1 Question 01

You decide to study a recent outbreak of **Flu-X**, a super-flu plaguing Lehigh University students. The Flu-X virus is quite infectious, and when it infects its victims they exhibit a curious symptom—they uncontrollably study statistics!

The first step in your study is to estimate the proportion of students infected with **Flu-X**.

(A)

What is the **population** under study?

To estimate the proportion of students infected with Flu-X, now uncontrollably studying statistics, you decide to select 100 names from the student registry at Lehigh University. You plan to observe each student and record: their major, their expected year of graduation, whether they are uncontrollably studying statistics.

(B)

What is another name for the 100 students you've selected to study?

(C)

Is randomly sampling 100 students **representative** of the population? Why or why not?

(D)

What if instead of randomly selecting and observing the 100 sampled students, you decided to send a University wide email asking students to reply with their major, expected year if graduation,

and whether they cannot stop studying statistics. Could asking students to reply to your email introduce any biases?

(E)

What are the **observational units** in the above estimation project?

(F)

Please name one **variable** that is collected

(G)

Is the above study an **observational study** or an **experimental study**? Why?

2 Question 02

Can the number of observations in a sample be larger than the number of observation in the population of interest? Why or why not?

3 Question 03

After sampling 100 students you find more than 80% are infected with Flu-X. Students all around you on campus are uncontrollably studying statistics! There is a shortage of calculators, students

are babbling about statistical distributions and computing averages. Only you can stop this outbreak! Time to experiment.

After intense laboratory experiments it appears a cure may be at hand—pizza. To confirm your scientific breakthrough you decide to run an experimental study that enrolls students infected with Flu-X. With a probability of 1/2 you assign students to eat pizza versus not eat pizza.

(A)

What is it called when you assign observations to different groups (eating versus not eating pizza)?

(B)

Are there any potential advantages to enrolling and assigning students infected with Flu-X versus an observational study that records student symptoms at a local pizzeria?

4 Question 04

Friends of yours, statisticians not yet infected with Flu-X, and yourself meet to discuss data that was collected on campus. When everyone pools together their data you find we have several variables.

Please classify the following variables as numerical continuous, numerical discrete, categorical ordinal, and categorical nominal.

1. Student's age
2. Whether they have do or do not have Flu-X symptoms
3. Study's body temperature (elevated temperature is a sign of Flu-X)
4. Whether the student is a freshman, sophomore, junior, or senior.