Challenges of Sampling  
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In the United States, food safety is considered to be everybody’s responsibility. From farm to table, everyone involved with the production, manufacture or consumption of food tries to keep food safe. Large outbreaks of *E. coli* O157:H7 are often traced back to producers, with disastrous financial results. The producers are therefore very interested in keeping contaminated beef from entering or leaving their plants.

One challenge the producers face is sampling. Even if *E. coli* O157:H7 is in a particular lot, it may not be evenly distributed. Also, the infectious dose of *E. coli* O157:H7 is very low, so even a small number of organisms slipping through quality control could cause a big problem for the producer. Currently, the only way to be 100% sure that the product is safe is to test 100% of the product – leaving nothing to sell.

In this lab you will explore the challenges faced by the producers, and try to develop an effective sampling protocol.

**Procedure:**

1. Obtain 10 containers. Each container represents one lot of beef. The ground beef is represented by Fruit Loops®. Some containers may be contaminated with plain, white Cheerios®, representing *E. coli* O157:H7.

2. Working with your lab group, devise a sampling plan. You may decide to sample a small amount from each lot, or sample a larger amount from selected lots. You can try out different strategies to see which one you prefer. Remember, any sample that is taken cannot be sold, and speed is critical.

3. When everyone is ready each group will put together a set of 10 containers. Fill the containers with Fruit Loops®. Add up to 10 Cheerios® in one or two containers.

4. When the teacher instructs you to do so, trade containers with another group in the class. You will be given a short time to do quality control on your 10 lots of beef. Your job will be to determine which, if any, of the lots are contaminated.
Questions:

1. Draw a flow chart of your preferred sampling plan.

2. Does your preferred sampling plan change when the nature of the contamination is different – i.e. if every lot is contaminated or if only an occasional lot is contaminated? Why or why not?

3. How does the sampling done in this lab compare to the sampling of ground beef to test for *E. coli* O157:H7? (Why is “real life” sampling more challenging?)
ASSESSMENT
Choose one of the following:

A. You are a legal assistant working for the firm of Lawyers R’ Us (LRU). Your firm is representing a family whose child became ill after eating an improperly cooked hamburger. LRU is suing Super Beef USA, Inc., the plant at which the hamburger was produced. They want to argue that Super Beef was negligent, and should have known that there was a problem with the meat. You have been asked to prepare a three-section report on E. coli testing in beef: Section 1 is a summary of the main issues in pathogen sampling. In section two, aspects of sampling that your firm could use to their advantage to prove that Super Beef was negligent is outlined. Section three outlines sampling issues that Super Beef could use in their own defense.

B. You are the manager in charge of quality control for Super Beef USA, inc., one of the nations largest ground beef producers. You are being sued by Lawyers R’ Us in connection with a foodborne outbreak associated with your ground beef. The company lawyers have requested a detailed explanation of how your department tests for E. coli, and a justification of why you have chosen those methods.

NOTE: All assessment writings will be judged by the following criteria:

- Uses appropriate concepts correctly
- Uses appropriate vocabulary
- Writing is organized and focused
- Writing is thoughtful
- Appropriate information is used to support concept
- Language mechanics are correct, and in the proper style
- References, if needed, are properly made
- Writing is neat and presentable