6: Intro to NHST

Review Questions

1. Beside estimation, what's the other main form of statistical inference?
2. Define "*P* value."
3. What question does the *P* value answer?
4. In generic terms, what does the null hypothesis state?
5. In generic terms what does the alternative hypothesis state?
6. Which hypothesis is initially considered to be true?
7. The evidence against the null hypothesis gets stronger and stronger as the *P* value _____.
8. True or false? A *P* value of .05 indicates the null hypothesis has only a 5% chance of being true.
9. True or false? A non-significant difference means there is a no difference between groups.
10. True or false? A statistically significant difference means there is a clinically important different between groups.
11. True or false? One study shows a statistically significant increase while another shows a statistically significant decrease. The results from these studies are therefore conflicting.

Exercises

6.1 Breast cancer revisited. A researcher proposes that a particular population has a lifetime incidence of breast cancer rate that exceeds the expected rate. The expected lifetime incidence of female breast cancer was 1 in 10 (see Exercise 4.2 (initially mislabeled as 3.2). To test his hypothesis, the researcher selects a simple random sample (SRS) of n = 21 from the suspect population.

(A) Convert the researcher's question into a *null hypothesis*. Using proper statistical notation.
(B) Under the null hypothesis, the number of breast cancer cases any given SRS is X~b(21, .1). You calculated this pmf in Exercise 4.2 (shown below). Then calculate the *P* value associated with seeing 3 cases in a given sample. [Note: *P* value = (data or data more extreme | Ho true) = Pr(X ≥ 3).]
(C) What would the *P* value be if we found 4 cases in the SRS?
(D) How many cases would you want to see before you would be surprised enough to say the number of cases is significantly greater than expected?

Part of the pmf X~b(21, .1) as calculated in Exercise 4.2.		
x	Pr(X = x)	Pr(X ≤ x)
0	0.1094	0.1094
1	0.2553	0.3647
2	0.2837	0.6484
3	0.1996	0.8480
4	0.0998	0.9478
5	0.0377	0.9856
6	0.0112	0.9967
7	0.0027	0.9994
8	0.0005	0.9999
etc….		
21	0.0000	1.0000