

Reading. Read Jewell: Chapter 16 through Section 16.3

1. Antunes CMF, et al. (*NEJM* 300:9-13,1979) studied the relationship between endometrial cancer and the use of menopausal estrogen. A woman was regarded as having used oral conjugated estrogens if she had taken them at any time before diagnosis (cases) or entry into the study (controls). Hospital controls were matched to cases on the basis of hospital, date of admission within six months, age within five years, and race. Table 1 displays the data for an unmatched analysis while Table 2 displays the data for a matched analysis.

	Table 1 <u>Estrogen Use</u>				Table 2 <u>Controls</u>		
	Yes	No			Yes	No	
Cases (CA)	55	128	183	Cases	Yes	12	43
Controls	19	164	183		No	7	121
Total	74	292	366			19	164

- a. First analyze the data ignoring the matching in the study design (Table 1). Report both the odds ratio and the chi-square statistic. What are your conclusions from this analysis?
 - b. Now analyze the data properly, taking the matching into account (Table 2). Report both the odds ratio and the chi-square statistic. What are your conclusions from this analysis?
 - c. Compute a 95% confidence interval for the odds ratio from the matched analysis. Make a statement regarding the association between the use of estrogen and endometrial cancer from this result.
 - d. In which direction is the odds ratio biased in the unmatched analysis? How could this be utilized as an argument for using the unmatched analysis? Why is this argument faulty?
2. Suppose you have three cases: (1) a female age 52, (2) a male age 61, and (3) a male age 58. You plan to perform a case-control study with these three persons and to match them by age and gender to the following control population:

Age	Males	Females
20-29	100	10
30-39	100	30
40-49	300	30
50-59	300	20
60-69	200	10
Total	1000	100

Answer the following questions using this information:

- a. What portion of the control population are possible matches for person 1 (i.e., same sex and approximate age)? Person 2? Person 3?
 - b. Assuming the population is randomly mixed, the expected number of persons you have to examine in order to obtain a match for person 1 is 90, and for person 2 is 9.5, and for person 3 is 5.5. Suppose it takes 1/4 hour to examine each person, how long will it take to match person 1? Person 2? Person 3?
 - c. What are your conclusions from this exercise?
3. A case-control study of the association between exogenous estrogens and endometrial cancer matched women on age, community of residence at time of diagnosis of the case, marital status, length of time in the community, and hysterectomy status. One analysis of these data considers age among 63 matched pairs as follows:

Age		Under 70		70 and older	
Cases	Yes	Yes	No	Yes	No
	No	2	7	2	6
		1	18	4	23
\hat{OR}		7.0		1.5	

- a. Compute a 95% confidence interval for the OR among women under age 70. Interpret this result.
 - b. Test for interaction of the odds ratios. State your hypothesis and your conclusions in the context of the problem. Show your work.
4. The following data are from a case-control study of the role of smoking on cardio vascular disease (CVD) in elderly subjects (aged 80 years and older). Given the fact that the rate of smokers decreases with older ages and that the prevalence of CVD changes with age, subjects were matched by age using two age groups (group 1: 80—89, group 2: 90 and older).
- a) The data below summarize the matched case/control study with 552 subjects matched on age

	Former or Current	Never
Cases	204	72
Controls	92	184

The MH OR is 5.67, with a chi-square 89.9 and a p-value < 0.0001 that showed evidence of a significant association between smoking and CVD. What is problematic with this analysis?

b) How many matched pairs are in the analysis?

c) Complete the table below that reports the number of matched pairs. [5pts]

	Control	
Case	Former or Current	Never
Former or Current		
Never		52

d) Compute the OR to measure the association between smoking and CVD and test whether the association is statistically significant. Use this result to discuss the conclusion of this study. BE COMPLETE