



1 point

1. Suppose it is your job to monitor the water quality at the local beach and to determine whether it contains high levels of certain bacteria. If there were high levels of bacteria the water may not be safe to swim in. However, the beach is very large and it is not possible to monitor the entire swimmable area of the beach.

One day you go down to the beach and collect water samples from 10 randomly selected areas. You estimate that the average level of bacteria is 10 parts per million. On the same day, a colleague of yours conducts an independent data collection and collects her own 10 samples from the same general area. She estimates the level of bacteria to be 12 parts per million.

What could be considered the population in this scenario?

- ☐ All of the water in the ocean.
- ☐ The water at all of the beaches in the world.
- ☐ The water contained in the 20 samples collected.
- ☒ All of the swimmable water around the beach.

1 point

2. [Continued from the previous question]

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What parameter are you and your colleague both trying to estimate?

- ☐ The average concentration of bacteria in the 20 samples.
- ☐ The average concentration of bacteria at a different beach.
- ☒ The average concentration of bacteria in the population.

1 point

3. [Continued from the previous question]

Suppose it is your job to monitor the water quality at the local beach and to determine whether it contains high levels of certain bacteria. If there were high levels of bacteria the water may not be safe to swim in. However, the beach is very large and it is not possible to monitor the entire swimmable area of the beach.

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What would be a likely explanation of the different estimates obtained by you and your colleague?

- ☐ Selection bias.
- ☒ Sampling variability. You and your colleague collected water samples from different areas of the beach.
- ☐ Incorrect model specification.

1 point

4. A Dean at a local university is concerned that male and female faculty in her school are not being paid equally for holding the same rank of professor. She assembles a dataset of the salaries for all of the faculty in her school and asks you to analyze the data to see if there is a difference in salaries that can be explained by gender after controlling for various differences between faculty.

What type of analysis needed to address this question?

- ☒ An associational analysis
- ☐ A predictive analysis

1 point

5. A Dean at a local university is concerned that male and female faculty in her school are not being paid equally for holding the same rank of professor. She assembles a dataset of the salaries for all of the faculty in her school and asks you to analyze the data to see if there is a difference in salaries that can be explained by gender after controlling for various differences between faculty.

What is the population in this analysis?

- ☐ All of the faculty at a different school.
- ☒ All of the faculty in this particular school, which is equal to the dataset.
- ☐ The faculty at all schools that are similar to this one.

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