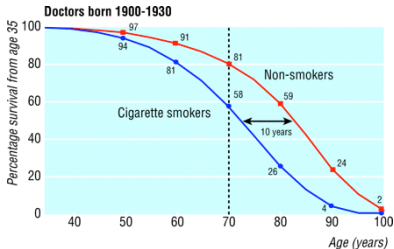# Hazard of Smoking: A 574 Exercise

Roger Koenker

University of Illinois, Urbana-Champaign
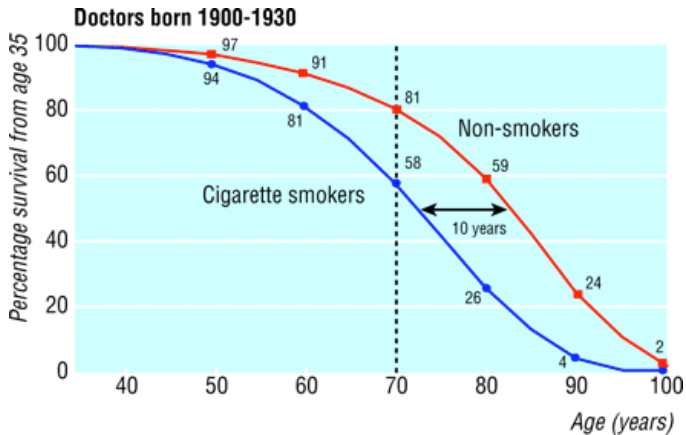
UIUC: 30 April 2013

The Study

The Study

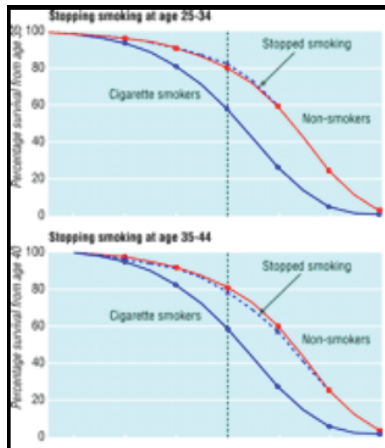Prospective study of smoking and mortality: 1951 - 2001.

Participants: 34,439 male British doctors. Information about their smoking habits was obtained in 1951, and periodically thereafter; cause specific mortality was monitored for 50 years.

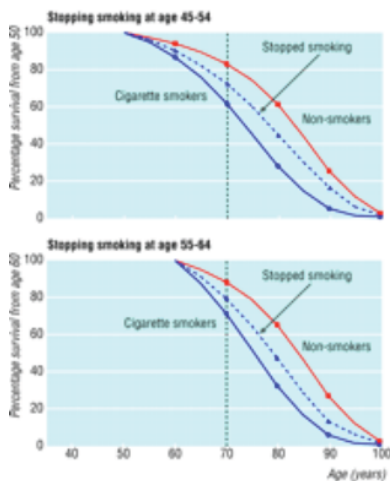Source: Doll, Peto, Boreham and Sutherland (BMJ, 2004)
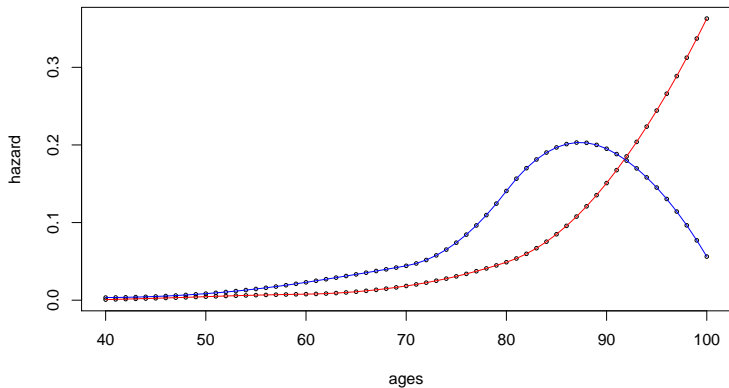
Survival Curves

Doctors born 1900-1930

Percentage survival from age 35

Non-smokers

Cigarette smokers

10 years

Age (years)

More Survival Curves

More Survival Curves

Hazard Curves

Some R Spline Magic

```
# Attempt to look at smoking treatment effect
# Source:  http://www.bmj.com/content/328/7455/1519  (Fig 3)
age <- 4:10*10
S0 <- c(99.5, 97,91,81,59,24,2)
S1 <- c(99, 94,81,58,26,4,1)
Lam0 <- splinefun(age,-log(S0))
Lam1 <- splinefun(age,-log(S1))
ages <- 40:100
lam0 <- Lam0(ages,deriv = 1)
lam1 <- Lam1(ages,deriv = 1)
pdf("smokinghazard.pdf", width = 8, height = 5)
plot(ages,lam0,cex = .5,ylab = "hazard")
points(ages,lam1, cex = .5)
lines(ages,lam0, col = "red")
lines(ages,lam1, col = "blue")
dev.off()
```

"What is already known on this topic?"

- About half of all persistent cigarette smokers are killed by their habita quarter while still in middle age (35-69 years)
- After a large increase in cigarette smoking by young people, the full effects on national mortality rates can take more than 50 years to mature
- British men born in the first few decades of the 20th century could be the first population in the world in which the full long term hazards of cigarette smoking, and the corresponding benefits of stopping, can be assessed directly

"What this study adds"

- Among the particular generation of men born around 1920, cigarette smoking tripled the age specific mortality rates
- Among British men born 1900-1909, cigarette smoking approximately doubled the age specific mortality rates in both middle and old age
- Longevity has been improving rapidly for non-smokers, but not for men who continued smoking cigarettes
- Cessation at age 50 halved the hazard; cessation at 30 avoided almost all of it
- On average, cigarette smokers die about 10 years younger than non-smokers
- Stopping at age 60, 50, 40, or 30 gains, respectively, about 3, 6, 9, or 10 years of life expectancy