

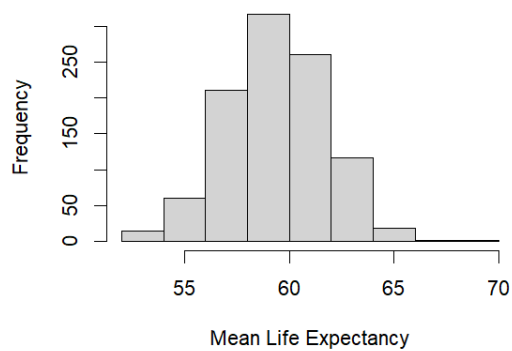
Activity:-

Change sample size and observe changes in shape:

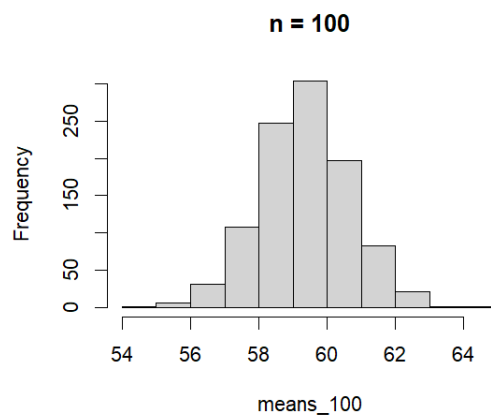
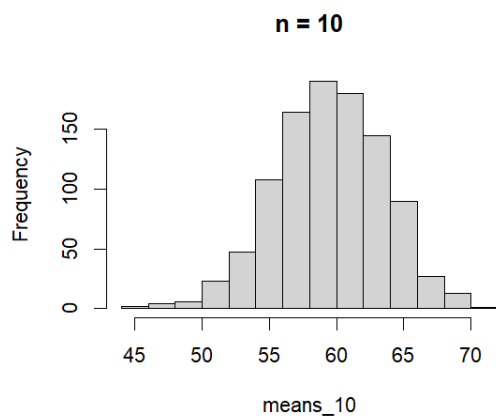
```
1 library(gapminder)
2 library(dplyr)
3
4 # Extract life expectancy data
5 life_data <- gapminder$lifeExp
6
7 # Generate 1000 sample means
8 sample_means <- replicate(1000, mean(sample(life_data, size = 30, replace = TRUE)))
9
10 # Visualise
11 hist(sample_means, main = "Sampling Distribution of Sample Mean", xlab = "Mean Life Expectancy")
```

Variable	Value
n	100
num	0.965428846422583
sample_means	num [1:1000] 59.9 62 61.6 58.1 59...
sample_sizes	num [1:4] 10 30 50 100
sum	5050
x	int [1:5] 1 2 3 4 5
X	5
y	num [1:5] 1 4 9 16 25

Sampling Distribution of Sample Mean



```
13 means_10 <- replicate(1000, mean(sample(life_data, 10, replace = TRUE)))
14 means_100 <- replicate(1000, mean(sample(life_data, 100, replace = TRUE)))
15
16
17 hist(means_10, main="n = 10")
18 hist(means_100, main="n = 100")
```



```

20 # Write a function to simulate sampling means
21 # Plot histograms for different sample sizes
22 # Calculate standard errors for each
23
24 simulate_means <- function(n, reps = 1000) {
25   replicate(reps, mean(sample(life_data, size = n, replace = TRUE)))
26 }
27
28 sample_sizes <- c(10, 30, 50, 100)
29 par(mfrow = c(2,2))
30 for (n in sample_sizes) {
31   hist(simulate_means(n), main = paste("n =", n))
32 }

```

