Plague epizootic in Southwestern Idaho rodents leads to public health response

Reports of illness clustering or mortality events ("die-offs") in wild animals, even before the etiologic agent is determined, can suggest the presence of an emergent or re-emergent zoonotic disease threat of public health importance. This was the case beginning mid-May 2015 when Piute ground squirrel (Urocitellus mamillatus) mortality events in the Snake River Birds of Prey National Conservation Area (NCA) in Ada County were first observed. Concerned citizens who noted an unusual number of dead ground squirrels while working or recreating in the NCA south of Boise, ID reported their observations to the Idaho Department of Fish and Game (IDFG). Wild rodent population die-offs in the western United States occur for many reasons; when infectious disease is suspected, plague (Yersinia pestis) is one of the pathogens considered as the likely cause. Because plague was suspected in these situations, IDFG alerted the Idaho Division of Public Health (IDPH) State Public Health Veterinarian on May 19 and sent samples from dead ground squirrels collected from two of the NCA mortality events to the Center for Disease Control and Prevention (CDC) for laboratory analysis. Y. pestis was detected by direct fluorescent antibody (DFA) on 5/21 in two ground squirrels from each mortality event sampled and was confirmed by bacterial culture on 5/22. Idaho Bureau of Laboratories (IBL) laboratorians sampled and confirmed five domestic dogs positive by DFA for Y. pestis.

One vole from each mortality event was determined to be presumptive positive by DFA for Y. pestis. During the response, the IBL tested two persons for Y. pestis; both were negative. IBL also tested 18 domestic animals; one ill domestic dog in Ada county was considered presumptive positive for plague by PCR and survived with treatment. Persons with high risk exposures to the presumptive positive dog received antibiotic prophylaxis. The exchange of surveillance information between public health, wildlife management, and other state agencies was critical for the rapid integrated response to this zoonotic disease threat.

West Nile surveillance practices in Idaho

The mosquito-borne arbovirus West Nile virus (WNV) is endemic to Idaho. WNV infections in humans are not considered rare; since its introduction around 2004, the average annual incidence of WNV in Idaho was 31 cases (range: 3 – 135), excluding the epidemic year of 2006, during which 96% cases were reported. Annual WNV infection incidence is likely an underrepresentation of true disease burden because infections resulting in severe or neuroinvasive disease are more likely to be reported than mild febrile illnesses. Reported human cases, classified as neuroinvasive or non-neuroinvasive, reports of presumptive positive viremic blood donors by the American Red Cross, and examination of death certificates provides information on disease burden and severity but non-human surveillance practices, described below, also inform seasonal risk for infection.

Routine mosquito, veterinary, and wildlife surveillance activities are conducted seasonally each year to inform public health risk reduction activities. Mosquito surveillance is conducted to detect virus activity in the environment, as a sentinel for human risk. Surveillance for WNV in mosquito populations in Idaho was initiated in 2001 after the detection of WNV in the United States in 1999. It wasn’t until 2004 that WNV was first detected in Idaho mosquitoes. Mosquito trapping is conducted by jurisdiction-specific mosquito abatement districts (MADs) and Southwest District Health; mosquito surveillance is not conducted in all counties. Climate change can alter ecosystems and affect the complex transmission cycle of emergent or endemic arthropod-borne pathogens.

Wildlife WNV surveillance, conducted in collaboration with the Idaho Department of Fish and Game (IDFG), signals activity in the environment and provides an insight into the effect WNV has on wildlife populations.
species. In 2006, a noticeable reduction in squirrel, crow, and magpie populations, particularly in southwest Idaho counties, was reported by IDFG, and testing revealed WNV as the primary cause.

Mosquito, veterinary, and wildlife surveillance data are routinely collected and analyzed by the Division of Public Health’s State Public Health Veterinarian because of their potential to indicate public health risks associated with the environment. Although positive mosquito pools or a veterinary report are considered key signals of WNV season onset, during 2004 through 2014, these reports were the first indication of the WNV season only half the time; ill persons were the first indicator of WNV activity in the other seasons. Surveillance in Idaho has resulted in the detection of WNV season onset as early as April 24 and the end of WNV season as late as October 31, although analysis of surveillance data shows that WNV seasons typically start in June and are, on average, 116 days long (Figure).

WNV infections can be life-threatening at any age and there is no human vaccine available. For these reasons, Idaho will continue to collect data from mosquito, veterinary, and wildlife surveillance to inform early and season-long public health activities, including the promotion of “Fight the Bite” awareness campaigns.

Echinococcosis is now a reportable condition in Idaho

Each case of echinococcosis, a parasitic disease (sometimes called “hydatid disease”) caused by accidental ingestion of eggs of the Echinococcus tapeworm, must be reported within three working days of identification. Reported cases will be investigated to confirm the diagnosis and identify possible sources of infection. Cases in Idaho are rare and most infections are acquired in other countries; however, local transmission should be ruled out. Idaho’s new reportable disease rules can be found at http://adminrules.idaho.gov/rules/current/16/0210.pdf.

Figure. WNV season duration, by year—Idaho, 2004–2014*