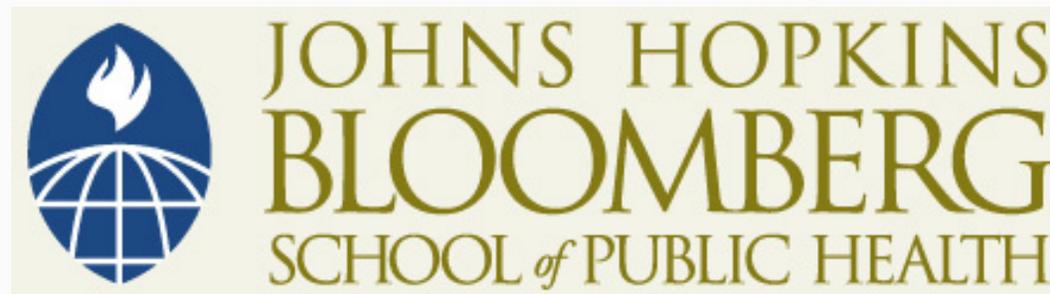




JOHNS HOPKINS
BLOOMBERG
SCHOOL of PUBLIC HEALTH

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Lecture 7d: Practice Problem Solutions

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Example: Breast Feeding Status and Age

1. Let's again consider the sample of 236 Nepali children less than three years old
 - Here is the output from the *logit* command relating breast feeding status to age (months)

```
. logit bf age_chld
```

```
Iteration 0:   log likelihood = -131.60114
Iteration 1:   log likelihood = -90.738276
Iteration 2:   log likelihood = -82.703292
Iteration 3:   log likelihood = -81.26411
Iteration 4:   log likelihood = -81.190302
Iteration 5:   log likelihood = -81.190047
```

```
Logistic regression
```

```
Number of obs   =      236
LR chi2(1)      =      100.82
Prob > chi2     =      0.0000
Pseudo R2      =      0.3831
```

```
Log likelihood = -81.190047
```

| bf | Coef. | Std. Err. | z | P> z | [95% Conf. Interval] | |
|----------|-----------|-----------|-------|-------|----------------------|-----------|
| age_chld | -.2450237 | .035756 | -6.85 | 0.000 | -.3151041 | -.1749433 |
| _cons | 7.431951 | 1.038099 | 7.16 | 0.000 | 5.397314 | 9.466588 |

Example: Breast Feeding Status and Age

1. Let's again consider the sample of 236 Nepali children less than three years old
 - Here is the output from the *logistic* command relating breast feeding status to age (months)

```
. logistic bf age_chld
```

```
Logistic regression               Number of obs   =       236
                                LR chi2(1)         =       100.82
                                Prob > chi2         =        0.0000
Log likelihood = -81.190047       Pseudo R2       =        0.3831
```

```
-----+-----
            bf | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----+-----
    age_chld |    .782686   .0279857   -6.85   0.000   .7297129   .8395047
-----+-----
```

Death in the ICU: Patients with Sepsis

- a) What do these results estimate for a comparison of the odds of being breast fed for two groups of children who differ by one year (12 months) in age, older to younger?
- Two ways (actually both are doing the same thing)
 - Start on *log odds* (slope scale); the estimated difference in the *ln odds* (i.e., *ln odds* ratio) of being breast fed for two groups of children who differ by 12 months in age will be $12 \times \hat{\beta}_1$ where $\hat{\beta}_1$ is the estimated *ln odds* ratio for being breast fed for a one-month difference in age
 - To get the odds ratio, take $e^{12 \times \hat{\beta}_1}$

$$e^{12 \times \hat{\beta}_1} = e^{12 \times -0.25} = e^{-3.0} \approx 0.05$$

Death in the ICU: Patients with Sepsis

- a) What do these results estimate for a comparison of the odds of being breast fed for two groups of children who differ by one year (12 months) in age, older to younger?
- Two ways (actually both are doing the same thing)
 - Start with odds ratio estimate of being breast fed for a one month difference in age and raise it to the 12th power

$$OR^{\hat{12}} = (0.78)^{12} \approx 0.05$$

- Both approaches are mathematically equivalent; the resulting estimate shows that older children have .05 times the odds (95% lower odds) of being breast fed as compared to younger children when the age difference is 12 months

Death in the ICU: Patients with Sepsis

- b) What is the 95% CI for the odds ratio estimated in Question A?
- Again, you could first do computations on *ln odds* (regression coefficient) scale and then exponentiate the results
 - A mathematically equivalent approach involves taking the endpoints of the 95% CI for the odds ratio of breast feeding for a one month difference in age and raising each to the 12th power
 - 95% CI for OR for one month difference: (0.73, 0.84)
 - 95% CI for OR for twelve month difference: $(0.73^{12}, 0.84^{12}) = (0.02, 0.12)$