

# A Case Study Involving Influenza and the Influenza Vaccine

by

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## Part I—Flu and “Flu”

Karen and Mary work at a grocery store. Mary is a nursing student and works part time to pay for her living expenses. Karen has worked at the grocery for nearly 30 years, since she was 22. The two of them are talking when Karen points to one of the tabloids by the check-out with a headline suggesting that aliens created the bird flu. As their conversation progresses, Mary suggests that Karen should get a shot when the nurses come in next week selling influenza vaccine.

*Karen:* No way am I going to waste 15 bucks on another flu shot. I got one last year and I still got sick. Do you remember that horrible sinus infection I had? I was so sick that I missed the Packer’s game at Lambeau Field. I had to watch the game at Tom’s house because he was having a party. I could barely breathe!

*Mary:* I remember that you were sick last year, but that wasn’t influenza. The influenza virus causes fever, aches and malaise.

*Karen:* What’s malaise?

*Mary:* That’s when you feel sick.

*Karen:* Well duh, I already told you I was sick.

*Mary:* But you went to the party to watch the game.

*Karen:* I was sick, I wasn’t dead.

*Mary:* Look, if you had had influenza you wouldn’t have gone out to a party. In fact, you probably wouldn’t even have cared to watch the game on tv at home. Malaise is the very sick and weak feeling that comes with having influenza, and it takes all of your energy away and leaves you with no desire to do anything but lie still. That’s influenza!

*Karen:* Well, anyway, Tom also got the flu shot and he still got the stomach flu real bad a couple weeks later. You can’t tell me that the flu shot did him any good.

*Mary:* I can’t argue with that. You’re right. The influenza vaccine didn’t protect him from the stomach flu.

*Karen:* There! So you admit it!

*Mary:* I don’t admit anything. What you call the stomach flu has nothing to do with the flu shot. The shot is a vaccination that protects against influenza, not vomiting and diarrhea. Some people do get

those symptoms, but influenza is the fever and aches. The stomach flu is caused by other viruses like rotavirus and Norwalk virus; sometimes they're called noroviruses. The influenza vaccine doesn't do anything about those.

*Karen:* If it doesn't stop you from getting the stomach flu, then what good is the vaccine? And another of my friends says that there are a lot of side effects from getting the flu shot, like allergic reactions, seizures, even autism.

*"That ought to do it,"* Karen thought to herself. She wasn't about to lose this argument to a kid of Mary's age.

### **Questions**

1. What are the main symptoms of influenza?
2. Would you expect a flu shot to protect against the "stomach flu"? Why or why not?
3. Identify some of the various causative agents of "stomach flu" and compare them to the influenza virus.
4. Explain how a vaccine provides immunity against infection. Are there any side effects to the influenza vaccine? Should Karen or Mary worry about developing autism?
5. Karen described the upper respiratory infection (URI) that she suffered last year and thinks that her well being is a matter of fate. How many infectious agents cause URI? How can these infections be prevented? How can they be treated?

## Part II—Shift and Drift

Mary didn't take the bait; instead of countering Karen's worries about side effects, she chose a different approach.

*Mary:* Influenza can wipe you out for a week. You won't have the strength to come to work and you would have to take vacation time. Who would take care of your mother at the retirement home if you were sick for a week?

*Karen:* Oh, come on. A week!?

*Mary:* The virus can make a person so tired, that once the fever is gone they still won't have the strength and energy to do anything productive for nearly a week. You'd even have difficulty finding the strength to visit your mother for another week.

*Karen:* Oh my gosh. That would be bad. I guess I remember being that sick about seven or eight years ago. Back then, my mother came over to help me. She wouldn't be able to do that any more.

*Mary:* So, now do you think you want to get the shot?

*Karen:* Not so fast; if I got the shot last year, won't I be immune this year?

*Mary:* The virus changes all the time. The vaccine might protect against the strain of virus that is circulating in the area, but then again, it might not. The new version of the influenza vaccine is designed to protect against the most frequently recognized strains of influenza.

Karen was starting to realize that influenza might really be a different kind of infection than she had thought.

### Questions

1. Is it a reasonable gamble for Karen to skip the influenza vaccine this year?
2. What is antigenic drift (or genetic drift)? What is antigenic shift (or genetic shift)?

## Part III—Viral vs. Bacterial Infection

Karen was still unconvinced, however Mary had brought up a lot of good points. But even if influenza was a lot more serious than she had thought, a vaccination wasn't a guarantee against illness.

*Karen:* So, are you telling me that I could get the shot again and still not be protected, because I got sick from some other strain? Then why bother?

*Mary:* Sure, but the vaccine protects against the most likely viruses. You could still get influenza, but the chances are smaller. You could get the stomach flu, you could get another sinus infection. But by getting the influenza vaccine, you are greatly decreasing your chance of getting very sick this winter.

*Karen:* Last year when I got sick, I ended up going to the doctor and he gave me some antibiotics. I got better the next day. I could just do that. That way, I only take medicine when I am sick instead of every winter.

*Mary:* Sorry, but there's a big difference between viral and bacterial infections. The antibiotics helped you feel better because your sinus infection was caused by a bacteria. Antibiotics don't help at all for viral infections. And influenza is a viral infection. Even if the doctor gives you antibiotics, they won't do any good.

### Questions

1. Can Karen rely on antibiotics if she gets influenza this year? Why or why not?
2. Compare the effectiveness of vaccines to antibiotics (or other antimicrobials) prior to infection. Compare the effectiveness of vaccines to antibiotics (or other antimicrobials) after the start of symptoms.
3. When are antibiotics effective?

## Part IV—Who Should Get Vaccinated?

Karen was still tempted to take the risk; she was generally healthy.

*Mary:* Besides, if you get the shot, and protect yourself from infection, you won't spread the virus to other people. Consider this; if you became infected, you could spread the virus to your mother and her friends at the retirement home.

*Karen:* Oh, I would hate to see that happen.

*Mary:* Did you know that approximately 36,000 people die each year in this country from influenza? That means influenza causes more deaths than breast cancer, and most of the people who die of influenza are elderly.

*Karen (sobered by the possibility):* So, if I get the shot, I probably won't get sick, but more importantly, I am less likely to pass the infection on to my mom?

If that were the case, then Karen thought it might be worth doing, despite her lingering doubts. On the other hand, she was deathly afraid of needles. If only there was another way to get a flu vaccine ....

### Questions

1. Should Karen's mother get an influenza shot, or is she too old?
2. What about Karen's sister who works in a daycare center or Mary's six month old niece?

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