**ISF 110, Lab 7 – Hypothesis testing using *z*-test, *t*-test, and chi-sq test**

***Test 1. z-test***

A common perception about COVID-19 is that Warm Climate is more resistant to the coronavirus outbreak and we need to verify this using Hypothesis Testing. So, what will our null and alternate hypothesis be?

* Null Hypothesis: … … …?
* Alternate Hypothesis: … … … ?

We are considering annual average temperature below 24 as Cold Climate and above 24 as Hot Climate in our dataset (phdi\_covid\_temp\_vita.dta on *bCourses*). Summarize total cases and temperature, and create a categorical variable for temperature. Then, use the following command to do a z-test:

*ztest total\_cases, by(temp\_cat)*.

Interpret the results. Is your hypothesis supported? What are some limitations of the results?

***Test 2. t-test***

This t-test is designed to compare the means of the same variable between two groups. Using the “high school and beyond” dataset (*use https://stats.idre.ucla.edu/stat/stata/notes/hsb2, clear*), we will test the following hypothesis:

“Female high school students do significantly better than male high school students on writing tests.”

In the dataset, the students were randomly selected from a larger population of high school students. Although the sample size is larger than 30, we assume that variances for the two populations are the same. Perform the *t*-test using the following command and interpret your results:

*ttest write, by(female)*.

***Test 3. chi-sq test***

The following data (*The Journal of Advertising*, 1983, p. 34-42) are from a cross-sectional study that involved soliciting opinions on anti-smoking advertisements. Each subject was asked whether they smoked and their reaction (on a five-point ordinal scale) to the ad. The data are summarized as a two-way table of counts, given below:

Table

Description automatically generated

Is there any statistically significant correlation between the respondents being a smoker and their opinions about the anti-smoking ads? To answer this question, perform a chi-square test using the following command:

*tabi [row1 observations] \ [row2 observations], chi2*

Interpret the results.

Post all your tables and interpretations on *bCourses*.

\*End of Lab7\*