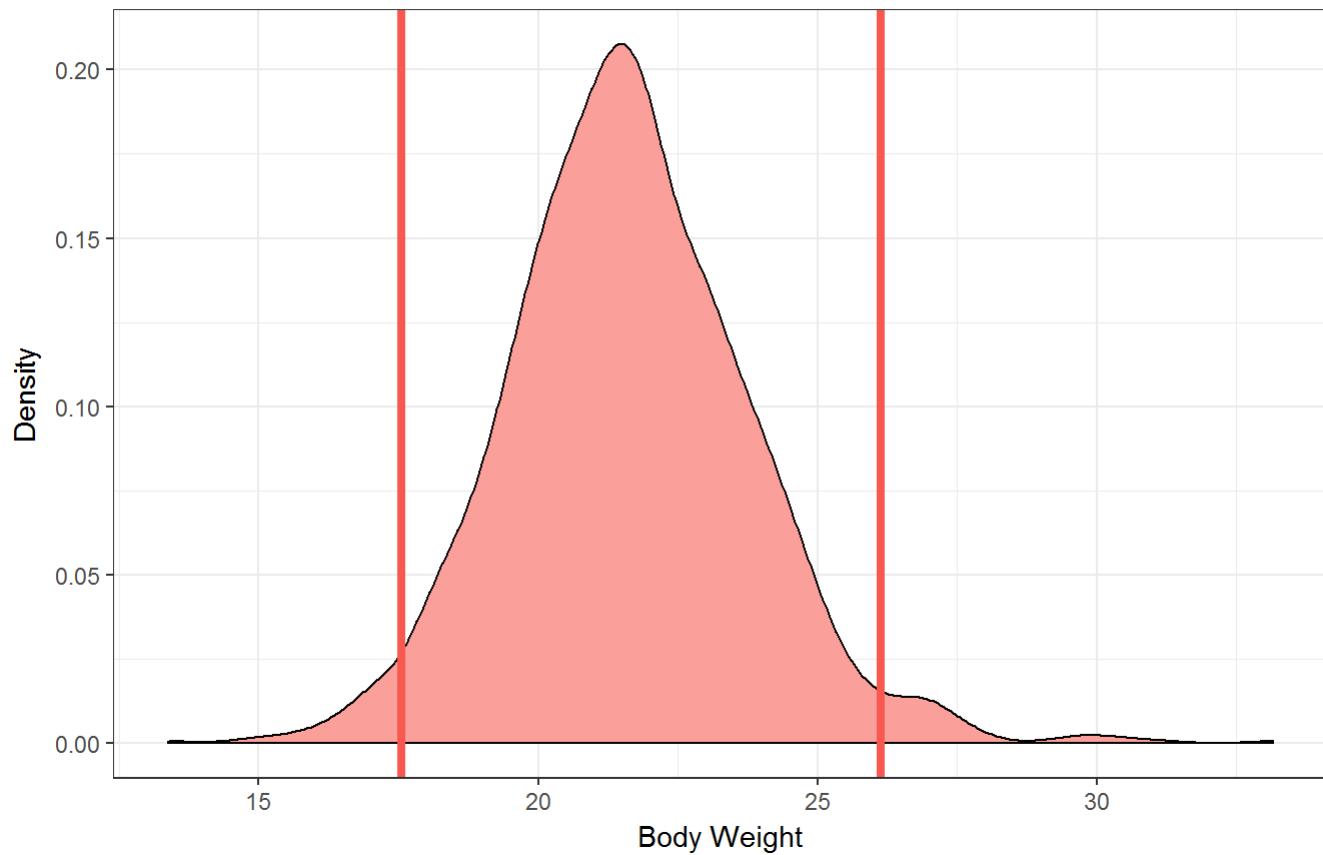
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

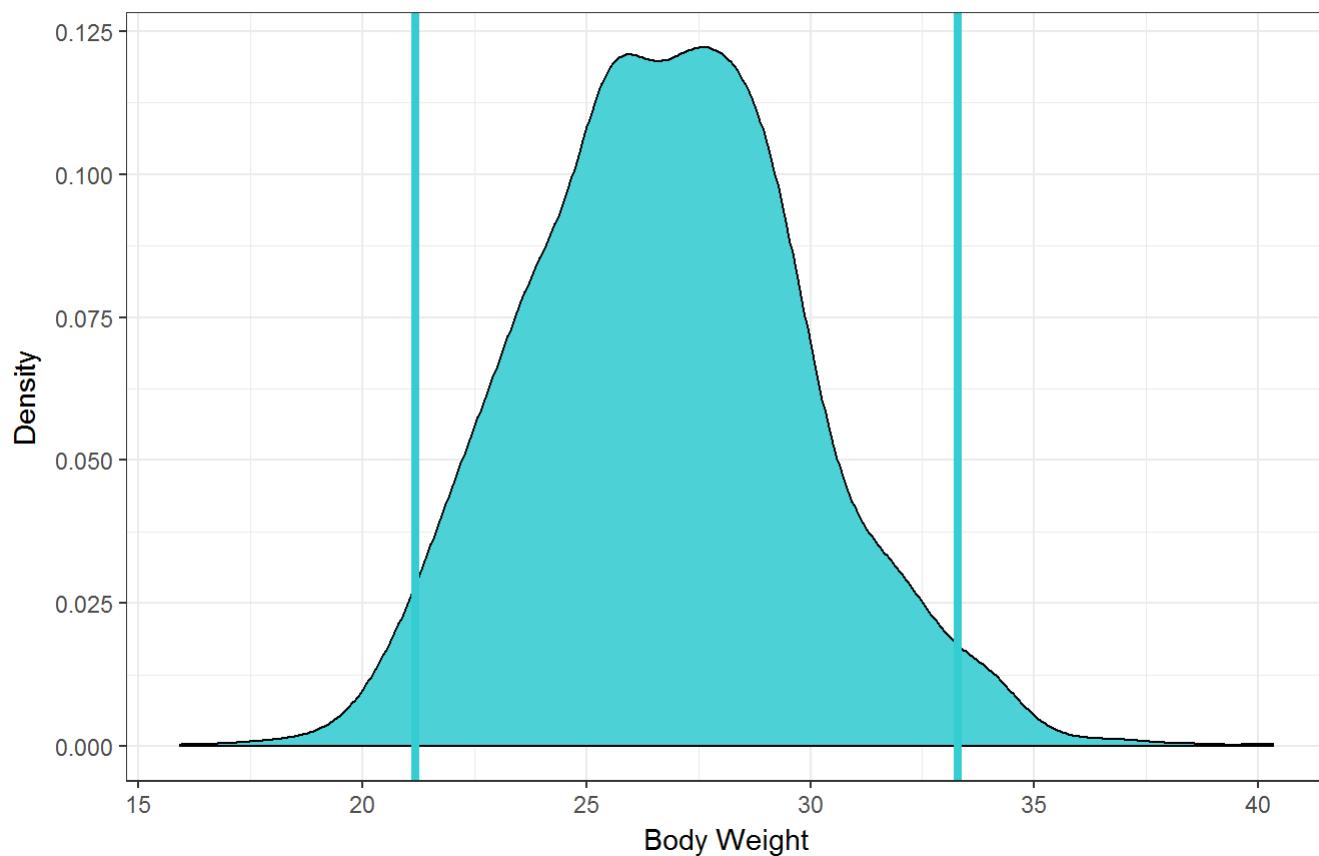
Body Weight with 2.5% (17.54775) and 97.5% (26.1335) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (21.18) and 97.5% (33.295) indicator for control mice

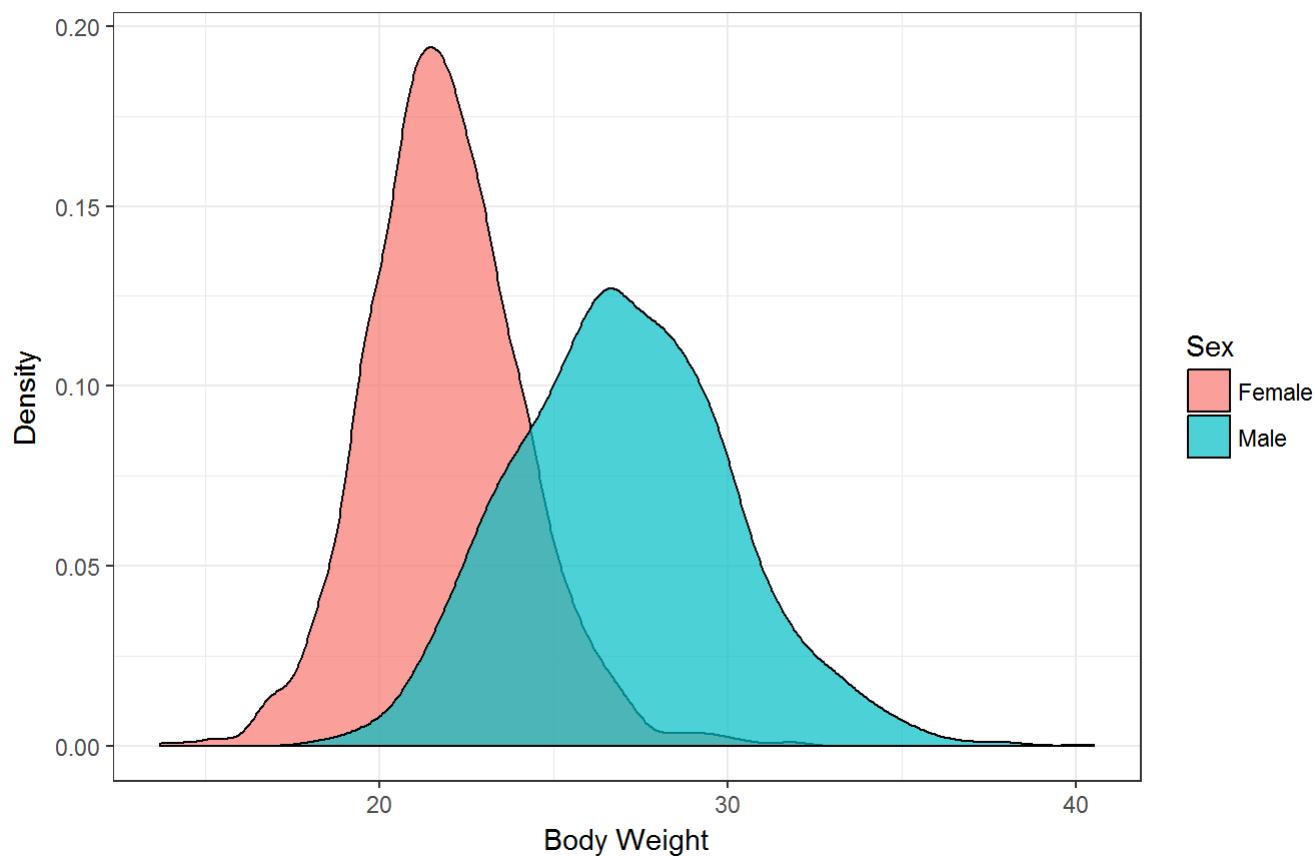


Week 17 Body Weight

```
## [[1]]
```

Density Plot

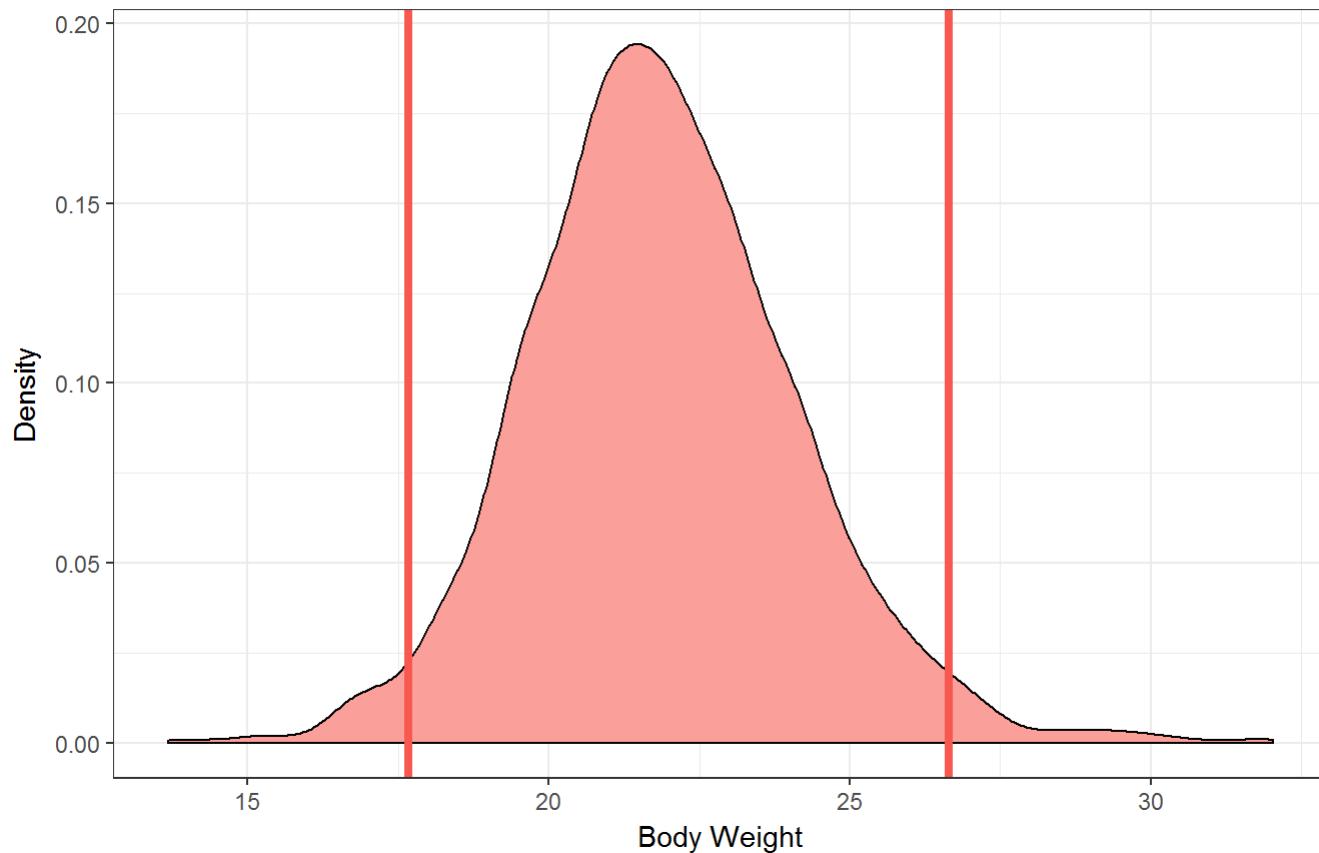
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

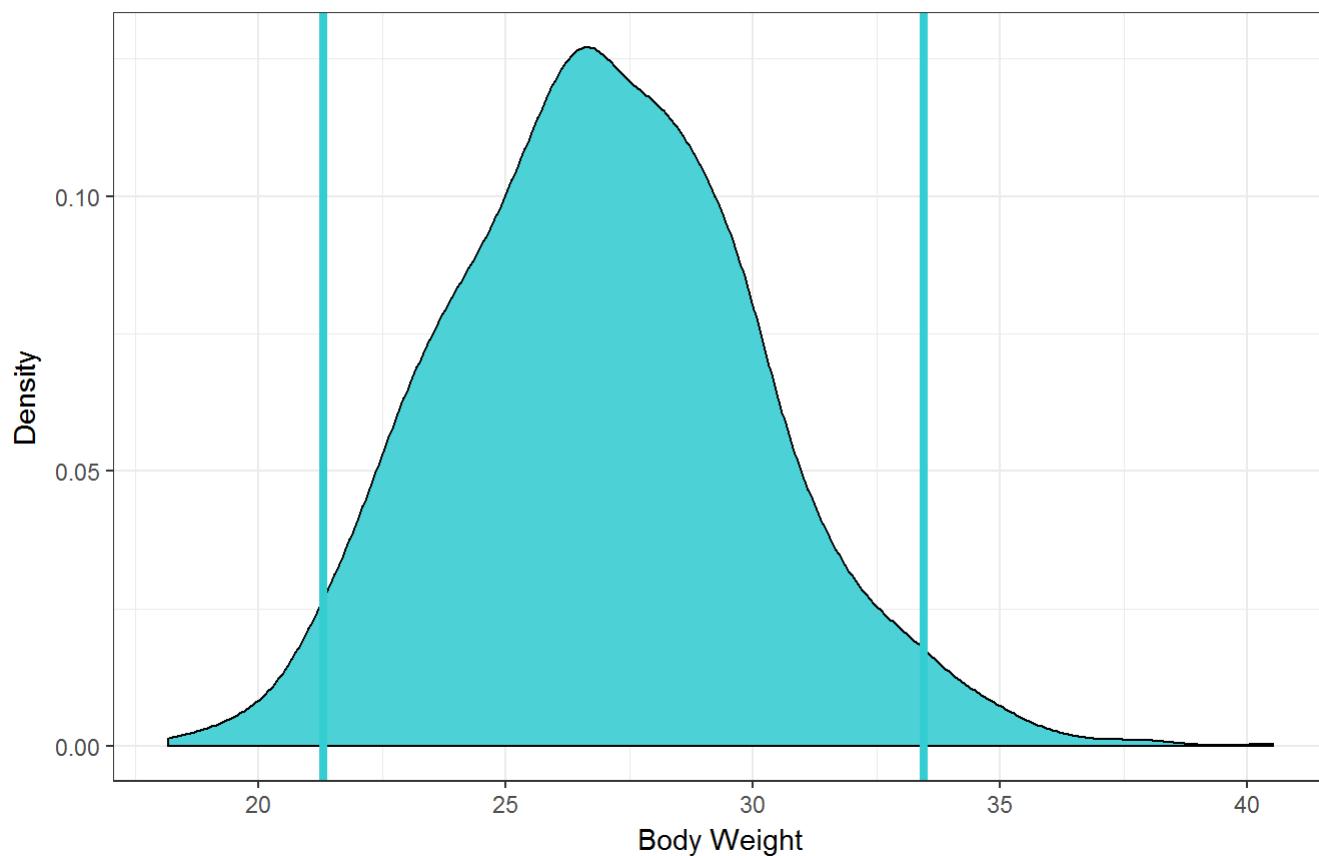
Body Weight with 2.5% (17.676) and 97.5% (26.64) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (21.3) and 97.5% (33.45) indicator for control mice

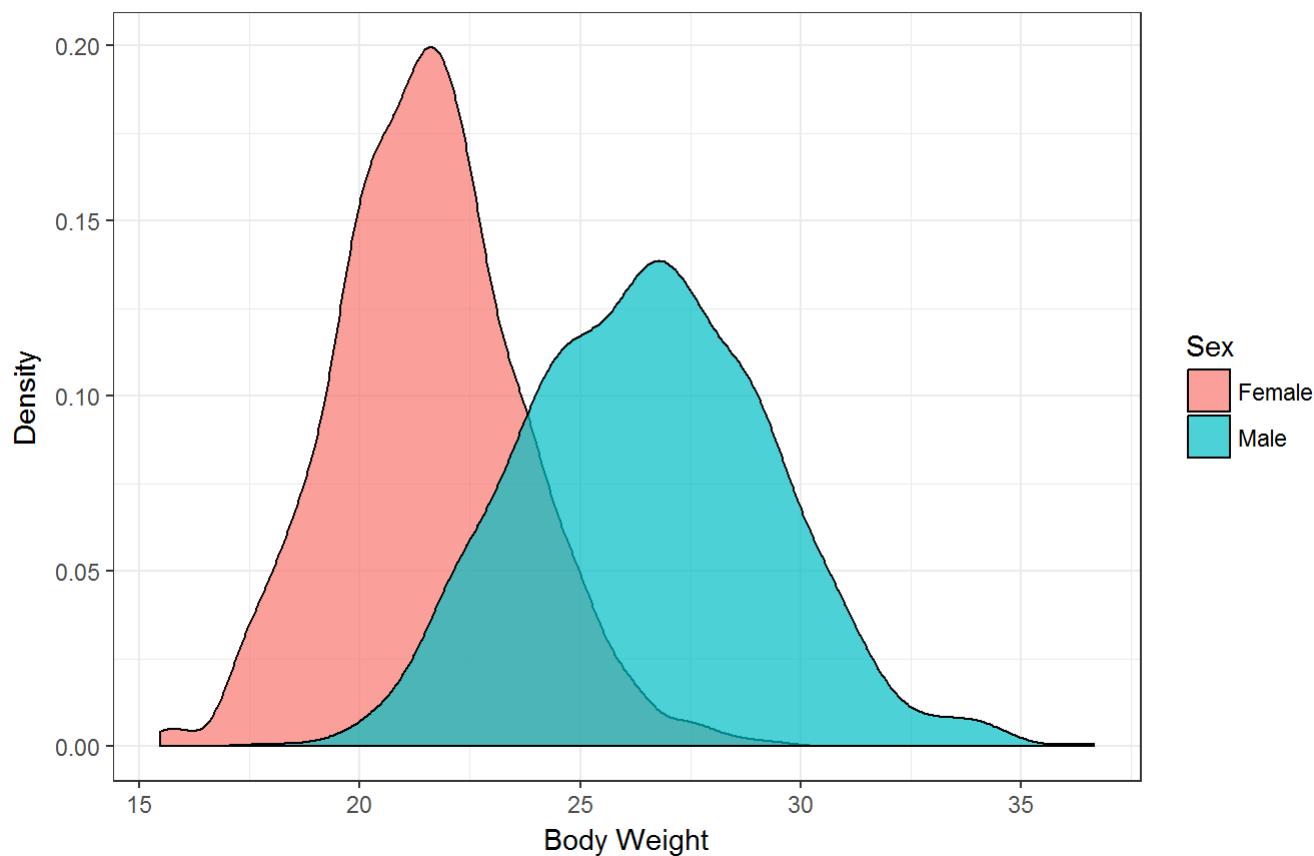


Week 18 Body Weight

```
## [[1]]
```

Density Plot

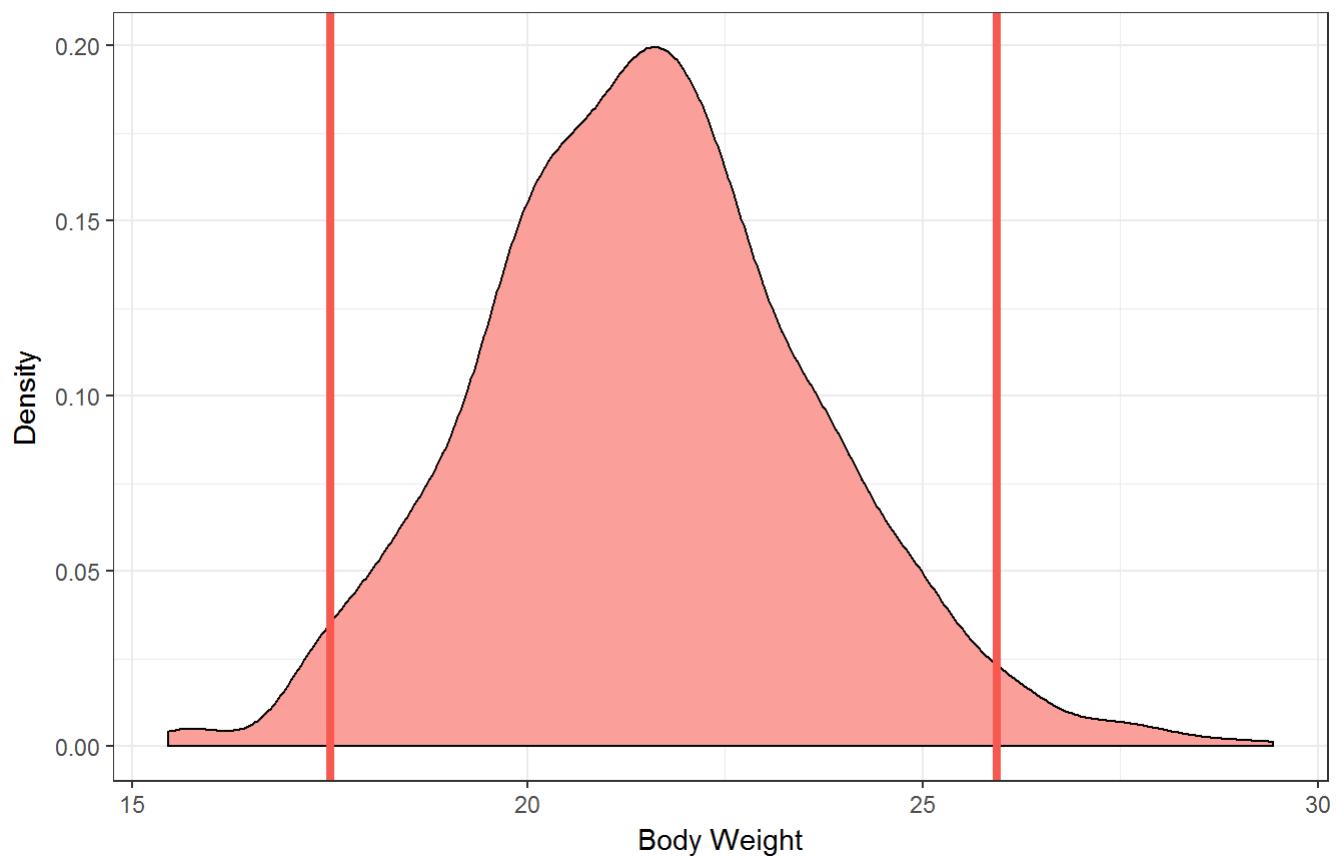
Body Weight by sex for control mice



```
##  
## [[2]]
```

Female Mice Density Plot

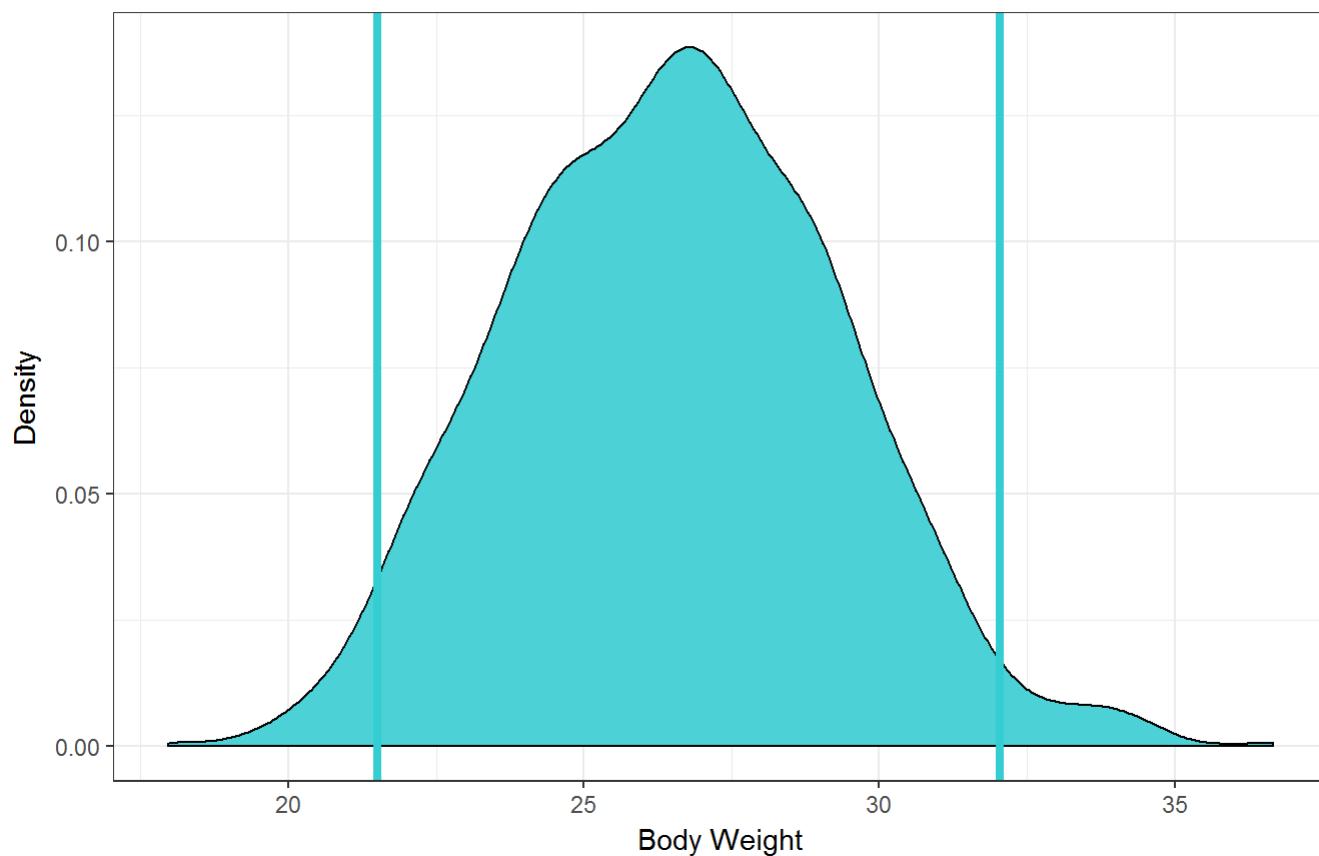
Body Weight with 2.5% (17.5095) and 97.5% (25.94) indicator for control mice



```
##  
## [[3]]
```

Male Mice Density Plot

Body Weight with 2.5% (21.51175) and 97.5% (32.04825) indicator for control mice



Bootstrapping

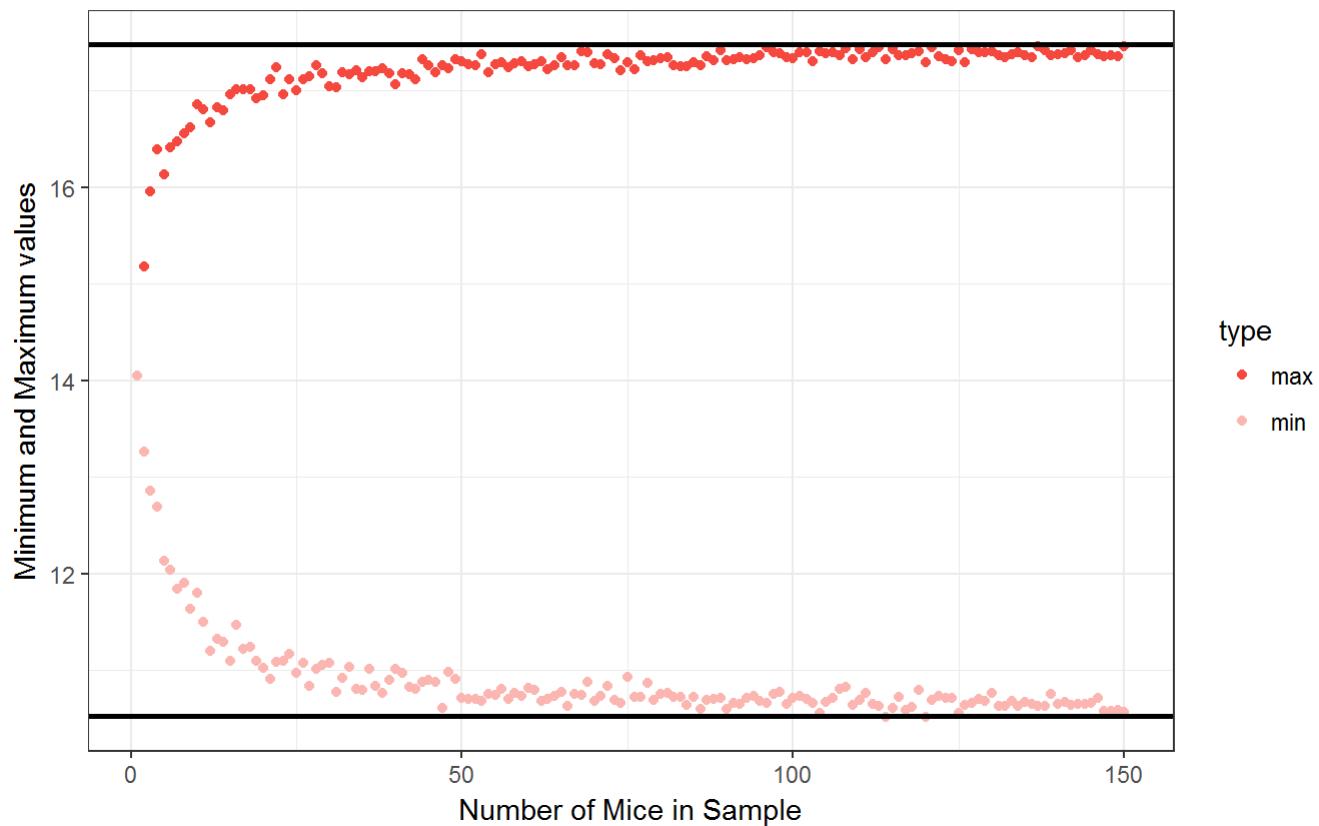
Bootstrapping was done to get an idea of how many samples were necessary to get the 2.5% and 97.% ranges of the complete data set.

Week 4 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

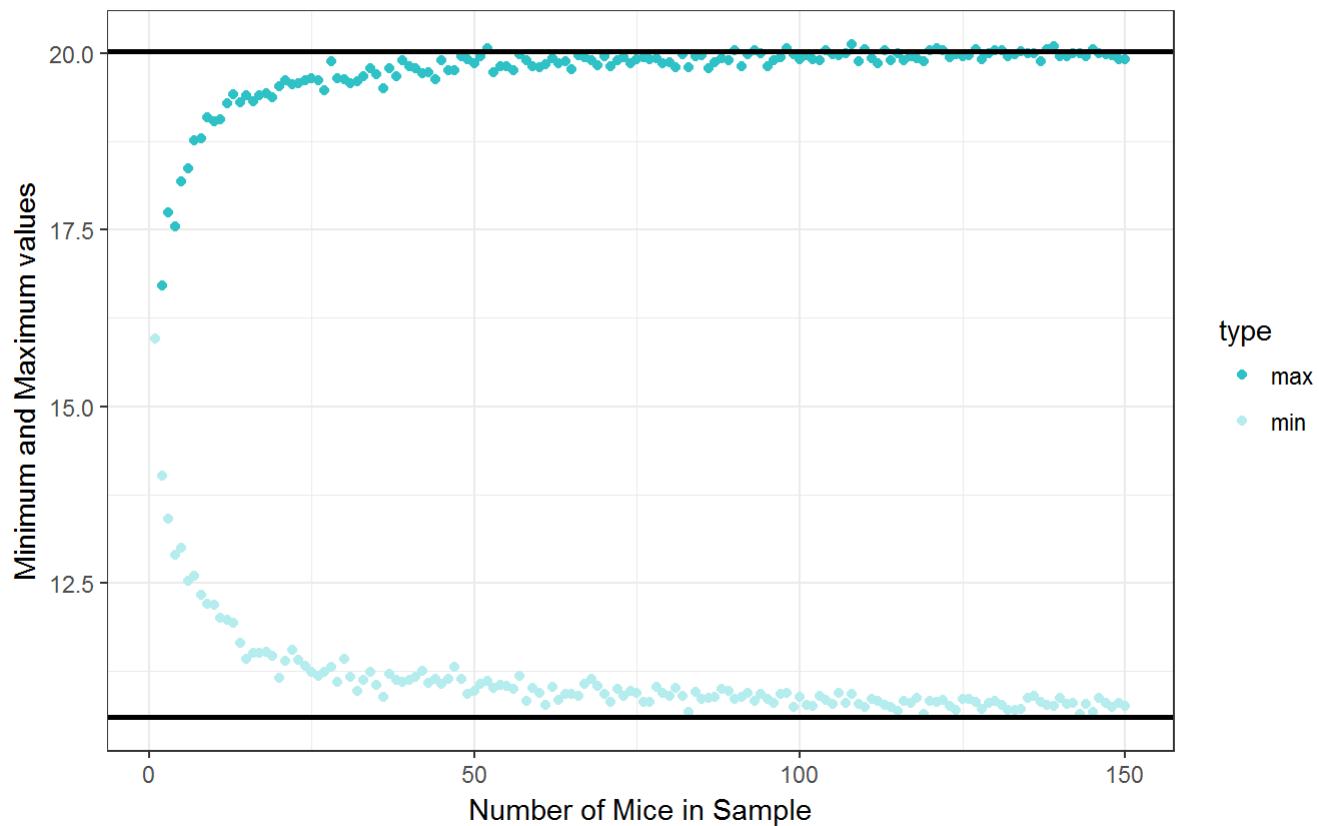
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

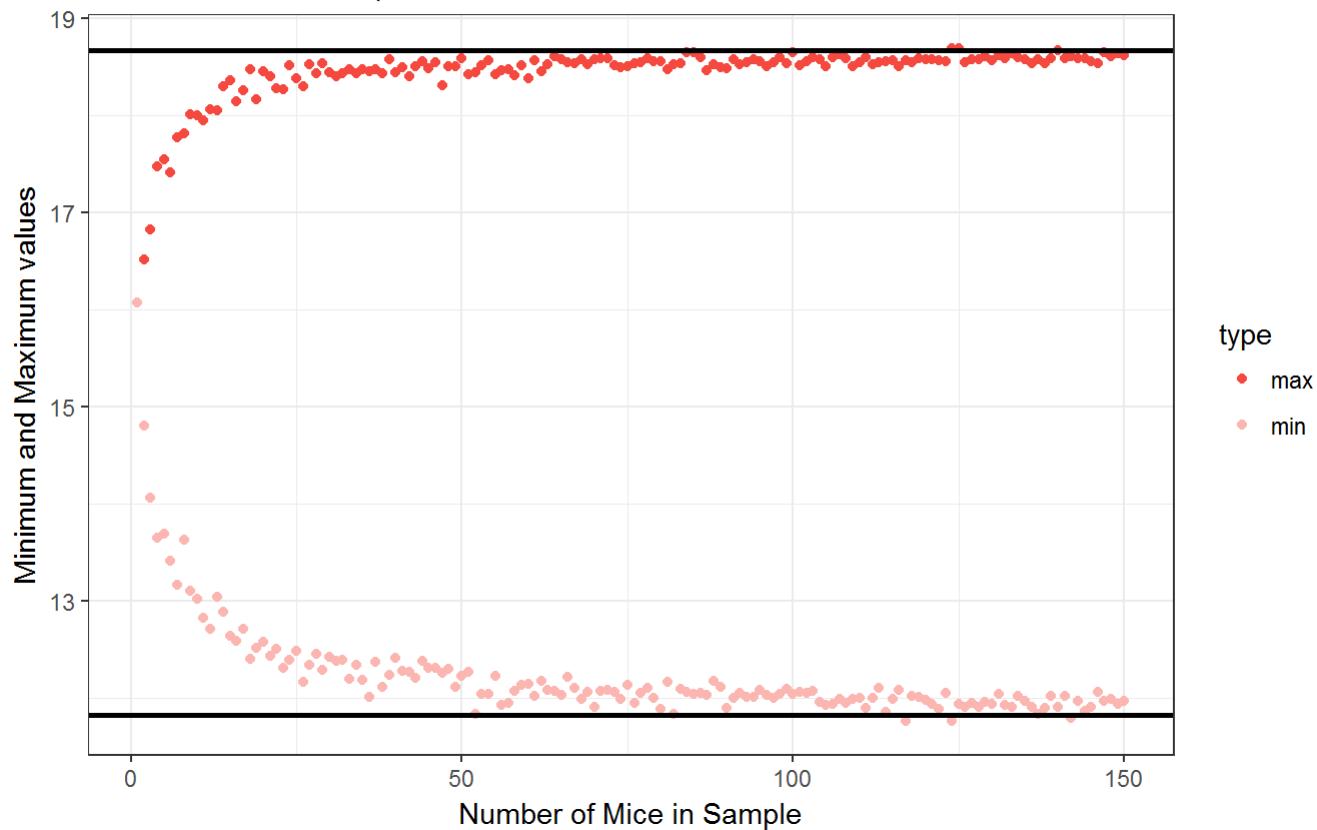


Week 5 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

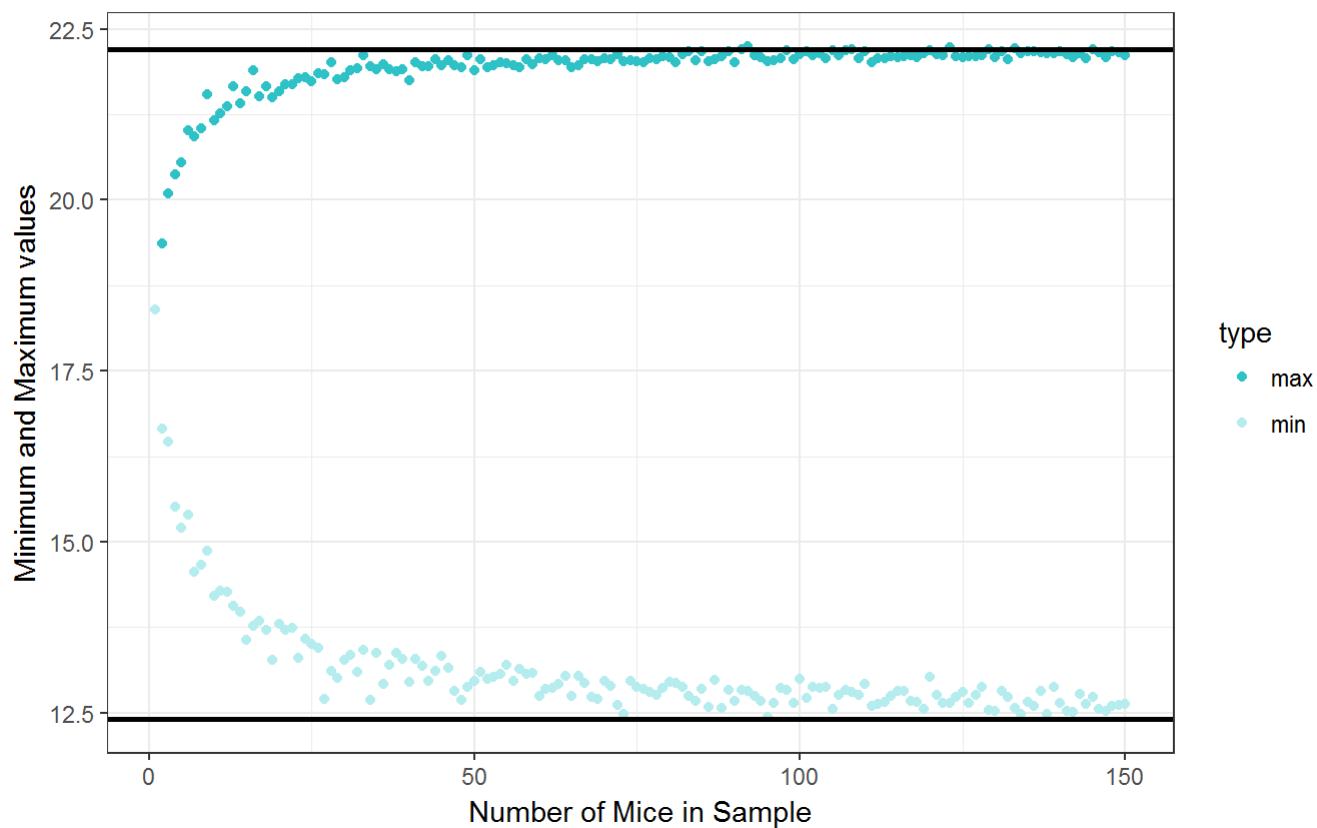
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

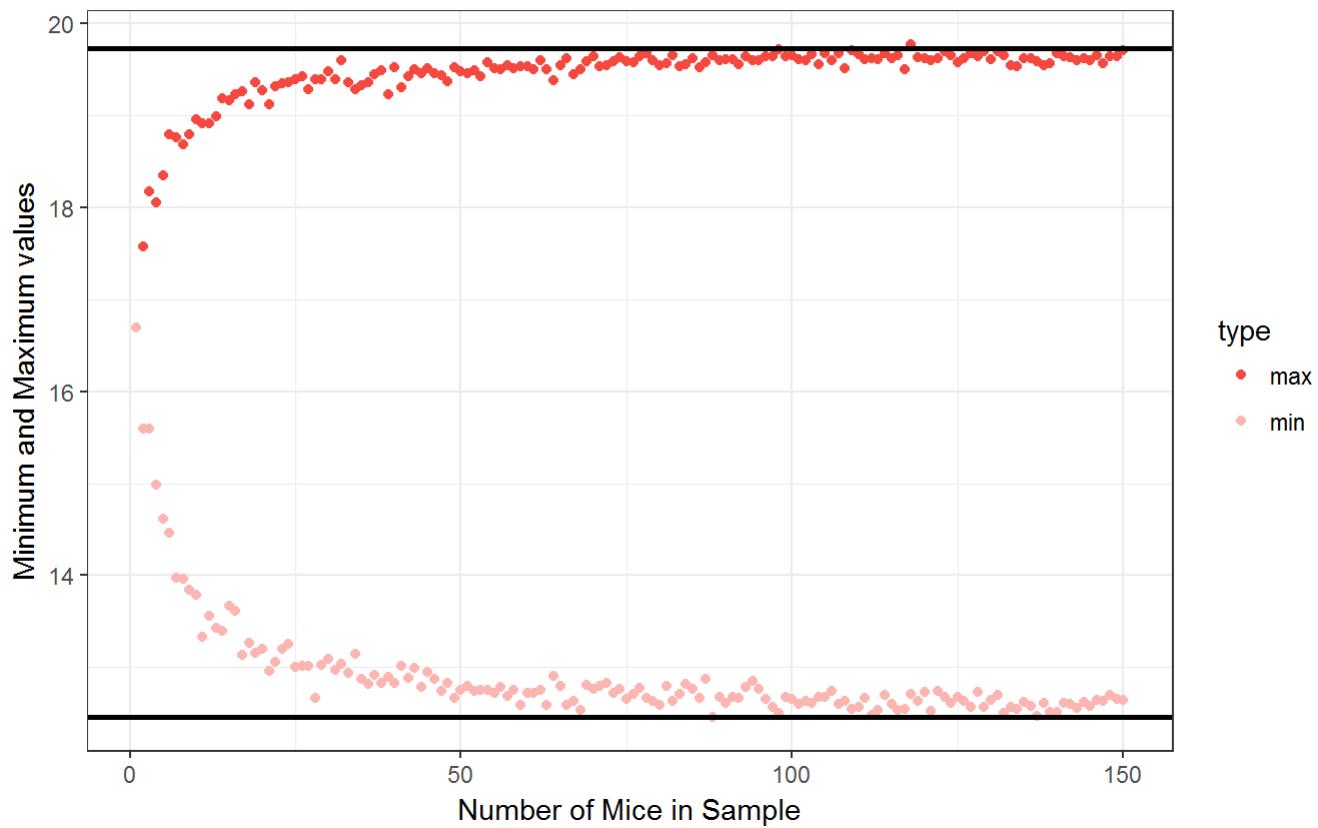


Week 6 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

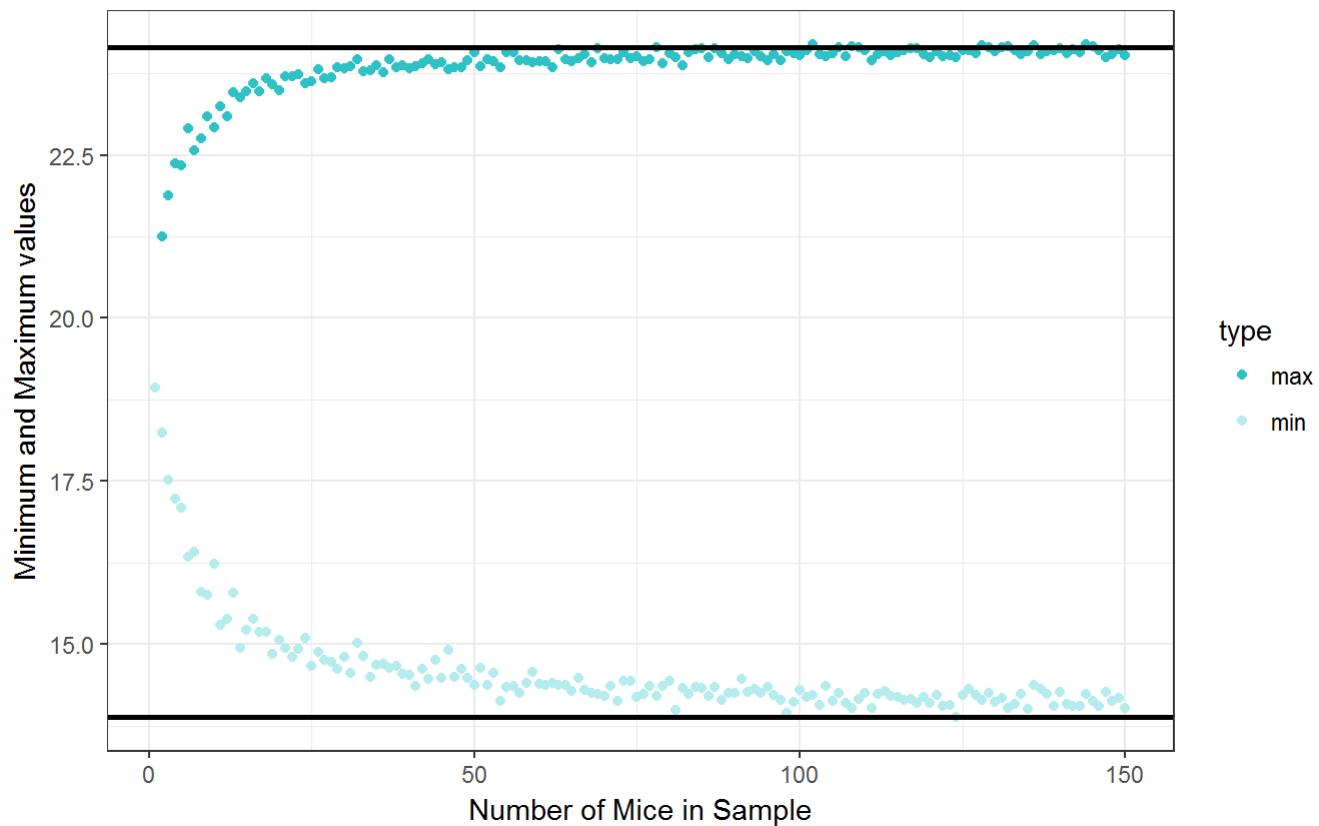
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

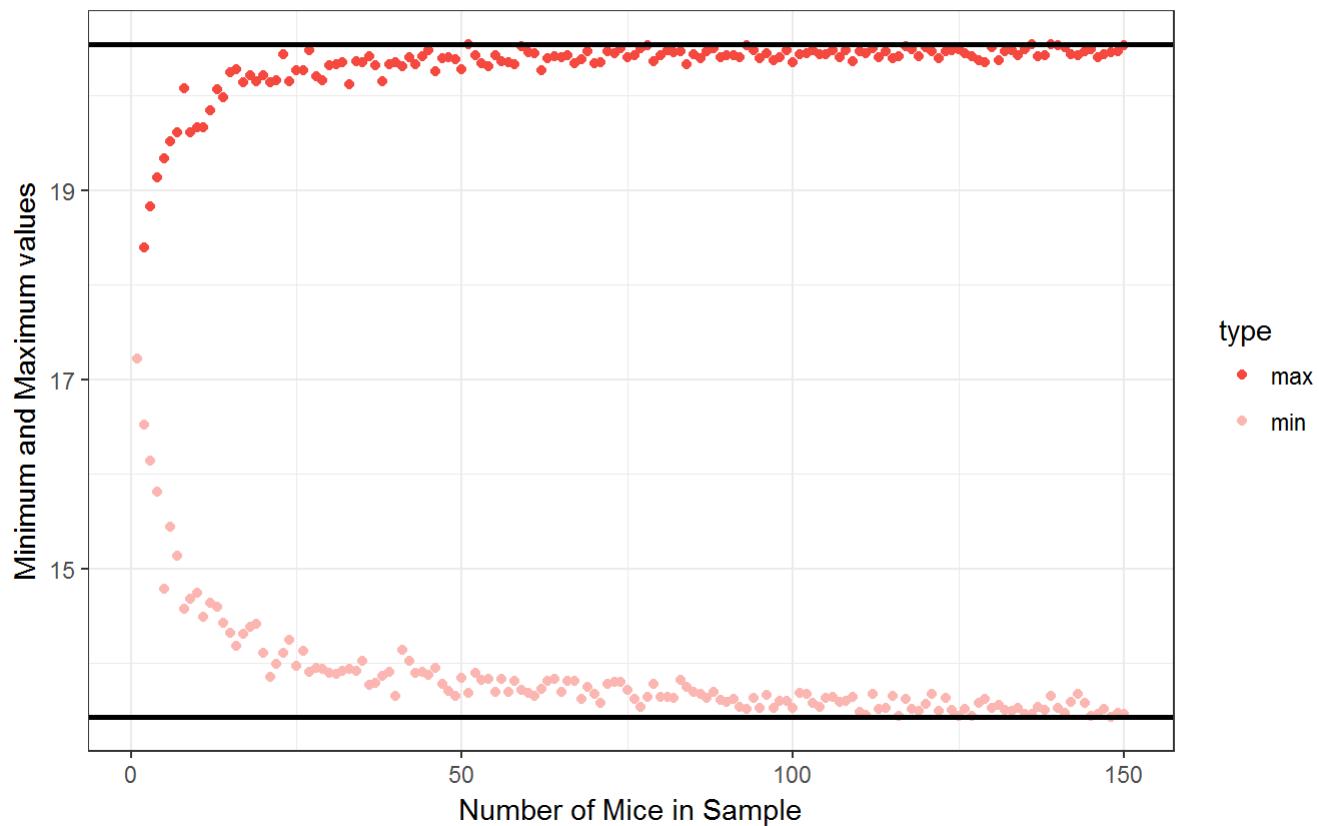


Week 7 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

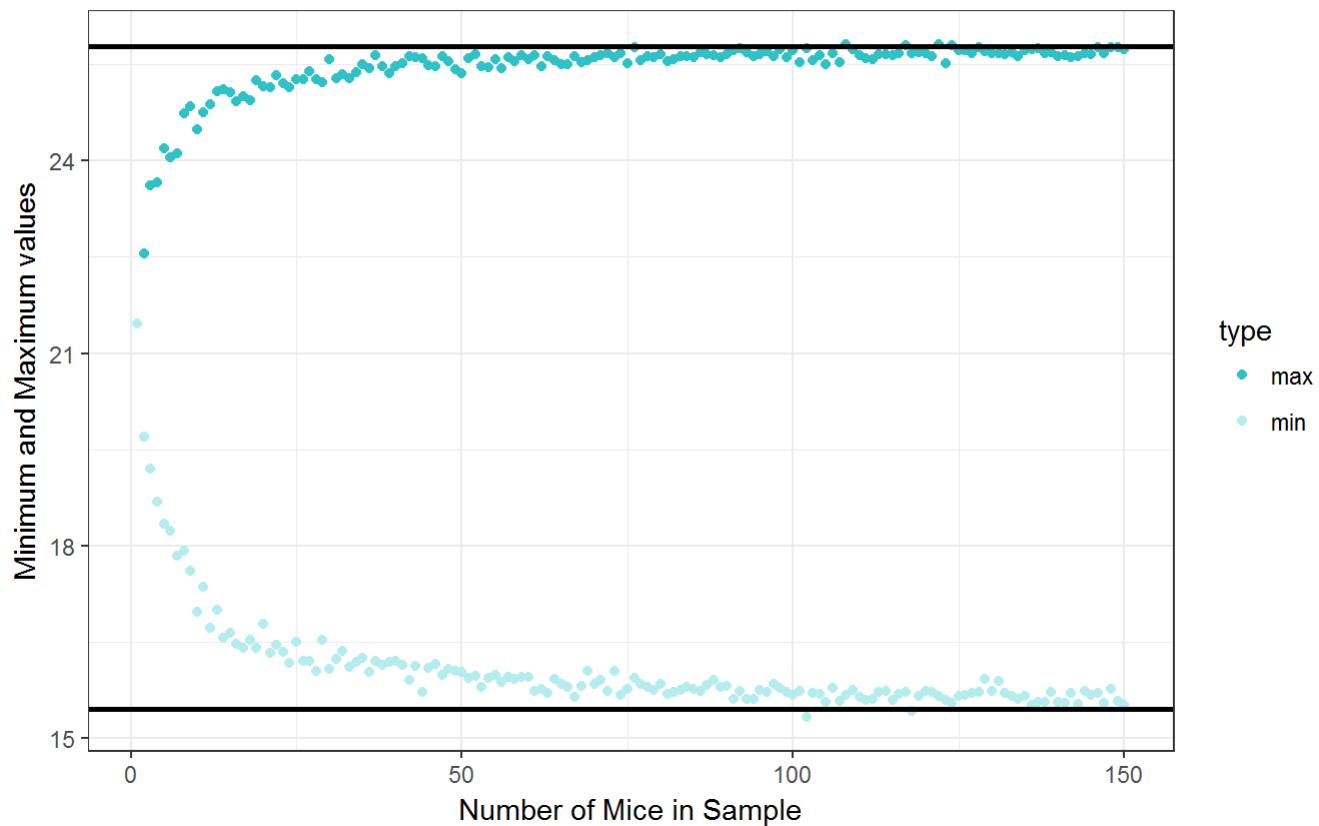
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

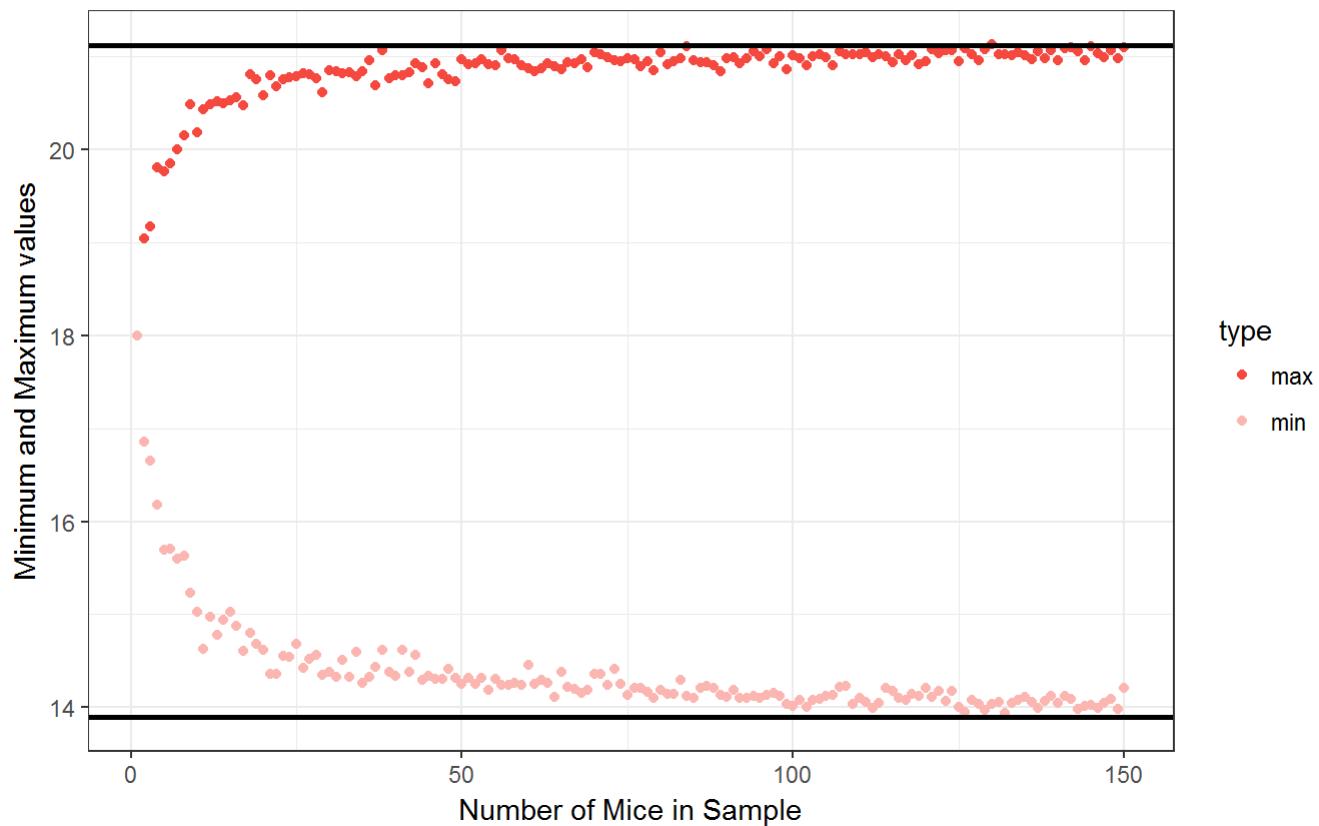


Week 8 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

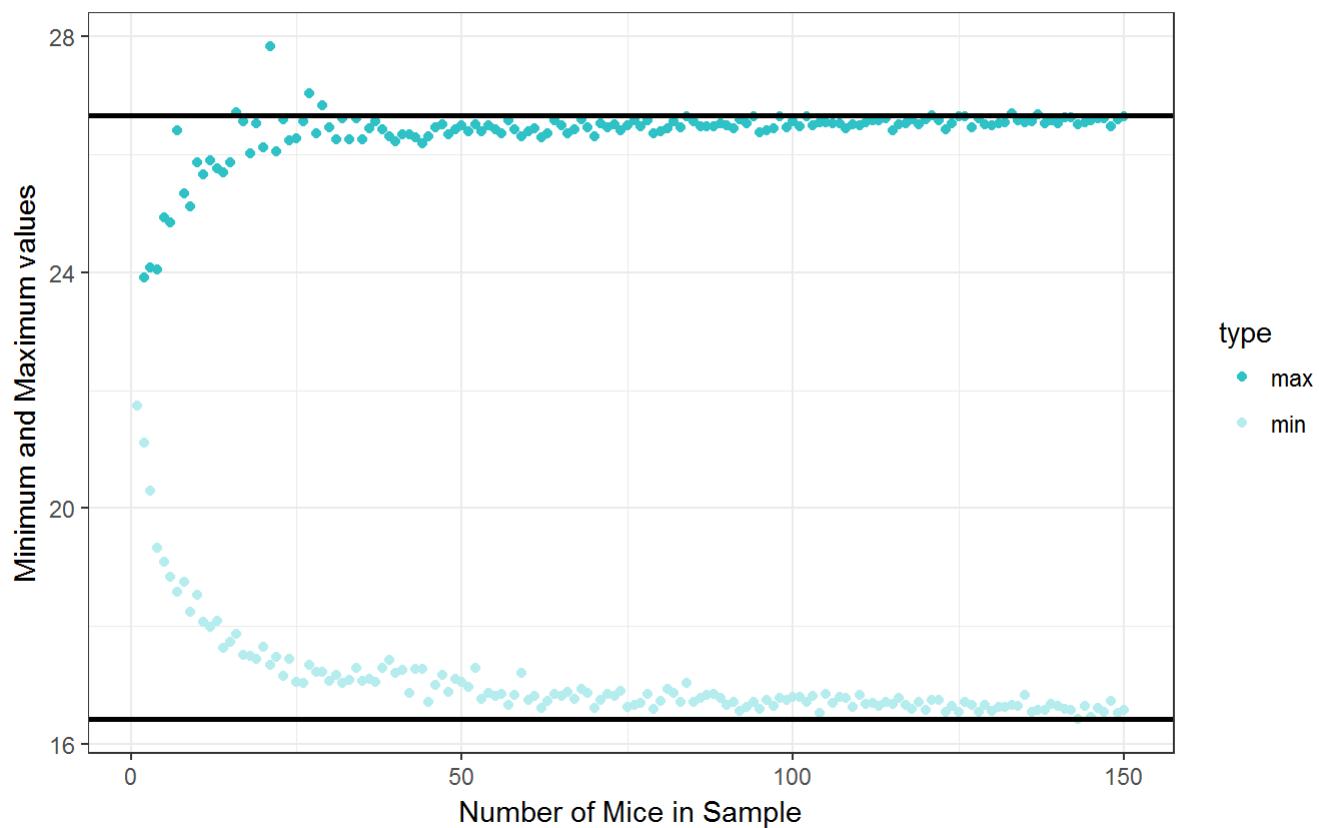
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the 2.5% and 97.5% quartiles of the historical data

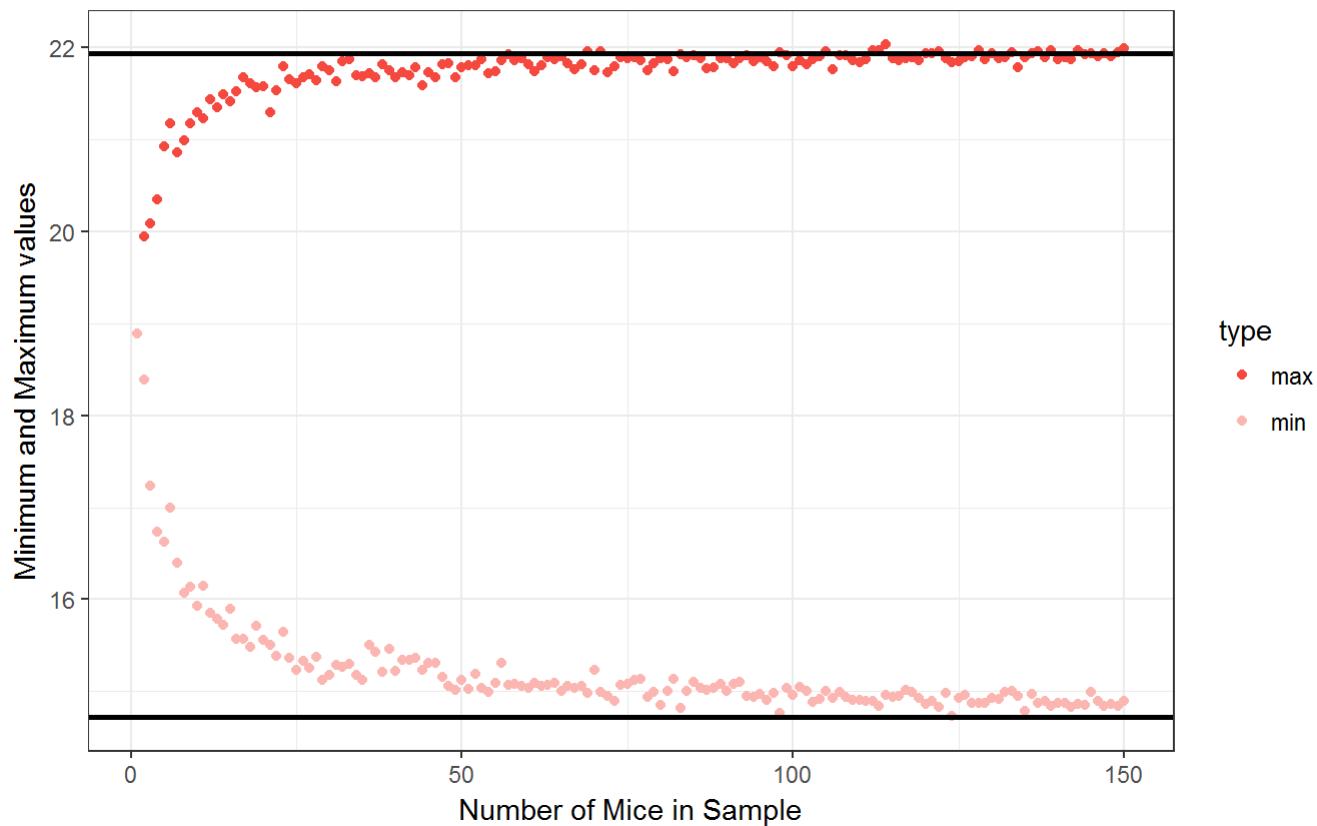


Week 9 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

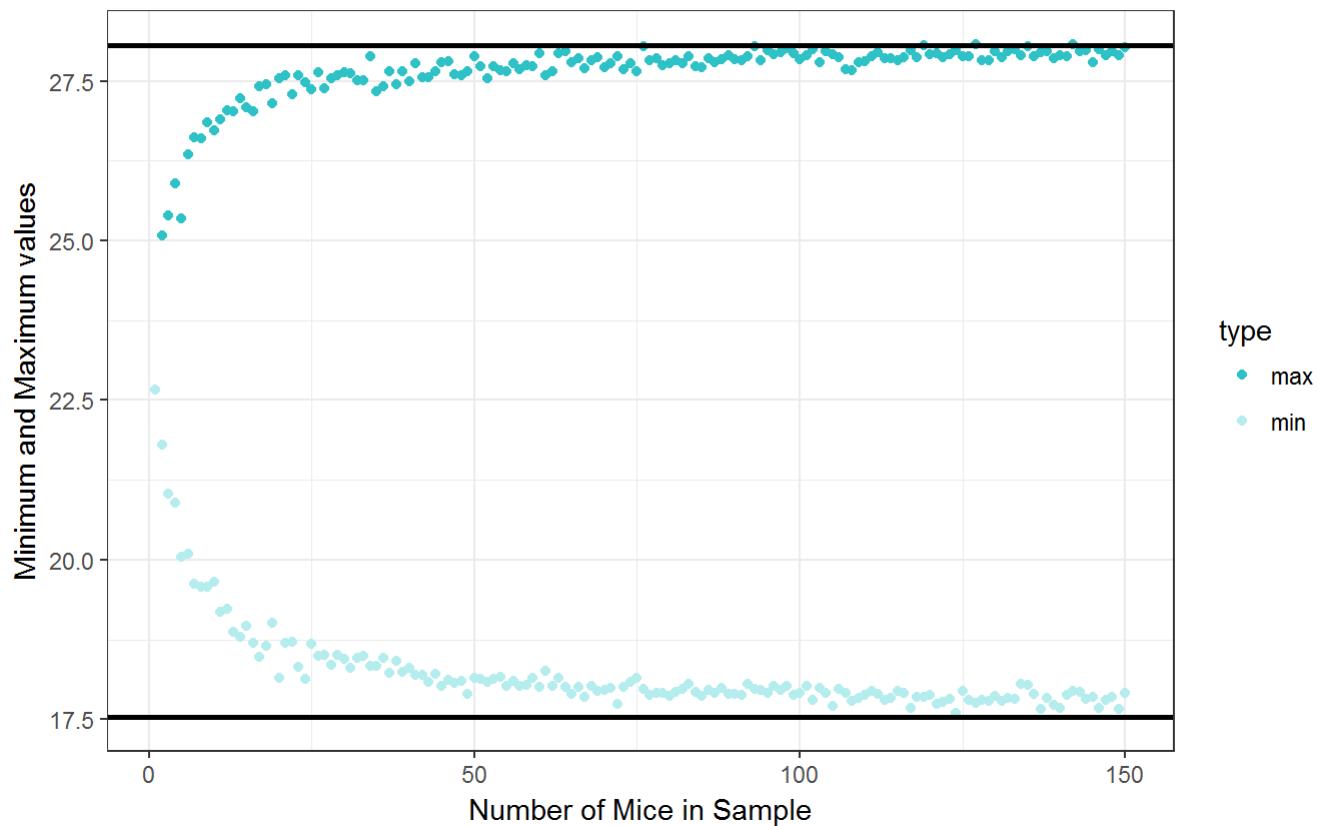
Visualization of what N would yield an approximation of the 2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

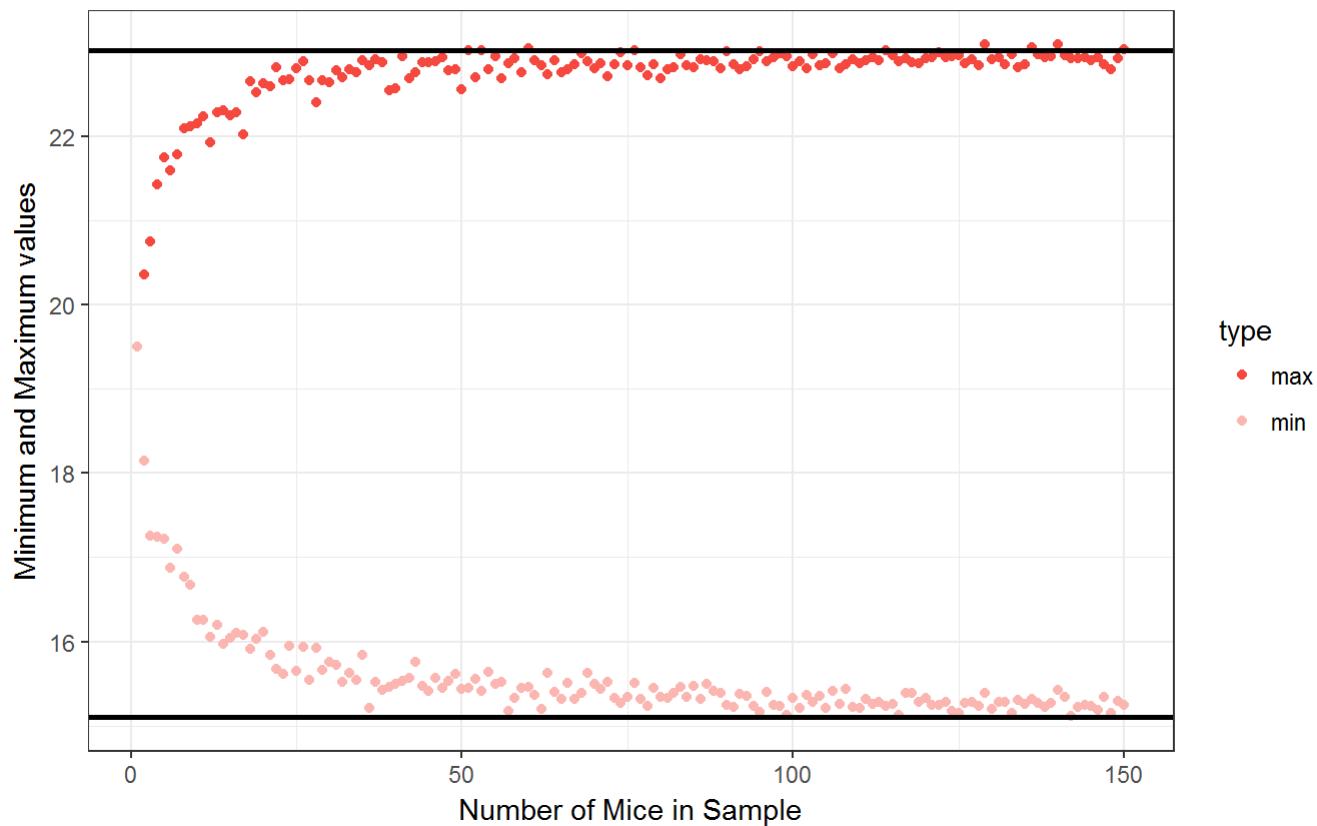


Week 10 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

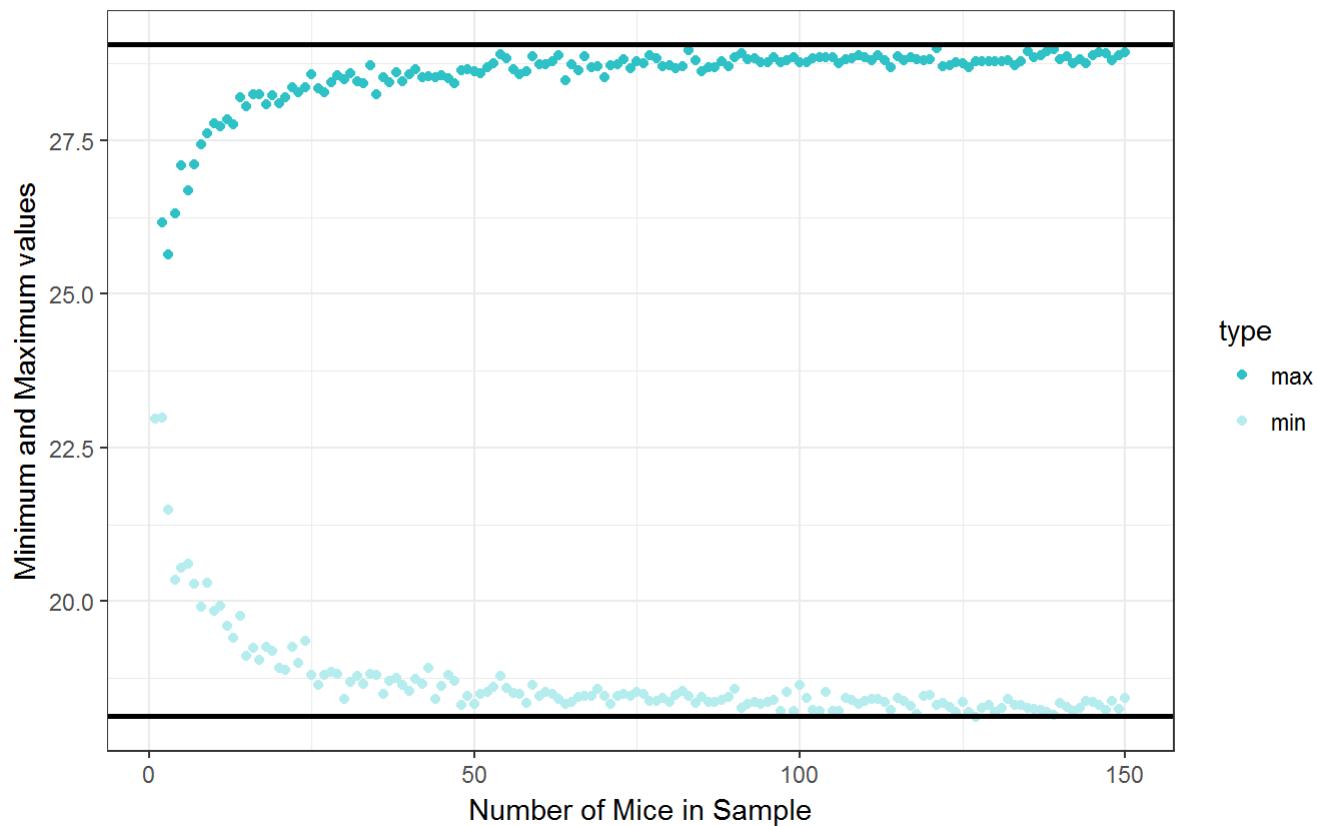
Visualization of what N would yield an approximation of the 2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

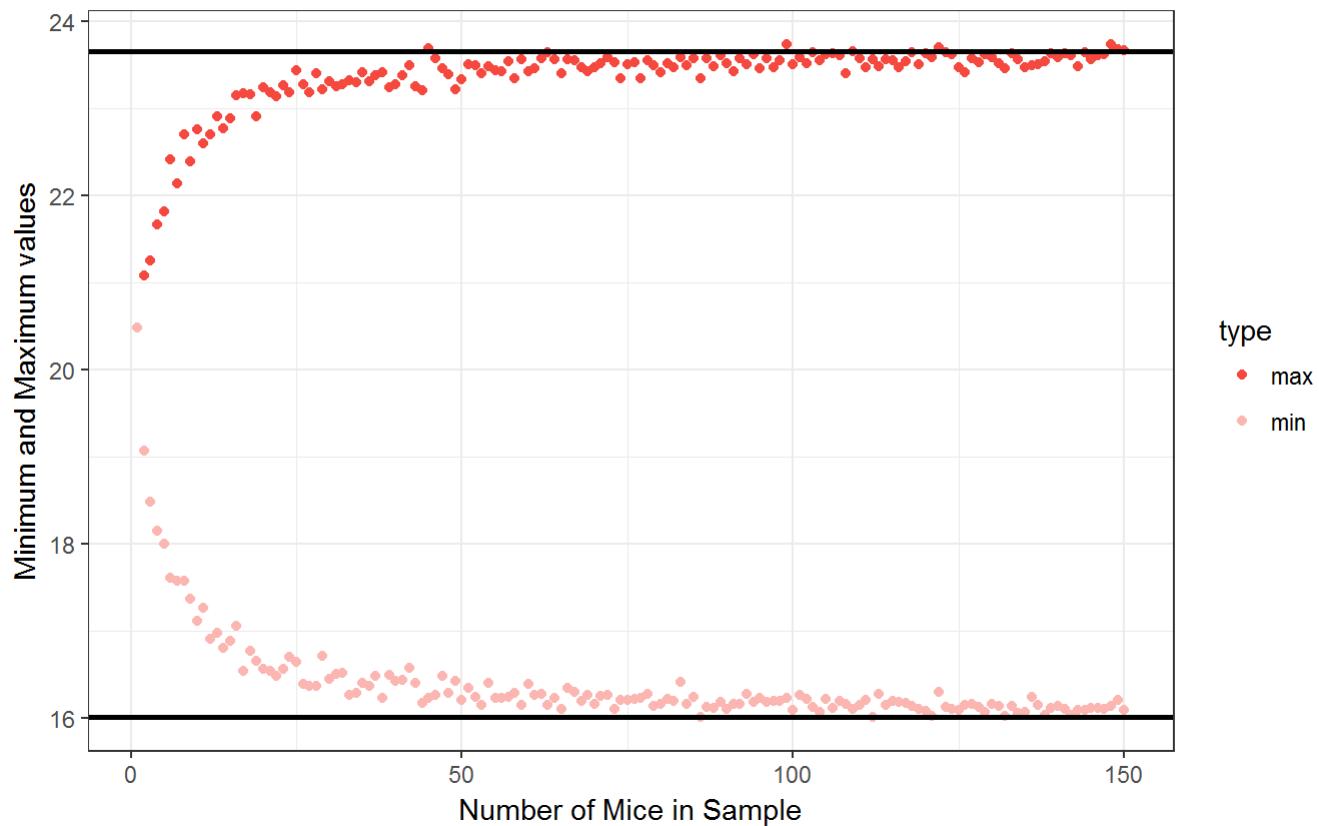


Week 11 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

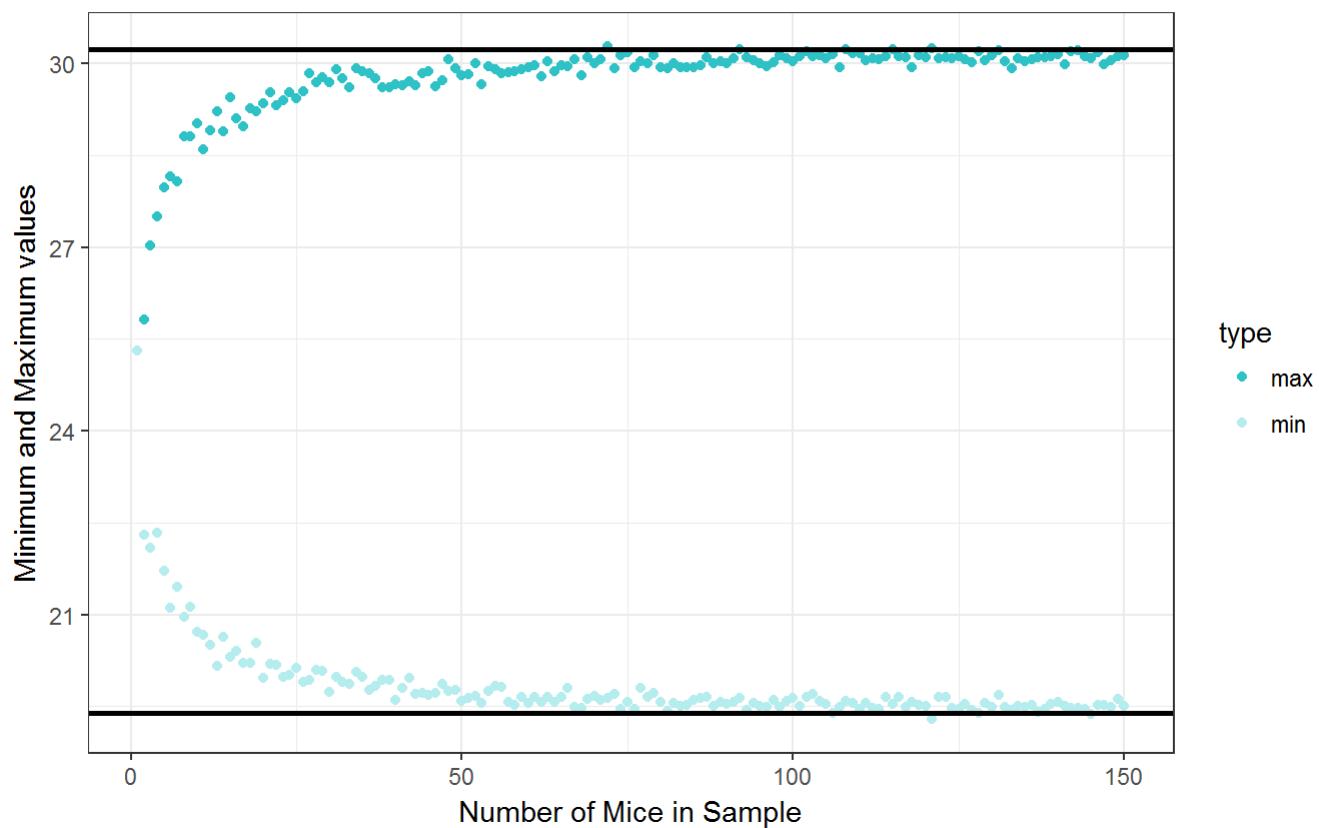
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

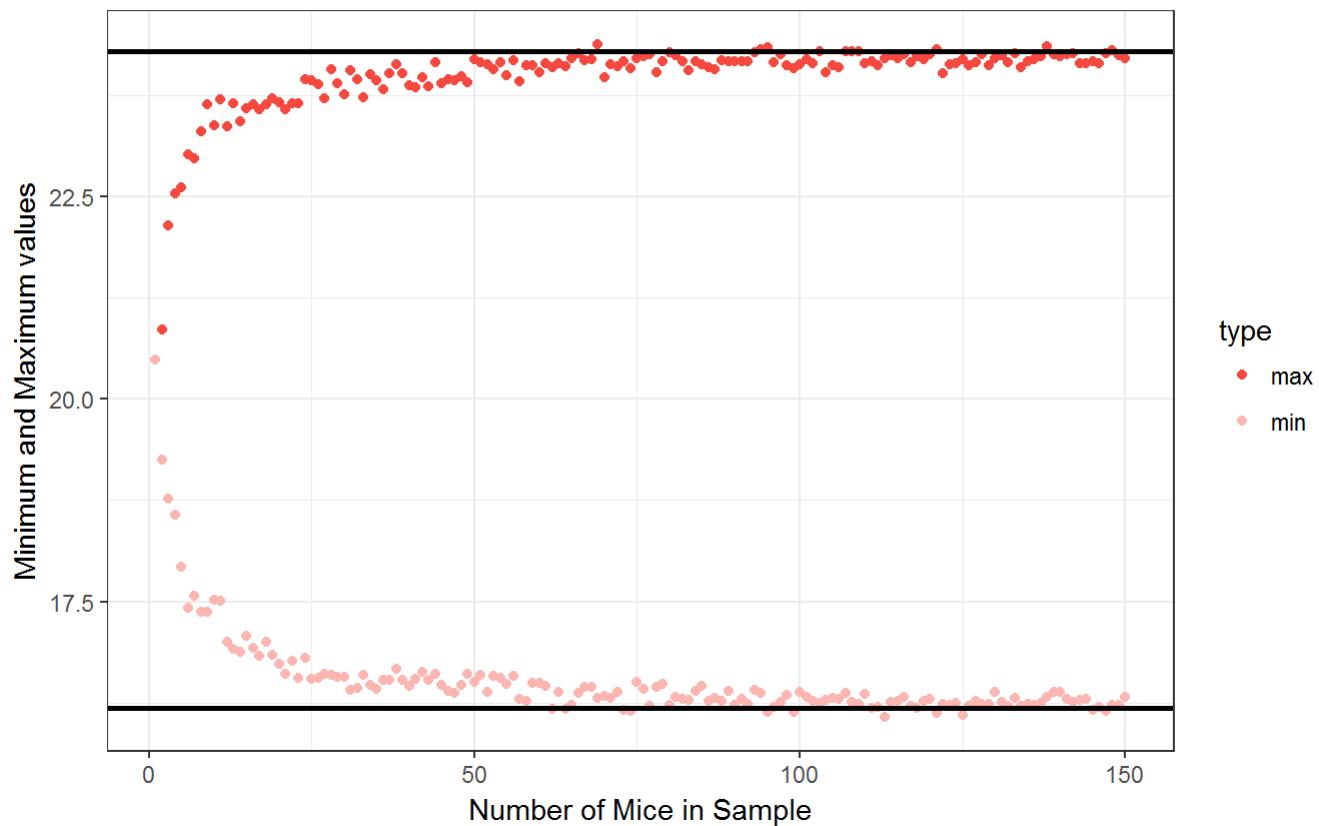


Week 12 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

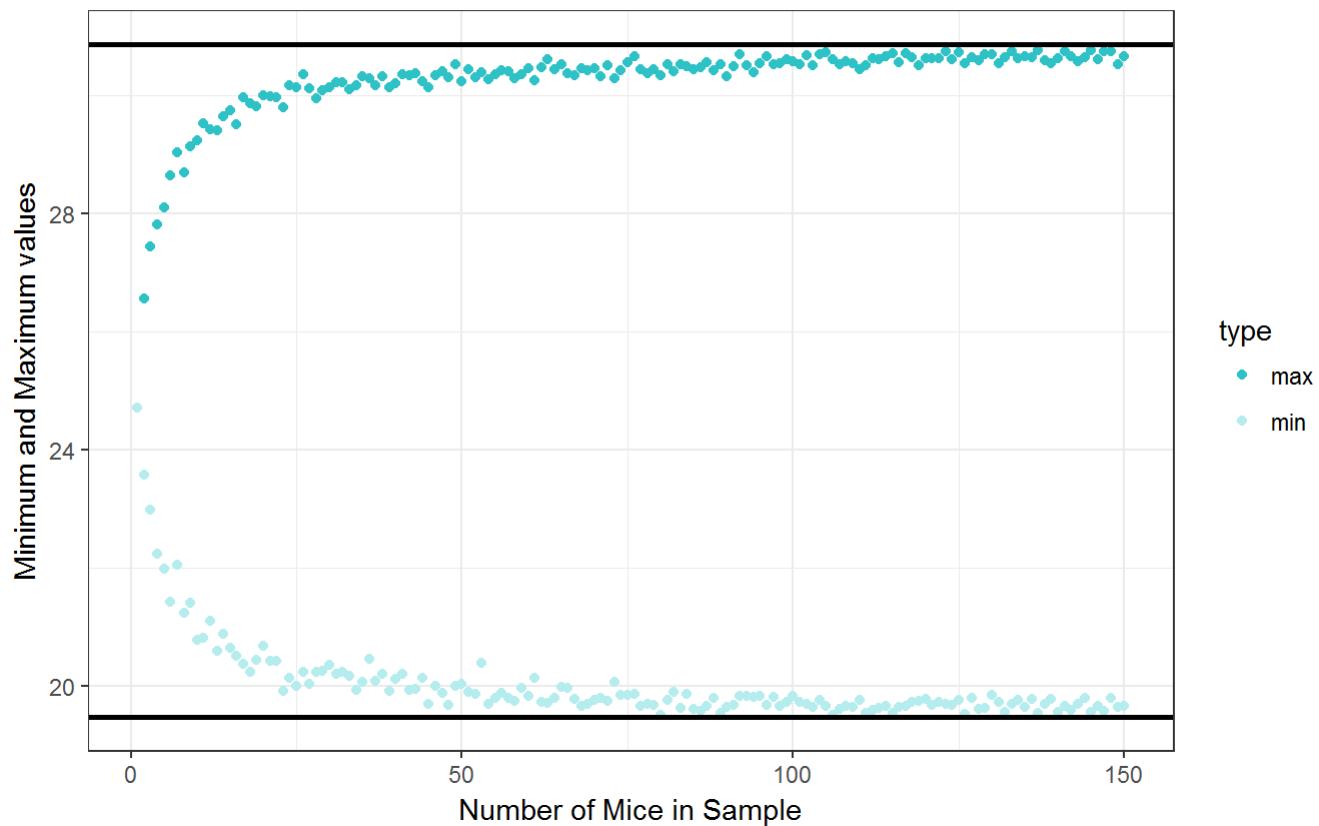
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

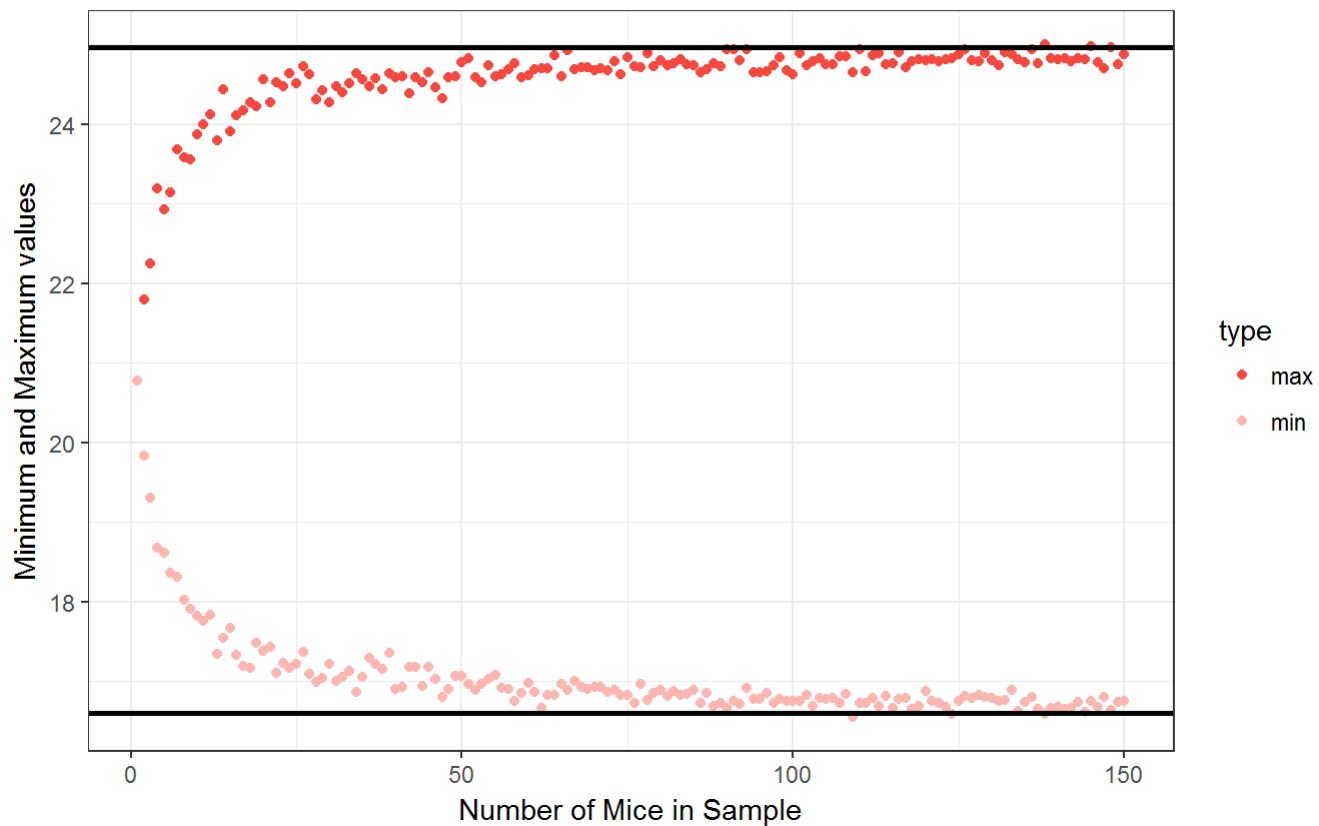


Week 13 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

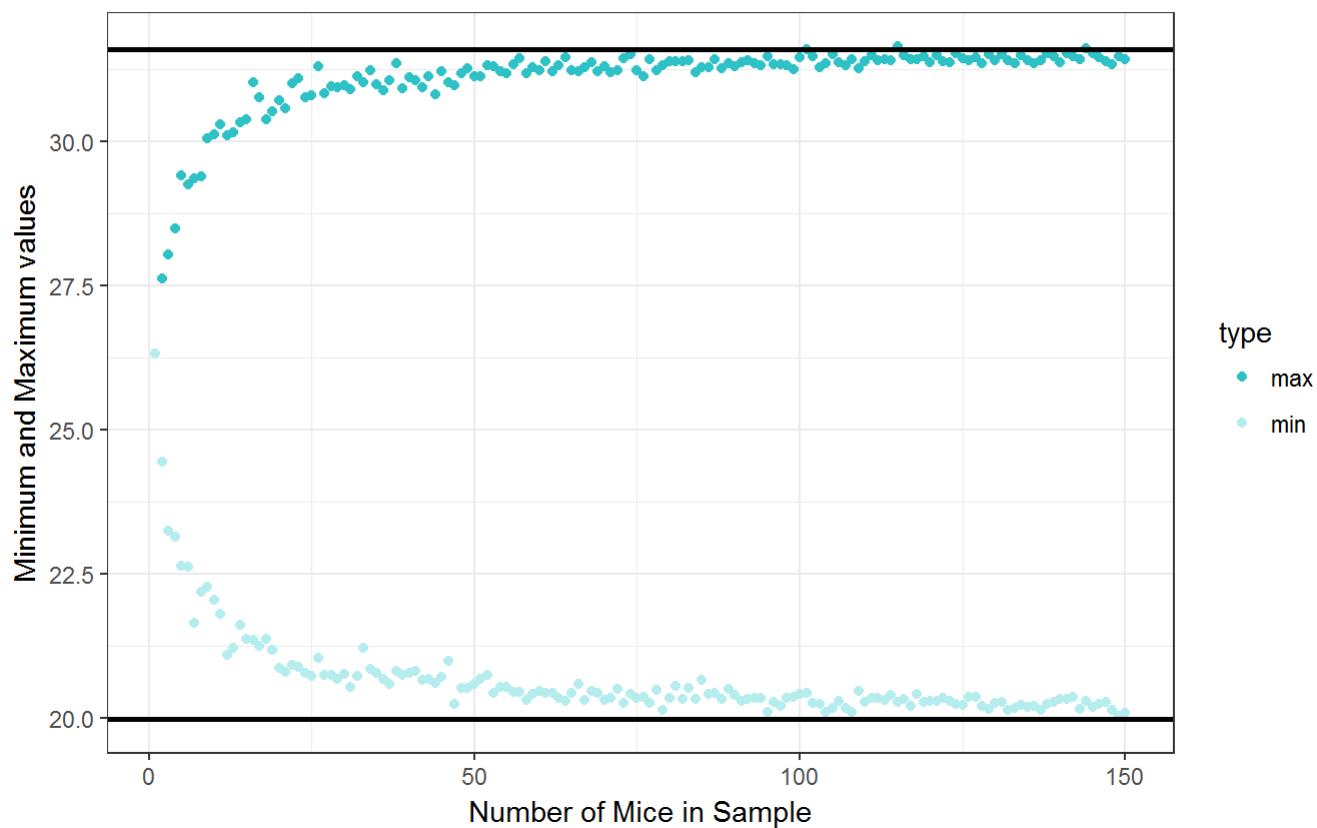
Visualization of what N would yield an approximation of the 2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

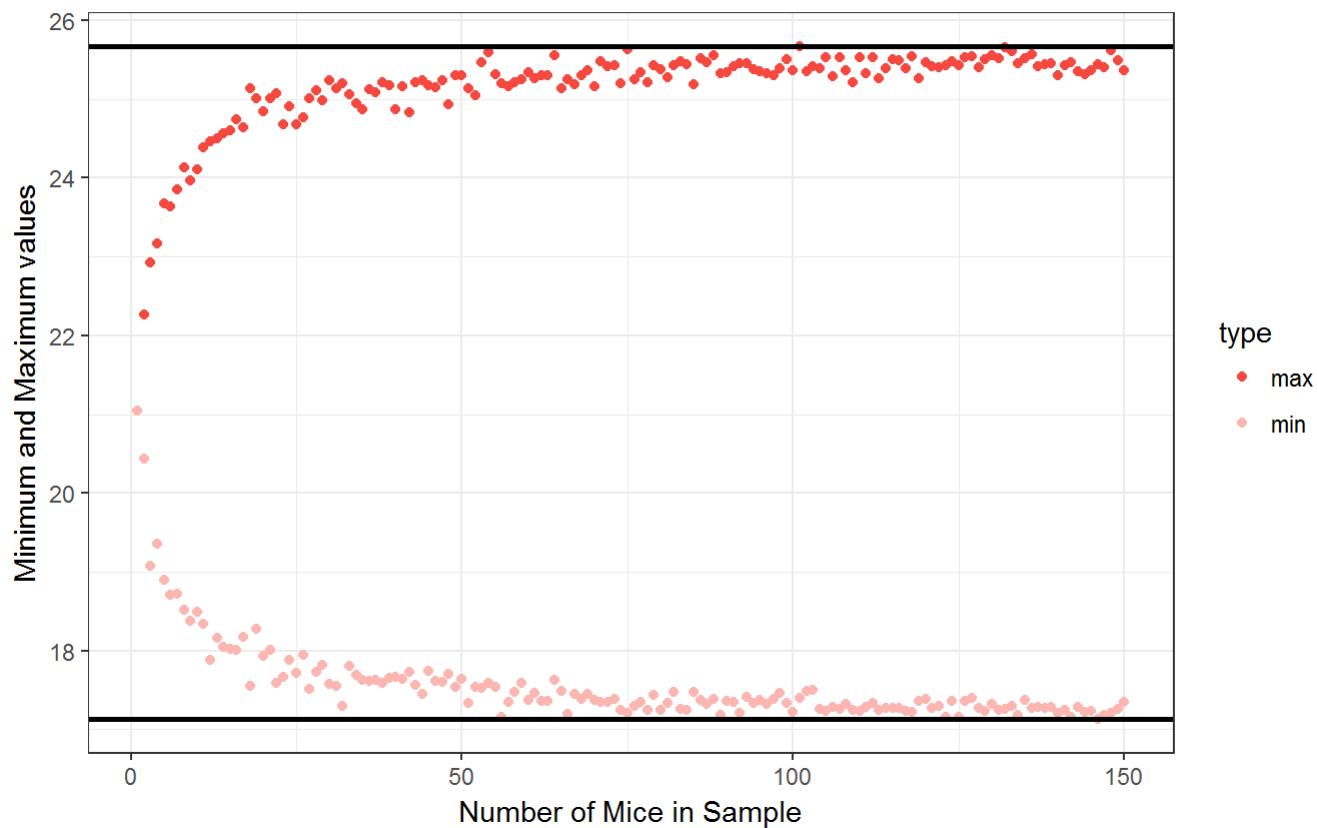


Week 14 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

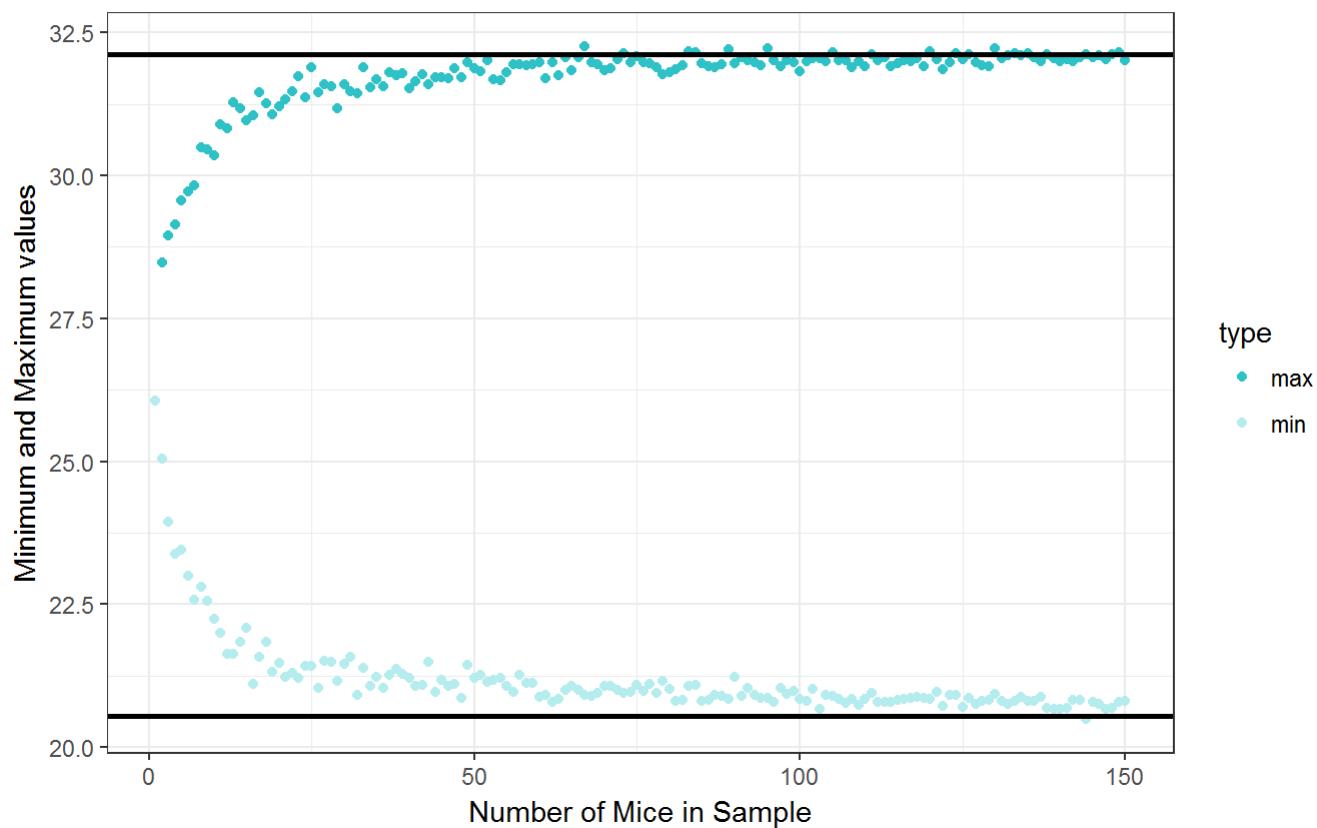
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

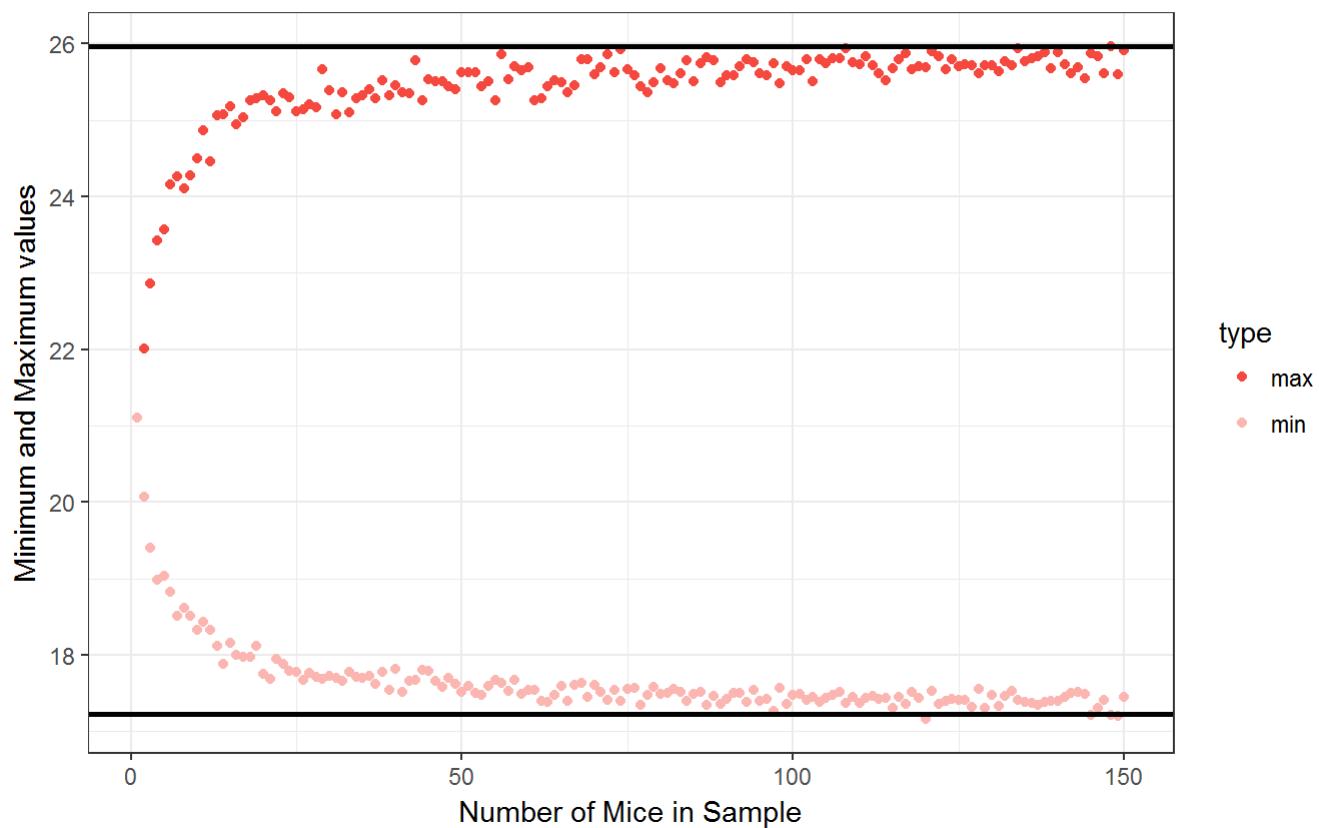


Week 15 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

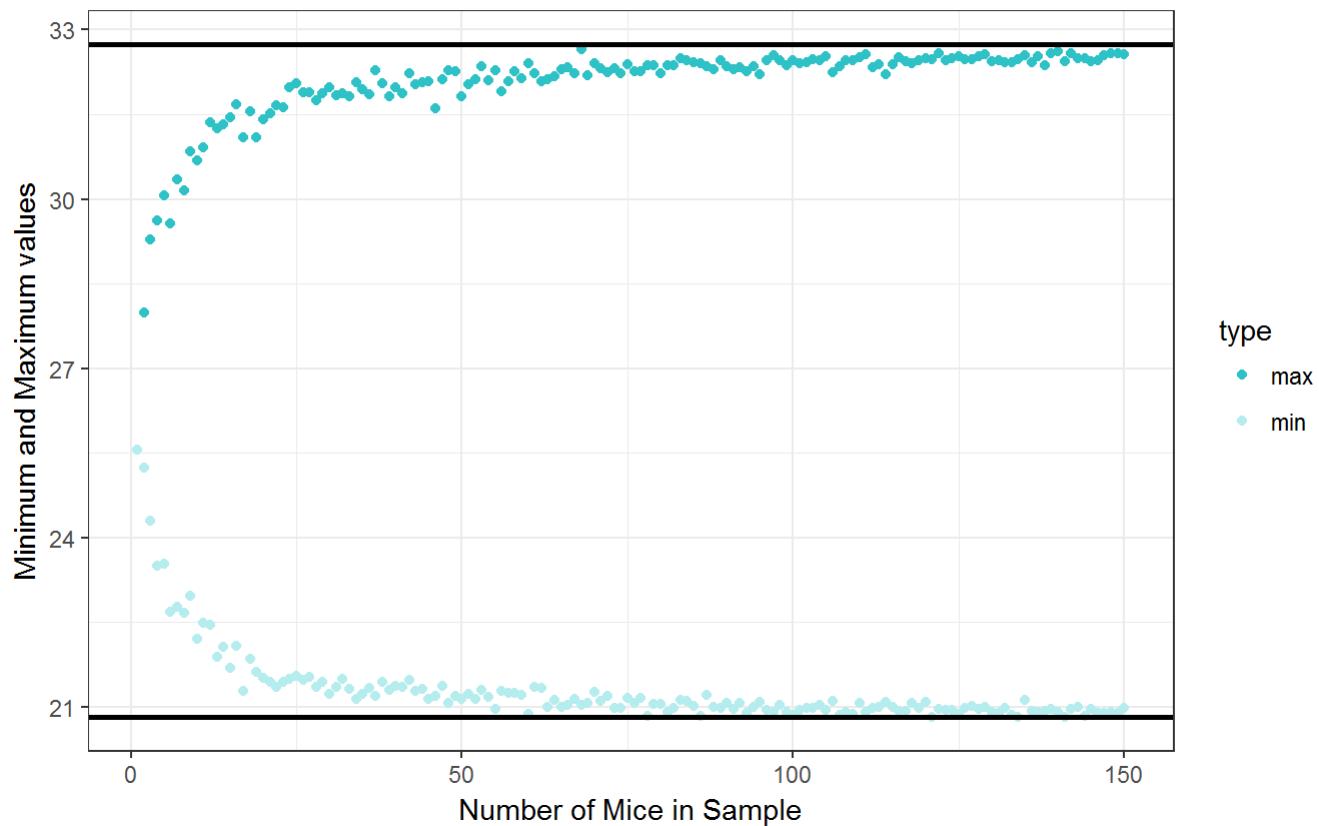
Visualization of what N would yield an approximation of the 2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the 2.5% and 97.5% quartiles of the historical data

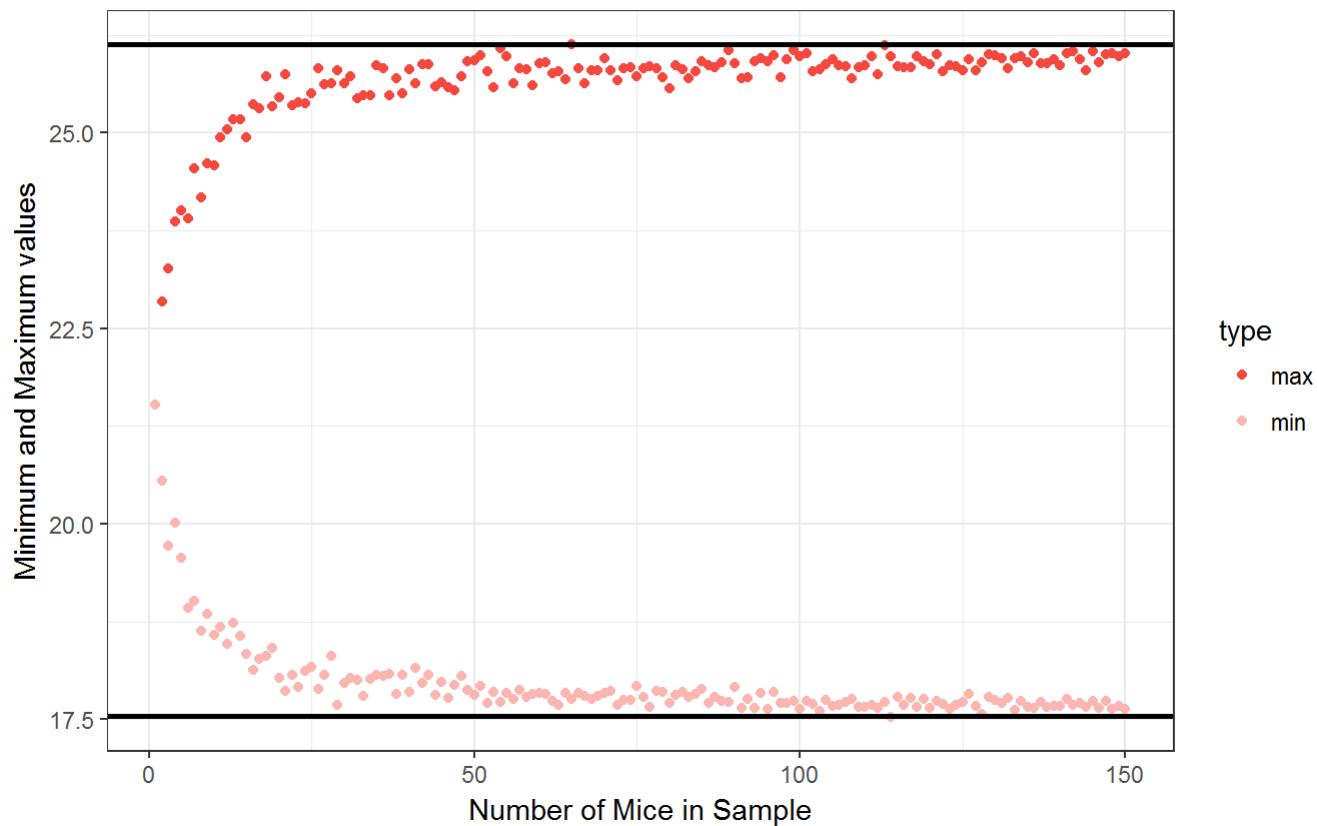


Week 16 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

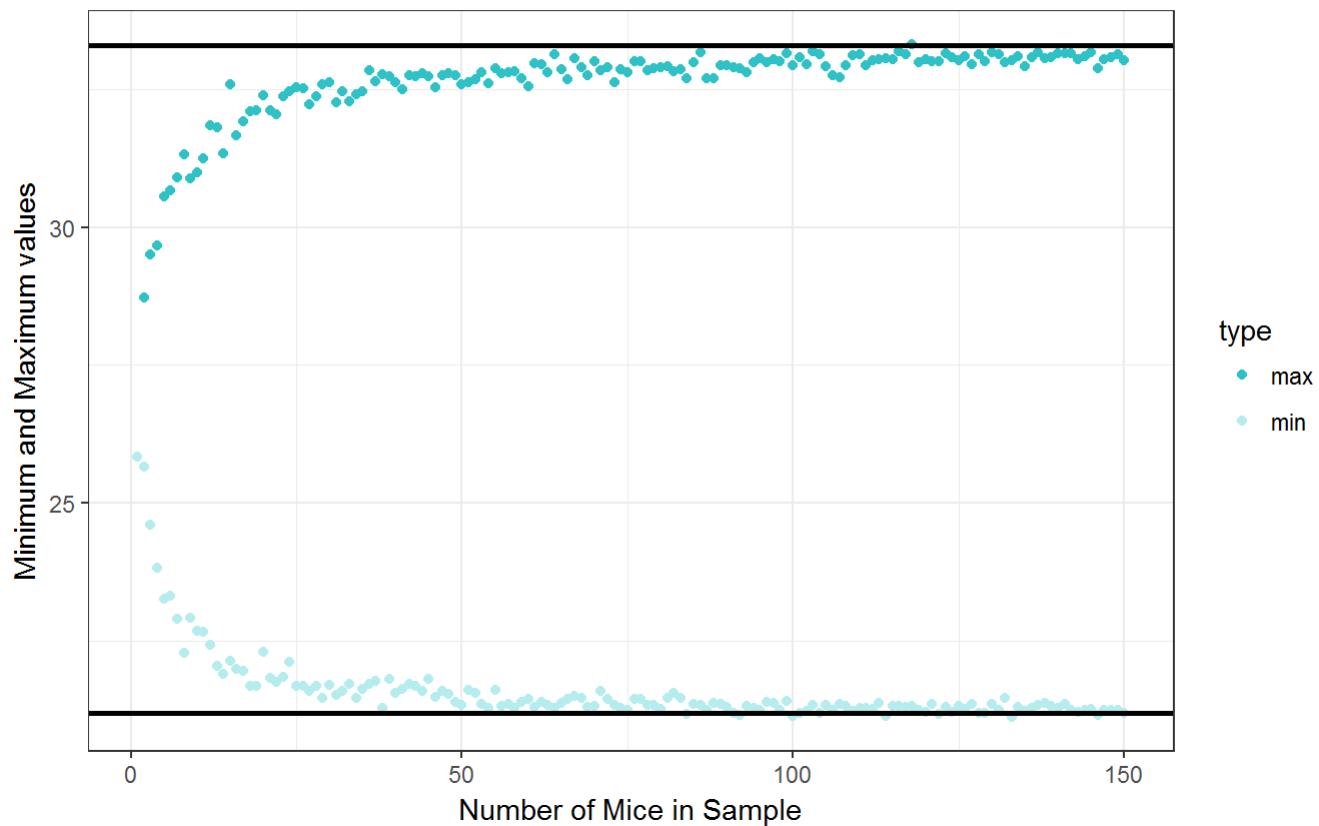
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

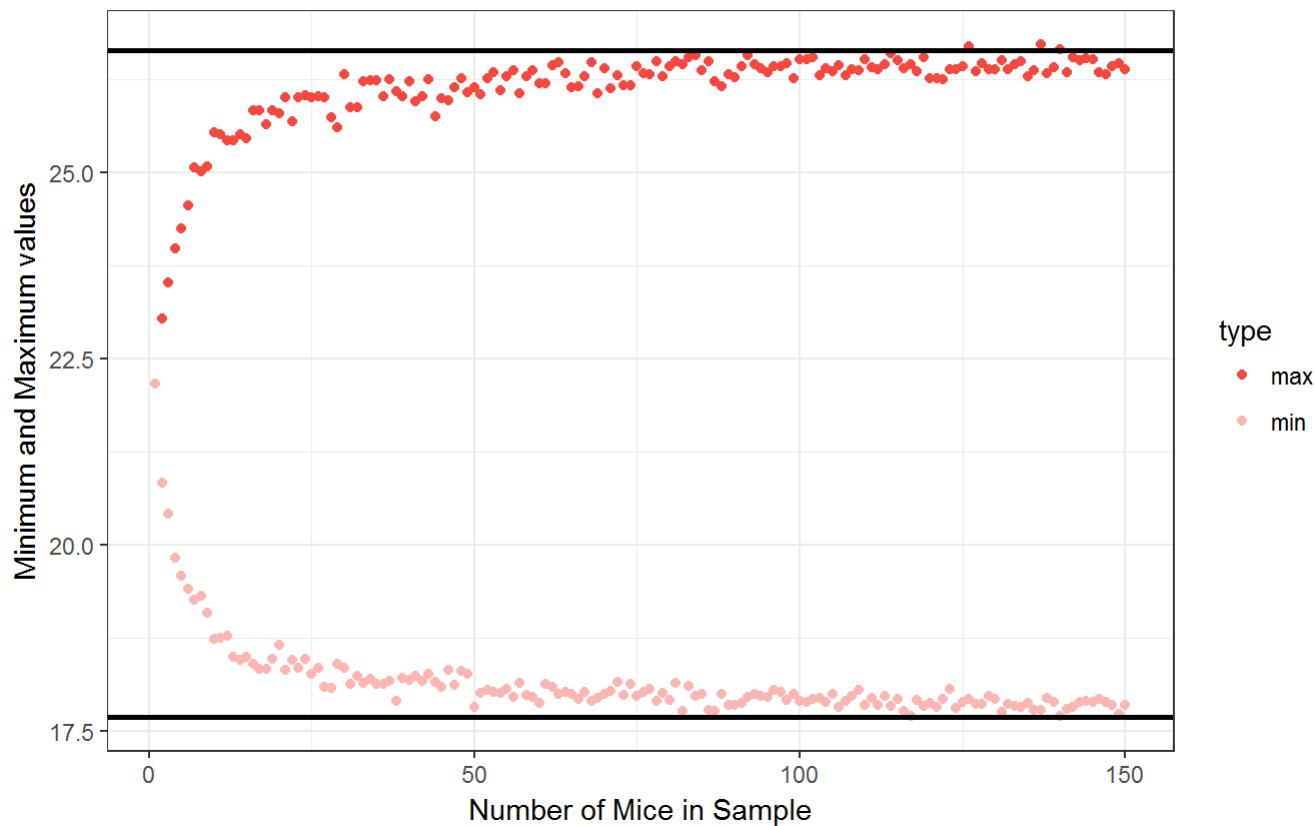


Week 17 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

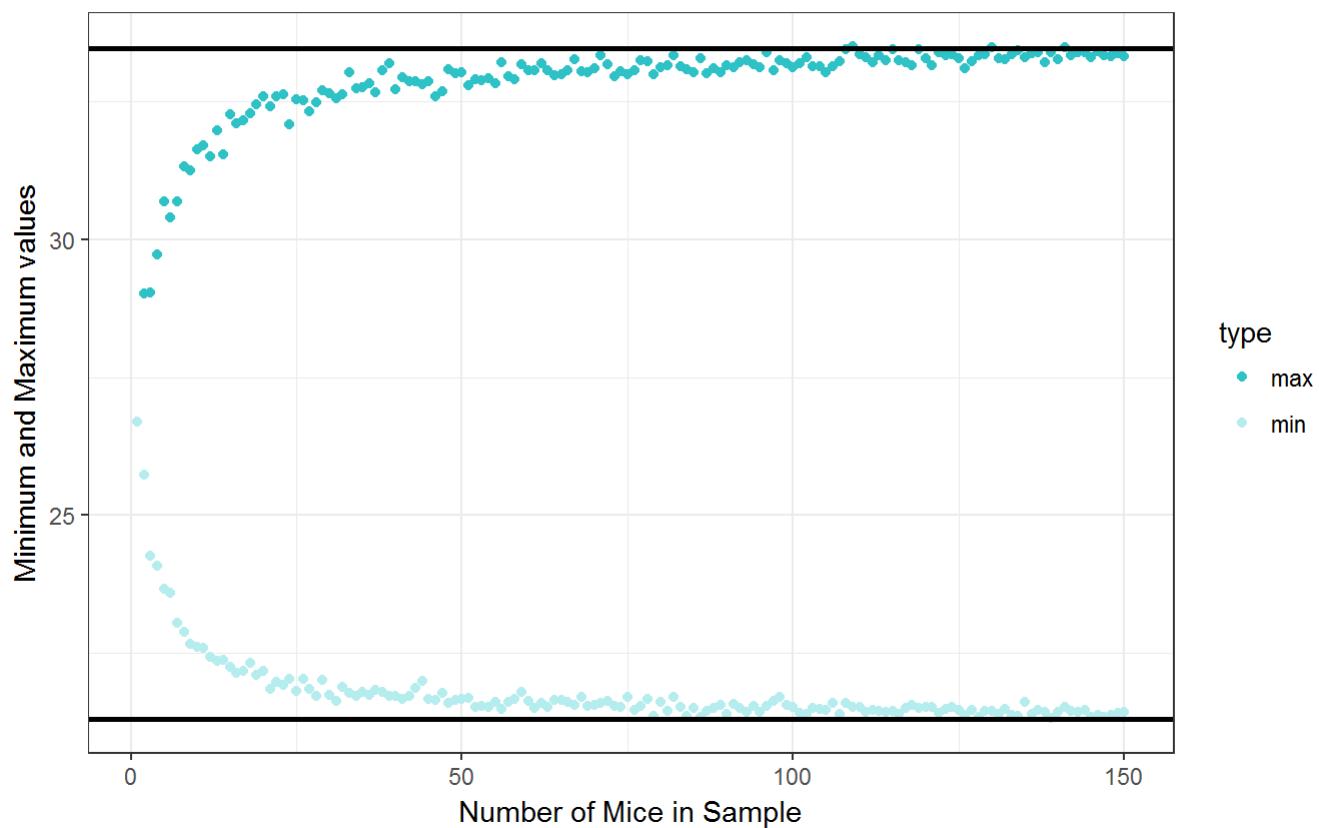
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data

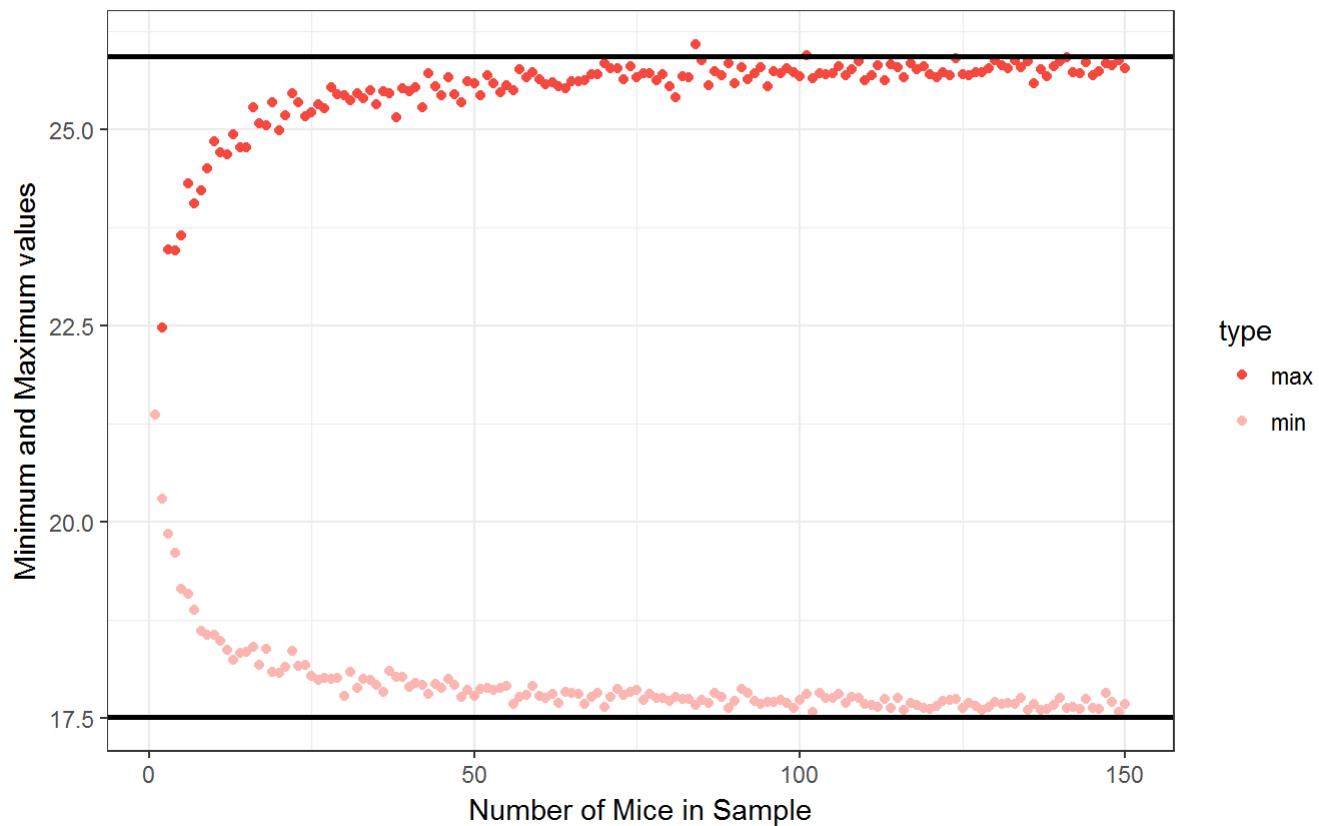


Week 18 Body Weight

```
## [[1]]
```

Bootstrapping of Historical Data for Body Weight by Female Mice

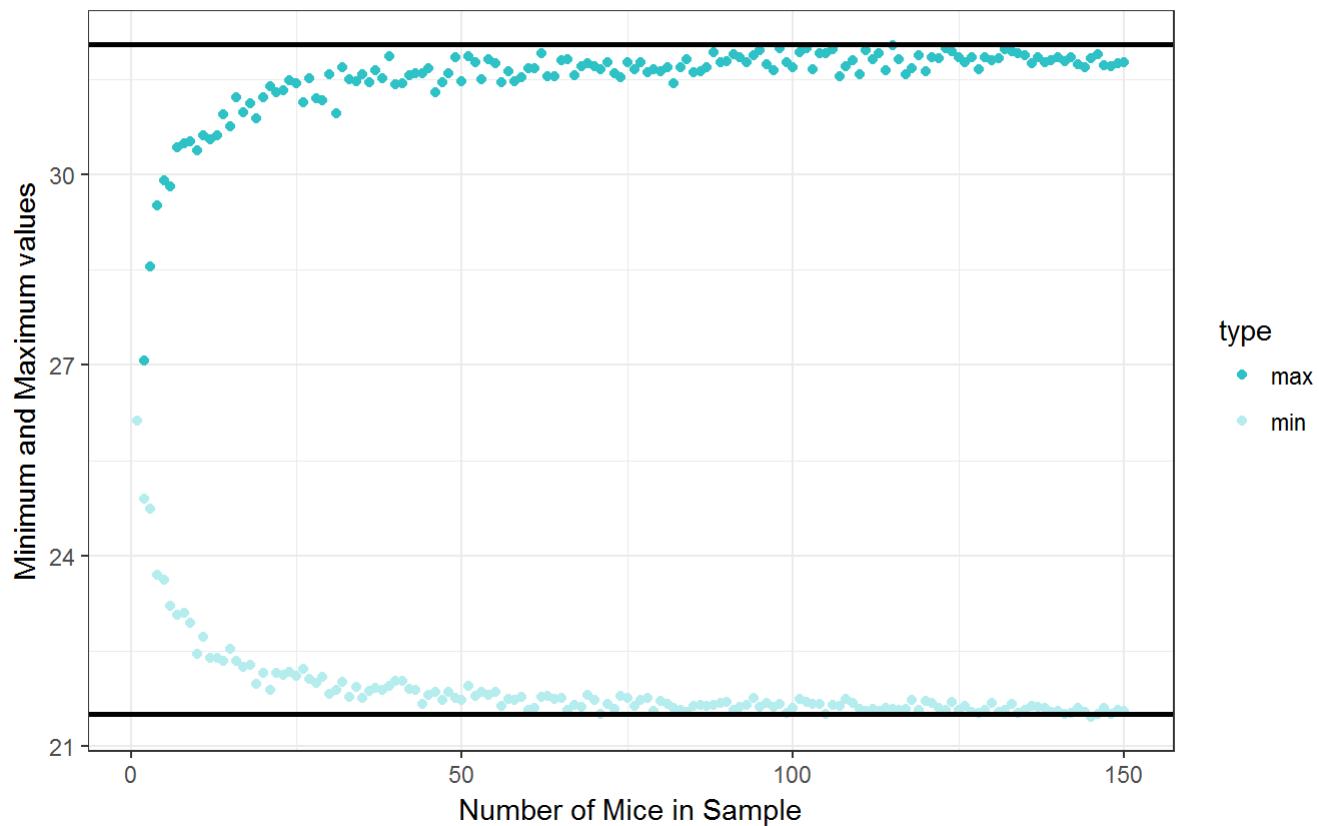
Visualization of what N would yield an approximation of the
2.5% and 97.5% quartiles of the historical data



```
##  
## [[2]]
```

Bootstrapping of Historical Data for Body Weight by Male Mice

Visualization of what N would yield an approximation of the 2.5% and 97.5% quartiles of the historical data



Power Analysis

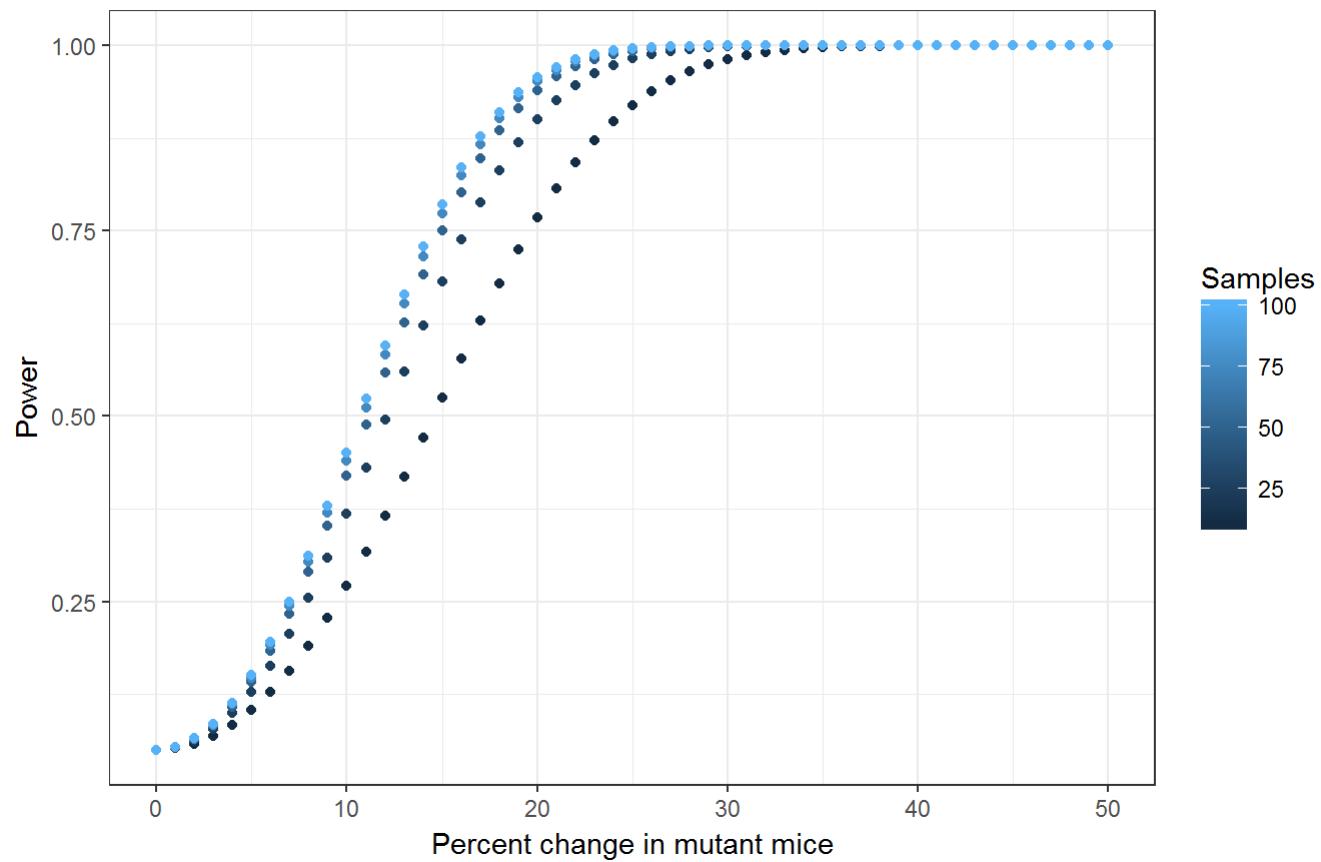
Doing a power analysis to determine what effect size (visualized as percent change in mutant mice) creates what power, using the sample mean of the control mice and that the standard deviation for control and knockout mice are the same. Curves are generated for the variable in question for both females and males.

Week 4 Body Weight

```
## [[1]]
```

Power Curves

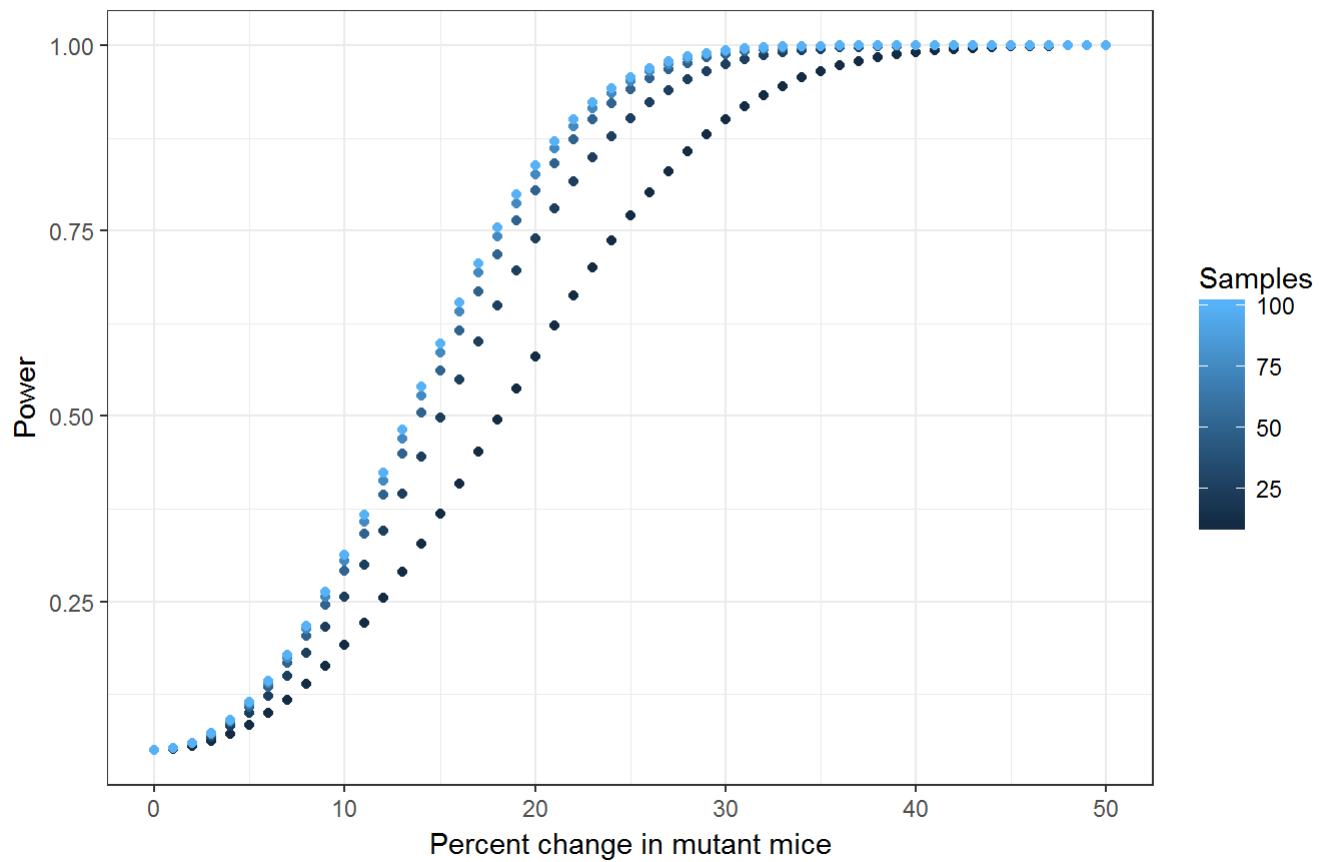
How varying effect size and control sample size affect power for female mice Body Weight



```
##  
## [[2]]
```

Power Curves

How varying effect size and control sample size affect power for male mice Body Weight

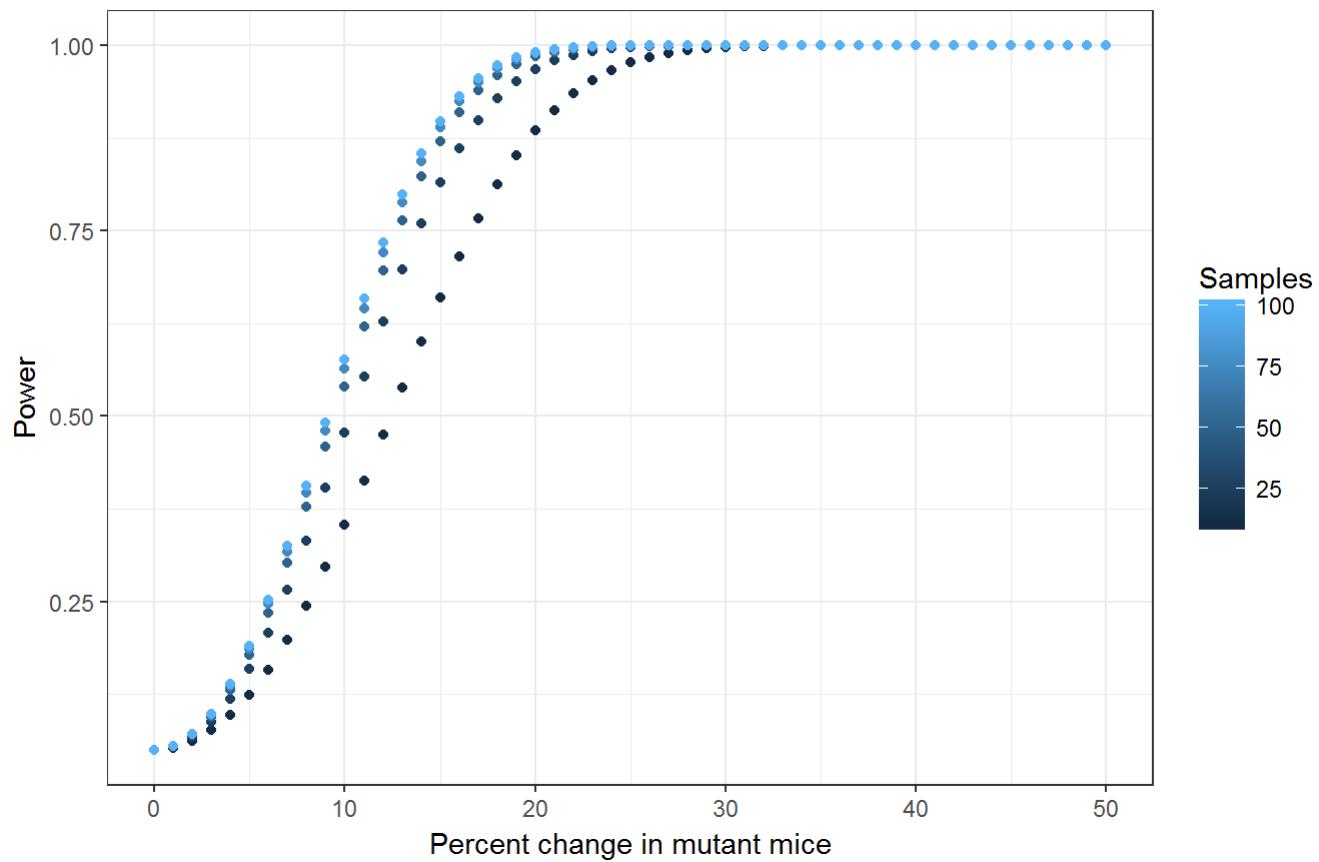


Week 5 Body Weight

```
## [[1]]
```

Power Curves

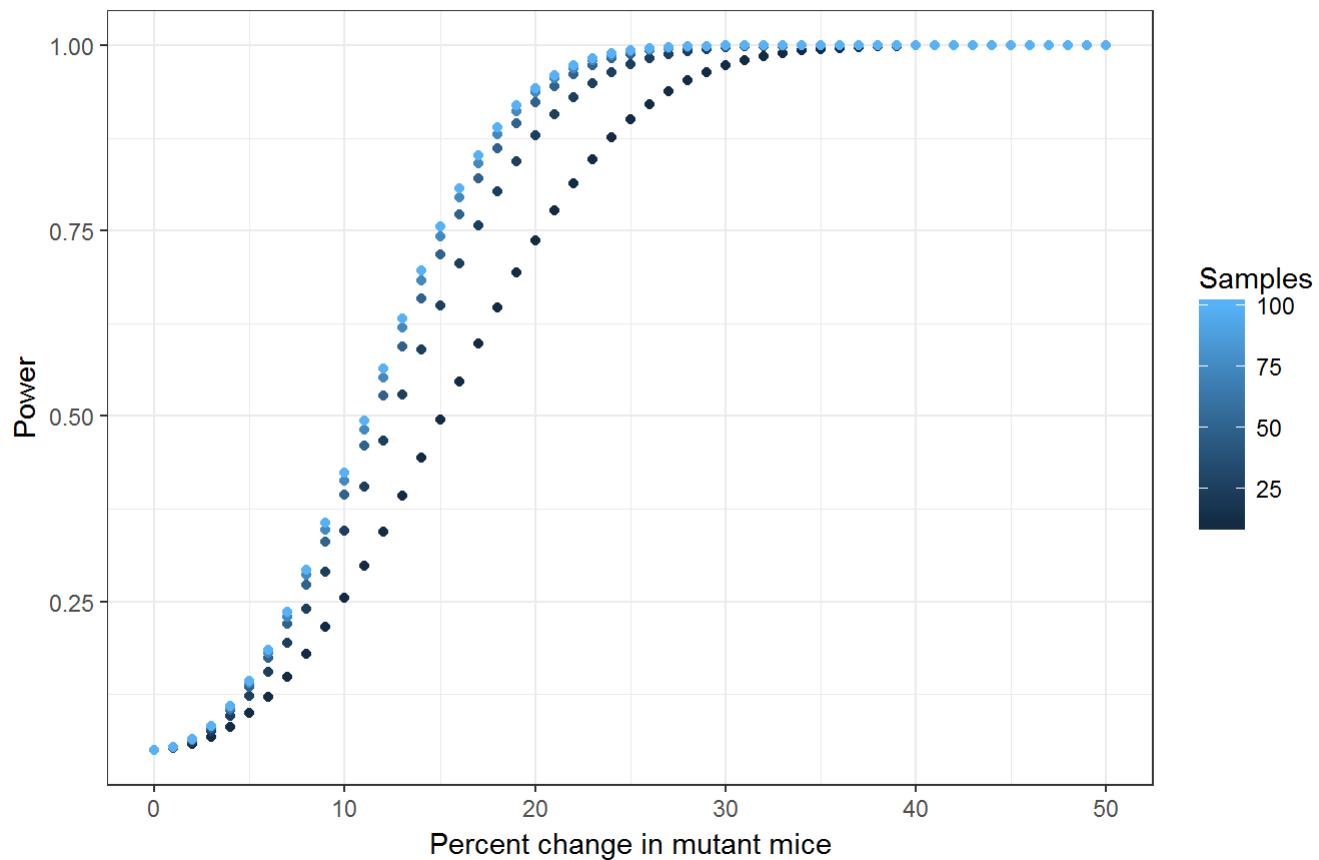
How varying effect size and control sample size affect power for female mice Body Weight



```
##  
## [[2]]
```

Power Curves

How varying effect size and control sample size affect power for male mice Body Weight

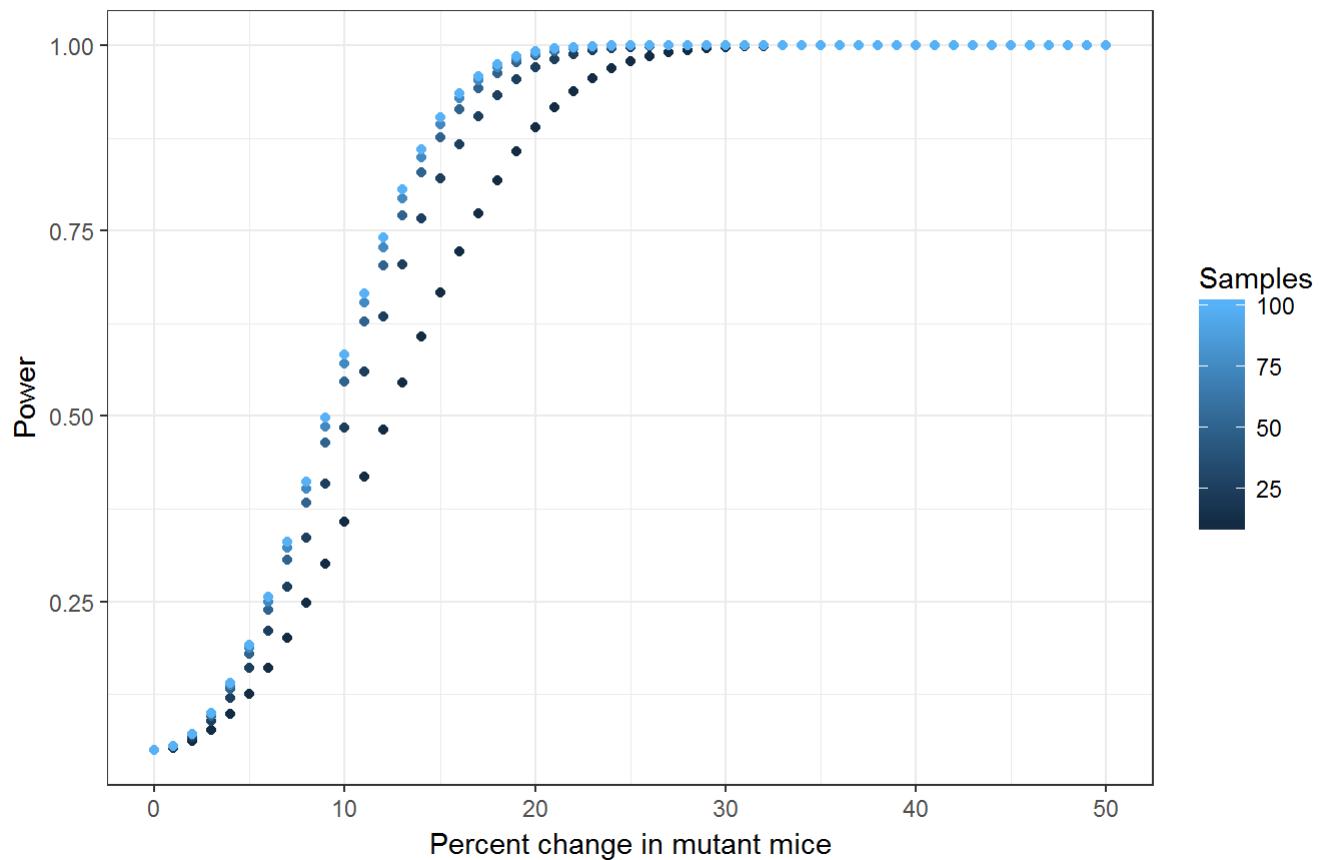


Week 6 Body Weight

```
## [[1]]
```

Power Curves

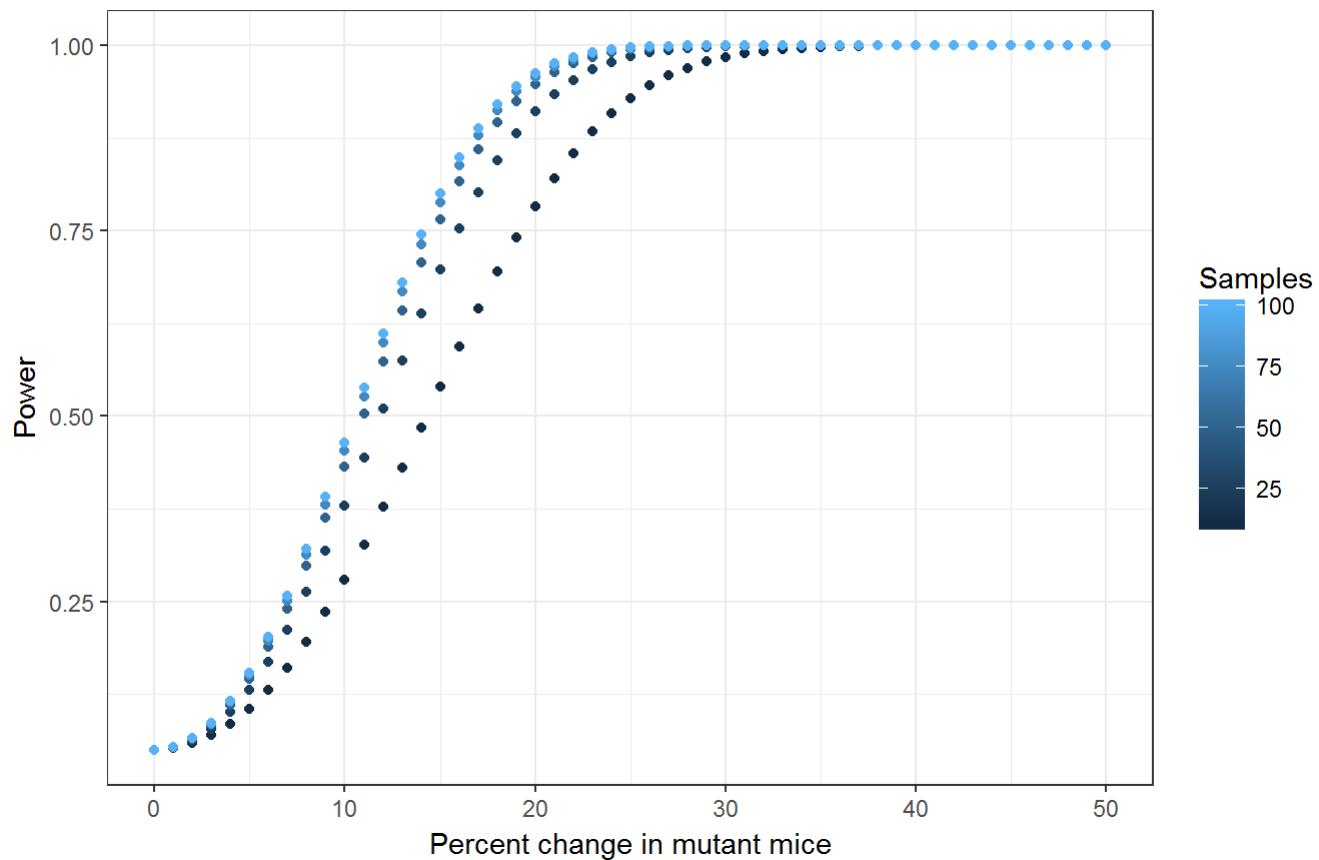
How varying effect size and control sample size affect power for female mice Body Weight



```
##  
## [[2]]
```

Power Curves

How varying effect size and control sample size affect power for male mice Body Weight

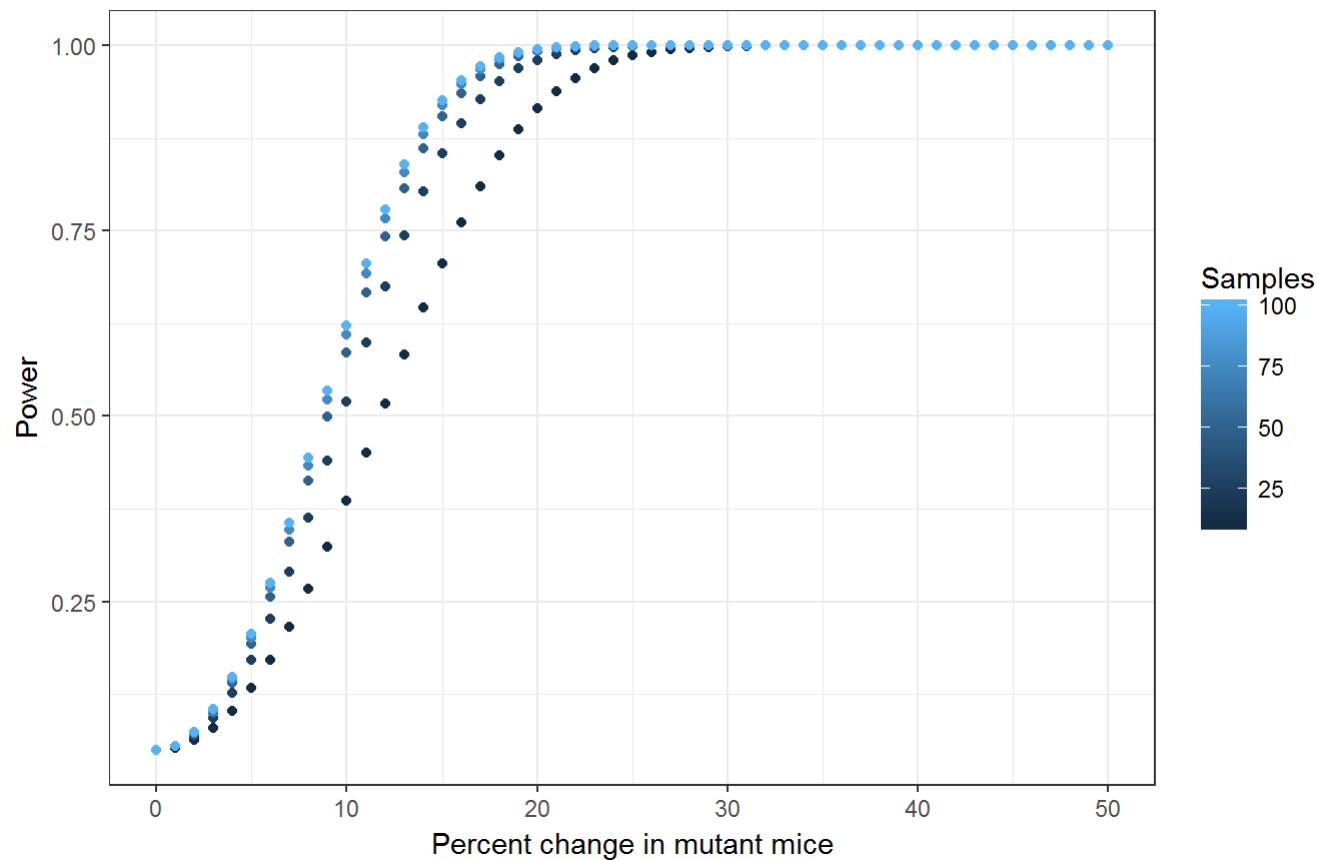


Week 7 Body Weight

```
## [[1]]
```

Power Curves

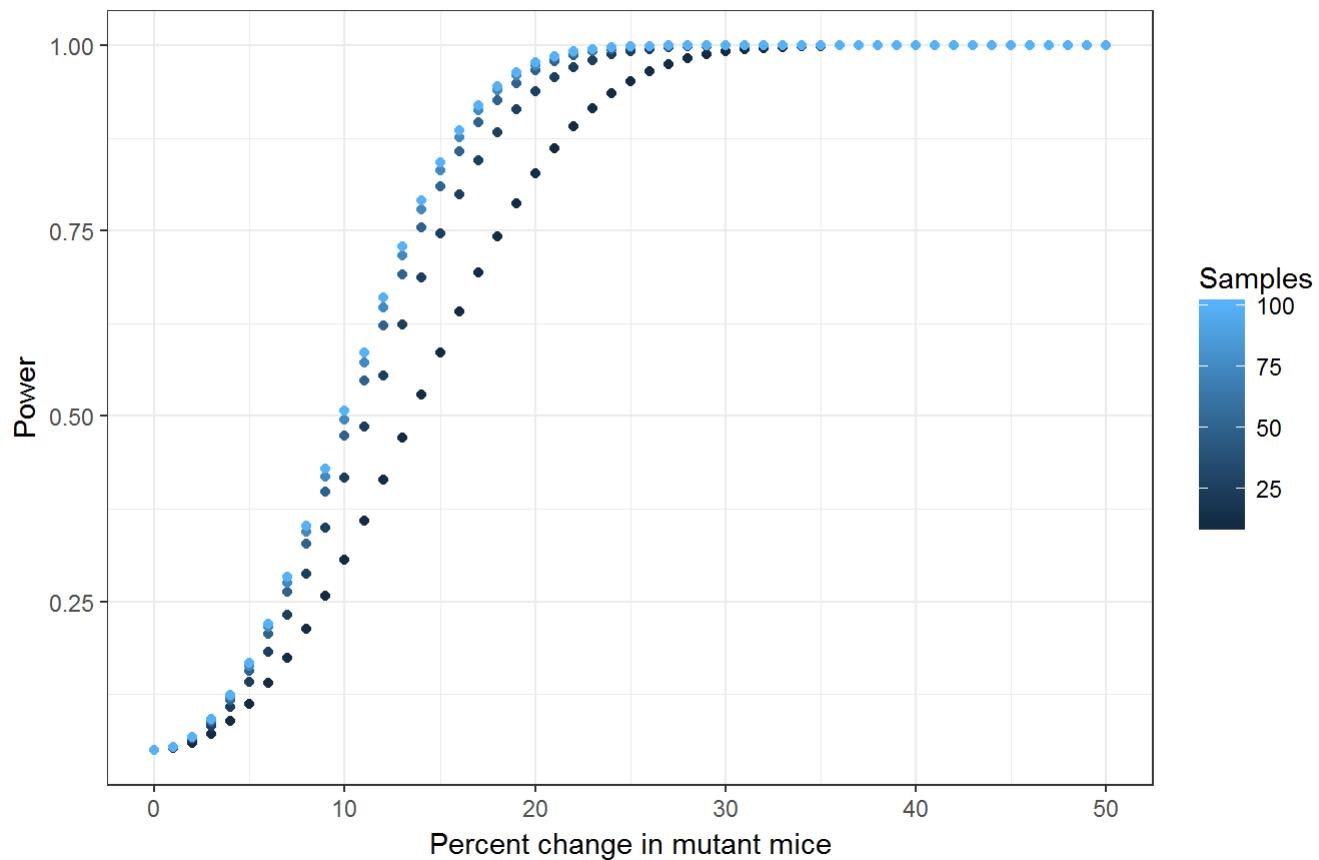
How varying effect size and control sample size affect power for female mice Body Weight



```
##  
## [[2]]
```

Power Curves

How varying effect size and control sample size affect power for male mice Body Weight

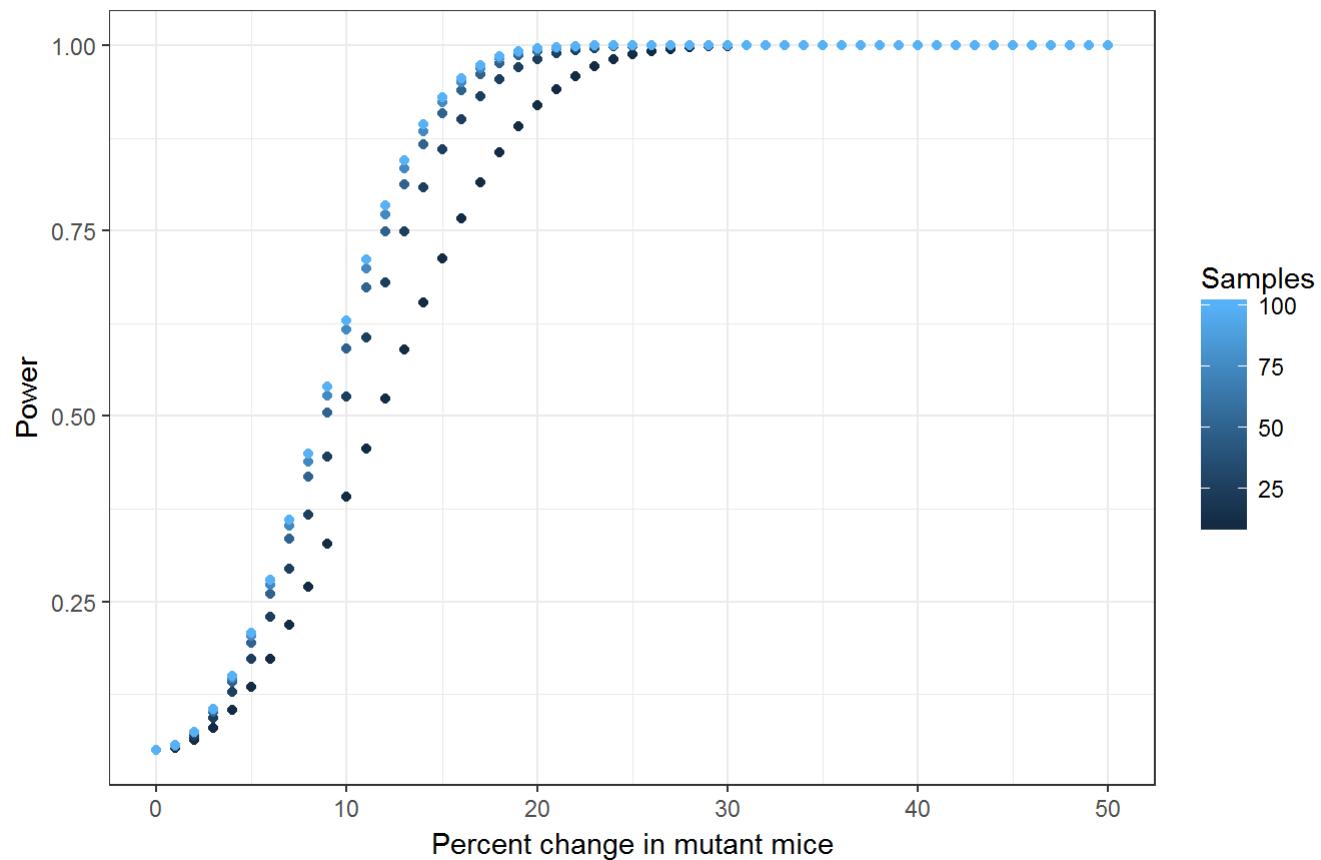


Week 8 Body Weight

```
## [[1]]
```

Power Curves

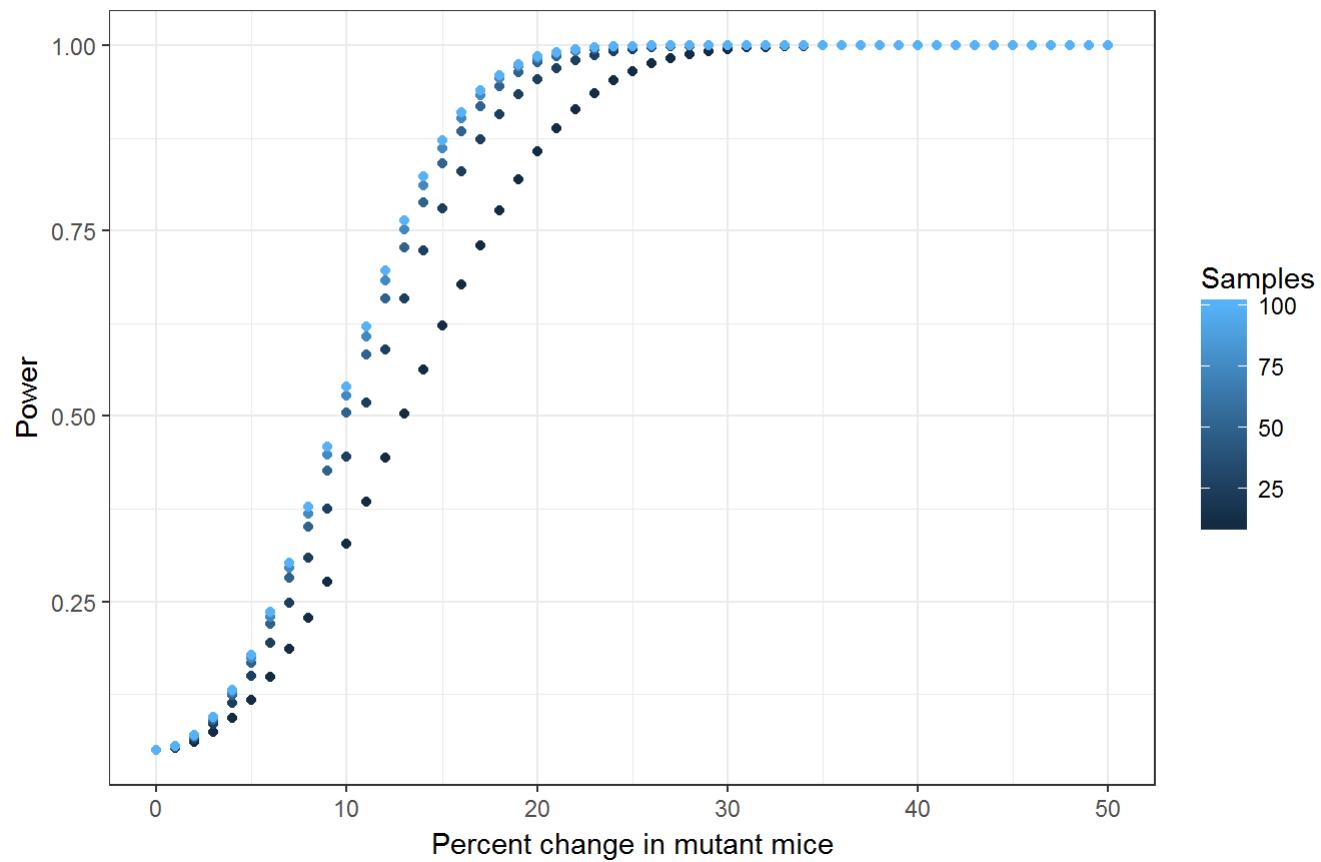
How varying effect size and control sample size affect power for female mice Body Weight



```
##  
## [[2]]
```

Power Curves

How varying effect size and control sample size affect power for male mice Body Weight

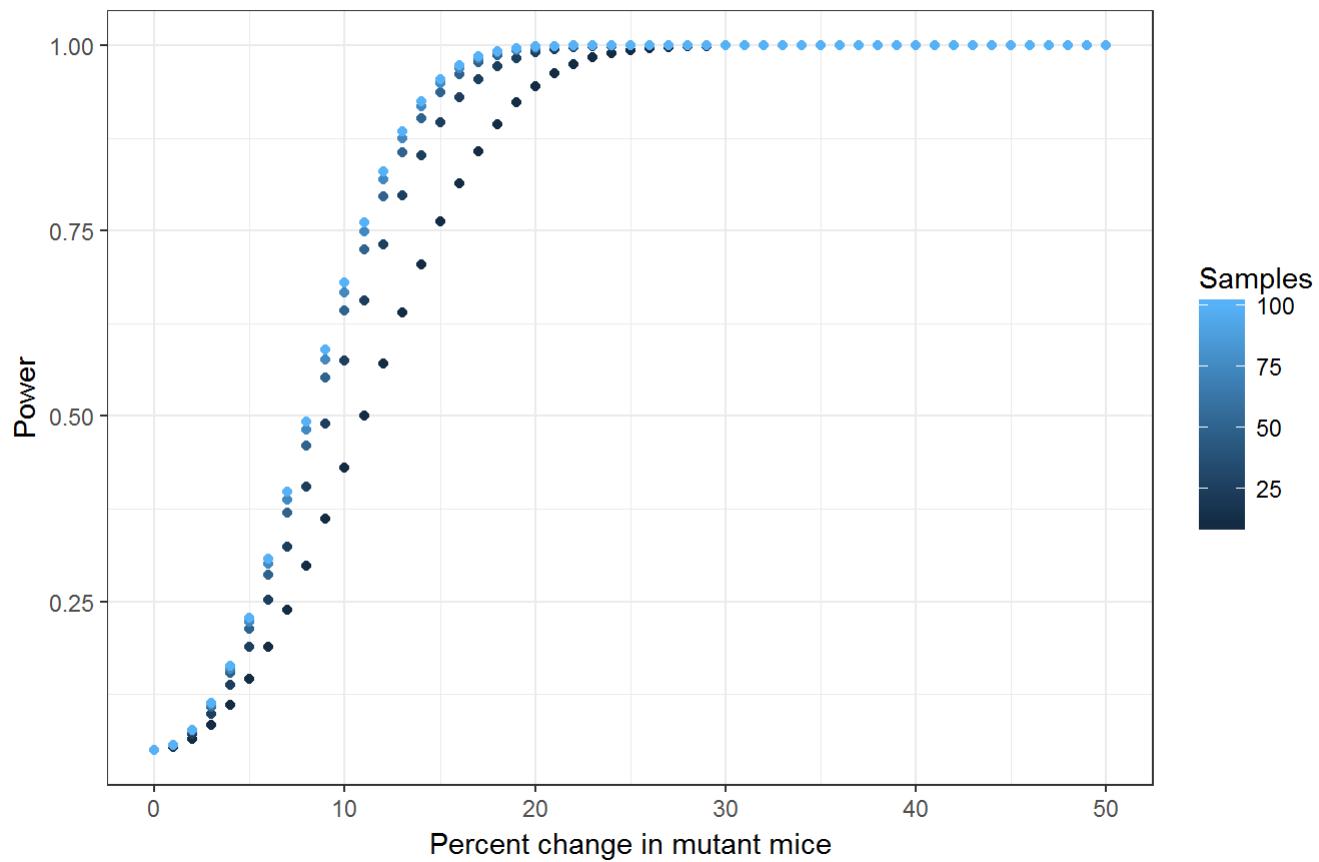


Week 9 Body Weight

```
## [[1]]
```

Power Curves

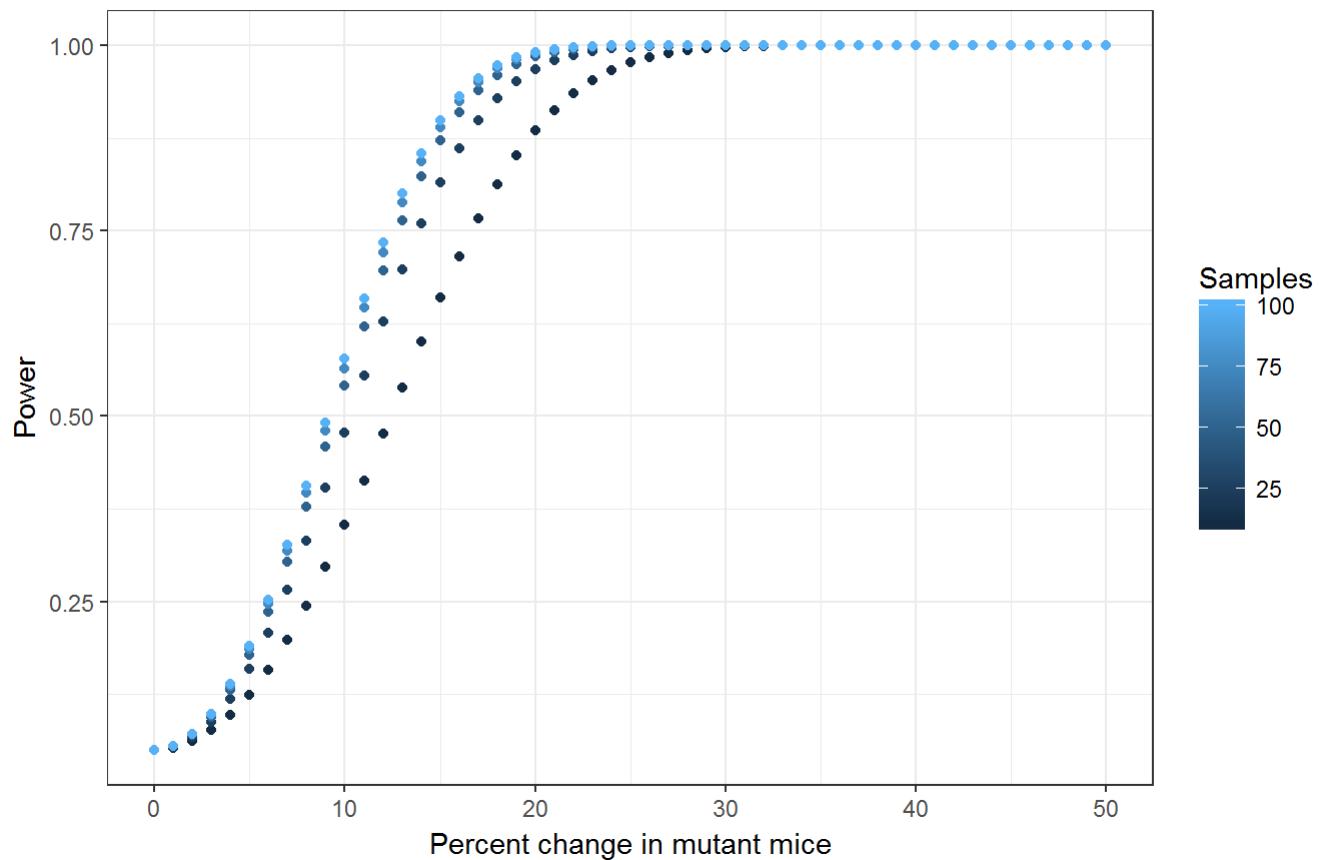
How varying effect size and control sample size affect power for female mice Body Weight



```
##  
## [[2]]
```

Power Curves

How varying effect size and control sample size affect power for male mice Body Weight



Week 10 Body Weight

```
## [[1]]
```