

1. A resident of Harrisburg was driving home late one night and noticed several homeless people who appeared to be setting up to sleep outdoors on a very cold night. She called local shelters and discovered that several of them had room for many more clients overnight. She decides that she and her roommate need to try to discover why the homeless people she saw were not taking advantage of the warm beds nearby. This question will consider this setting.

- (a) She decides to go out with her roommate and some friends and ask several short, simple questions to any homeless person that they find on the street the next evening/night to find out why they are not planning to sleep indoors. Would the group of homeless people that she talks to be considered a sample or a population? Why?

A sample, because she is very unlikely to talk to all homeless people in Harrisburg.

- (b) If the goal of the study that has been described is simply to get a picture of what reasons the homeless have for not using shelters and some basic demographics about the homeless population of this area, which branch of statistics will they primarily be using? (Explain why in one sentence.)

Descriptive Statistics, which just summarizes data and creates graphs. (Inference would imply drawing conclusions.)

2. One of the arguments made in favor of the death penalty is that it is an effective deterrent that discourages future criminals from committing the same crimes as the individual who is sentenced to death. For this quiz, suppose that a study is commissioned to study whether this claim is accurate. Since this is a commonly used argument, we will assume that the argument is true for the purpose of the discussion to follow.

- (a) In this setting, what would be the null hypothesis?

The death penalty is an effective deterrent.

- (b) What would be the alternative hypothesis?

The death penalty is not an effective deterrent.

- (c) Describe in plain English what a Type I Error would entail here, and what the consequences would be.

We decide that the death penalty is not an effective deterrent, but it actually is.

We stop using the death penalty and crime increases. (or we continue to not use it and we could have reduced crime.)

- (d) Describe in plain English what a Type II Error would entail here, and the consequences.

We decide that the death penalty might be an effective deterrent, but it actually is not.

We keep using the death penalty, but it doesn't deter crime. (or we consider using the death penalty and execute people we otherwise wouldn't have, but it doesn't deter crime.)

- (e) In light of your work here, which choice would you consider to have the more serious risks? Briefly explain your reasoning.

Ethics would point to a Type II error being worse. A Type I error could result in more crime. (Either is acceptable, but your answer should pick and defend one of them.)