HW4

JOE BREW
PHC 6711

1. You are conducting a case-control study of years of oral contraceptive use (OC) and stroke in young women. Your exposure measurement (X) is self-report of years of OC use, from an in-person interview. You want to design an ancillary study to determine if there is differential bias between cases and controls in recall of their years of OC use, by selecting a sample of cases and a sample of controls and comparing their self-reported OC use to a comparison measure.

A. What criterion must the comparison measure meet to allow an estimation of differential bias?

The comparison measure, in order to be the standard with which the self-reported consumption will be compared, will need to be some sort of biological measurement which will not be subject to the same kinds of bias as recall. In other words, it needs to be assured that the comparison measure *not* show differential measurement between the groups, except for insofar as the actually exposure is concerned.

B. Suppose the mean OC use from interview is 10.2 years for cases and 11.0 years for controls, and the mean OC use from the comparison measure (Assuming a perfect measure method) is 11.2 years for cases and 10.0 for controls. What is the bias of X in the case group, the bias of X in the control group and the amount of differential bias?

Interview = 10.2 / 11 = 0.9273
Comparison = 11.2 / 10 = 1.12

Bias in case group = 10.2 / 11.2 = 0.912
Bias in controls group = 11 / 10 = 1.1

Differential bias = 1.1 - 0.912 = 0.1893

C. Suppose oral contraceptive (OC) use increases the risk of stroke, the true odds ratio for one year of OC use is OR=1.05. Use your results from question 1b above for bias in self-report of years of OC use (X), and suppose the correlation of reported use to true use (T) is .8 in both groups. If you conduct a case-control study of stroke in young women that uses self-report, estimate the effect of measurement error in X on the observable odds ratio for one year of use. (*Hints: the comparison method in b is a perfect measurement*)

True OR = 1.05

Ratio of self-reported vs. true use in exposed = 0.912
Ratio of self-reported vs. true in controls = 1.1
Ratio to adjust OR = 0.912 / 1.1 = 0.829

The effect of measurement error in X on the observable odds ratio for one year of use will be:
(1.05 + sqrt(0.8)) - (0.829 + sqrt(0.8)) = 0.221

(I'm fairly confident that this is incorrect, but not exactly sure why)

D. Suppose your study of bias found that oral contraceptive use is overestimated by .5 years on average among both those who develop disease and those who do not and r_{TX} = .8 in both groups. Estimate the observable odds ratio for 1 years of use. (Again assume that the assumptions from class are reasonable.)

To adjust for differential overestimation interaction (0.5 times years), with a rTX of 0.8, the observable odds ratio after 1 year of use will have to be adjusted differentially. But, I'm not sure how to do this.