



MS Learn Online Feature Presentation Clues of Epidemiology: Part 1

Tracey

Welcome to MS Learn Online. I'm Tracey Kimball.

Tom

and I'm Tom Kimball. Today we're going to spend some time looking at a question many of us have - what causes MS?

Tracey

Epidemiological studies have given us many clues about who develops MS - like more than twice as many women as men get the disease and it is most common in people with northern European backgrounds.

Tom

Yes, and MS appears to be more prevalent in temperate regions of the world than in the tropics. There's a lot to gain from this type of study so watch with us as we begin searching "The Clues of Epidemiology"

Anne Trujillo

Are you more likely to have MS if you are: a man? A woman? Over 30? Under 30? If you live at the beach? Or in the mountains? I'm Anne Trujillo. Thank you for joining us as we explore the science of epidemiology and its contributions to the study of multiple sclerosis.

Epidemiology is the study of disease patterns, which takes into account variations in geography, demographics, socioeconomic status, genetics, and infectious causes. Epidemiologists contribute to knowledge about MS by studying the relationships between these factors, as well as patterns of migration, in an effort to understand who gets MS and why.

The origins of the study of disease patterns began with Dr. John Snow's analysis of cholera epidemics in London in 1848. Before his medical contemporaries had considered such techniques, snow initiated a study to track the progress of the disease to see if he could determine exactly how it was spread. Eventually, he was able to trace the outbreak to polluted water. For the statistical and mapping methods he initiated, John Snow is widely considered to be the father of epidemiology. During an outbreak in 1853, Snow decided to gather statistical evidence to compile a map showing where the victims lived and where they got their water. He discovered that seventy-three of the eighty-three deaths had occurred in homes closer to the Broad street pump than to any other pump. After visiting the homes of the ten victims who had lived nearer to another pump, he was told that eight of those ten victims had drunk from the Broad street pump. Some preferred that water and others, who were children, had drunk from the pump on their way to school.

To date, epidemiological studies have helped to identify factors that may be related to the risk of developing MS, but we still have few definitive answers. The mysteries of MS continue to weigh on those studying to identify a cause and cure, as well as those who have been diagnosed. Because science hasn't yet provided answers, many have developed their own theories about the cause of MS.

Is it because I grew up on a farm in a rural area did I eat something funny... was I sick as a kid, and don't remember it?

You know, I really don't discount anything, really. Some people, I've heard lyme disease might be connected to MS somehow. It's possible. Stress. Mono. Something in the environment.

But I've also read now that they don't, they're not sure that auto-immunity is actually the problem with MS. So, it's really, it's so confusing.

I don't know if it's true, but I mean a lot of things in my past, trauma both physical and emotional.

Why does it take so long to come up with a solution?

What could I have done to cause this? I have an identical twin sister. How come she doesn't have it and I do?

What is the make-up that I have that my siblings don't have? Why was I predisposed to this illness?

While these ideas are interesting, they may not be or supported by research findings. Epidemiology is one way that may provide the answers to our questions. Research continues with promising new studies.

Yeah there are two studies, we are working on. The nurses report is over 200,000 women and the even larger investigation is a collaboration with the Department of Defense that is based on 7 million people who are Army / Navy personnel, and they have blood samples collected every year or two and are storing in a very large depository and we compare those samples to those that have MS, so therefore we have a window in to the past we have repeated blood samples that go back years before the onset of symptoms. So we can examine say Vitamin D or the role of infection and how that relates to the risk of MS in that population.

Today's program will continue to explore what the science of epidemiology has uncovered about this often misunderstood disease that affects an estimated 400,000 Americans.

We will be talking with several prominent epidemiologists from around the country in the hopes of answering many questions about the science behind discovering possible causes of this disease as well as debunking a few myths along the way.

Our first guest is Dr. Sharon Warren, one of Canada's leading contributors in the field of epidemiology. Welcome Dr. Warren.

I would just thank you for having me. I'm glad to be here.

How has epidemiology been successful determining the cause of other diseases?

Epidemiology has, actually, been successful in determining the cause of a number of diseases. One of the ones that I remember from my childhood is thalidomide and birth of babies with congenital malformations.

Epidemiologists were quite quick to determine that women who took thalidomide during their pregnancies were at high risk for having babies with malformations. Simply just don't let women who are pregnant take thalidomide any more and you don't have those congenital malformations.

What have we learned about ms through epidemiology?

I think that epidemiology has made a good contribution to understanding, particularly, the distribution of multiple sclerosis. So we do know that it's more common in temperate than it is in tropical climates. We know that it's more common in women than men. We know that the peak onset age is around 30. We also know that it's more common in Caucasians than non-Caucasian. So we have a good idea of how the disease is distributed. But, despite very intensive studies of many many possible risk factors, most of them- risk factors that might be correlated with latitude because of the known latitude gradient, epidemiologists have really not been able to provide any compelling evidence in favor of any of those environmental factors that they have studied.

In what way does the Canadian health system differ from the U.S. in its ability to research MS through epidemiology?

I don't know if I could speak to the difference between Canada and the United States, but I can talk a little bit about Canada. The Provincial Health Department keeps statistics on when people visit the doctor, what they visit them for, when they're hospitalized, what they're hospitalized for and so on and so forth. They do have a classification system, which I believe is based on the International Classification of Diseases and so, they can identify when people have come to a doctor or gone into hospital due to MS. But, the problem with government health statistics is that people will argue that using doctors' visits or hospitalization isn't a very accurate indicator of incidence and prevalence, because of diagnostic problems. So, for example, I think their main concern is that possible cases of MS might be included in those figures, and that the figures might be inflated because of the inclusion of possibles.

Is the North/South gradient caused by geography or ethnicity?

The North/South gradient is probably some combination of those two factors. And, I was just recently re-reading a study by John Kurtzke in which he looked at the contribution of latitude and parental ancestry to the North/South gradient among U.S. veterans. He found that both factors did make a contribution to the gradient. And, in fact, he found that latitude made a slightly greater contribution than parental ancestry.

Fascinating. Thank you for joining us, doctor.

Thank you very much for having me. I enjoyed talking to you.

One job of epidemiology is to determine if certain theories are fact or fiction. Here's one for you: Everyone with MS will eventually need a Wheelchair? Fiction. Many people with MS remain able to walk without help. However, the likelihood of needing a mobility device increases the longer someone has MS. Only 25% of people with ms use a wheelchair because they are unable to walk.

Our next guest is Dr. Milton Alter of the renowned Lankenau Research Institute in Philadelphia. Thank you for joining us, Dr. Alter.

Thank you very much for having me. It's a privilege to be here.

Doctor, in your opinion does genetics play a role in multiple sclerosis? Yes, I'm sure genetic factors play a role as in many diseases. It's not only the environment that influences risk, but the particular inherited traits that seem to be important. In MS it has been established that the parts of the genetic system that control immune response appear to affect the risk of multiple sclerosis. Many other factors, many other genes are also associated with this risk and since the entire genome, all the genes can be looked at, there are studies underway which show that the genetic makeup of an individual also influences the risk. So the two factors, the environment and the genetic makeup play together in ways that we don't fully understand yet, but are being intensively studied. Both of those factors seem to influence risk of multiple sclerosis.

How does migration affect risk and how much does it skew or affect results of epidemiological studies?

Migration is a very nice tool that epidemiologists can use if one is looking at environmental factors. The individual who moves doesn't change his genes, but he does change his environment. So one is holding one set of risk factors constant, the genetic makeup and looking at the effect of environment. So by studying migrants, you can look at factors in the environment that are of possible relevance to multiple sclerosis and that is what we're doing. We have a study that is completed, well the data collection is, now we have to write up the results to look at age of migration and risk of multiple sclerosis. The study area is Israel where you have many migrants from different parts of the world and each group is identified in the national statistics that we have ready access to the whole population of people,

including native born people and immigrants. We can look at MS rates in people who came from different parts of the world to Israel.

I've read a little about the Faroe Island epidemics, can you tell us about what we've learned because of the Faroe Islands?

The Faroe Islands are, I've never been, I'd love to go there, a bunch of fishermen living there. They have good medical records and so a colleague of mine, John Kurtzke, went there to study the rate of MS in that population because he could get information on the whole population. They couldn't walk away into the ocean easily of course they could travel, but he was able to collect statistics on the entire population and he noted blips in the frequency of the disease. In fact, he found three blips and he interpreted that as being epidemics of the disease and by backward reasoning, he said something must have caused that epidemic. He noted that at least one of the epidemics was associated with the stationing of the British troops from the British Isles in the Faroe Islands during the World War, Second World War and he guessed that maybe those British troops were bringing something with them that increased the risk of multiple sclerosis in the people who were native to the Faroe Islands.

Let's talk about clusters.

Clusters are a problem because there is a distribution of MS which follows statistical rules and by chance an area can have more MS patients than another area and that could be accidental not just due to chance affect. On the other hand, finding a cluster would be terrific because you'd look what is unusual about that environment, or that population compared to adjacent areas. Are they near a factory which has toxic smoke for example or where groundwater is contaminate? So those would be important to determine. But it's always a question because there is a distribution and by chance, one area can have a lot more MS than another area.

Thank you, Dr. Alter. You have been very informative.

Thank you.

Alright, now that you've learned a little more, are you ready for another fact or fiction query? MS is a directly inherited disease. Fiction. The fact that identical twins of people with MS— who share all the same genes—don't always get MS, and that more than 80% of people with MS do

not have a first-degree relative with MS, demonstrates conclusively that MS is not directly inherited and that factors other than genetics must be involved.

Tom

Every day we seem to know a bit more

Tracey

We sure do and there's even more to learn! So join us for the second installment of "The Clues of Epidemiology."