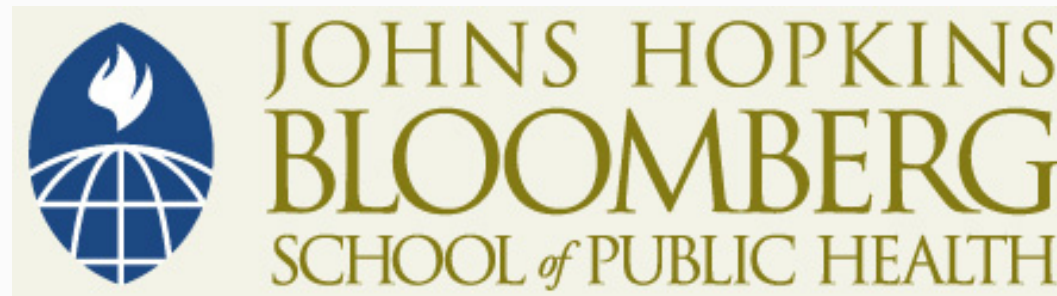


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JOHNS HOPKINS
BLOOMBERG
SCHOOL *of* PUBLIC HEALTH

Lecture 7b: Practice Problem Solutions

John McGready
Johns Hopkins University

Example: CHD and Age

1. Recall the resulting logistic regression equation based on the sample of 58 subjects, relating CHD evidence to patient's age:

$$\ln\left(\frac{p}{1-p}\right) = -6.54 + .135 \times Age$$

- Where p is the estimated probability of evidence (i.e., the estimated proportion of persons with CHD evidence) amongst persons of a given age

Example: CHD and Age

- a) What is the estimated difference in the log (ODDS of CHD) for 60 year olds compared to 55 year olds, based on this equation?
- We can actually evaluate this equation at Age = 60 and Age = 55 and take the difference:

$$\ln\left(\frac{p}{1-p}; Age = 60\right) = -6.54 + .135 \times 60$$

$$\ln\left(\frac{p}{1-p}; Age = 55\right) = -6.54 + .135 \times 55$$

Example: CHD and Age

- a) What is the estimated difference in the log (ODDS of CHD) for 60 year olds compared to 55 year olds, based on this equation?
- We can actually evaluate this equation at Age = 60 and Age = 55 and take the difference:

$$\ln\left(\frac{p}{1-p}; \text{Age} = 60\right) = -6.54 + .135 \times 60$$

$$\ln\left(\frac{p}{1-p}; \text{Age} = 55\right) = -6.54 + .135 \times 55$$

$$\ln\left(\frac{p}{1-p}; \text{Age} = 60\right) - \ln\left(\frac{p}{1-p}; \text{Age} = 55\right) = (60 - 55) \times .135 = 5 \times .135 = 0.675$$

Example: CHD and Age

b) What is the estimated odds ratio of CHD for 60 year olds compared to 55 year olds, based on this equation?

– Now to get the odds ratio, recall:

$$\ln\left(\frac{p}{1-p}; Age = 60\right) - \ln\left(\frac{p}{1-p}; Age = 55\right) = \ln\left(\frac{\frac{p}{1-p}; Age = 60}{\frac{p}{1-p}; Age = 55}\right) = \ln(OR\hat{R}) = 0.675$$

■ So, $OR\hat{R} = e^{0.675} \approx 1.96$

■ So, these results estimate that 60 year olds have roughly twice the odds of having CHD evidence compared to 55 year olds