survival

MJ

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```r
library(DT)
library(tidyverse)
library(ggpubr)
library(lubridate)
library(survival)
library(ggplot2)
library(survminer)
```

```r
# lets create dummy tibble for last surgery sx and last followup date sx fup

date_ex = tibble (
                sx_date = c("2007-06-22", "2004-02-13", "2010-10-27"),
                last_fup_date = c("2017-04-15", "2018-07-04", "2016-10-31")
                )
date_ex
```

```
## # A tibble: 3 x 2
##   sx_date    last_fup_date
##   <chr>      <chr>
## 1 2007-06-22 2017-04-15
## 2 2004-02-13 2018-07-04
## 3 2010-10-27 2016-10-31
```

```r
# class are chr but we need dates as date not chr , so formatting dates using base R as.date fun

date_ex = date_ex %>%
                mutate(
                        sx_date = as.Date(sx_date),
                        last_fup_date = as.Date(last_fup_date),

                        os_yrs =as.numeric(difftime(last_fup_date, sx_date,  units = "days")) / 365
                    )

date_ex
```

```
## # A tibble: 3 x 3
##   sx_date    last_fup_date os_yrs
##   <date>     <date>         <dbl>
## 1 2007-06-22 2017-04-15      9.82
## 2 2004-02-13 2018-07-04     14.4
## 3 2010-10-27 2016-10-31      6.01
```

```r
table(lung$status)
```

```
##
##   1   2
##  63 165
```

```r
# lung
Surv(lung$time, lung$status)[1:10]
```

```
## [1]  306   455  1010+  210   883  1022+  310   361   218   166
```

```r
f1 = survfit(Surv(time, status)~1, data = lung)
f1
```

```
## Call: survfit(formula = Surv(time, status) ~ 1, data = lung)
##
##        n  events  median 0.95LCL 0.95UCL
##      228     165     310     285     363
```

```r
names(f1)
```

```
##  [1] "n"         "time"      "n.risk"    "n.event"   "n.censor"  "surv"
##  [7] "std.err"   "cumhaz"    "std.chaz"  "type"      "logse"     "conf.int"
## [13] "conf.type" "lower"     "upper"     "call"
```

```r
f1$n.event
```

```
##   [1] 1 3 1 2 1 1 1 1 2 1 1 2 1 1 2 1 1 2 2 1 1 2 1 2 1 1 1 1 1 2 1 1 1 2 1 1 2
##  [38] 3 2 1 1 0 0 1 1 1 2 1 2 1 1 0 1 0 1 0 0 1 0 1 1 2 1 0 1 1 1 0 1 1 0 1 1 0
##  [75] 0 1 1 1 0 0 2 0 0 1 1 0 0 0 1 1 1 1 0 0 0 1 1 2 1 1 1 0 1 0 0 1 1 1 1 2 0
## [112] 1 1 0 1 1 1 1 1 1 2 0 1 2 1 2 0 0 0 1 1 1 0 0 1 1 1 1 1 1 1 1 1 0 1 1 1 0
## [149] 1 1 2 0 1 0 1 0 1 0 1 0 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 0 1 0 0 1 0 0
## [186] 0
```

```r
plot(f1, xlab = "Days",
     ylab = "Overall survival probability", mark.time = TRUE)
```
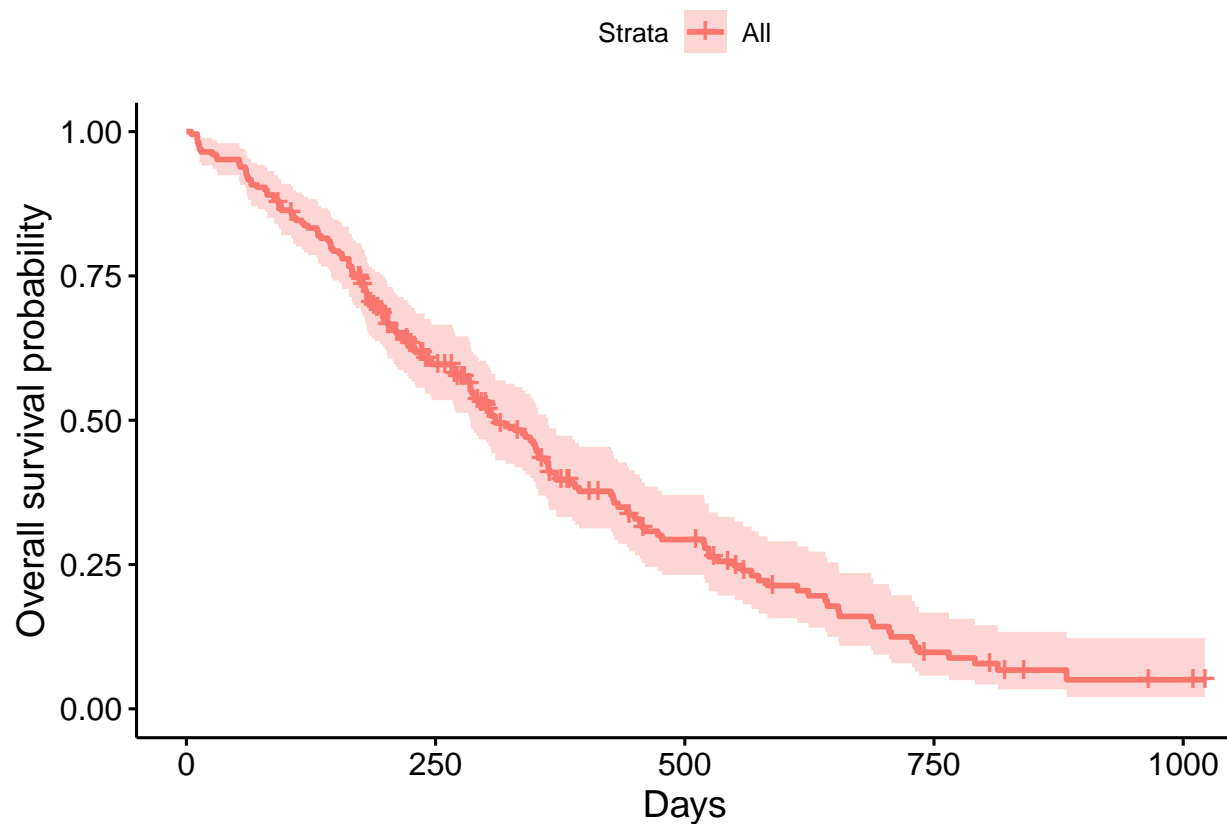
```r
ggsurvplot(f1, xlab = "Days",
     ylab = "Overall survival probability", mark.time = TRUE)
```
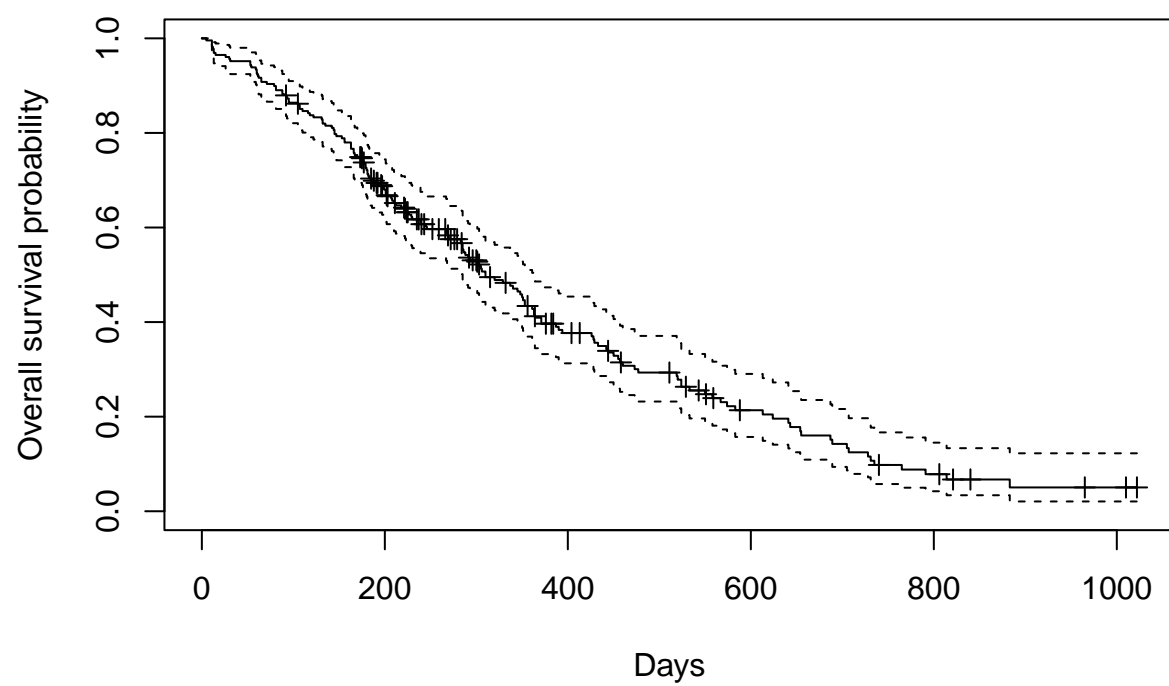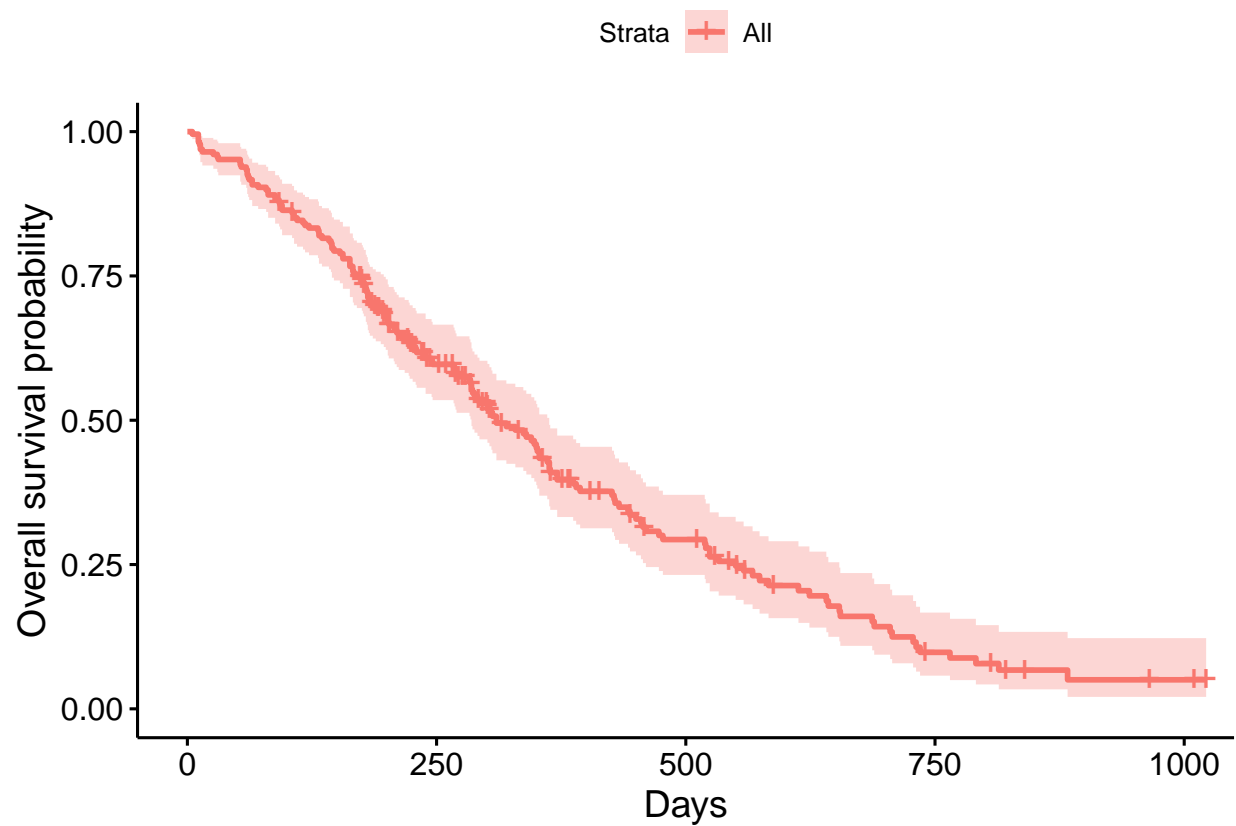
```
# or we can use directly fit sunction Surv inside ggsurvplot

ggsurvplot(
  fit = survfit(Surv(time, status) ~1, data = lung),
  xlab = "Days",
  ylab = "Overall survival probability"
)
```

```
summary(survfit(Surv(time, status) ~1, data = lung), times = 365.25) #(  in this survival 0,409 = 40.9 )
```

```
## Call: survfit(formula = Surv(time, status) ~ 1, data = lung)
##
##   time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    365     65     121    0.409  0.0358        0.345        0.486
```

```
f2 = survfit(Surv(time, status)~1, data = lung)
f2
```

```
## Call: survfit(formula = Surv(time, status) ~ 1, data = lung)
##
##         n  events  median 0.95LCL 0.95UCL
##       228     165     310     285     363
```

```
SDS = survfit(Surv(time, status)~sex , data = lung)

SDS
```

```
## Call: survfit(formula = Surv(time, status) ~ sex, data = lung)
##
##           n events median 0.95LCL 0.95UCL
## sex=1   138    112    270     212     310
## sex=2    90     53    426     348     550
```

```
summary(SDS)$table
```

```
##       records n.max n.start events   *rmean *se(rmean) median 0.95LCL 0.95UCL
## sex=1     138   138     138    112 326.0841   22.91156    270     212     310
## sex=2      90    90      90     53 460.6473   34.68985    426     348     550
```

```
survdiff(Surv(time, status)~sex, data = lung)
```

```
## Call:
## survdiff(formula = Surv(time, status) ~ sex, data = lung)
##
##           N Observed Expected (O-E)^2/E (O-E)^2/V
## sex=1 138      112     91.6      4.55      10.3
## sex=2  90       53     73.4      5.68      10.3
##
##  Chisq= 10.3  on 1 degrees of freedom, p= 0.001
```

```
ggsurvplot(SDS, color = "strata", linetype = "strata", conf.int = TRUE, pval = TRUE, risk.table = "abs_p
```