hw2

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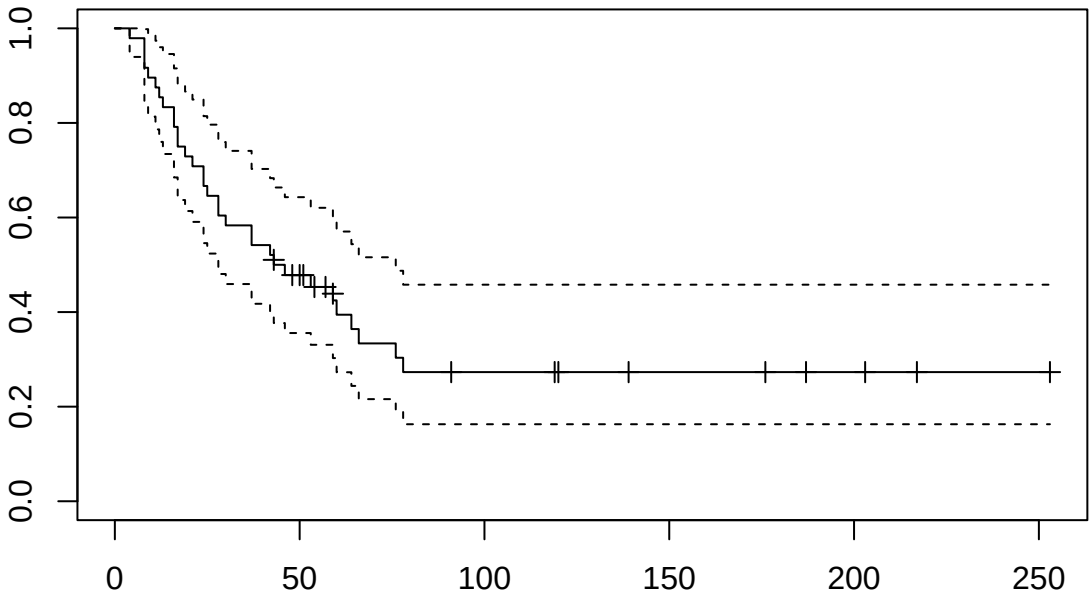
1

1. kphaz.fit from the muhaz package calculates Kaplan-Meier type hazard estimates.
2. phreg from eha (event history analysis) package computes proportional hazards model with parametric baseline hazard(s).
3. bpcp2samp from bpcp tests for dissimilarity between two groups in their survival distributions at a fixed point in time. Can operationalize that dissimilarity as 'difference', 'ratio' or 'oddsratio'.

2

Q1 survival time is 17 weeks, with 95% confidence between 13 and 30 Median survival time is 44.5 weeks, with 95% confidence between between 28 and 76 Q3 survival time is infinity, with 95% confidence between 64 and infinity

```
library(survival)
library(asaur)
gx = asaur::gastricXelox
fit1 <- survfit(Surv(timeWeeks, delta) ~ 1, data=gx)
plot(fit1, mark.time=TRUE)
```




```
fit1
```

```
## Call: survfit(formula = Surv(timeWeeks, delta) ~ 1, data = gx)
##
##       n  events  median 0.95LCL 0.95UCL
##    48.0    32.0    44.5    28.0    76.0
```

```
summary(fit1)
```

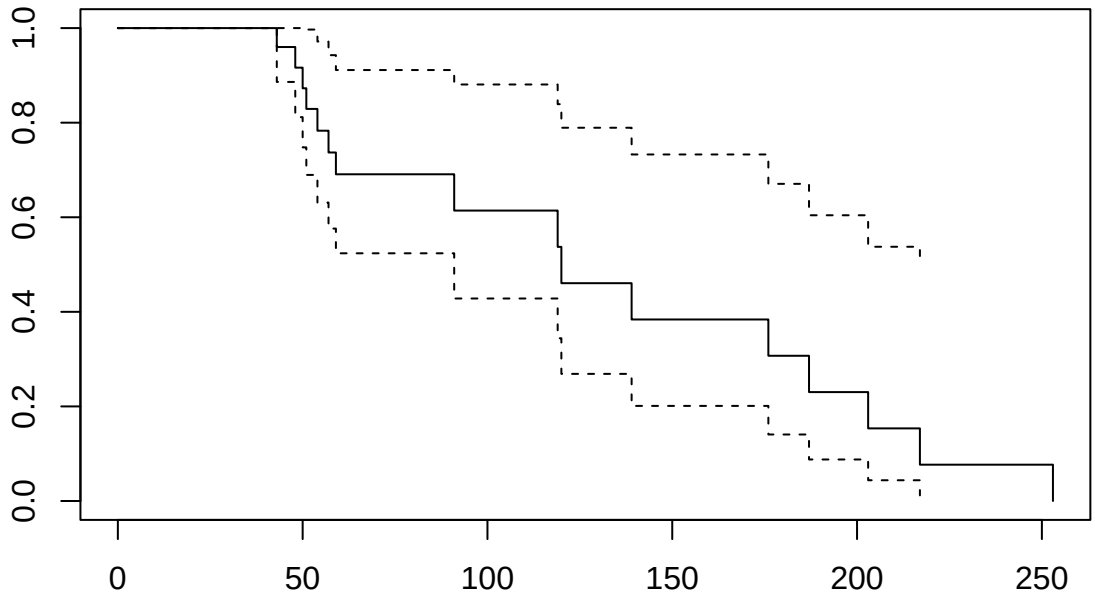
```
## Call: survfit(formula = Surv(timeWeeks, delta) ~ 1, data = gx)
##
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     4     48       1    0.979  0.0206        0.940        1.000
##     8     47       3    0.917  0.0399        0.842        0.998
##     9     44       1    0.896  0.0441        0.813        0.987
##    11     43       1    0.875  0.0477        0.786        0.974
##    12     42       1    0.854  0.0509        0.760        0.960
##    13     41       1    0.833  0.0538        0.734        0.946
##    16     40       2    0.792  0.0586        0.685        0.915
##    17     38       2    0.750  0.0625        0.637        0.883
##    19     36       1    0.729  0.0641        0.614        0.866
##    21     35       1    0.708  0.0656        0.591        0.849
##    24     34       2    0.667  0.0680        0.546        0.814
##    25     32       1    0.646  0.0690        0.524        0.796
##    28     31       2    0.604  0.0706        0.481        0.760
```

```
##     30      29       1    0.583  0.0712        0.459        0.741
##     37      28       2    0.542  0.0719        0.418        0.703
##     42      26       1    0.521  0.0721        0.397        0.683
##     43      25       1    0.500  0.0722        0.377        0.663
##     46      23       1    0.478  0.0722        0.356        0.643
##     53      19       1    0.453  0.0727        0.331        0.620
##     59      16       1    0.425  0.0735        0.303        0.596
##     60      14       1    0.394  0.0742        0.273        0.570
##     64      13       1    0.364  0.0744        0.244        0.544
##     66      12       1    0.334  0.0742        0.216        0.516
##     76      11       1    0.303  0.0734        0.189        0.487
##     78      10       1    0.273  0.0720        0.163        0.458
```

3

Median follow-up time is 120 weeks

```
gx$delta1 = ifelse(gx$delta == 1, 0, 1)
fit2 <- survfit(Surv(timeWeeks, delta1) ~ 1, data=gx)
plot(fit2)
```




```
fit2
```

```
## Call: survfit(formula = Surv(timeWeeks, delta1) ~ 1, data = gx)
```

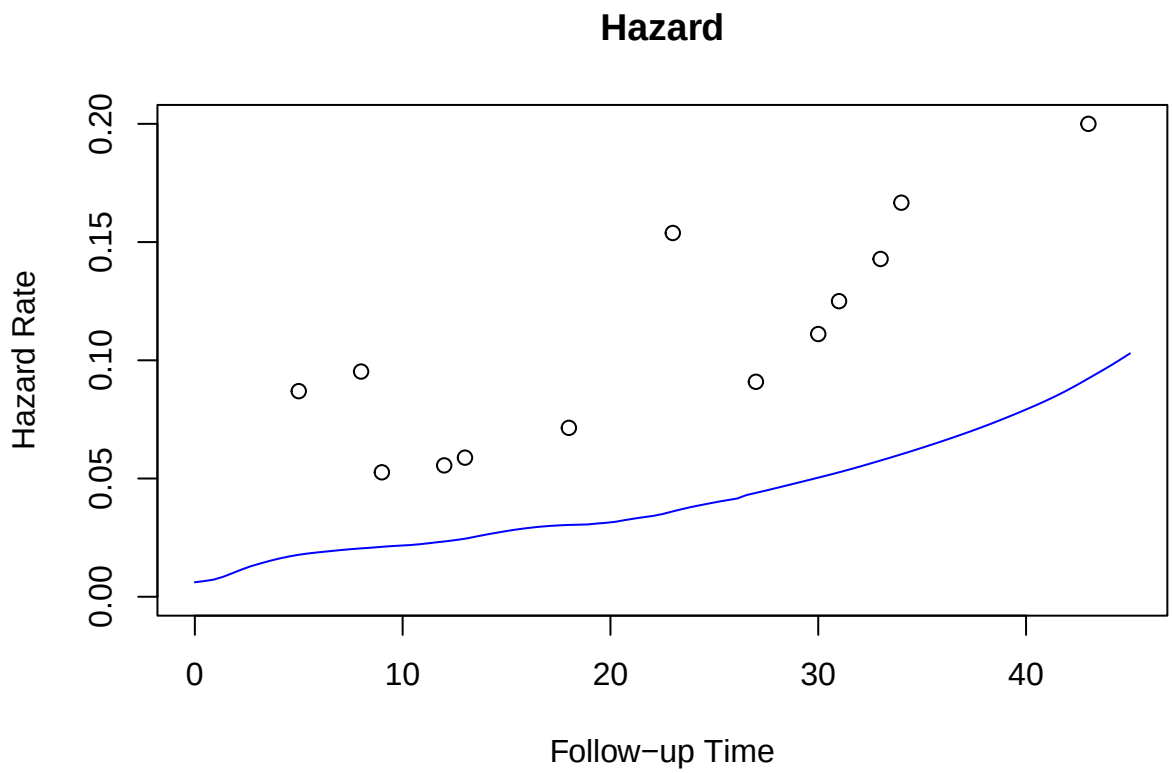
```
##
##       n  events  median 0.95LCL 0.95UCL
##      48      16     120      91     217
```

4

```
library(muhaz)
```

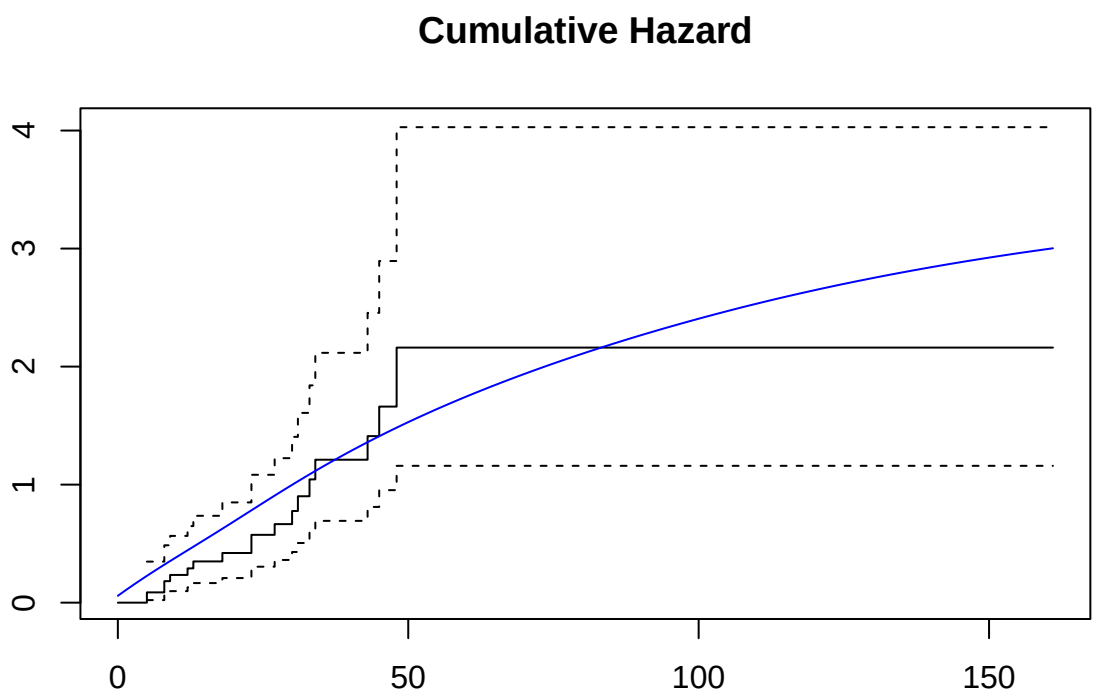
```
## Warning: package 'muhaz' was built under R version 4.1.2
```

```
fit3 <- survfit(Surv(time, status) ~ 1, data=aml)
sfit3 <- summary(fit3)

mfit3 <- muhaz(aml$time, aml$status, max.time = 45)

haz3 <- sfit3$n.event/sfit3$n.risk
plot(mfit3, col='blue', main = "Hazard", ylim = c(0,0.2), xlim = c(0,45))
points(sfit3$time, haz3)
```

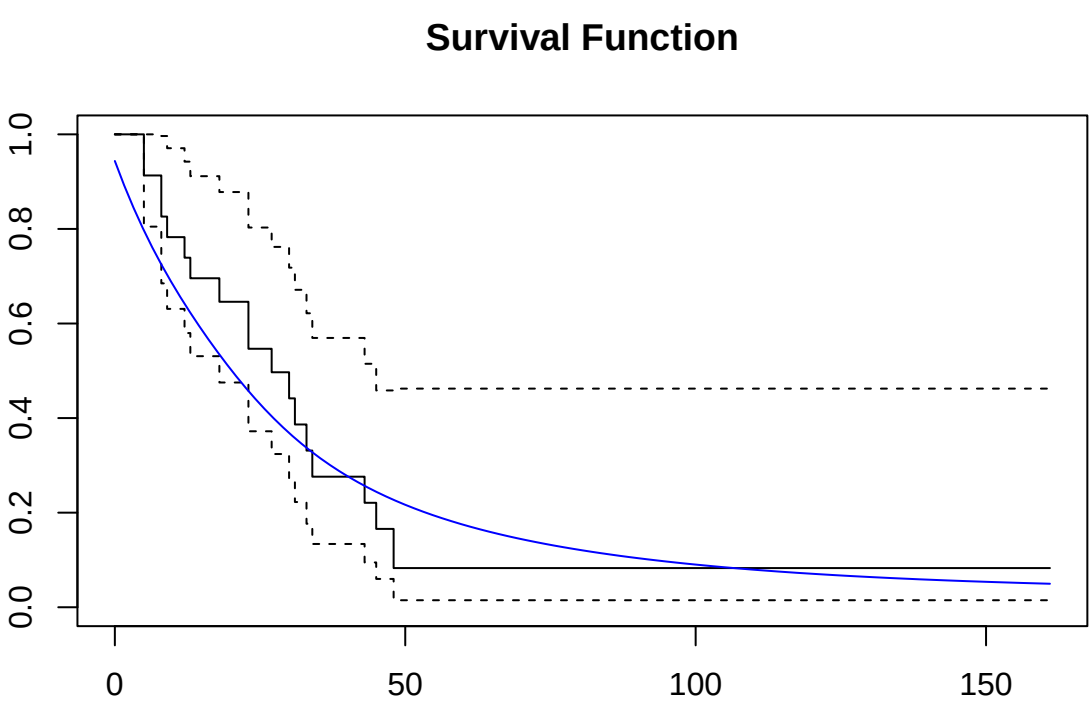



```
mfit3 <- muhaz(aml$time, aml$status, max.time = 161)

plot(fit3, cumhaz=TRUE, main = "Cumulative Hazard")
```

```
lines(mfit3$est.grid,
      cumsum(mfit3$haz.est)*diff(mfit3$est.grid)[1],
      col='blue')
```




```
plot(fit3, main = "Survival Function")
lines(mfit3$est.grid,
      exp(-cumsum(mfit3$haz.est)*diff(mfit3$est.grid)[1]),
      col='blue')
```


Survival Function
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150