In Class Assignment 5

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```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.3.6      v purrr   0.3.4
## v tibble  3.1.8      v dplyr   1.0.10
## v tidyr   1.2.1      v stringr 1.4.1
## v readr   2.1.2      v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(readr)
```

```
data <- read.table("table12-16.txt", sep = ",", header = TRUE)
head(data)
```

```
##    Fib gam Hth
## 1 2.52  38   0
## 2 2.46  36   0
## 3 2.29  36   0
## 4 3.15  36   0
## 5 2.88  30   0
## 6 2.29  31   0
```

```
str(data)
```

```
## 'data.frame':    32 obs. of  3 variables:
##  $ Fib: num  2.52 2.46 2.29 3.15 2.88 2.29 2.99 2.38 2.56 3.22 ...
##  $ gam: int  38 36 36 36 30 31 36 37 31 38 ...
##  $ Hth: int  0 0 0 0 0 0 0 1 0 0 ...
```

```
data$Hth <- as.factor(data$Hth)
```

```
str(data)
```

```
## 'data.frame':    32 obs. of  3 variables:
##  $ Fib: num  2.52 2.46 2.29 3.15 2.88 2.29 2.99 2.38 2.56 3.22 ...
##  $ gam: int  38 36 36 36 30 31 36 37 31 38 ...
##  $ Hth: Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 2 1 1 ...
```

```
colSums(is.na(data))
```

```
## Fib gam Hth
##   0   0   0
```

```
table(data$Hth)
```

```
##
##  0  1
## 26  6
```

```
prop.table(table(data$Hth))
```

```
##
##      0      1
## 0.8125 0.1875
```

```
logistic.model <- glm(Hth~Fib + gam, family = "binomial", data = data)
summary(logistic.model)
```

```
##
## Call:
## glm(formula = Hth ~ Fib + gam, family = "binomial", data = data)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -0.9683  -0.6122  -0.3458  -0.2116   2.2636
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept) -12.7921     5.7963  -2.207   0.0273 *
## Fib           1.9104     0.9710   1.967   0.0491 *
## gam           0.1558     0.1195   1.303   0.1925
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 30.885  on 31  degrees of freedom
## Residual deviance: 22.971  on 29  degrees of freedom
## AIC: 28.971
##
## Number of Fisher Scoring iterations: 5
```

Part A

Fib is related to the probability that a patient has an unhealthy level of ESR, and gam isn't. Fib has a p-value of 0.0491 (which is less than 0.05), and gam has a p-value of 0.1925 (which is greater than 0.05).

Part B

Beta 0 is -12.7921, Beta 1 is 1.9104 (Fib), and Beta 2 is 0.1558 (gam).

```
confint(logistic.model, level = 0.95)
```

```
## Waiting for profiling to be done...
```

```
##                    2.5 %     97.5 %
## (Intercept) -27.27978361 -3.1496138
## Fib           0.33941838  4.2904709
## gam          -0.06617422  0.4266588
```

Based on the values above, we are 95% confident that the estimates are within those ranges.

Part C

```
prob_esr <- function(x, y) {
  eee <- exp((-12.7921+(1.9104 * x) + (0.1558 * y)))
  eee/(1+eee)
}
```

```
prob_esr(2.52, 38)
```

```
## [1] 0.1132975
```

Group 3: Christopher Hainzl, Christopher Hakkenberg, Christopher Barbieri, Ryan Podzielny, Peter Bitanga