Hazardrate=1.386 # This value is from **PASS** instruction for hazard rate;

#The following examples assume an exponential survival distribution.

#Median Survival Time Hazard Rate

#0.5 1.386

#1.0 0.693

#2.0 0.347

#3.0 0.231

#3.0 0.231

Because , and for exponential model, the survival function is,

.

Thus,

.

Assume that the event rate is 50% and follow-up time t is 0.5, then

The hazard rate is



Assume that the event rate is 55% and follow-up time t is 0.5, then

The hazard rate is



Also, event rate *.*

Hazardrate=1.386 # From PASS instruction for hazard rate;

#The following examples assume an exponential survival distribution.

#Median Survival Time Hazard Rate

#0.5 1.386

#1.0 0.693

#2.0 0.347

#3.0 0.231

#3.0 0.231

t=0.5

xx=seq(0,2, .001)

y=1-pexp(xx, Hazardrate)

s=exp(-Hazardrate\*xx)

table(round(y,5)==round(s,5))

plot(y,s, pch=16, cex=.3)

abline(0,1,col=2)

par(mfrow=c(1,2))

plot(xx, y, ylim=c(0, 1), type="l", lwd=5, xlab="Time", ylab="Event probability")

abline(h=.5)

abline(v=.5, col=2)

# find the hzard rate for eventR0

# Confirm hazard rate with PASS 1.386 for median survival time of 0.5.

Time=0.5 #month

eventR0=0.5

hazardseq=seq(0.5, 2, 0.001)

eventprob= pexp(Time, hazardseq)

wh=which(abs(eventprob-eventR0) ==min(abs(eventprob-eventR0)))

wh

# Confirm hazard rate with PASS 1.386 for median survival time of 0.5.

hazardseq[wh]

# find the hzard rate for eventR0

# 6 month event rate is 55%

Time=0.5 #month

eventR0=0.55

hazardseq=seq(0.5, 2, 0.001)

eventprob= pexp(Time, hazardseq)

wh=which(abs(eventprob-eventR0) ==min(abs(eventprob-eventR0)))

# Confirm hazard rate with PASS 1.386 for median survival time of 0.5.

hazardseq[wh]

Hazardrate=hazardseq[wh]

xx=seq(0,2, .001)

y= 1-pexp(xx, Hazardrate)

s=exp(-Hazardrate\*xx)

plot(xx, y, ylim=c(0, 1), type="l", lwd=5, xlab="Time", ylab="Event probability")

points(xx, s, ylim=c(0, 1), type="l", lwd=2, col=3)

abline(h=1-eventR0)

abline(v=.5, col=2)

Hazardrate

# use this Hazardrate in SAS proc power

exp(log(.96)\*c(1, seq(5,20,5)))

# use this Hazardrate in SAS proc power

**proc** **power**;

    twosamplesurvival test=logrank  
    hazardratio = **0.3 0.4 0.5 0.6**  
    refsurvexphazard=**0.996**  
    followuptime = **2**  
    totalTIME = 2.**5**  
    power = **0.80**  
    ntotal = **.** ;  
**run**;