

FULL LCA Analysis

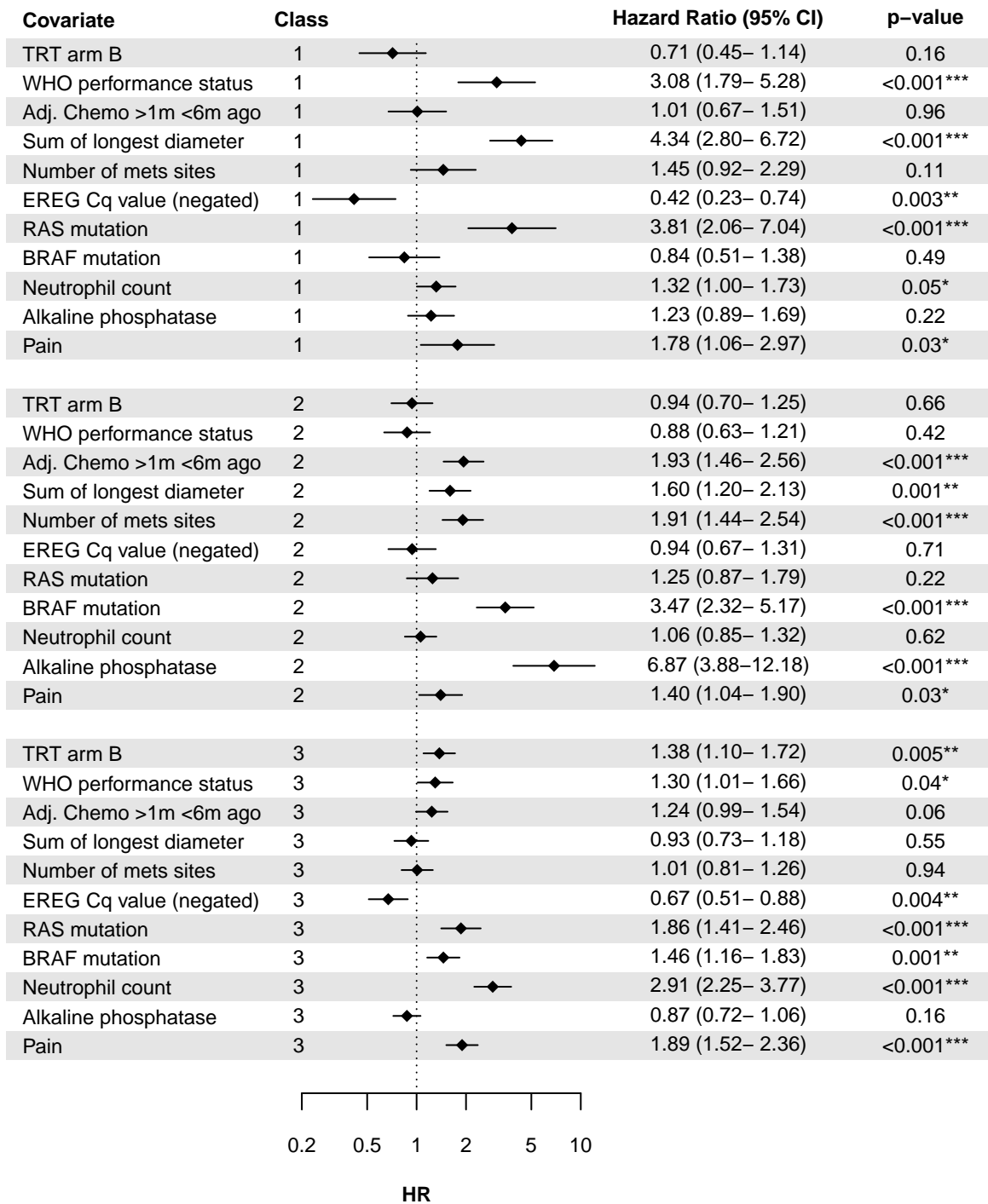
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```
load(file = "COIN_Final.Rdata")
```

Forest plot of covariates

```
## Loading required package: stringr
```



KM Curves

```
library(survival)

data <- patient_data

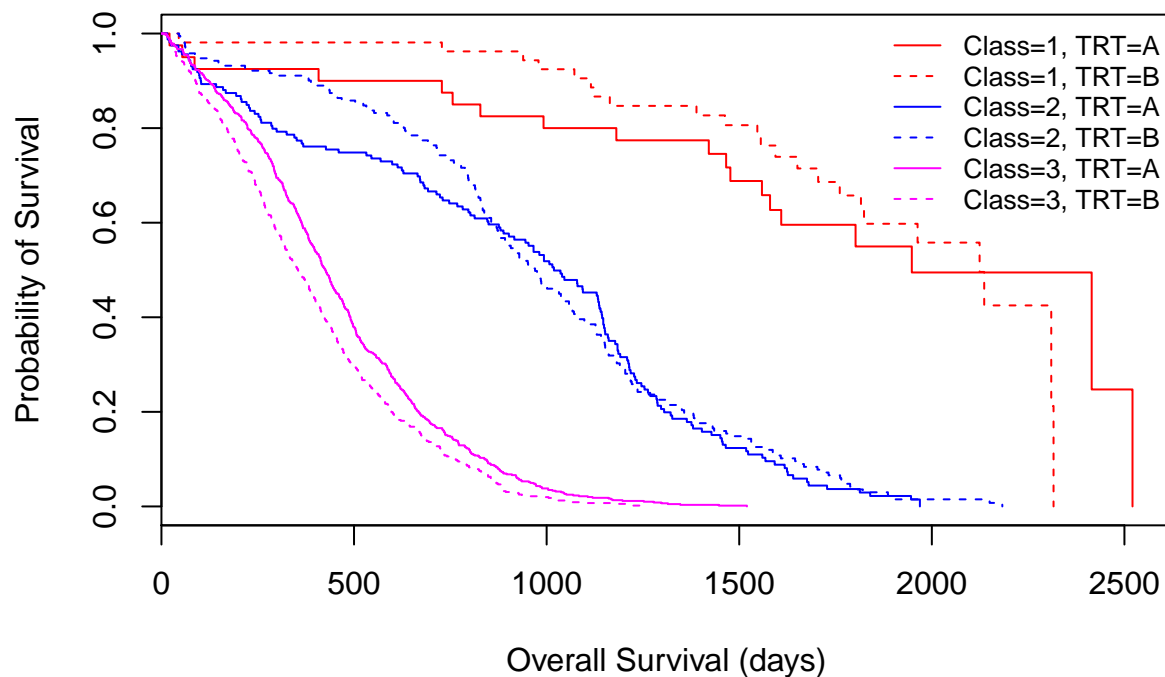
data$SurvObj.os <- with(data, Surv(ostime, osevent))
data$SurvObj.pfs <- with(data, Surv(pfstime, pfsevent))

col=c("red", "red", "blue", "blue", "magenta", "magenta")
lty=c(1,2,1,2,1,2)
```

OS

```
# rename
data$Class <- data$Class.OS

km <- survfit(SurvObj.os ~ Class + TRT, data=data)
plot(km, col=col, lty=lty, xlab="Overall Survival (days)", ylab="Probability of Survival")
legend("topright", col=col, legend = names(km$strata), lty=lty, bty="n", cex=0.8)
```



```
print(km)

## Call: survfit(formula = SurvObj.os ~ Class + TRT, data = data)
##
##              n events median 0.95LCL 0.95UCL
## Class=1, TRT=A 40      19  1948   1580    NA
## Class=1, TRT=B 53      23  2124   1816    NA
```

```
## Class=2, TRT=A 159      150    1019      902      1140
## Class=2, TRT=B 191      183     970      892      1058
## Class=3, TRT=A 616      608     425      402       448
## Class=3, TRT=B 571      560     355      327      386
```

```
survdiff(SurvObj.os ~ Class, data=data)
```

```
## Call:
## survdiff(formula = SurvObj.os ~ Class, data = data)
##
##              N Observed Expected (O-E)^2/E (O-E)^2/V
## Class=1   93         42      258      180.9      263
## Class=2  350        333      558       90.6      153
## Class=3 1187       1168      727      267.2      653
##
##  Chisq= 728  on 2 degrees of freedom, p= <2e-16
```

```
survdiff(SurvObj.os[Class==1] ~ TRT[Class==1], data=data)
```

```
## Call:
## survdiff(formula = SurvObj.os[Class == 1] ~ TRT[Class == 1],
##          data = data)
##
##              N Observed Expected (O-E)^2/E (O-E)^2/V
## TRT[Class == 1]=A 40         19      18.2      0.0325      0.0621
## TRT[Class == 1]=B 53         23      23.8      0.0250      0.0621
##
##  Chisq= 0.1  on 1 degrees of freedom, p= 0.8
```

```
survdiff(SurvObj.os[Class==2] ~ TRT[Class==2], data=data)
```

```
## Call:
## survdiff(formula = SurvObj.os[Class == 2] ~ TRT[Class == 2],
##          data = data)
##
##              N Observed Expected (O-E)^2/E (O-E)^2/V
## TRT[Class == 2]=A 159         150      146      0.134      0.241
## TRT[Class == 2]=B 191         183      187      0.104      0.241
##
##  Chisq= 0.2  on 1 degrees of freedom, p= 0.6
```

```
survdiff(SurvObj.os[Class==3] ~ TRT[Class==3], data=data)
```

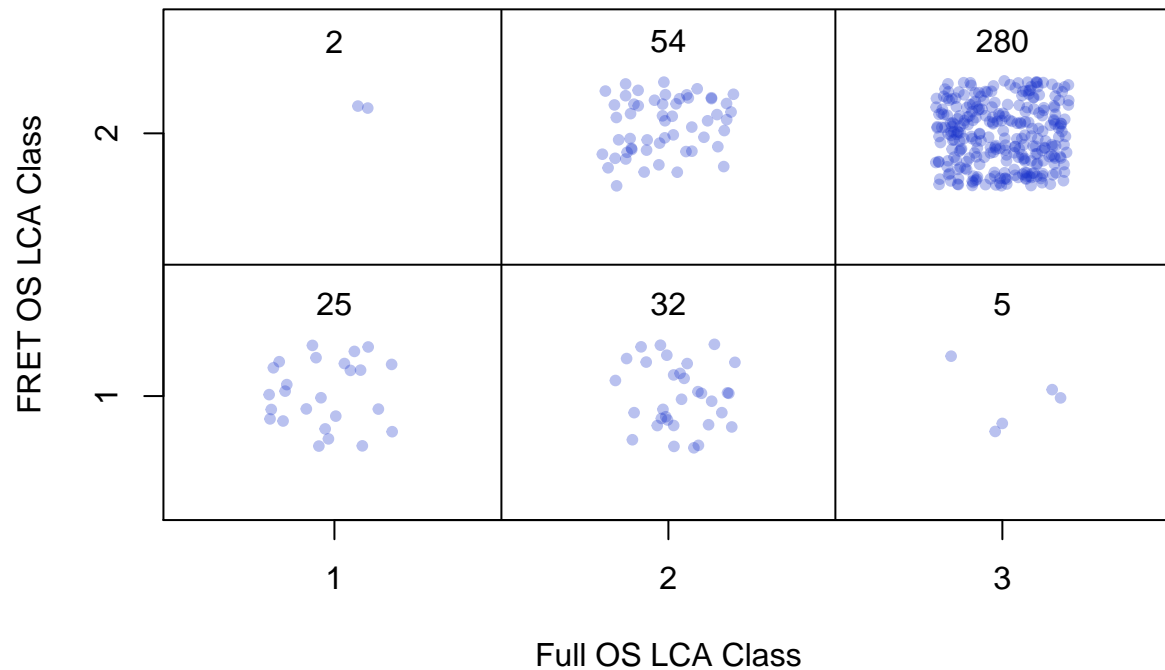
```
## Call:
## survdiff(formula = SurvObj.os[Class == 3] ~ TRT[Class == 3],
##          data = data)
##
##              N Observed Expected (O-E)^2/E (O-E)^2/V
## TRT[Class == 3]=A 616         608      676      6.75      16.2
## TRT[Class == 3]=B 571         560      492      9.25      16.2
##
##  Chisq= 16.2  on 1 degrees of freedom, p= 6e-05
```

```
ggrisktable(km, data=data) + theme_cleantable()
```

	Number at risk					
Class=1, TRT=A	40	36	32	24	6	1
Class=1, TRT=B	53	52	49	38	13	0
Class=2, TRT=A	159	119	79	18	0	0
Class=2, TRT=B	191	163	87	27	2	0
Class=3, TRT=A	616	231	23	1	0	0
Class=3, TRT=B	571	166	11	0	0	0

Compare Classes of FRET and FULL LCA

```
as.numeric.factor <- function(x) {as.numeric(levels(x))[x]}
data <- patient_data[patient_data$FRET.cohort==1,]
data$Class.FRET.OS <- as.numeric.factor(data$Class.FRET.OS)
data$Class.OS <- as.numeric.factor(data$Class.OS)
```



Cohen's Kappa

```
library(irr)
```

```
## Warning: package 'irr' was built under R version 3.5.3
```

```
## Loading required package: lpSolve
```

```
## Warning: package 'lpSolve' was built under R version 3.5.3
```

```
kappa2(data[,c("Class.FRET.OS", "Class.OS")])
```

```
## Cohen's Kappa for 2 Raters (Weights: unweighted)
##
## Subjects = 398
## Raters = 2
## Kappa = 0.00682
##
## z = 0.592
## p-value = 0.554
```

Calculate the means and standard deviations from 100,000 random group assignments with the same number per subclass as the real data. Also do permutations test and see how many random group are as, or more, extreme as the real data.

Session Information

```
sessionInfo()
```

```
## R version 3.5.1 (2018-07-02)
## Platform: x86_64-w64-mingw32/x64 (64-bit)
## Running under: Windows 10 x64 (build 16299)
##
## Matrix products: default
##
## locale:
## [1] LC_COLLATE=English_United Kingdom.1252
## [2] LC_CTYPE=English_United Kingdom.1252
## [3] LC_MONETARY=English_United Kingdom.1252
## [4] LC_NUMERIC=C
## [5] LC_TIME=English_United Kingdom.1252
##
## attached base packages:
## [1] stats      graphics  grDevices  utils      datasets  methods   base
##
## other attached packages:
## [1] irr_0.84.1      lpSolve_5.6.13.3  survival_2.42-3
## [4] filesstrings_3.0.0 stringr_1.3.1      survminer_0.4.6
## [7] ggpubr_0.2      magrittr_1.5       ggplot2_3.1.1
##
## loaded via a namespace (and not attached):
## [1] zoo_1.8-4      tidyselect_0.2.5  purrr_0.2.5
## [4] splines_3.5.1  lattice_0.20-35   colorspace_1.3-2
## [7] generics_0.0.2 vctrs_0.2.0       htmltools_0.3.6
## [10] yaml_2.2.0     survMisc_0.5.5    rlang_0.4.0
## [13] pillar_1.4.1   glue_1.3.0        withr_2.1.2
## [16] matrixStats_0.54.0 lifecycle_0.1.0    plyr_1.8.4
## [19] munsell_0.5.0  gtable_0.2.0      evaluate_0.12
## [22] labeling_0.3   knitr_1.20        broom_0.5.2
## [25] Rcpp_1.0.1     xtable_1.8-4      scales_1.0.0
## [28] backports_1.1.2 checkmate_1.9.3    km.ci_0.5-2
## [31] gridExtra_2.3  digest_0.6.18     stringi_1.2.4
## [34] dplyr_0.8.3    KMsurv_0.1-5      grid_3.5.1
```

```
## [37] rprojroot_1.3-2    tools_3.5.1        lazyeval_0.2.1
## [40] tibble_2.1.1       crayon_1.3.4       tidyr_1.0.0
## [43] pkgconfig_2.0.2    zeallot_0.1.0      Matrix_1.2-14
## [46] data.table_1.12.2  strex_1.0.1        assertthat_0.2.0
## [49] rmarkdown_1.10     R6_2.3.0           nlme_3.1-137
## [52] compiler_3.5.1
```