

international and global health tropical disease specialist

A TRUE TALE

James LeDuc, PhD, says he “blundered into public health” as a result of being in college during the Vietnam War, when the military was a prominent factor in young men’s lives. Around the time he was graduating with a degree in zoology from California State University, Dr. LeDuc’s mentor asked him if he wanted to work in West Africa for a few years on an army-sponsored contract under the jurisdiction of the Smithsonian Institution.

During the next two years, he worked as a medical entomologist in the Ivory Coast and in Dahomey (now Benin). While in Africa, he received a direct commission into the military and for the next 23 years served as an officer in the Medical Service Corps of the U.S. Army Medical Research and Development Command. “Because I had both the opportunity to work closely with individuals and the opportunity to see the patterns of health problems throughout whole and different populations, those years in Africa inspired me to make public health my career within the service,” Dr. LeDuc explains. “But I’m not unique, by any means. Many people I know ended up in public health because of similar experiences gained through their time in the Peace Corps.”

Over the course of his career, Dr. LeDuc has worked as an epidemiologist and infectious disease specialist in some of the farthest reaches of the world, participating in many important public health initiatives that touch the lives and welfare of countless people. He did entomological and arbovirus research at the Walter Reed Army Institute of Research. In 1975, he began his PhD studies at UCLA. After receiving his doctorate in epidemiology in 1977, LeDuc commanded a Department of Defense medical research laboratory in Belem, Brazil, at the mouth of the Amazon River, and worked as chief of the arbovirus section in the virology department at the Gorgas Memorial Laboratory in Panama City, Panama. The programs he ran in Panama focused on diseases transmitted by arthropods, which involved field collections of mosquitoes, ticks and sand flies.



James LeDuc, PhD



Tropical Disease Specialist Checkpoint

Are you looking for adventure coupled with challenge?

Do you like to travel?


Are you willing to work in situations that are sometimes difficult?

Does the prospect of working closely with people from different cultures intrigue you?

If so, read on

LeDuc retired from the Army in 1992 and began working for the Centers for Disease Control and Prevention (CDC) as an epidemiologist, and was detailed by the CDC to the World Health Organization (WHO) in Geneva, Switzerland. As a medical officer, he worked on emerging infectious diseases that continue to pose problems in many parts of the world. He moved to the CDC in Atlanta in 1996 as Associate Director for Global Health within the National Center for Infectious Diseases (NCID), and in 2000, became Director of the Division of Viral and Rickettsial Disease at the NCID, his current position.

During the course of his career, Dr. LeDuc has participated in many public health initiatives. For example, he played a role in establishing programs at



“To do well in global health, you must have knowledge of the cultural as well as the scientific aspects of disease prevention and health care delivery, particularly in developing parts of the world.”

the CDC, the Pan American Health Organization and the World Health Organization (WHO) on emerging infectious diseases, worked with the World Bank to improve disease surveillance in developing countries and tracked Ebola virus in Africa. He is also a highly regarded specialist on viral hemorrhagic fevers and has devoted much of his time recently to

the process of ensuring that the United States will have sufficient smallpox vaccine, should the need ever arise for large quantities.

Profiling the job

Before setting foot in the tropics or elsewhere abroad, the successful global health professional should acquire a set of core skills that includes a background in epidemiology (especially epidemiology of infectious diseases), nutrition, biology, public health communications/education and ecology, according to Dr. LeDuc. It is essential to understand the specific challenges posed by the more prevalent global diseases such as malaria, tuberculosis and, particularly, AIDS. Knowledge of the cultural and scientific aspects of disease prevention and health care delivery is essential, especially in developing parts of the world. Finally, basic understanding of economics and accounting is always useful, especially for those professionals who will manage large budgets and/or grants.

Global health is an exciting option for individuals who thrive on adventure and challenge. Physicians, pharmacists and nurses are always needed, but so are epidemiologists, sanitarians and program managers. Biologists and ecologists are necessary because they understand the health impact that may result from such events as dam construction and reservoir excavations.



Likewise, medical entomologists who understand how mosquitoes and other insects transport and transmit diseases, and parasitologists who are experts in how parasites cause disease, are also essential.

Global public health offers unparalleled opportunities for travel. Practitioners can find work in the tropics or in northern climates, in the jungles of Africa or on the streets of Bangladesh. Work is available in governmental agencies such as the CDC, USAID, the military services or non-governmental agencies. Such agencies include the

Carter Foundation, whose health work is accomplished through its International Task Force for Disease Eradication; the Bill and Melinda Gates Foundation, a grant-making foundation that supports initiatives in education, world health and population, and community; Cooperation for Assistance and Relief Everywhere (CARE), which, among its many missions, delivers emergency medical relief; and WHO, which stimulates and advances work on the prevention and control of epidemic, endemic and other diseases.

The field is also exceptional for its occasional exotic travel opportunities and its professional challenges, says Dr. LeDuc. “One day you’re doing seroepidemiology of hantaviruses and population dynamics of mammal communities in Baltimore, and the next day, you’re consulting on the same type of virus in a severely ill patient in Greece.” Dr. LeDuc describes a recent incident in which a man from Texas died of yellow fever after returning home from an Amazon River fishing trip. Health authorities were concerned that this episode might launch an outbreak in the United States. Physicians, pathologists and epidemiologists from the Texas State Department of Health sprang into action. Blood and tissue specimens were sent to the CDC for laboratory evaluation. Once yellow fever was verified, the Pan American Health Organization and Brazil’s public health officials were immediately contacted,



Did you know?
The Hospital for Tropical Diseases dates its origins to the old British Royal Navy warship HMS *Grampus*, which in 1821 was turned into a floating hospital for the treatment of tropical and infectious diseases.¹



and conference calls were set up between the Texas state epidemiologist, the state laboratory and CDC experts. “For us,” says Dr. LeDuc, “the vital next step was to track this man’s activities from the day he departed the Amazon to the day he died in Texas.”

Since mosquitoes transmit yellow fever, the man’s hometown was placed on mosquito control alert. The travel industry was brought in to identify everyone else on the man’s fishing tour and these people were contacted. This case is a good lesson in tropical medicine, says Dr. LeDuc. For someone considering a career in global public health, it is an excellent example of how many different people and occupations are integrated in a large-scale cross-border epidemiological investigation, and how much each relies on the other.

Tracking Ebola virus

In 1995, Dr. LeDuc was working in Geneva for WHO when he received a telephone call from the communicable disease chief of service at the WHO office in Brazzaville, Republic of the Congo. The chief described people dying in large numbers from what appeared to be a sudden outbreak of a type of hemorrhagic fever.

What happened, Dr. LeDuc explains, was that a medical laboratory technician working in a clinical laboratory at a hospital in Kikwit, Zaire, became infected from a blood specimen drawn from a patient whose disease’s etiology no one could explain. The lab technician had fallen suddenly ill. Because he was a hospital staff member, many of his co-workers wanted to be involved in his care, and when he became sicker, physicians performed exploratory surgery. This proved a tragic mistake, because all of the operating room personnel became infected, too. When these people in turn became ill, those caring for them were also exposed to the virus. The number of deaths escalated rapidly.

When Dr. LeDuc was notified at WHO in Geneva, he suspected the cause to be the Ebola virus and immediately called the CDC in Atlanta, considered throughout the world to be the gold standard in handling such outbreaks. The WHO and CDC together sprang into action, sending a full response team to the African site. Because there is no vaccine for Ebola, it was essential to interrupt its transmission, which meant isolating infected patients and protecting any new incoming health care workers with barrier clothing and equipment. “We needed gloves, gowns and money to hire local help so they

could go out and actually do the case finding. After obtaining the necessary equipment and supplies, our first tasks were to set up systems for managing the virus within the hospital and lab. Then we went out into the community to locate new cases,” says Dr. LeDuc. This meant stopping at every house to determine if there were sick people inside, moving them to an isolation ward and then following the “chains of transmission” — finding every single person who had come in contact with each patient and the people whom *they* had contacted. In the meantime, Dr. LeDuc was busy dealing with the world press coverage of the outbreak while keeping eager reporters away to avoid transmission from the Ebola patients.

A crucial part of his challenge was to trace where the outbreak had started. A team of ecologists and biologists was sent into the forest where the first patient — the “index case” — had been working. They collected “everything that moved and much that did not,” LeDuc says. Though epidemiologists and microbiologists tested thousands of collected specimens, none proved positive for Ebola, so the source was never found. Fortunately, the outbreak was contained through the heroic efforts of local physicians and nurses working in concert with the medical and public health professionals from WHO Geneva and Brazzaville and the CDC. At the end of the 1996 outbreak some 250 lives had been lost.² This outbreak would probably have been a far greater disaster had not an organized global health community intervened. While most careers in tropical medicine and public health may not be involved in such a dramatic scenario, many professionals in this field enjoy interesting, exciting and professionally rewarding careers.

A day in the life

As Director of the Division of Viral and Rickettsial Diseases, Dr. LeDuc’s day includes many administrative responsibilities which, to the casual observer, might seem tedious but are, according to Dr. LeDuc, engaging and fascinating — there’s never a dull moment for a division director. Just as when Dr. LeDuc worked for WHO and faced an Ebola outbreak with equanimity and professionalism, today he similarly represents his division with other colleagues in the CDC, to other government agencies, and to the global health community concerning health issues and infectious disease outbreaks worldwide. Dr. LeDuc lectures, consults, and shares his expertise in infectious disease and public health at meetings and symposia across the globe. Recently, he has devoted much of his time to assuring the public of the CDC’s preparedness in the aftermath of the events of September 11, 2001.



Did you know?

An estimated fourteen million people die from treatable infectious and parasitic diseases every year, a quarter of all deaths worldwide. Over 90% of the victims live in developing countries.³



“Infectious diseases do not respect international boundaries; consequently, an outbreak of disease anywhere must now be perceived as a threat to most countries.”

James LeDuc,
PhD

He recently gave testimony before the Senate Appropriations Committee regarding bioterrorism preparedness and what the CDC’s public health response would be to terrorist use of smallpox.

As director of his division, Dr. LeDuc oversees a staff of about 500 people, some of whom spend much of their time in the field, as Dr. LeDuc did in his earlier days. He describes one staff member’s involvement with the Hong Kong flu virus several years ago, upon the outbreak of a brand-new strain. Transmitted from chickens, the virus had been identified as the source of infections and deaths of otherwise healthy Hong Kong citizens. The epidemiologist flew to Hong Kong and was named project manager to work jointly with his counterparts in the Hong Kong Ministry of Health. The only way to stem the epidemic, local experts and the CDC decided, was to depopulate all markets in Hong Kong of chickens, close the markets and sterilize the city’s chicken pens. Dr. LeDuc says the strategy worked; no more human cases were seen. Many public health professionals, particularly those in the field of influenza, felt that quick action saved the world from an influenza pandemic. “That is the kind of work that a global health specialist does,” Dr. LeDuc says, “saving not just single lives but populations of lives. It’s really a remarkable opportunity.”



career at a glance

James LeDuc, PhD

- 2000–Present **Director** Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases, the Centers for Disease Control and Prevention
- 1996–2000 **Associate Director for Global Health** National Center for Infectious Diseases, the Centers for Disease Control and Prevention
- 1992–1996 **Medical Officer** Communicable Diseases Division, World Health Organization, Geneva, Switzerland
- 1981–1992 **Director** Disease Assessment Division, U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick, Maryland, and other related positions

1 <http://thehtd.org>

2 <http://www.msnbc.com/news/686255.asp?cp1=1#BODY>

3 www.neglecteddiseases.org/thecrisis.shtml