

public health preparedness and function

state epidemiologist

A TRUE TALE

At the conclusion of his first year of medical school at the University of Rochester, Dale Morse, MD, MS, spent the summer on a Navajo Indian reservation investigating disease patterns. He enjoyed epidemiology so much



Dale L. Morse, MD, MS

that as a fourth year medical student he set up his own four-week elective at a county health department “just to see what people in public health do.” Serendipitously, he happened to be there when two important health issues emerged. The first was a small outbreak of an allergic reaction among children to a dye in popular “tattoos” they bought. The second was a huge community outbreak of giardiasis, a gastrointestinal illness caused by a parasite found in water. The giardiasis outbreak was so serious that a team from the Centers for Disease Control and Prevention (CDC) came up from Atlanta to investigate. The Epidemic Intelligence

Service (EIS) officer on the scene asked Dr. Morse if he wanted to help with the investigation. After that experience, he knew he would be an epidemiologist.

After graduating from medical school, Dr. Morse interned in internal medicine, and then joined the CDC as an EIS officer. Upon completing his residency, he joined the New York State Department of Health. Except for “sabbaticals” at Harvard to earn his master’s in epidemiology, and a year as a consultant for the British government at their communicable disease surveillance center in London, he spent the next 20 years at the New York State Department of Health as an epidemiologist, rising through the ranks from Assistant Bureau Director to Director of Infectious Disease, to his current position as Director, Office of Science and Public Health.

“Working through a disaster is like transitioning from working on a general medical floor to a busy hospital emergency room. You’re doing some of the same things you might do in your routine as an epidemiologist, but everything is intensely time-driven.”



State Epidemiologist Checkpoint

Do you enjoy solving difficult and involved puzzles?

Would you find it exciting to track down the cause of infectious disease outbreaks?

Would you enjoy the challenge of working through a public health disaster?

If so, read on

Profiling the job

Epidemiology and surveillance programs provide the scientific foundation for public health. Dr. Morse suggests that this profession can best be approached with a medical degree or through training at a school of public health, although some people work their way up by starting as sanitarians, for example, or as nurses in local health departments.

Over the span of a career, an infectious disease epidemiologist will investigate many different types of outbreaks. These might be food borne, such as the outbreaks in New York State in 1982 of gastroenteritis and hepatitis associated with the consumption of raw clams, and food-borne typhoid and listeria. Other outbreaks are transmitted by direct contact, such as the case clusters of meningococcal meningitis Dr. Morse has witnessed on college campuses and in school districts, where thousands of doses of vaccine were administered to prevent secondary cases.



In these instances, epidemiological methods must be applied and activities among multiple public health groups must be coordinated. At the local level, those involved include the commissioner of health, public health nurses, sanitarians and environmental specialists. At the state level, activities are coordinated among laboratory epidemiologists, biostatisticians, public affairs groups, environmental scientists and those who oversee health care services. At the federal level, the CDC's experts are often recruited, as are personnel from the Food and Drug Administration (FDA), United States Drug Administration (USDA), Environmental Protection Agency (EPA), National Institutes of Health (NIH) and other organizations.

Two high-profile public health crises Dr. Morse has worked on were the West Nile virus outbreak and the bioterrorist use of anthrax. When the initial West Nile virus case was reported in 1999, Dr. Morse was working in Albany at the Wadsworth Center laboratories of the New York State Department of Health. The outbreak was unprecedented, he says. The virus, which is transmitted by mosquitoes and carried in birds, had never before been seen in the Western Hemisphere.

Dr. Morse believes that credit for the initial detection of the virus should go to a New York City physician who reported the first two cases of unusual illness in patients, and to the New York City Health Department officials who investigated those cases. The physician assumed her patients had encephalitis, but noted uncharacteristic muscle weakness, which prompted her to call the City Health Department. The New York City Health Department sent two physicians to interview the initial group of patients. When similar cases arose, the department mounted a full-blown investigation. Specimens were sent to Wadsworth for testing, and Wadsworth scientists who noted antibodies to St. Louis encephalitis (SLE) in the blood samples made this initial diagnosis.

After the CDC confirmed the diagnosis of SLE, the Health Department instituted measures to control mosquitoes and reduce the public's exposure. Several weeks later, however, several epidemiologists noted unusual aspects of the outbreak that a diagnosis of SLE couldn't alone explain. For example, birds in the city had been dying in numbers larger than usual, although these deaths had not at first been recognized as part of the outbreak. SLE literature did not suggest that SLE killed birds at all. Additionally, the titers in some patients were not as high as they should have been for cases of St. Louis encephalitis. Finally, some of the tests done on the patients' spinal fluid in the molecular laboratory showed no evidence of SLE. The connection between birds and humans was made only after some of the bird autopsies showed a form of encephalitis similar to that being found in the humans. The identical West Nile encephalitis virus (WNV) was identified in both human and avian populations.²

Dr. Morse outlines the steps taken in an outbreak investigation as follows:

- Check validity of information received;
- Verify the diagnosis;
- Search for additional cases to determine whether there is an outbreak;
- Establish clear definition of the disease (case definition);
- Make arrangements for laboratory support;
- Verify the diagnosis of potential secondary cases;
- Characterize each case in terms of time, place and person (case finding);



Did you know?
The Centers for Disease Control and Prevention estimates that the release of 100 kilograms of aerosolized anthrax would result in approximately 130,000 to three million deaths and would carry an estimated economic burden of \$26.2 billion per 100,000 people exposed to the spores.¹



“Epidemiologists are sometimes known as the ‘medical detectives’ of public health. So it’s no surprise that some of the prime areas in the profession involve solving often unanticipated problems arising from public health disasters and outbreaks.”

Dale Morse,
MD, MS

- Hypothesize what is causing the outbreak or identify the source;
- Develop analytic studies to try to ascertain whether the hypothesis is correct;
- Conduct control measures; and
- Inform the public.³

“No one is an island anymore,” says Dr. Morse. “Treatment and containment of an illness such as that caused by West Nile virus requires the expertise of a number of people.” This particular investigation included the expertise of epidemiologists, entomologists, veterinarians, zoo directors, national wildlife groups, academic centers and lab technicians. The investigation’s success was due in large part to the rapid communication with the laboratory, where Wadsworth scientists were in contact with the epidemiologists and environmental groups at least twice a day. In addition, local and state health departments communicated openly with the CDC. “We had conference calls twice a day, in which up-to-the-minute information was presented to all groups working on the outbreak, so that they could then determine their next steps. We also set up a computerized health information network that connected local health departments with state health departments. That network allowed us to instantly share case reports, public announcements, press releases and scientific articles. In the end, there were 62 confirmed cases of West Nile and seven deaths in the New York area, but we prevented what could have been a far greater disaster.”

The anthrax attack that occurred in 2001, another high profile case, was similar to dealing with other emerging infections, Morse says. Although the number of cases was small, the level of concern was and continues to be very high because anthrax fits the profile of “dreaded disease phenomena,” i.e. illnesses that might be rare but are extremely severe in their impact. When anthrax was diagnosed in the first patient, the laboratory used the tools gathered from previous disease outbreaks. “The investigation required all the same correspondence and communication components that we had developed in our West Nile experience,” Dr. Morse says. In the end, the laboratory had to gear up to test large numbers of specimens and develop new capabilities very rapidly. “This was particularly difficult,” he notes, “for something that really hadn’t been handled before, at least environmentally.”

A day in the life

Epidemiologists are sometimes referred to as “medical detectives,” says Dr. Morse. “They’re responsible for tracking and analyzing patterns of health and disease with the goal of improving the overall health of the population.” Indeed, unraveling the mysteries behind disease outbreaks and patterns of conditions is a key part of the epidemiologist’s role.

“This can be a fast-moving and extremely challenging profession,” Dr. Morse says. He compares working through an outbreak and an “everyday” disease-state cluster or pattern investigation to the difference between working on a general medical floor and working in an emergency room. “Basically,” he says, “you are doing some of the same things you might do in your routine



life as an epidemiologist, but everything is intensely time-driven. You’re faced with high pressure and an accelerated need to respond quickly. You don’t have time to reflect.”

In an outbreak, the epidemiologist’s role includes zeroing in on a diagnosis and looking for additional cases to verify whether in fact an outbreak exists. “We then make a hypothesis

as to the cause of the outbreak and develop analytic studies to determine whether our hypothesis is correct. We also conduct control measures and make sure to keep the public and professional community current on what’s happening.”

As epidemiologist and Director of the Office of Science and Public Health, Dr. Morse coordinates activities among the New York State Health Department Centers for Epidemiology, Laboratory and Environmental Services. He is also responsible for overseeing scientific epidemiologic investigations and serves as either principal or co-principal investigator on a number of studies, including those on emerging infections, a bioterrorism grant, an asthma grant and several communicable diseases.

“My work crosses many disciplines, centers and regions,” he notes “and my job is to coordinate among them — via phone, e-mail and in-person meetings that typically involve people from the various sections of my department as

well as other divisions in the State Department of Health.” In a sense, he says, “epidemiology at the local and state — rather than federal — level offers more of an opportunity to work on the front lines of public health. It’s really where science and practice come together.”

>>> career at a glance

Dale L. Morse, MD, MS

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| 2001–Present | Director Office of Science and Public Health, New York State Department of Health |
| 2000–Present | Professor of Medicine Albany Medical College |
| 1995–Present | Full Professor Department of Epidemiology, School of Public Health, State University of New York at Albany |
| 1997–2001 | Director Division of Infectious Disease, and Director for Epidemiology, Wadsworth Center for Laboratories and Research, New York State Department of Health |
| 1996–1997 | Director for Epidemiology Wadsworth Center for Laboratories and Research, New York State Department of Health |
| 1993–1997 | Chair Department of Epidemiology, School of Public Health, State University of New York at Albany |
| 1993–1996 | Director Division of Epidemiology, New York State Department of Health |
| 1985–1996 | State Epidemiologist New York State Department of Health |
| 1987–1994 | Associate Professor Department of Epidemiology, School of Public Health, State University of New York at Albany |
| 1992–1993 | Head Field Services Unit, Communicable Disease Surveillance Center, Public Health Laboratory Service, London, England |
| 1982–1993 | Director Bureau of Communicable Disease Control, New York State Health Department |
| 1980–1982 | Assistant Director Bureau of Disease Control, New York State Health Department |
| 1976–1978 | Epidemic Intelligence Service Officer Centers for Disease Control and Prevention |

1 <http://www.hopkins-biodefense.org/pages/agents/agentanthrax.html>

2 <http://www.aphis.usda.gov/vs/ep/WNV/summary.html>

3 Personal communication, Dr. Dale Morse, 1/16/02.