Cardiac arrest demo

Load libraries

```
library(ggplot2)
library(dplyr)
```

Let's take a quick look at the empirical data

```
meeting_admitted <- 388
meeting_died <- 66
meeting_mortality <- meeting_died/meeting_admitted


nonmeeting_admitted <- 2154
nonmeeting_died <- 535
nonmeeting_mortality <- nonmeeting_died/nonmeeting_admitted


mortality_diff <- meeting_mortality - nonmeeting_mortality


# Make a dataframe to show the results
data.frame(type = c("Nonmeeting", "Meeting", "Difference"),
           mortality = c(nonmeeting_mortality, meeting_mortality, mortality_diff))
```

```
##         type   mortality
## 1 Nonmeeting  0.24837512
## 2    Meeting  0.17010309
## 3 Difference -0.07827202
```

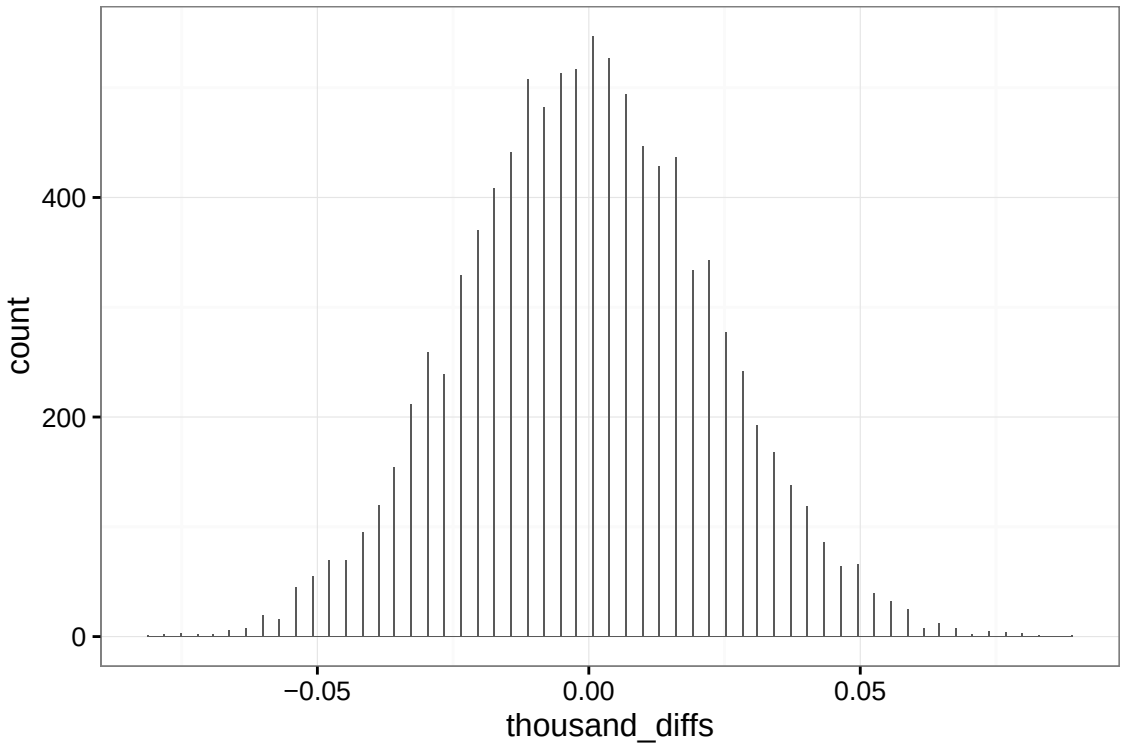
Let's simulate it

```
day_diff <- function() {

  # Make an array with the right number of patients
  patients <- c(rep("Meeting", meeting_admitted),
                rep("NonMeeting", nonmeeting_admitted))

  # randomly select the total who died from the array
  died <- sample(patients, meeting_died + nonmeeting_died)

  # Compute the difference in mortality between Meeting and NonMeeting Days
  died_meeting <- sum(died == "Meeting")/meeting_admitted
  died_nonmeeting <- sum(died == "NonMeeting")/nonmeeting_admitted

  return(died_meeting - died_nonmeeting)
}

day_diff()
```

```
## [1] 0.01601671
```

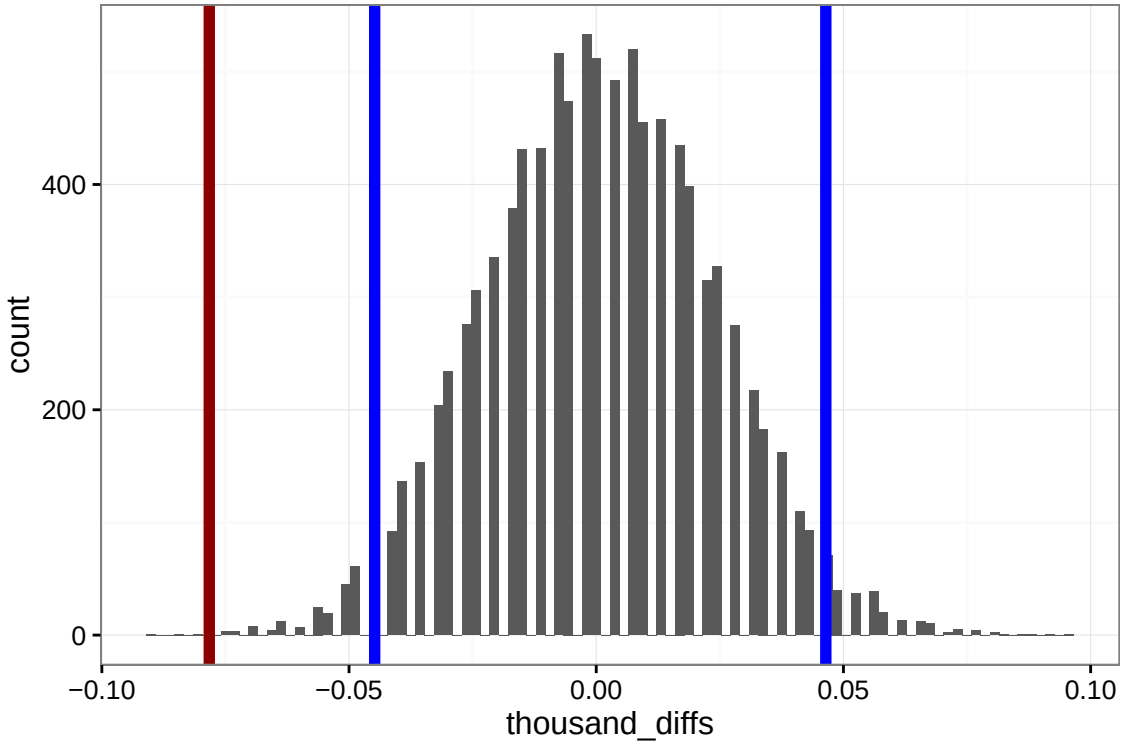
Now lets draw samples and pot

```r
thousand_diffs <- replicate(10000, day_diff())

qplot(thousand_diffs, bins = 500) +
  theme_bw()
```



Sample and plot along with our original result

```r
thousand_diffs <- replicate(10000, day_diff())

percentile <- .025

# Find top and bottom 2.5% percents
lower_percentile <- sort(thousand_diffs)[percentile * length(thousand_diffs)]
upper_percentile <- sort(thousand_diffs)[length(thousand_diffs) -
                                           (percentile * length(thousand_diffs))]



#add a vertical line to the random samples to show the empirical data
qplot(thousand_diffs, bins = 100) +
  theme_bw() +
  geom_vline(xintercept = mortality_diff, color = "darkred", size = 2) +
  geom_vline(xintercept = lower_percentile, color = "blue", size = 2) +
  geom_vline(xintercept = upper_percentile, color = "blue", size = 2)
```



Where does our difference lie?

```
# Compute the proportion of samples that the actual difference was greater than
sum(mortality_diff >= thousand_diffs) / 10000
```

```
## [1] 3e-04
```

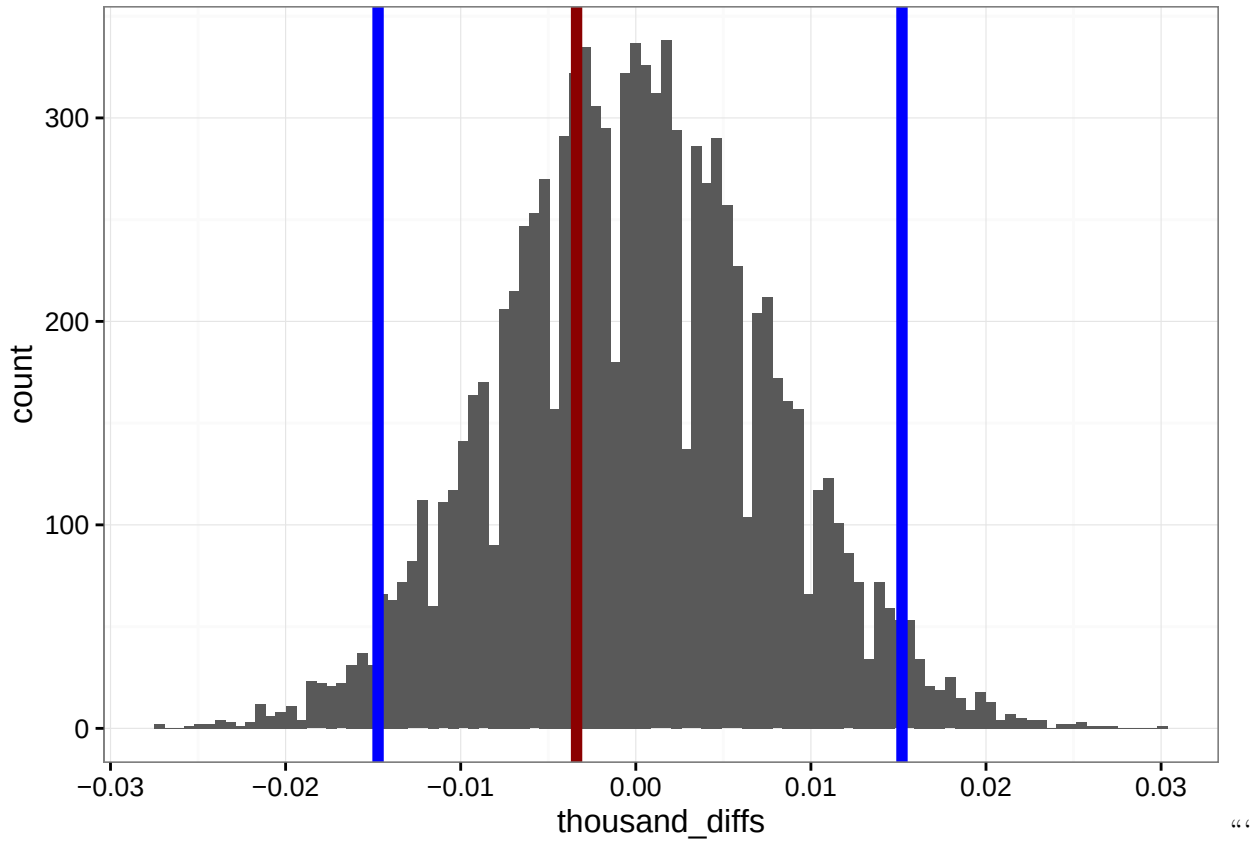
What about nonteaching hospitals?

```
meeting_admitted <- 3709
meeting_died <- 901
meeting_mortality <- meeting_died/meeting_admitted


nonmeeting_admitted <- 22054
nonmeeting_died <- 5432
nonmeeting_mortality <- nonmeeting_died/nonmeeting_admitted


mortality_diff <- meeting_mortality - nonmeeting_mortality


# Make a dataframe to show the results
data.frame(type = c("Nonmeeting", "Meeting", "Difference"),
           mortality = c(nonmeeting_mortality, meeting_mortality, mortality_diff))
```

```
##         type    mortality
## 1 Nonmeeting  0.246304525
## 2    Meeting  0.242922621
## 3 Difference -0.003381905
```

Sample and plot along with our original result

```r
thousand_diffs <- replicate(10000, day_diff())

percentile <- .025

# Find top and bottom 2.5% percents
lower_percentile <- sort(thousand_diffs)[percentile * length(thousand_diffs)]
upper_percentile <- sort(thousand_diffs)[length(thousand_diffs) -
                                           (percentile * length(thousand_diffs))]



#add a vertical line to the random samples to show the empirical data
qplot(thousand_diffs, bins = 100) +
  theme_bw() +
  geom_vline(xintercept = mortality_diff, color = "darkred", size = 2) +
  geom_vline(xintercept = lower_percentile, color = "blue", size = 2) +
  geom_vline(xintercept = upper_percentile, color = "blue", size = 2)
```



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