

Outbreak in Wyoming: Deer Flies or Bioterrorism?

Scott A. Seys
Annette G. Heryford

*...September 11
made us aware
that even our
sparsely populated
state...is not
immune from acts
of bioterrorism.*

When a human case of tularemia occurs in Wyoming, bioterrorism isn't the first thought on our minds. As in many rural states, we tend to be complacent in our attitude toward bioterrorism, assuming that a terrorist will aim for a much more "productive" target than a landmass of 97,000 square miles with more animals than people. However, when an outbreak of tularemia occurs, suspicions do arise.

On July 25, 2001, the epidemiology staff of the Wyoming Department of Health received a report of a case of human tularemia. Even though tularemia is endemic in Wyoming's wildlife, the disease has historically been rare and sporadic among humans. The epidemiology unit quickly undertook case investigation with the assistance of field staff, health care providers, and laboratorians. The infected man was a resident of Sweetwater County in Southwestern Wyoming. He reported an insect bite while visiting the Flaming Gorge Reservoir around the Fourth of July. The signs and symptoms of infection began on July 5 and included a swelling, ulcerative lesion on his back, high fever and chills, swollen lymph nodes, and muscle aches.

Tularemia, also known as rabbit fever or deer fly fever, is an infectious bacterial disease found principally in wild animals, especially rabbits. It is endemic in Wyoming's wildlife population and has also been found in mink, badgers, mule deer, sage grouse, squirrels, prairie dogs, beavers, and porcupines among others. It has also been diagnosed in sheep in the state.

Since tularemia is endemic in Wyoming, occasional human cases are expected, especially during the summer months when flies and ticks are abundant. Humans primarily contract tularemia by the bite of an infective insect or tick or by direct contact with infected animals. Rarely, tularemia can be spread through the inhalation of contaminated dust or by ingesting contaminated meats or water. Human-to-human transmission is uncommon. The signs and symptoms of tularemia usually appear three to five days after exposure and can include an ulcer at the site of the infection, swollen lymph nodes, fever, and flu-like symptoms. With antibiotic treatment most people recover completely from the disease.

On July 26, epidemiology staff received an unexpected report. The Centers for Disease

Control and Prevention (CDC) had confirmed a second case of the ulceroglandular form of tularemia. This man was also from Sweetwater County. His onset was approximately July 10, and he also reported insect bites and being near a body of water.

A ProMED-mail posting on July 29 added further evidence that an outbreak was underway (ProMED-mail, the Program for Monitoring Emerging Diseases, is a global electronic reporting system of the International Society for Infectious Diseases for tracking outbreaks of emerging infectious diseases and toxins; www.promedmail.org). The report detailed two Utah men who had been recently diagnosed with tularemia. One of those men had been camping in Wyoming prior to becoming ill.

The three reported cases with exposures in the state, along with the rarity and potential severity of the disease, prompted us to send an urgent message to health care providers and public health professionals. We distributed Epidemiology Bulletin Alerts throughout the state to provide information on this disease. In addition, we sent press releases statewide, along with frequent media updates to the most highly affected area in Southwestern Wyoming.

By the end of the outbreak, and the summer, we had received reports of a total of 26 people with exposures in Wyoming. With extensive support from the CDC, we were able to rule out tularemia in the majority of these individuals. However, at least 7 people were classified as confirmed or probable cases.

Deer flies or bioterrorism?

Since tularemia is considered to be a bioterrorism category A agent, a cluster or outbreak of this disease should always generate some suspicion. So how did we decide whether this unusually high number of tularemia cases was "natural" or the result of a criminal act? The following clues helped us reach our conclusion.

First, a bioterrorist attack would probably involve a disease that is unusual or that does not occur naturally in a given area. This was not entirely true in our case. Though rare in humans, tularemia is endemic in Wyoming.

Acts of bioterrorism are expected to involve the aerosol route of infection, although the anthrax attacks that occurred after September 11 demonstrate that other routes are possible.

Wyoming cases were infected via the cutaneous route, and all cases were classified as the ulceroglandular form of tularemia, not the respiratory form.

A bioterrorist attack may also involve an atypical disease transmission, such as through food or water, which would suggest deliberate sabotage. In our cases, flies and rabbits were associated with disease transmission. Investigative interviews indicated that the majority of ill people had been infected through the bite of a fly. No items of food or water became suspect among the ill people, and no gastrointestinal illness was reported.

Furthermore, an agent of bioterrorism could presumably be modified to produce higher rates of morbidity and mortality in a population than would occur naturally. All seven cases in this instance responded normally to antibiotic therapy and recovered without sequelae.

A final clue was that in a bioterrorism event, people would likely become ill at about the same time, indicating a point source release of an agent. We observed illness onset dates over a three-month span, from July 5, 2001, until September 17, 2001.

As a result of these clues, we concluded that our tularemia cases occurred naturally.

What if it were bioterrorism?

If bioterrorism had been suspected, how would we have responded?

First, we would have quickly investigated each reported case as we did in this outbreak. Geographic or temporal clustering of an uncommon disease in humans that is also a potential bioterrorism agent necessitates rapid follow-up. We would also have contacted CDC immediately, as we did in this outbreak. A laboratory response is also critical when responding to any outbreak, including a bioterrorist event. Our response, organized for the collection, transportation, storage, and testing of suspect samples, would also be instituted if bioterrorism was suspected.

If our initial follow-up had pointed to anything other than “natural” causes, we would have immediately notified local law enforcement and the Federal Bureau of Investigation (FBI) in order to preserve criminal evidence. Our Emergency Operations Center (EOC) at the Wyoming Department of Health would have been activated. This Center would have coordinated communication between hospitals, laboratories, health care providers, local and national public health agencies, and the state office. Pertinent information could be quickly disseminated from the EOC with guidance from CDC. The EOC would also act as a data collection site and would facilitate mapping of

cases to help determine the location of the exposure point.

Patients would also have been contacted and asked to name others who were ill or potentially exposed, so that appropriate medical treatment could be procured. Since tularemia is not transmitted from person to person, quarantines would be unnecessary in an intentionally caused outbreak of the disease.

As with all state health departments, we deal with outbreaks of various diseases on a routine basis. However, September 11 made us aware that even our sparsely populated state (with the smallest population in the United States) is not immune from acts of bioterrorism. We are aware that our health system could quickly become overwhelmed in a single act of sabotage. To protect the health of the public, we are taking steps to improve our surveillance and response to all reportable diseases, whether naturally occurring events or acts of bioterrorism. 🐾

Authors

Scott A. Seys, MPH, is the deputy state epidemiologist and chief of the epidemiology section at the Wyoming Department of Health. Annette G. Heryford, MS, is a field epidemiologist for the Wyoming Department of Health.

Resources

Medical aspects of chemical and biological warfare. www.nbc-med.org. Chapter 20, “Use of Biological Weapons”

Tularemia Resources at the Centers for Disease Control and Prevention. www.bt.cdc.gov/Agent/Tularemia/Tularemia.asp

Dennis DT, Inglesby TV, Henderson DA, et al. Tularemia as a biological weapon: medical and public health management. *JAMA* 2001; 285(21):2763-2773.

Veterinarians and Public Health: Sharing Information in Idaho

Leslie Tengelsen

Many of the agents of bioterrorism, such as anthrax, plague, and brucellosis, are zoonotic (can infect both humans and animals). In the event of a bioterrorism attack, especially in rural states such as Idaho, the first responders may not be police, fire, or FBI; they may be the large-animal veterinarian who notices an anthrax outbreak in a herd of cattle that is unexplained by natural causes or the small-animal veterinarian who diagnoses plague in sneezing cats in a non-endemic area.

The Idaho Department of Health and Welfare Office of Epidemiology and the Idaho Department of Agriculture Division of Animal Industries have been developing joint, enhanced surveillance activities between the veterinary and medical communities. They have distributed newsletters to practicing veterinarians and physicians encouraging reporting of zoonotic diseases. They have also spoken at numerous society and association meetings to disseminate information and encourage disease reporting. For emergencies, veterinarians and physicians are encouraged to contact the Idaho State Communications Center, a 24-hour response hotline that can bring together content experts and health officials any time, day or night. Information regarding any potential animal or animal product source of infection is shared with the Department of Agriculture and investigated by both veterinary and public health professionals.

Bioterrorist events cannot always be prevented solely through enhanced intelligence gathering and intervention by law enforcement. Professionals in allied health and agricultural sectors must report and respond to unusual events so that the effect of a bioterrorist event can be diminished by rapid public health and veterinary interventions. This is particularly important in Idaho, a rural, agricultural state economically dependent on the animal industry. 🐾

Author

Leslie Tengelsen, PhD, DVM, is deputy state epidemiologist with the Office of Epidemiology, Idaho Department of Health and Welfare.