Small Simulation

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Performing 100 simulation (of cases each 1000 cases)

```r
#Set seed
set.seed(3791)
library(ggplot2)

#Create dataframe to store sampled value's in
samples <- matrix(nrow = 100,
                  ncol = 1000)

#Create dataframe to store summary stats in
summary <- matrix(nrow = nrow(samples),
                  ncol = 5)
colnames(summary) <- c("absolute bias","se","lower","upper","covered")

#Sample values and attribute to dataframe
for (i in 1:nrow(samples)){
  samples[i,] <- rnorm(ncol(samples))
}

#Calculate sample stats and attribute to summary matrix

for (i in 1:nrow(summary)){

  #Absolute bias
  summary[i,1] <- mean(samples[i,])

  #Standard error
  summary[i,2] <- (sd(samples[i,])) / sqrt(ncol(samples))

  #Lower bound
  summary[i,3] <- sort(samples[i,])[25]

  #Upper bound
  summary[i,4] <- sort(samples[i,])[975]

  #Covered?
  summary[i,5] <- summary[i,3] < 0 & 0 < summary[i,4]
}

#Plot
summary <- data.frame(summary)
```
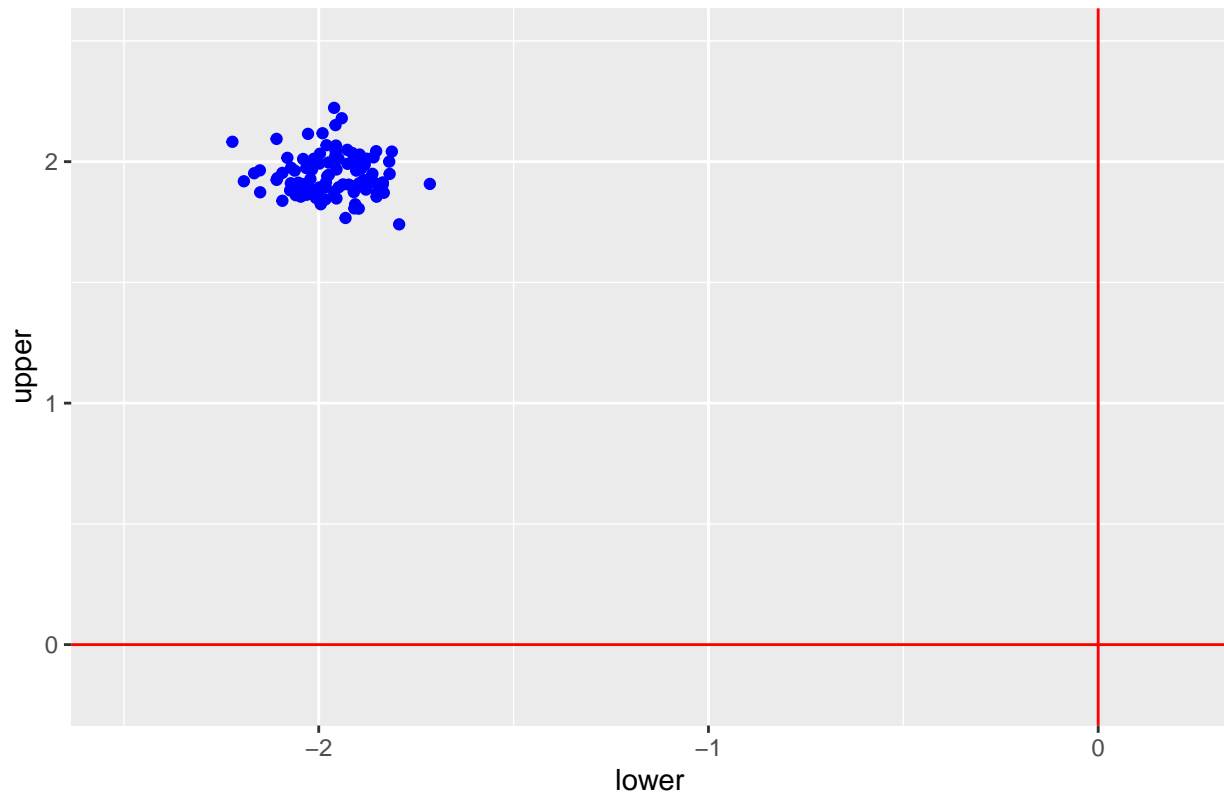
```
ggplot(summary) +
  aes(lower,upper) +
  geom_point(color="blue")+
  xlim(-2.5,0.2)+
  ylim(-0.2,2.5)+
  geom_hline(yintercept = 0, color="red")+
  geom_vline(xintercept = 0, color="red")+
  ggtitle("Scatterplot of Upper bound vs. lower bound")
```

Scatterplot of Upper bound vs. lower bound

From the plot, it can be discerned that the confidence intervals for all samples include the true sample mean (0). Thus, 100 out of 100 samples cover the mean.