

# Career *of the* Month

September 2005

Science in the Workplace

## Foodborne Disease Epidemiologist

We are often warned about risks of well-known foodborne bacteria, such as *Salmonella* and *E. coli*. But did you know that these infections are just two of more than 250 different identified foodborne diseases? The Centers for Disease Control and Prevention (CDC) estimates that 76 million cases of foodborne illness occur in the U.S. each year; 5,000 are fatal. Most of these illnesses are caused by a variety of bacteria, viruses, and parasites and the remaining are poisonings triggered by harmful toxins or chemicals. To Jack Guzewich, a foodborne disease epidemiologist with the Food and Drug Administration's (FDA) Center for Food Safety and Applied Nutrition, every outbreak is a new mystery. The mysteries unravel as Guzewich discovers how foods become contaminated and works to prevent similar outbreaks in the future.

### What led you to this field?

I had no idea such a career even existed when I was in high school or college. I learned about food epidemiology—the causes, distribution, and control of foodborne disease in populations—after I received formal training in my first job as a sanitarian with the New York State Health Department. I like solving puzzles, and every report of a foodborne illness is a new challenge. Piecing together these puzzles requires knowledge and support from a number of disciplines, including epidemiology, microbiology, chemistry, and environmental health.

### Describe your job.

I coordinate the work being done by state and local health departments, the CDC, and FDA field staff to assure

the best possible investigation and a rapid response to foodborne illness outbreaks. A typical day for a field staff food epidemiologist is different than my job. Field staff receive illness and outbreak reports, conduct investigations, and interpret the findings. Investigations can last from a few days to weeks if they are local in nature. If contamination sources come from other states or countries, federal agencies then get involved and investigations can last from weeks to months.

Essentially, investigations involve determining how food was prepared and interviewing people—both healthy and sick—exposed to the suspected food. There is no one syndrome that constitutes foodborne illness—the different diseases have an assortment of symptoms. However, because the microbe or toxin enters the body through the gastrointestinal tract, the first indications of foodborne illness are often nausea, vomiting, abdominal cramps, and diarrhea. A field epidemiologist must know which agents make people sick in order to obtain proper clinical specimens for laboratory tests. Biostatistics are then used to identify which foods are likely culprits in connection with the illness. Based on the findings, actions to prevent future illnesses are carried out.

Programs that maintain foodborne illness statistics include FoodNet—an active, population-based surveillance system of laboratory-diagnosed illnesses in 10 states—and PulseNet, which works at the DNA level. FoodNet quantifies and monitors the incidence of infections caused by enteric pathogens transmitted commonly through food. PulseNet uses pulsed-field gel electrophoresis (PFGE) to distinguish strains of disease-causing agents, such as *E. coli* or *Salmonella*. PFGE

produces DNA fingerprints of these agents, which are submitted electronically to a dynamic database for rapid comparison to related cases of illness and contaminated foods.

### Advice for students?

A precollege science and math course track provides a good foundation. Students should contact a food epidemiologist at their local health department and question that individual about investigations conducted in the past. Students may even be invited to observe or participate in an investigation, which can be good exposure to this and other interesting public health careers.

The minimum educational background required is a bachelor's degree. As undergraduates, students should major in biological sciences or environmental health and build strong skills in biostatistics. Students should plan to go on for a master's degree, or even a doctorate, in public health with plenty of elective epidemiology courses.

—By Megan Sullivan

### Bonus Points Education:

- ◆ Associate of Arts in biology lab technology, B.S. in biology, Master of Public Health in environmental health

### On the web:

- ◆ FDA's Center for Food Safety and Applied Nutrition ([www.cfsan.fda.gov](http://www.cfsan.fda.gov))
- ◆ CDC's National Center for Infectious Diseases ([www.cdc.gov/ncidod/diseases/food/index.htm](http://www.cdc.gov/ncidod/diseases/food/index.htm))

### Related careers:

- ◆ Physician, nurse, sanitarian, microbiologist, laboratory technician, dietitian, veterinarian, food technologist