“Case Study: How Do Bacteria Become Resistant?”

Answer Key

1. Based on the graph, make an inference about where the "community acquired" penicillin resistant S. aureus originated from. hospitals

2. Why did methicillin resistance lag behind penicillin resistance? Based on the trend seen with penicillin, what would you expect to see happen with methicillin?

methicillin wasn't used until penicillin stopped working, eventually, bacteria will also become resistant to methicillin

3. What methods would hospitals employ to eliminate MRSA from their facilities? sterilizing surfaces and equipment

4. What is a "strain" of bacteria? How is it possible that some strains of *Staphylococcus aureus* can be harmless, but others can be deadly? *(You may need to google this.)*

a strain is like a different species, they have different genetics and may not all be resistant to antibiotics

5. A young scientist suggests that a chemical found on the skin of frogs can be used as an antibiotic. Explain how the Kirby-Bauer disk technique could be used to support this hypothesis.

Place the chemical on disks and grow bacteria on agar plates, if the bacteria does not grow near the disks that would suggest the chemical is an antibiotic

6. Consider the data gathered from the frog-skin experiment. What conclusion would you draw from the data?

the frog skin is an antibiotic, but it is not as effective penicillin or amoxicillin

7. The following table identifies the sample sources. Which sample contains MRSA? How do you know?

Sample 4, the disks did not inhibit the growth of bacteria except in the VA section

8. Sample 2 was taken from a nasal swab of a family member who has been having sinus infections. What course of antibiotics would you recommend?

Vancomycin

9. What recommendations would you make to Madeline's family and the hospital where Madeline was delivered. Your recommendations should include evidence-based reasoning and details from the case to support your position.

Answers vary, though any answer should include a statement that it is likely that Madeline contracted MRSA from the delivery room, since sample 4 shows that the surface does have MRSA. The hospital is liable.