

Name _____ Date _____ Sec: _____

Worksheet—ID Case Study 4: Does antibiotic use on farms contribute to resistant infections in humans?

Learning Objectives. At the end of today's lesson, you will be able to:

- Draw a picture to illustrate the effect of antibiotics on a population of bacteria.
 - Distinguish between antibiotic resistance and an antibiotic-resistant infection.
 - Analyze and make predictions using data on antibiotic resistance.
 - Develop a model to explain how human antibiotic resistant infections may be linked to antibiotic use on animal production farms.
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Discussion: Understanding the evolution of antibiotic resistance

1) Describe or draw a picture to explain how a population of bacterial cells develops resistance to an antibiotic.

Activity: Developing a model to link antibiotic use on farms with human infections.

2) The amount of antibiotics used on meat producing farms in the U.S. is much greater than that prescribed for human infection. What might you predict about the bacteria isolated from those farm animals?

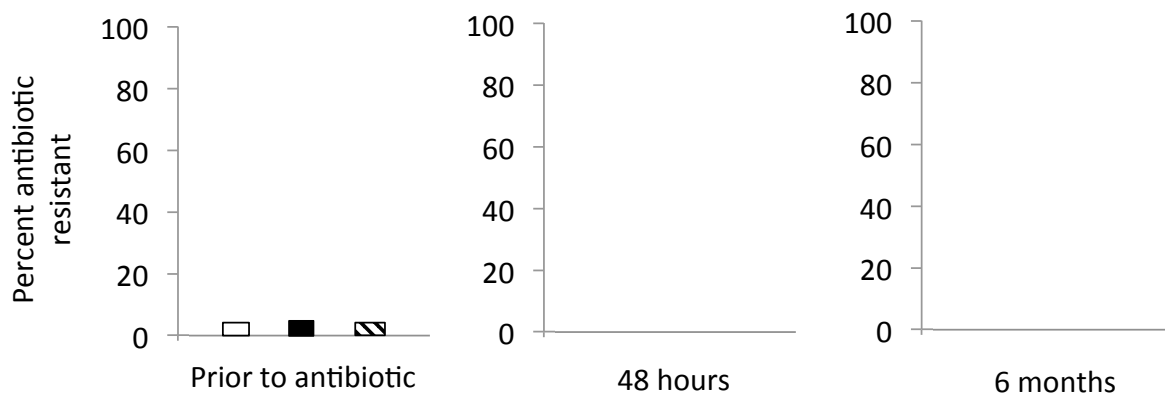
3) Researchers sampled the intestinal microbes present in feces of healthy chickens on farms that did or did not use antibiotics in the daily feed. Analyze the data in the table. Do they support your prediction? Explain.

Farm type	Number of antibiotic-resistant samples	Total number of samples tested	Percent resistant
Conventional (antibiotics (Ab) used)	10	13	77%
Organic (no antibiotics)	0	16	0%

In a revolutionary study in 1976, scientists ran an experiment on a farm in western Massachusetts. Prior to the start of the study, fecal samples of family members, chickens and neighbors were tested for the presence of antibiotic-resistant microbes. The result is shown in the graph on the left. Then, the chickens were given a low dose of antibiotic in their daily feed.

4) Predict the results of the stool sampling 48 hours and 6 months after start of antibiotic feeding. Draw the expected result as bars on the graphs.

- ☐ chickens
- ☒ farm family
- ☒ neighbors



5) Does having antibiotic-resistant bacteria on your skin or in your intestinal tract make you sick? Explain.

6) Choose the best answer

A) Humans can become resistant to antibiotics

B) Humans can get infected with bacteria that are resistant to antibiotics

C) Both are true

D) Neither is true.

7) Provide a model to explain how a deadly Salmonella strain (in the background reading) became resistant to the antibiotic ciprofloxacin?