-> Open RGui on your computer.

-> Type getwd() in the prompt to get the current working directory of your R installation.

-> Copy the output file into a folder and set that folder as the working directory. You can do this by clicking on File->Change Dir inside RGui. In my case, I have set my working directory to "C:\Users\Prasanna\Downloads\Working Dir"

-> Then execute the following set of commands-

```
cardiac <- read.csv(file="93015.csv",header=TRUE,sep=",")
```

```
medi <- cardiac$Medicare
```

```
ph <- cardiac$Pharma
```

```
cor(medi,ph)
```

0.003328825

The above obtained correlation value is close to 0 and hence there is barely any correlation between the Medicare payments and pharmaceutical payments.

I manually verified this by calculating the co-relation value is excel as well. If you have excel installed on your computer, use this formula CORREL to calculate the co-relation value. You need to select all the rows containing medicare payments and then all the rows containing pharmaceutical payments.

Example – CORREL(A2:A2613,B2:B2613).

-> Next in order to generate the scatterplot type the following command-

```
plot(ph,medi,xlab='Pharmaceutical Payments',ylab='Medicare Payments',col='red')
```

The variables "xlab" and "ylab" can be used to give any custom labels to the x and y axis in the scatter-plot and "col" can be used to assign any colors to the scatterplot. By default the color is black.

Similarly, I executed the following commands for the CPT code "93010"-

```
ecg <- read.csv(file="93010.csv",header=TRUE,sep=",")
```

```
med <- ecg$Medicare
```

```
pha <- ecg$Pharma
```

```
cor(med,pha)
```

0.01871026

Here, again the correlation value is close to 0 and hence they are not correlated with each other.

Scatter-plot can be generated for this using the following piece of code-

```
plot(pha,med,xlab='Pharmaceutical Payments',ylab='Medicare Payments',col='red')
```

There are multiple ways to calculate p-value in R and one of them is as below-

For 93015 run this code – t.test(cardiac)

It will yield the following p-value -> p-value < 2.2e-16 which is very close to 0.

For 93015 run this code – t.test(ecg)

It will yield the following p-value -> p-value < 2.2e-16 which is very close to 0.

Venn diagram

Use the below code to generate the Venn diagram using R GUI:

First install the Venn Diagram package in R - install.packages('VennDiagram')

require(VennDiagram)

draw.pairwise.venn(385935, 8900, 2732, category = c("Pharmaceutical Records Count", "Medicare Records Count"), lty = rep("blank",

   2), fill = c("light blue", "red"), alpha = rep(0.5, 2), cat.pos = c(0,

   0), cat.dist = rep(0.025, 2))

------- This is for the CPT code 93015

draw.pairwise.venn(388798, 30366, 5595, category = c("Pharmaceutical Records Count", "Medicare Records Count"), lty = rep("blank",

   2), fill = c("light blue", "red"), alpha = rep(0.5, 2), cat.pos = c(0,

   0), cat.dist = rep(0.025, 2))

------- This is for the CPT code 93010 (Extra Credit)