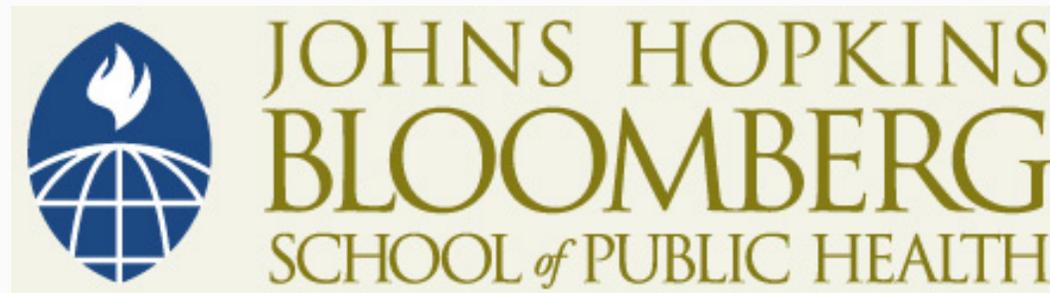


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Lecture 7c: Practice Problems

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Death in the ICU: Patients with Sepsis

1. Let's again consider the sample of 106 patients admitted to the ICU at a large U.S. hospital
 - All patients in sample had sepsis (blood infection) at time of admission to ICU; information was collected on whether a patient died while in the ICU, the patient's age at admission (range 17-94 years), and whether the patient was in shock at time of admission, and whether patient was suffering from malnutrition at time of admission
 - Now using malnutrition as the x , let's use logistic regression to relate death to malnutrition status

Death in the ICU: Patients with Sepsis

- Results from logistic regression using Stata

Variable	Estimated Coefficient	Standard Error
Malnutrition (1 = “yes”)	1.21	0.05
Constant	-1.86	0.34

- a) Using this result, estimate the odds ratio of death for patients who were malnourished (at the time of ICU admission) compared to patients who were not malnourished
- b) What is the interpretation of the intercept in the above model? Does it potentially have scientific relevance?
- c) Suppose we have coded the x as 1 if a patient was not malnourished, and 0 if the patient was malnourished; if we re-ran the logistic model what would the resulting slope and odds ratio be?

Example: Breast Feeding Status and Age

2. Recall results from logistic regression using Stata relating breast feeding status to age for the sample of Nepali children < 36 months

Variable	Estimated Coefficient	Standard Error
Age of Child (mos)	-0.25	0.04
Constant	7.43	1.04

- In the lecture, we showed that the difference in breast feeding status between two groups of children who differed by more than one unit (month) in age was additive on the log odds scale:

$$\ln(\text{Odds of bf } x_1 = 24) - \ln(\text{Odds of bf } x_1 = 18) = 6\hat{\beta}_1$$

- This same difference was multiplicative on the odds ratio scale:

$$(0.78)^6 = .78 \times .78 \times .78 \times .78 \times .78 \times .78$$

Example: Breast Feeding Status and Age

- a) What is the mathematical reason that quantities that are additive on the log scale are multiplicative when exponentiated?
- b) What is a more “intuitive” explanation of why the odds ratio for a six-month difference in age involved multiplying the odds ratio for a one-month difference in age times itself six times?