SpaceCeleb_VA_Outcomes

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2024-08-18

```
# I utilized the readxl library function to read in the data from my folder
library(readxl)
# Gpplot2 for better visulization
library(ggplot2)
# gridExtra allows to arrange multiple plots to be viewed
library(gridExtra)
SpaceCeleb_VA_Outcomes <- read_excel("C:/Users/jacob/OneDrive/Desktop/R Studio Projects 2024/Dat
asets/SpaceCeleb_VA_Outcomes.xls")
```

```
## New names:
## • `Footnote` -> `Footnote...14`
## • `Footnote` -> `Footnote...35`
```

```
#head matrix function to view the first few rows of data
head.matrix(SpaceCeleb_VA_Outcomes)
```

```
## # A tibble: 6 × 81
##   `Patient Name`         `Hospital Visited` Address `City/Town` State `ZIP Code`
##   <chr>                  <chr>              <chr>   <chr>       <chr>      <dbl>
## 1 Elon Musketeer         BIRMINGHAM VA MED… 700 SO… BIRMINGHAM  AL         35233
## 2 Buzz Lightyear DiCapr… BIRMINGHAM VA MED… 700 SO… BIRMINGHAM  AL         35233
## 3 Stellar Swift          BIRMINGHAM VA MED… 700 SO… BIRMINGHAM  AL         35233
## 4 Martian McConaughey    BIRMINGHAM VA MED… 700 SO… BIRMINGHAM  AL         35233
## 5 Nebula Clooney         BIRMINGHAM VA MED… 700 SO… BIRMINGHAM  AL         35233
## 6 Orbit Winfrey          BIRMINGHAM VA MED… 700 SO… BIRMINGHAM  AL         35233
## # ℹ 75 more variables: `County/Parish` <chr>, `Telephone Number` <chr>,
## #   Condition <chr>, `Measure ID` <chr>, `Measure Name` <chr>, Score <chr>,
## #   Sample <chr>, Footnote...14 <chr>, `Start Date` <dttm>, `End Date` <dttm>,
## #   `Ambulatory Surgical Center` <dbl>,
## #   `Ambulatory Surgical Center Quality Reporting` <dbl>,
## #   `Acute Myocardial Infarction` <dbl>, Average <dbl>,
## #   `Coronary Artery Bypass Graft` <dbl>, …
```

```r
# Library function gridExtra allows to plot three variables
plot_three_variables <- function(df, var1, var2, var3) {
  p1 <- ggplot(df, aes(x = .data[[var1]], y = Score)) +
    geom_point(color = "red") +  # Red points
    geom_smooth(method = "lm", color = "blue") +  # Blue linear model fit
    ggtitle(paste(var1, "vs Score")) +  # Title showing variable vs Score
    theme_minimal()  # Minimal theme for a clean look

  p2 <- ggplot(df, aes(x = .data[[var2]], y = Score)) +
    geom_point(color = "green") +  # Green points
    geom_smooth(method = "lm", color = "blue") +  # Blue linear model fit
    ggtitle(paste(var2, "vs Score")) +  # Title showing variable vs Score
    theme_minimal()  # Minimal theme for a clean look

  p3 <- ggplot(df, aes(x = .data[[var3]], y = Score)) +
    geom_point(color = "purple") +  # Purple points
    geom_smooth(method = "lm", color = "blue") +  # Blue linear model fit
    ggtitle(paste(var3, "vs Score")) +  # Title showing variable vs Score
    theme_minimal()  # Minimal theme for a clean look

  grid.arrange(p1, p2, p3, ncol = 3)  # Arrange the three plots in a row
}

# The three variables that I will plot
plot_three_variables(SpaceCeleb_VA_Outcomes, "Ambulatory Surgical Center", "Acute Myocardial Inf
arction", "Coronary Artery Bypass Graft")
```

```
## `geom_smooth()` using formula = 'y ~ x'
```

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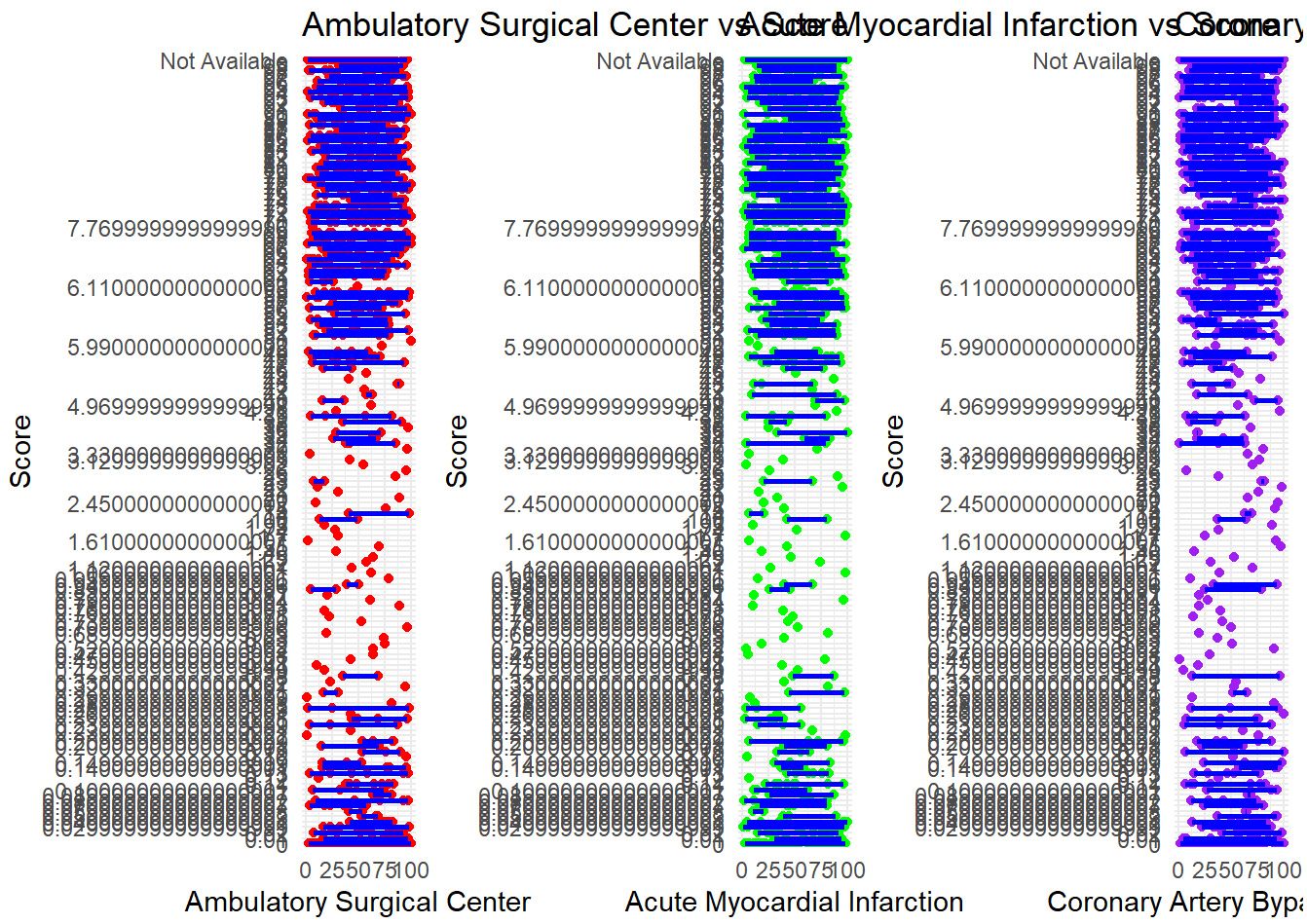


```
plot_three_variables(SpaceCeleb_VA_Outcomes, "Catheter-associated urinary tract infections", "Cl
ostridium difficile Infection", "Central line-associated bloodstream infections")
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## `geom_smooth()` using formula = 'y ~ x'
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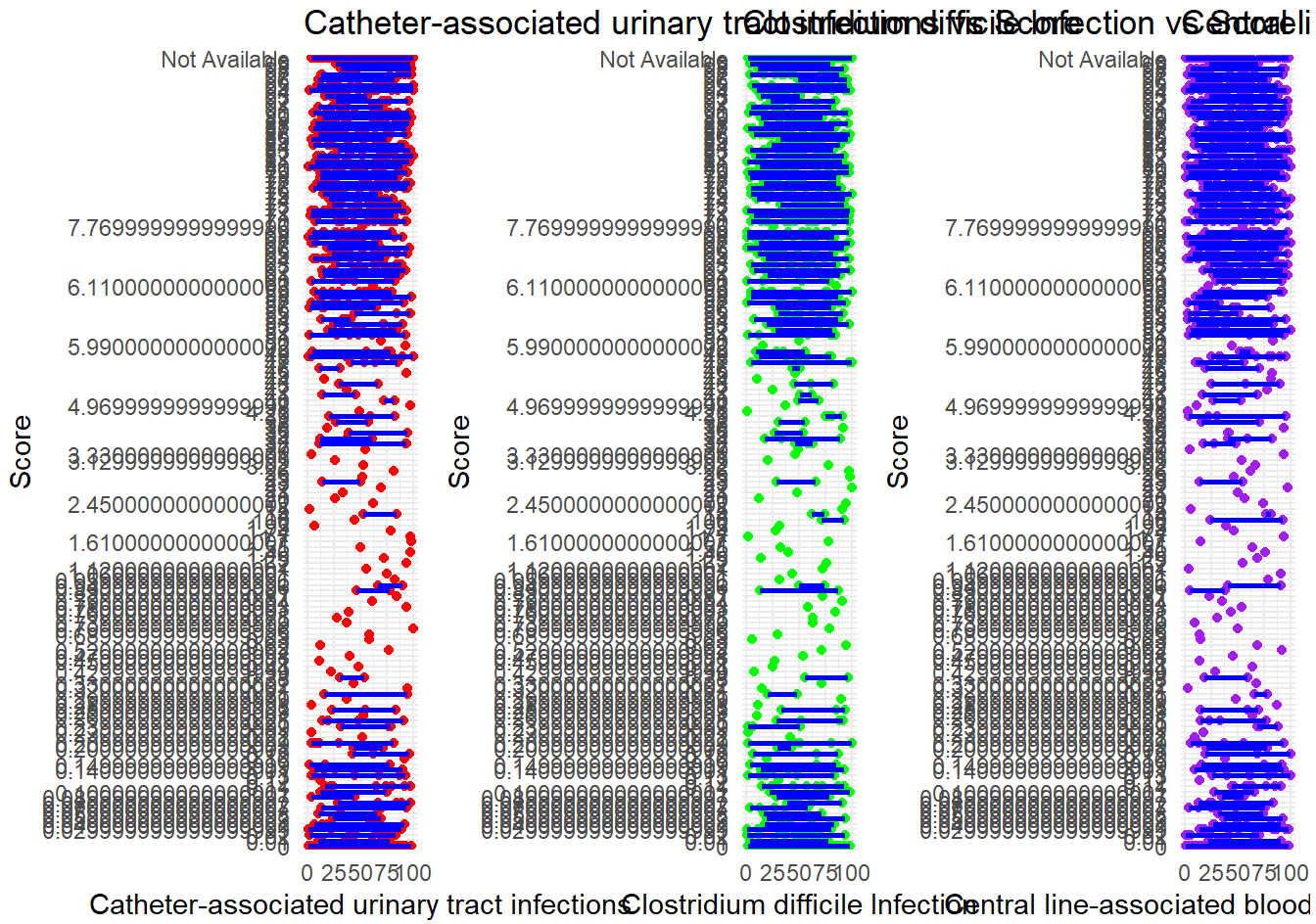


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plot_three_variables(SpaceCeleb_VA_Outcomes, "Complications", "Chronic Obstructive Pulmonary Dis
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## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning
## -Inf
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## -Inf
## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning
## -Inf
## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning
## -Inf
```
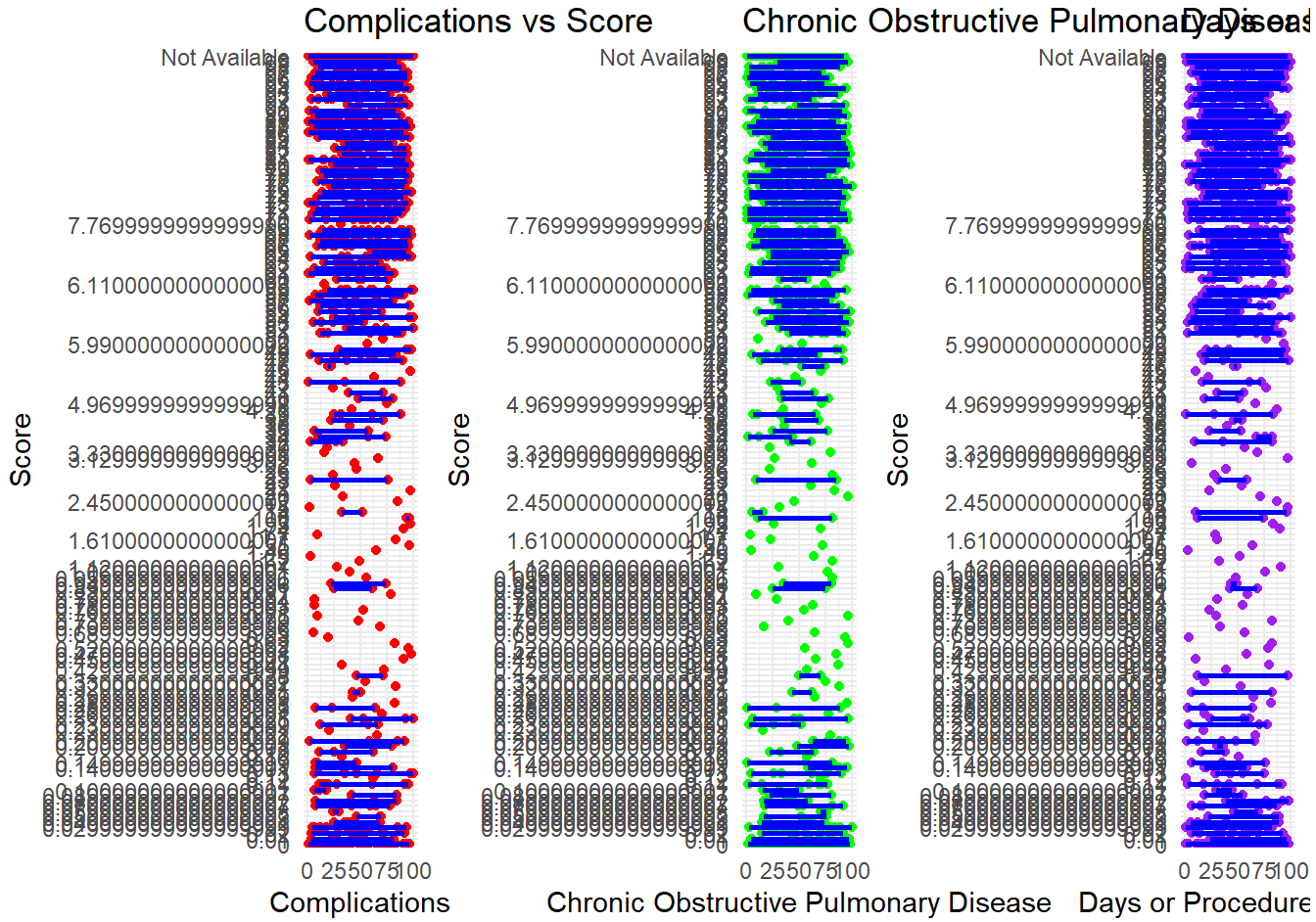



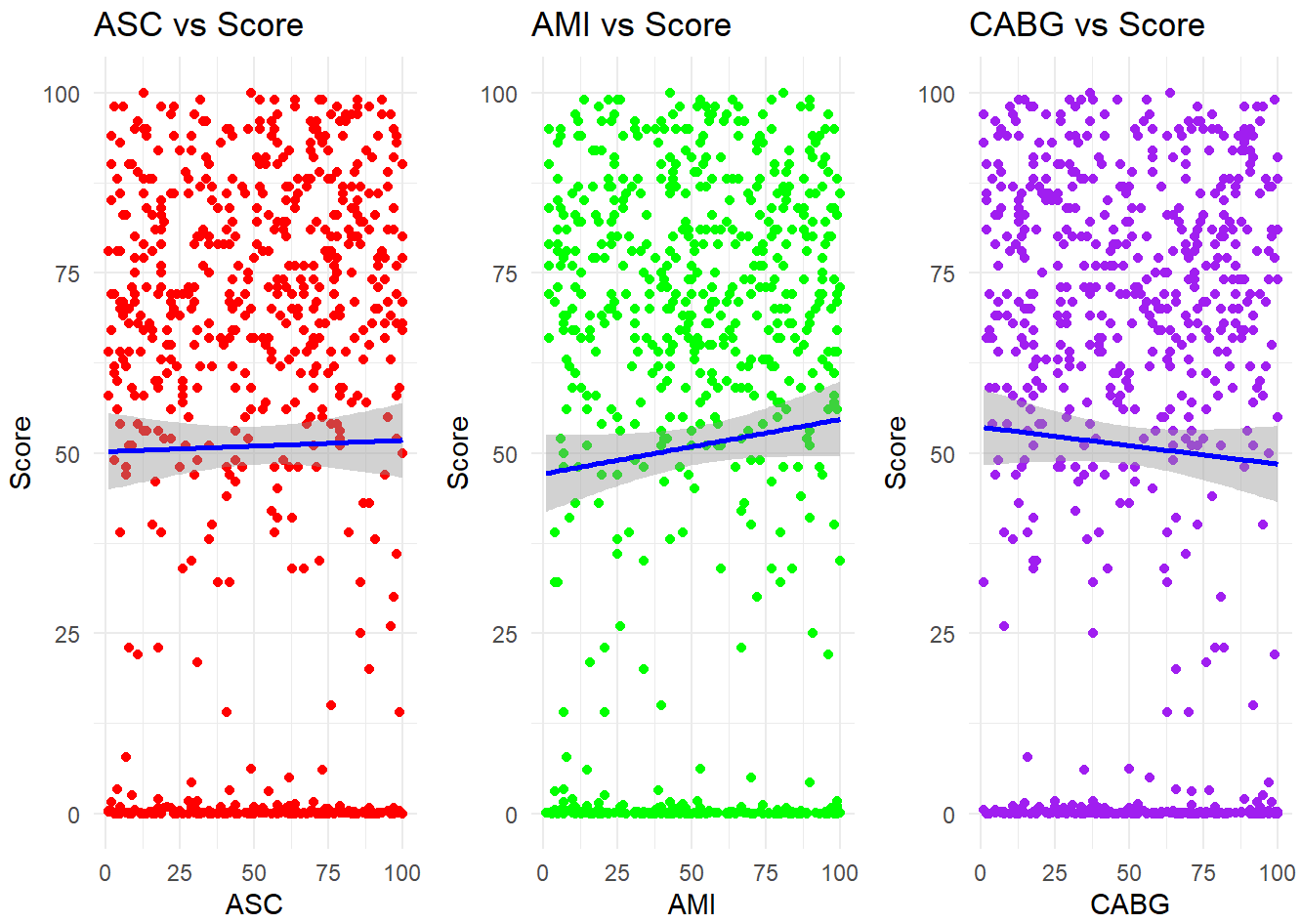

```
# I Converted Score to numeric so it can handle the non-numeric values in my data because the la
st plot was not visible so I had to comment it out in order to fix it.There was alot of "Not Ava
ilable" data points in my data so I removed them so "Score" was not able to be converted in my a
bove grapgh on the y axis.So this allowed for myself to rerun the plot with better scalling on t
he y axis.But I still received a warning message about the NA's in the data but I felt they were
necessary to see the full aspect of the data being rendered. "Warning: NAs introduced by coercio
n"

SpaceCeleb_VA_Outcomes$Score <- as.numeric(as.character(SpaceCeleb_VA_Outcomes$Score))
```

```
## Warning: NAs introduced by coercion
```

```
SpaceCeleb_VA_Outcomes <- SpaceCeleb_VA_Outcomes[!is.na(SpaceCeleb_VA_Outcomes$Score), ]
```

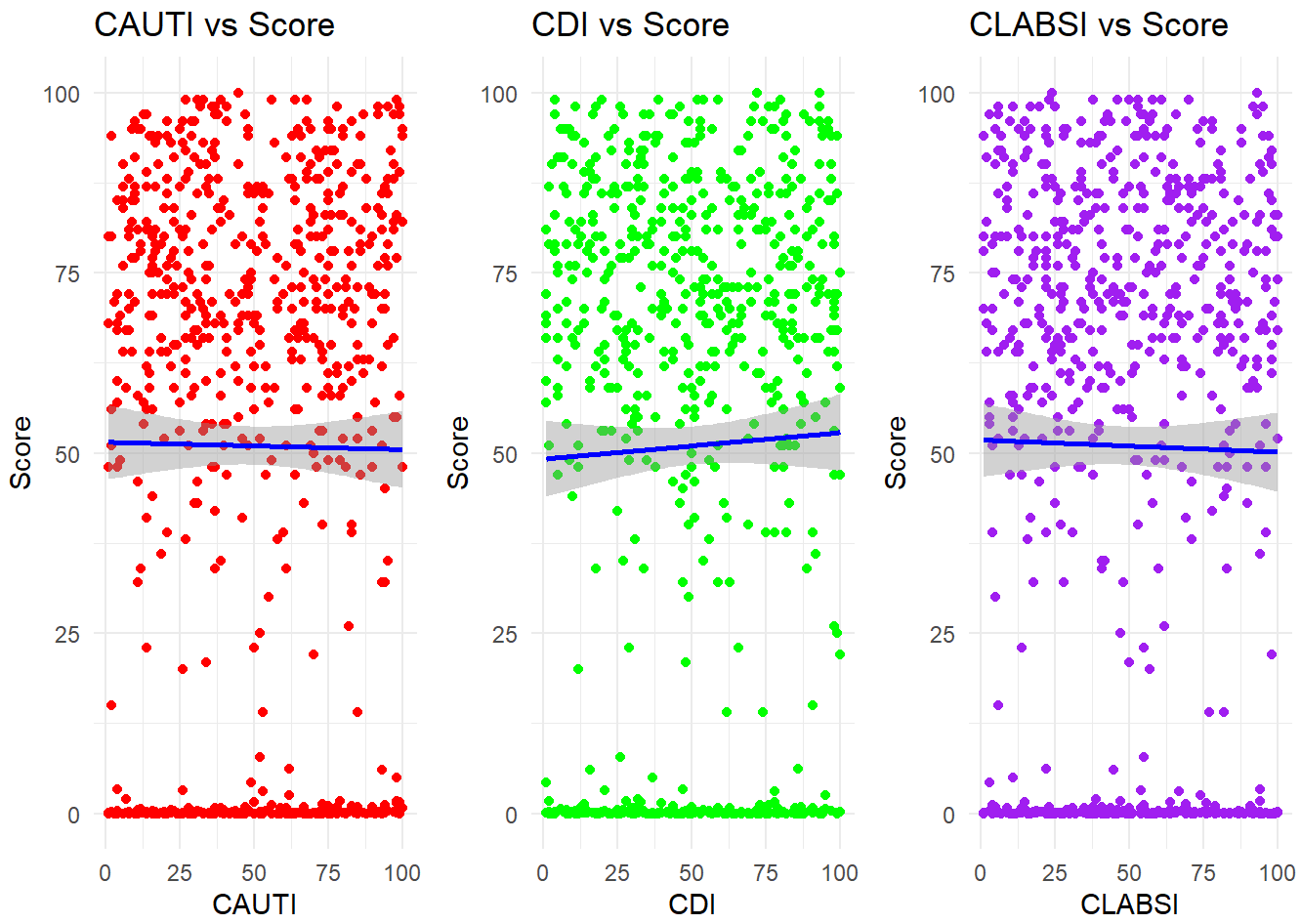
```
# Some how I was only able to reproduce one plot so I decided to rename the the columns in order to shorter names for easier plotting
colnames(SpaceCeleb_VA_Outcomes)[colnames(SpaceCeleb_VA_Outcomes) == "Ambulatory Surgical Center"] <- "ASC"
colnames(SpaceCeleb_VA_Outcomes)[colnames(SpaceCeleb_VA_Outcomes) == "Acute Myocardial Infarction"] <- "AMI"
colnames(SpaceCeleb_VA_Outcomes)[colnames(SpaceCeleb_VA_Outcomes) == "Coronary Artery Bypass Graft"] <- "CABG"
colnames(SpaceCeleb_VA_Outcomes)[colnames(SpaceCeleb_VA_Outcomes) == "Catheter-associated urinary tract infections"] <- "CAUTI"
colnames(SpaceCeleb_VA_Outcomes)[colnames(SpaceCeleb_VA_Outcomes) == "Clostridium difficile Infection"] <- "CDI"
colnames(SpaceCeleb_VA_Outcomes)[colnames(SpaceCeleb_VA_Outcomes) == "Central line-associated bloodstream infections"] <- "CLABSI"
colnames(SpaceCeleb_VA_Outcomes)[colnames(SpaceCeleb_VA_Outcomes) == "Chronic Obstructive Pulmonary Disease"] <- "COPD"
colnames(SpaceCeleb_VA_Outcomes)[colnames(SpaceCeleb_VA_Outcomes) == "Days or Procedure Count"] <- "Procedure Days"

# Create a function to plot three variables
plot_three_variables <- function(data, var1, var2, var3) {
  p1 <- ggplot(data, aes(x = .data[[var1]], y = Score)) +
    geom_point(color = "red") +
    geom_smooth(method = "lm", color = "blue") +
    ggtitle(paste(var1, "vs Score")) +
    theme_minimal()

  p2 <- ggplot(data, aes(x = .data[[var2]], y = Score)) +
    geom_point(color = "green") +
    geom_smooth(method = "lm", color = "blue") +
    ggtitle(paste(var2, "vs Score")) +
    theme_minimal()

  p3 <- ggplot(data, aes(x = .data[[var3]], y = Score)) +
    geom_point(color = "purple") +
    geom_smooth(method = "lm", color = "blue") +
    ggtitle(paste(var3, "vs Score")) +
    theme_minimal()

  grid.arrange(p1, p2, p3, ncol = 3)
}

# Now lets plot the new variables that I converted into abbreviations to see the results
plot_three_variables(SpaceCeleb_VA_Outcomes, "ASC", "AMI", "CABG")
```

```
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
```



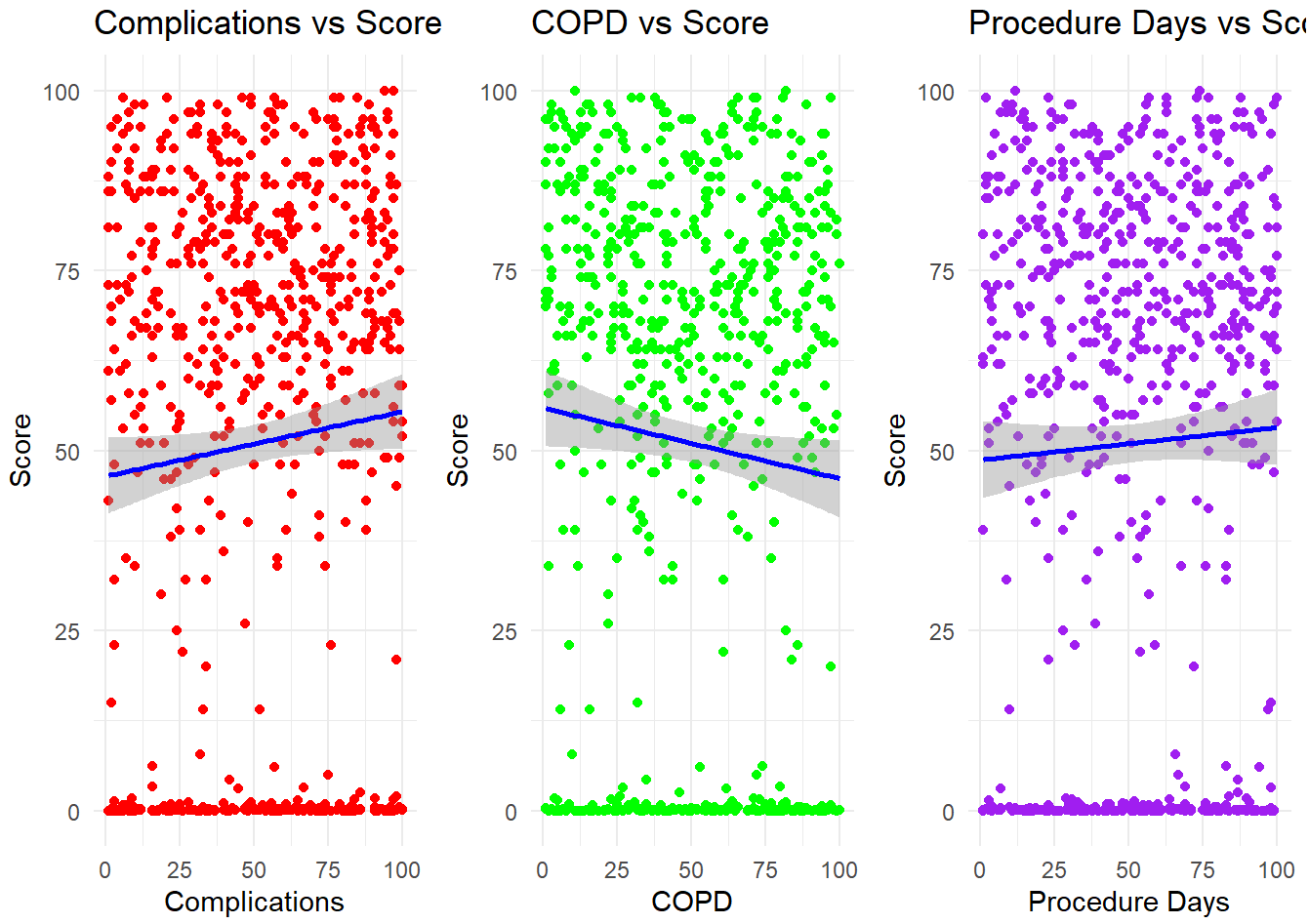

```
plot_three_variables(SpaceCeleb_VA_Outcomes, "CAUTI", "CDI", "CLABSI")
```

```
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
```



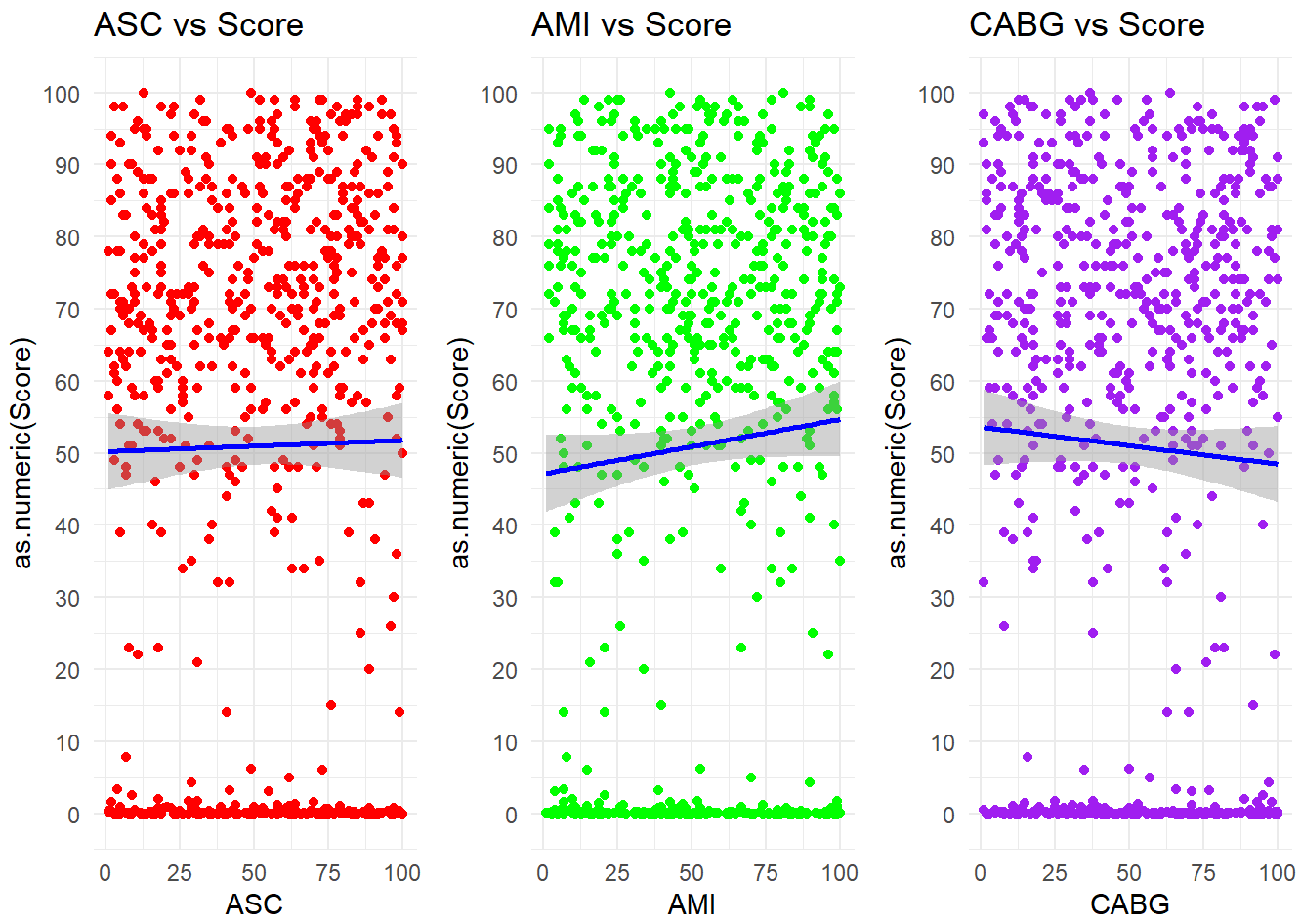

```
plot_three_variables(SpaceCeleb_VA_Outcomes, "Complications", "COPD", "Procedure Days")
```

```
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
```


Complications vs Score
COPD vs Score
Procedure Days vs Sc
Score
Complications
COPD
Procedure Days
0
25
50
75
100

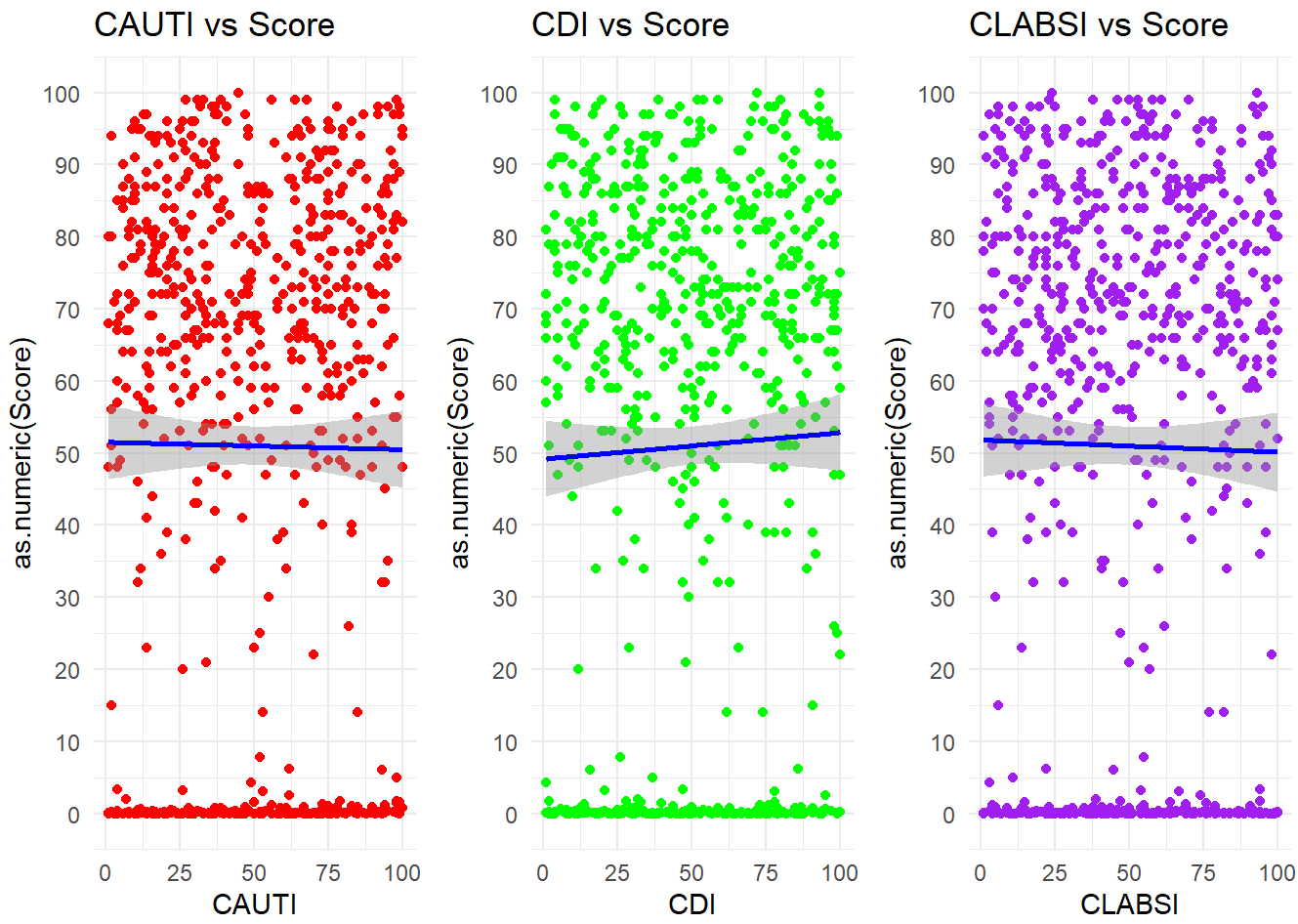
```
# The grapgh seems to still be over crowded so lets replot again with different scalable functio
n of the three variables for more readablility on the y-axis
plot_three_variables <- function(data, var1, var2, var3) {
  p1 <- ggplot(data, aes(x = .data[[var1]], y = as.numeric(Score))) +
    geom_point(color = "red") +
    geom_smooth(method = "lm", color = "blue") +
    ggtitle(paste(var1, "vs Score")) +
    theme_minimal() +
    scale_y_continuous(limits = c(0, 100), breaks = seq(0, 100, by = 10))

  p2 <- ggplot(data, aes(x = .data[[var2]], y = as.numeric(Score))) +
    geom_point(color = "green") +
    geom_smooth(method = "lm", color = "blue") +
    ggtitle(paste(var2, "vs Score")) +
    theme_minimal() +
    scale_y_continuous(limits = c(0, 100), breaks = seq(0, 100, by = 10))

  p3 <- ggplot(data, aes(x = .data[[var3]], y = as.numeric(Score))) +
    geom_point(color = "purple") +
    geom_smooth(method = "lm", color = "blue") +
    ggtitle(paste(var3, "vs Score")) +
    theme_minimal() +
    scale_y_continuous(limits = c(0, 100), breaks = seq(0, 100, by = 10))

  grid.arrange(p1, p2, p3, ncol = 3)
}

# Now lets replot
plot_three_variables(SpaceCeleb_VA_Outcomes, "ASC", "AMI", "CABG")
```

```
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
```



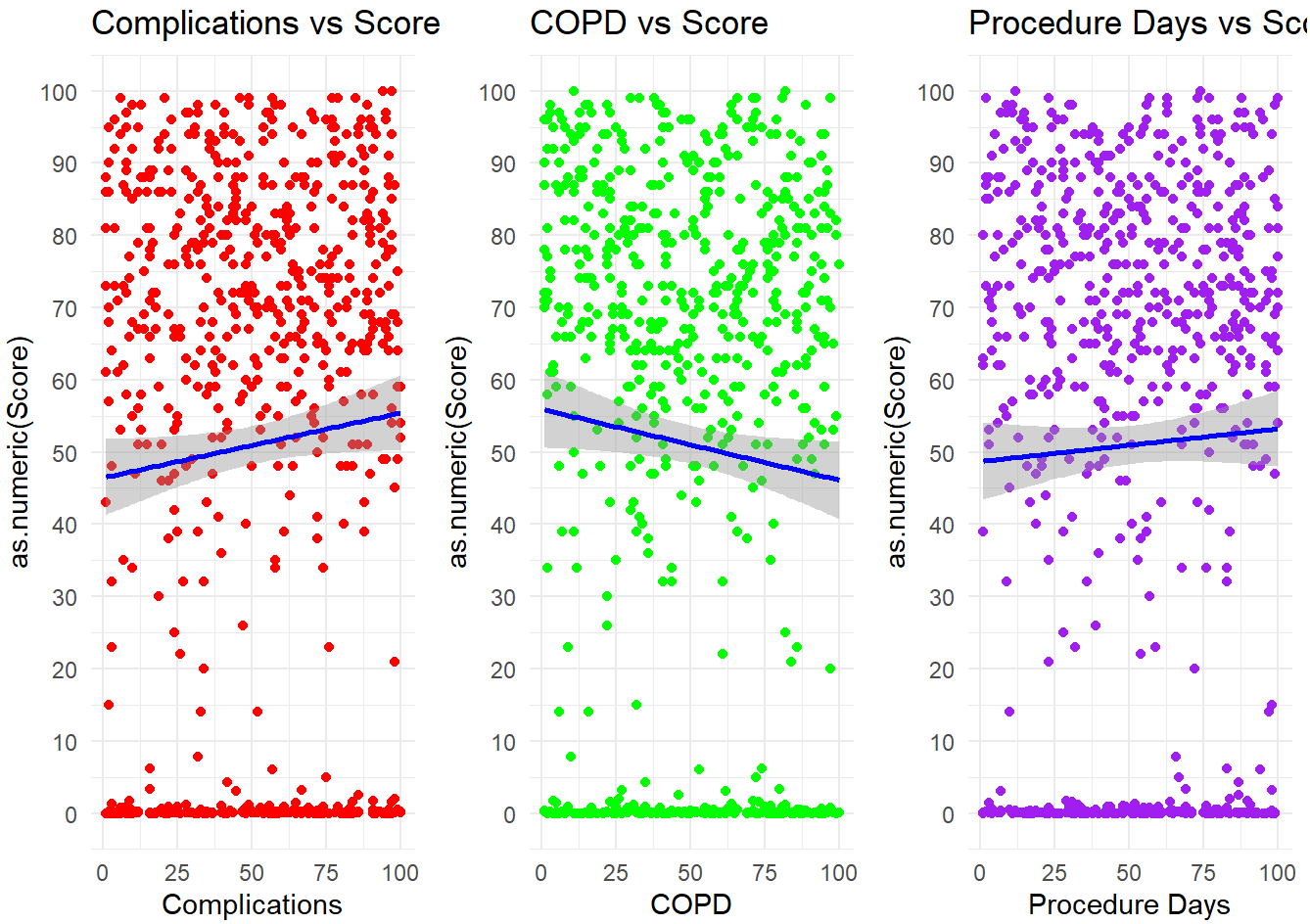

```
plot_three_variables(SpaceCeleb_VA_Outcomes, "CAUTI", "CDI", "CLABSI")
```

```
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
```




```
plot_three_variables(SpaceCeleb_VA_Outcomes, "Complications", "COPD", "Procedure Days")
```

```
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'
```


Complications vs Score
COPD vs Score
Procedure Days vs Sc
as.numeric(Score)
Complications
COPD
Procedure Days
0
10
20
30
40
50
60
70
80
90
100
0
25
50
75
100