

Poisson Regression with Robust Standard Errors

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The Poisson Distribution

A random variable Y is said to have a Poisson distribution with parameter λ if its probability is given by the probability mass function

$$Pr(Y = y) = \frac{e^{-\lambda} \lambda^y}{y!}$$

for $\lambda > 0$ and $y = 0, 1, 2, \dots$

The mean and variance of this distribution can be shown to be

$$E(Y) = Var(Y) = \lambda$$

Introduction to Poisson Regression?

In Poisson regression:

- Model used when the response variable, Y_i , is a count (eg. Number of vehicle accidents per year, number of visits to a website over a certain time span, etc)
- We can also have the response variable be Y/t , the rate of the event happening with t being an interval representing time, space, or some other grouping

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Robust Poisson Regression

[Placeholder Text]

Smoking and Lung Cancer Dataset

Smoking and Lung Cancer

We will be using data originally collected from a Canadian study of mortality by age and smoking status

The file containing cleaned data comes from the website of Professor German Rodriguez of Princeton University

link: <http://data.princeton.edu/wws509/datasets/smoking.raw>

Smoking and Lung Cancer Dataset

- age at start of study: coded 1 to 9 for 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80+ respectively
- smoking status: 1 = never smoked, 2 = smoked cigars or pipe only, 3 = smoked cigarettes and cigar or pipe, 4 = smoked cigarettes only
- population: number of male pensioners followed
- deaths: number of deaths in a six-year period