

Lab session 8
Answers to questions

a) How is the Odds Ratio and the χ^2 statistic calculated?

OR=13/5=2.6

$\chi^2 = \{ |13-5| - 1 \}^2 / 18 = 2.72$ (with the continuity correction)

$\chi^2 = \{ |13-5| \}^2 / 18 = 3.56$ (without the continuity correction)

Notice that Stata gives the uncorrected χ^2

b) Compare with Mc Nemar's test output

The OR is the same but the confidence interval is a bit different since its calculation in the logit output is based on asymptotic approximation

c) How is the "LR chi2 (1)=35.35" statistic calculated? What is the meaning of this result?

Null model

```
. clogit casecon ,group(id)

Iteration 0:   log likelihood = -101.39459

Conditional (fixed-effects) logistic regression   Number of obs   =           315
                                                    LR chi2(0)      =           0.00
                                                    Prob > chi2     =           .
Log likelihood = -101.39459                       Pseudo R2       =           0.0000

-----+-----
casecon |      Coef.   Std. Err.      z    P>|z|      [95% Conf. Interval]
-----+-----
```

Current Model

```
. clogit casecon estrogen,group(id) nolog

Conditional (fixed-effects) logistic regression   Number of obs   =           315
                                                    LR chi2(1)     =          35.35
                                                    Prob > chi2     =           0.0000
Log likelihood = -83.72159                       Pseudo R2       =           0.1743

-----+-----
casecon |      Coef.   Std. Err.      z    P>|z|      [95% Conf. Interval]
-----+-----
estrogen |  2.073761   .4208245     4.928  0.000     1.24896   2.898561
-----+-----

. di (-101.39459+83.72159 )*(-2)
35.346
. di chiprob(1,35.346)
2.760e-09
```

d) Fill the table below. Are the effects of estrogen use more likely to be additively combined or multiplicatively with those of Gall disease?

Report of interactions

		Yes	No
Gall	Yes	OR=exp(2.700+2.894-2.052) =14.88x18.67x0.128=34.53	OR=exp(2.894)= =18.07
Disease	No	OR=exp(2.700)=14.88	1

The model suggests that the effects of estrogen use are more likely to be additively combined rather than multiplicatively with those of Gall disease. In other words, in the absence of interactions: effect of using estrogens (OR_1) and having Gall disease OR_2 : $OR_1 * OR_2$. Here is more close to $OR_1 + OR_2 = 14.88 + 18.67 = 33.66$.