Statistics 6625 (AU16)

Homework 4

Due September 30

Chapter 11:

11.4: "Return to the data of Problem 10.8." (page 317)

11.7: "Suppose that a candidate gene case-control study ..." (page 317)

Note: In 11.7.4 , ignore χ^2-het in the solution.

Extra Problems:

1. A study investigated interaction between BRCA1 gene and Oral Contraceptive (OC) use before first full-term pregnancy. The following table classifies breast cancer cases by carriers/non-carriers of BRCA1 mutation and OC use (> 48 months or ≤ 48 months). [More details about the study can be found in Thomas (2004)]

		BRCA1 Mutation	
		Carriers	Non-Carriers
OC use	> 48	7	7
	≤ 48	7	26

   Is there an interaction between BRCA1 gene and OC use? Carry out appropriate test and calculate OR and its 95% confidence interval. Interpret the results. What is an important assumption for the validity of this test? Can that assumption be violated in some way? (Hint: Think about those women who have positive family history, i.e., have relatives known to be mutation carriers)

2. Suppose 1 million SNPs are to be tested for association with a disease under study. Using Bonferroni correction, what point-wise significance level should be used to achieve FWER of 0.05? Why is this correction too conservative, especially in the context of genetic association studies? What is the premise and logic behind the permutation test?