How does someone with a Ph.D. in philosophy end up as an epidemiologist?

I've had an interest in both science and philosophy for a long time. As an undergrad, I was interested in philosophy of science. Working on my Ph.D., I focused on the science of epidemiology; in particular, I was looking at how patterns of disease were used to inform public policy. After finishing my Ph.D., I wanted practical experience working in a public health environment, so I did a post-doctoral fellowship at the National Institutes of Health. That put me on the path to where I am now.

Was your post-doc at NIH in the same area you’re working now?

I actually had two fellowships. The first was in bioethics, which is one field where philosophers commonly find a niche in a medical research setting. One of the projects I was working on was looking at how we deal with uncertainty in the clinic setting. Sometimes we don’t have all the information we’d like on novel drugs and other therapies: Are they equally effective in all patients, for example, or are there certain treatments that will be more effective in some patients than in others? And sometimes there are differences of opinion among experts regarding which therapy is best in a particular situation. That’s partly a scientific question, in that we use science to try to answer these questions. But there are also ethical questions. How do you communicate the uncertainty to the patient? How do you ensure that the patient understands not only what science can tell us, but also what we don’t know, so they can play an active role in making decisions about their healthcare?

So how did you end up at the Tobacco Control Research Branch in particular?

My other post-doc fellowship was designed for people who want to work in cancer prevention and also want a more comprehensive public health education. I focused on tobacco because I think so many of the questions that I find interesting about philosophy of science, particularly the challenges of translating scientific evidence into public health policy, are very relevant to this area.

Interview by Melissa Hartman

Cancer prevention covers a wide range of research and requires knowledge from a variety of disciplines. I focused on tobacco because I think so many of the questions that I find interesting about philosophy of science, particularly the challenges of translating scientific evidence into public health policy, are very relevant to this area.

Your dissertation focused in part on something called “causal inference.” Is that related to what you’re doing now?

Yes. Here’s an example, a classic case in the history of epidemiology: How do we reach a conclusion about whether smoking causes lung cancer? We know now, of course, that smoking causes lung cancer and a range of other diseases. But when the first studies were done in the 1950s, there was a lot of debate over what kind of scientific information was needed to finally conclude that smoking actually causes lung cancer. One of the alternative hypotheses was that maybe smokers are somehow constitutionally different, which makes them more prone to lung cancer. Maybe smokers tend to be nervous people who have more anxiety, for example, and who perhaps are also more prone to other types of diseases. One of the fundamental questions in philosophy of science is, when you see an association between some activity and a disease, how do you determine if it’s actually a cause-and-effect relationship?

Even though we know a lot now about what the effects of tobacco are, we’re still trying to figure out the best policies to put into place to reduce tobacco use. We have found some things that we know are helpful. For example, we know that if...
we raise the price of cigarettes, fewer kids and adolescents start to smoke because they tend to be very sensitive to price. So epidemiology is important not only for measuring disease, but also for measuring how policies change people’s behavior in ways that might, down the road, impact their disease risk.

Does your research extend beyond cigarettes?
One thing we’re looking into is what are called “potential reduced exposure products.” In the 1970s, there was a big effort to introduce so-called light and low-tar cigarettes, which smokers perceived as less harmful because they were claimed to have less nicotine and lower amounts of tar. And we know now that those cigarettes were in fact not safer or less harmful than conventional cigarettes because smokers could modify their behavior in a way so that they would still end up taking in the same amount of tar and nicotine.

There are some new products, such as oral lozenges and moist snuff, that have come out on the market with claims that they may be an alternative to conventional cigarettes. They might be presented as either less harmful or as a product to use when you can’t smoke, such as when you’re at work or in another public place. Hookah smoking and other types of alternative tobacco products are also becoming more popular, and I think sometimes people may not associate the same risks with them as they do with cigarettes. But so far there is no evidence to suggest that these kinds of alternative products and things like hookah smoking are less harmful than cigarettes on a population level.

Where do you conduct your scientific work?
In the field of epidemiology, we’re often dealing with large data sets. A lot of the work is done at the computer, analyzing data, often in collaboration with a statistician. I don’t actually go out and collect data—that’s a huge project in itself—but I might develop questions to add to existing surveys that go out across the country, and then we analyze the results from those.

What do you find most challenging about the work you do?
One of the biggest challenges in the field of tobacco research is that things move quickly. There are always new policies, such as last summer’s new law giving the FDA authority to regulate tobacco, and states and cities placing restrictions on where people can smoke. But often we’re not able to collect data on what’s happening fast enough. Just keeping up with the pace of such changes is challenging, but that also makes the work exciting.

What do you find most rewarding about your work?
One of the most exciting things is collaborating with scientists who are at the top of their field around the country. Being in Washington, and at the National Institutes of Health in particular, gives me the opportunity to work with world-class scientists and to collaborate with them.

What skills or qualities do you think are important for people to succeed in your field?
For me, the philosophy background was helpful. It’s certainly not necessary in order to be an epidemiologist, but philosophy trains you how to structure an argument and how to use evidence to support a conclusion. Those things are really important in any branch of science. It’s also important to have some proficiency in quantitative skills, some training in mathematics and statistics. That’s not a strong point of mine, but with so much software available and the ability to collaborate with statisticians, you don’t necessarily have to be a math scholar to be an epidemiologist. Finally, I think it’s important to have a passion about public health. Although epidemiology is a science, its goal is to improve public health.

What epidemiologists do
Epidemiologists study how diseases and medical treatments affect groups of people. Epidemiologists often work with policymakers to prevent the spread of disease and develop treatment guidelines for those who are sick.

Where they work
Epidemiologists work in universities, hospitals, non-profit organizations, private offices, government organizations, and public health departments. They work as researchers, health professionals, grant writers, policy advisors, and teachers. Epidemiologists who study populations abroad must travel a lot. When conducting a study, they often work as members of large teams of professionals.

Education
Most epidemiologists have a Ph.D.; however, some positions only require an M.S. in fields such as biology or statistics, or a Master’s of Public Health.

Job outlook
Faster than average employment growth is anticipated for epidemiologists due to risks to the public from obesity, bioterrorism, emerging infectious diseases such as H1N1 and West Nile Virus, and product safety issues. In general, the demand will be higher for applied vs. research epidemiologists.

Salary range
The U.S. Department of Labor listed the median annual salary for epidemiologists in 2008 at $61,360.

What you can do now
Talk to epidemiologists in your community. Volunteer with a public health organization. Observe a research project. Study biology and statistics. Participate in science fairs.

For more information
Centers for Disease Control and Prevention
www.cdc.gov/phtrain/epidemiology.html
U.S. Department of Labor
www.bls.gov/oco/ocos310.htm