Ex 3: Intro to Survival Analysis

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Question 1

You are studying three different new drugs that may help slow the progression of Alzheimer's. Do the following:

a. Draw a survival plot that shows the survival curves for all three drugs.

b. Test to see if overall there is an effect of any of the drugs on survival taken as a global set.

c. Compare the survival curves for each of the three drugs with each other (three comparisons) and see if any if the curves are different from each other.

```r
#Read in data
df2 = read.csv("alzheimers data.csv")
```

```r
#part a: Survival Curve
fit2 <- survfit(Surv(Time, Event)~Group, data = df2)

ggsurvplot(fit2, df2)
```
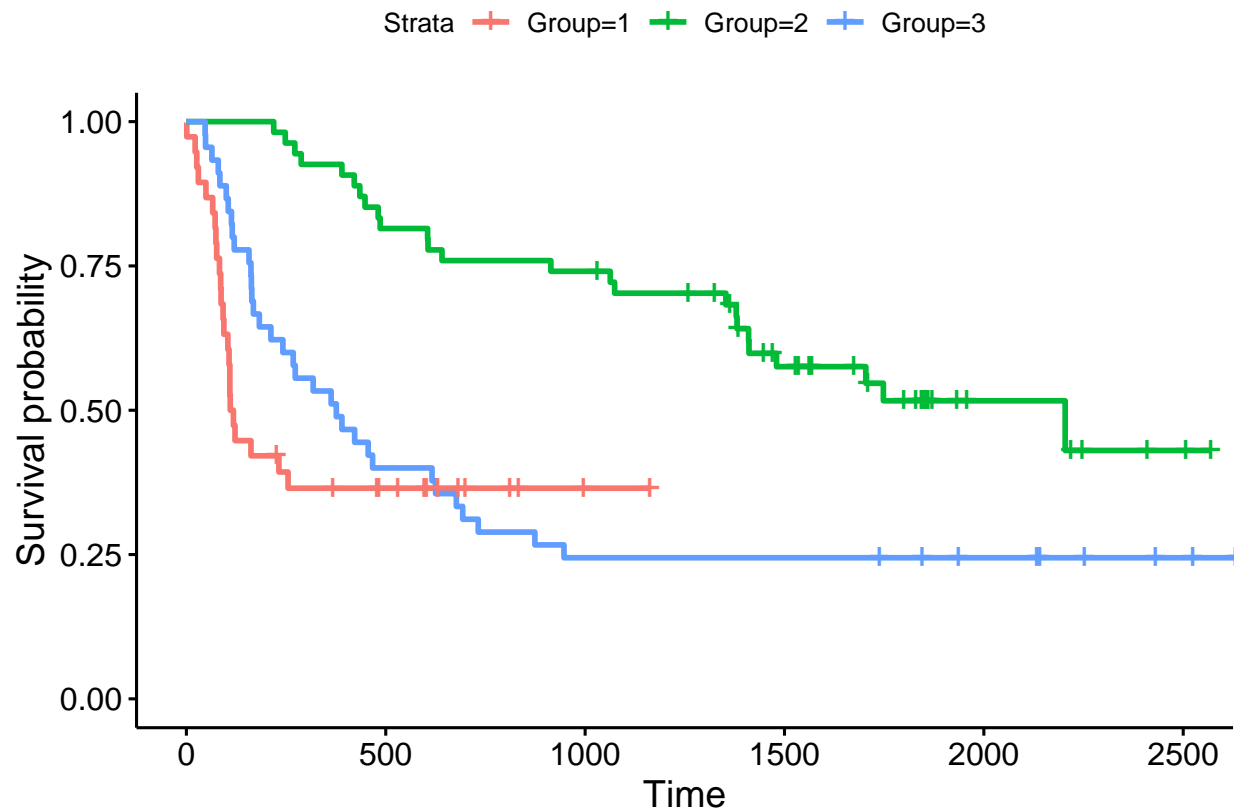
```
#part b: LogRank test
survdiff(Surv(Time, Event)~Group, data=df2)
```

```
## Call:
## survdiff(formula = Surv(Time, Event) ~ Group, data = df2)
##
##          N Observed Expected (O-E)^2/E (O-E)^2/V
## Group=1 38       24     12.3     11.07     13.66
## Group=2 54       25     46.0      9.58     22.50
## Group=3 45       34     24.7      3.51      5.04
##
##   Chisq= 25.7  on 2 degrees of freedom, p= 3e-06
```

The Log Rank test returned a p-value less than 0.05, meaning there is a significant difference between the groups. At least one of the drugs is different compared to the other two.

```
#part c: Pairwise LogRank test
pairwise_survdiff(Surv(Time, Event)~Group, data=df2)
```

```
##
##  Pairwise comparisons using Log-Rank test
##
## data:  df2 and Group
##
##    1        2
```

2

```
## 2 9.8e-07 -
## 3 0.38    6.1e-05
##
## P value adjustment method: BH
```

The difference between groups 1 and 2 is significant, and the difference between groups 2 and 3 is significant. There is no significant difference between group 1 and group 3. Based off of these results and our survival curve, we can conclude that the drug used in treatment group 2 is significantly better at slowing the progression of Alzheimer's compared to the other two drugs used in groups 1 and 3.