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What Does An Epidemiologist Do?

By: Kelly E. Kline, MPH

When I tell people my job is an **epidemiologist**, they often ask my favorite question: "What does an epidemiologist do?"

There are many different answers, but the simplest one is that an epidemiologist is a type of scientist who studies disease in different populations. In other words, epidemiologists want to know who gets sick and why. Epidemiologists work as disease detectives who study patterns to solve mysteries. When there is an **outbreak**, epidemiologists gather clues to help find the cause of the disease. Sometimes clues are medical tests, like testing someone's skin for bacteria. Other times, clues are **risk factors** like spending time with people who were sick or eating something that wasn't fully cooked. Epidemiologists work with doctors and laboratory workers to help find these clues.

All of this work is part of **public health**. Public health workers cooperate with doctors and nurses, but their jobs are different in some ways. Doctors and nurses usually treat people when they're sick. Public health workers, on the other hand, try to prevent people from becoming sick. There are many important jobs in public health besides epidemiology. Some of them include laboratory workers, environmental scientists, health educators, food service inspectors, and computer experts, just to name a few!



One of my favorite things about working in public health is that I get to do something different every day that allows me to use different skills from different fields. For example, I use science when I study how diseases like Ebola, influenza, and measles move from one person to another. I also use mathematics because I use numbers to understand how common a disease is or who is at risk of getting the disease. I work in speech and writing when I share my work through presentations and reports. All of this work requires me to cooperate with many different people every day.

To become an epidemiologist, I studied **infectious disease** epidemiology at the Yale School of Public Health. While I was there, I also worked as a researcher. I interviewed people who were sick with diseases from food. I asked them to tell me about their symptoms, activities they had done, and foods they had eaten before becoming sick. Then my team used our disease detective skills to decide which foods or restaurants needed to be investigated.

Now I work at the Pennsylvania Department of Health, where I work on different projects as a CDC/CSTE fellow. Some of my work has included interviewing people



Ask The Expert!

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Your questions will be featured in the upcoming newsletters with answers from our collaborators.

during an outbreak, collecting water samples to test for bacteria, analyzing **surveillance** data to see if more people are getting sick, and evaluating how well our team prevents diseases and protects the public.

I didn't always know I wanted to be an epidemiologist, but I've always liked science, working with people, and solving mysteries! Along the way, I've had many teachers encourage me to pursue epidemiology. It's very exciting to work in public health; no two days are ever the same!

Fun Links:

Try your hand at being a disease detective by playing the game Outbreak at [WatersEdge](#).

Check out [this website](#) full of stories and pictures about one of my biggest inspirations, John Snow. In 1854, John Snow traced the cause of an outbreak to a water pump in London and removed the pump handle. In doing this, he prevented many deaths and founded the discipline we call epidemiology!

Vocabulary:

Epidemiologist—a person who studies how disease spreads and how it can be controlled
Outbreak—a sudden increase of a disease in a population

Risk factor—something that makes a person more likely to get a particular disease or condition

Public health—the health of people in general

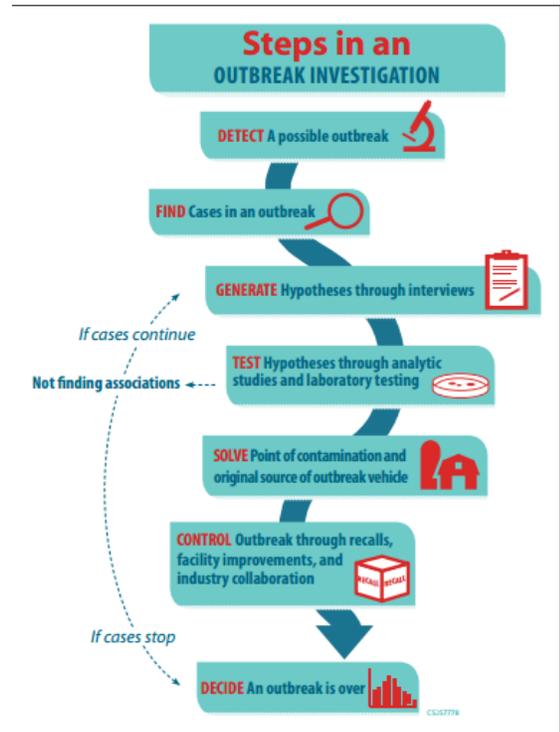
Infectious disease—a disease caused by an organism, such as bacteria, viruses, fungi, or parasites

Surveillance—collecting, counting, and analyzing health data on a regular, ongoing basis

Using Epidemiology Skills To Investigate A Disease Outbreak

Why is it important to investigate disease outbreaks? This question has many answers. For example, it is important that we find the source of the outbreak and find ways to eliminate the risk of another outbreak in the future. This can be used to discover more information about the disease or even discover a new disease, and is used to ensure the safety of the public. Being an epidemiologist, or disease detective, is not only interesting, it can save lives.

The Centers for Disease Control and Prevention (CDC) chart to the right shows the steps to follow when investigating an outbreak. An outbreak investigation can take many forms. It can be large involving hundreds of people or very small with only a few people affected. Unfortunately, we never know when a small outbreak can snowball into a situation that is much wider reaching.



We will go through the steps of a small, but important investigation from an example found on the CDC website.

In early 2009, two fatal meningitis cases happened at Fort Leonard Wood, Missouri, which is an Army training base. The severity of a disease impacts the response of an investigation. With both initial cases being fatal, it was important for epidemiologists to quickly find the source and prevent future cases. The two individuals belonged to the Alpha Company, which consisted of 303 individuals, all who were now potentially at risk.

There were many factors to consider at the start of the investigation, such as the number of individuals at Ford Leonard Wood, vaccination requirements, and the housing and training separated by the different Companies. Just like police detectives gather evidence while investigating a crime, epidemiologists gathered and reviewed evidence to learn about this outbreak. This included collecting data on symptoms and reviewing past medical history, such as laboratory testing, exam findings, and recent treatments that were received by all individuals at Fort Leonard Wood. Just like detectives review case files, epidemiologists reviewed medical records from the base and civilian hospitals.

Between February 1 and February 21, 2009, epidemiologists interviewed all individuals at the Alpha Company and collected nasal and throat swabs from certain individuals. They also collected demographic information and details about their illnesses including symptoms, health care use, flu vaccine status, and treatment with antibiotics. They then created a database with the information to determine characteristics associated with meningitis.

Fortunately, this outbreak was limited; the two deaths that initiated the investigation were the only cases of meningitis that were reported. However, 72 pneumonia cases were also identified. Epidemiologists were able to rule out several risk factors that were **not** associated with getting sick, such as taking antibiotics, living with more than four persons per room, smoking, having one or more symptoms of illness, and living on a particular floor in the housing units.

To prevent future outbreaks from occurring, several steps were taken including vaccinations of individuals at the base and education regarding adherence to hand hygiene practices. This is a great example of a timely response to an outbreak at a military facility.

For more information on outbreak investigation see the links below:

[The Importance of Epidemiology](#) (The example above)

[An Introduction to Applied Epidemiology and Biostatistics](#)

[AMD in Action: Tracing Connections in an HIV-1 Outbreak in Indiana](#)

[Epidemiologic Case Studies](#)

[Disease Detectives Event](#)

Looking ahead...

- Kick-off of 2016 Get Smart Kids' Art Competition will be in the April edition. Check it out for details!

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