

Session

One Health surveillance of emerging zoonoses, vector-borne diseases, and the link to ecosystem change.

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APHA's 2019 Annual Meeting and Expo (Nov. 2 - Nov. 6)

Abstract

One Health Approach to Understand the Zoonosis Risk of Human-Animal Interaction in Southern China

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With its rapid urbanization and development as well as high diversity of animal species, Southern China is facing major social and ecological changes that result in human and animal interactions favoring the emergence of zoonotic diseases. In order to identify the zoonotic risks from human-animal interactions and develop a risk-mitigation strategy, concurrent surveillance was conducted in bat and human communities in southern China from 2015 to 2017.

Data were collected in 88 semi-structured ethnographic interviews as an exploratory study, followed by serological and quantitative questionnaire surveillance among 1,596 residents in locations where potential human-animal interactions were identified. Questionnaires were administered and participants were asked to provide serum samples. Viral surveillance in bat populations was conducted at the same locations and during the same period as the human surveys to maximize the understanding of pathogen transmission from bats to humans. Laboratory testing was conducted for bat coronaviruses with RT-PCR and developed ELISA assays, and a mixed method was employed to analyze the qualitative and quantitative human data.

This study demonstrates the first serological evidence of the spill-over of bat-origin coronaviruses into human populations in southern China, identifies demographic factors and human-animal interactions associated with viral exposure and self-reported severe acute respiratory and influenza-like illness symptoms known to occur with coronavirus infection. Combining existing protective factors and intervention opportunities, individual, social, community, and policy-level mitigation strategies are recommended to prevent zoonotic risk in Southern China.

Public health or related research Social and behavioral sciences

Abstract

Environmental Dimensions of Health Security: Opportunities for One Health

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One Health approaches are increasingly being operationalized through coordination platforms, technical guidance development, and on-the-ground implementation projects. However, engagement of the environment sector has been limited to date, missing key opportunities to dually advance health security and conservation gains and leaving the public health sector unprepared for existing and anticipated risks related to local and global environmental change and ecosystem degradation. This gap is especially relevant given that the majority of recently-emerging zoonotic diseases (often high-consequence pathogens) have wildlife origins, and as changing land use, food production, and trade and travel practices alter pathogen exposure and spread dynamics at human-animal-environment interfaces. We review global and country assessment, planning, and reporting frameworks to assess the current scope of environment sector inclusion, identify areas where coverage has been limited to date, and provide recommendations for key entry points to incorporate environmental information in risk monitoring and management. These provide tangible avenues for broadening collaboration at international to field-based scales, particularly in effective prevention strategies, early warning systems, and sentinel surveillance for a range of emerging and endemic disease threats. We demonstrate pathways to maximize efficiency and effectiveness of existing resources and target priorities for environment sector integration in future capacity investments for health security. Greater attention to the environmental dimensions of health security can help promote optimal multisectoral solutions toward sustainable development targets.

Environmental health sciences Epidemiology Program planning Protection of the public in relation to communicable diseases including prevention or control Public health or related organizational policy, standards, or other guidelines Public health or related public policy

Abstract

Increasing tick surveillance in Illinois through collaboration between, governmental, academic, and citizen scientists

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Between 1990 and 2013, the number of reported cases from the four most common tick-borne diseases (TBDs) in humans increased ten-fold in Illinois. Previously, IL has lacked a tick surveillance program leading to insufficient information on how, where, and why people are exposed to ticks. The aim of this research is to address these gaps. Three surveillance strategies were utilized to gather information about the ticks of public health concern: 1) IL Tick Inventory Collaboration Network (I-TICK); 2) systematic collection; 3) special collections. I-TICK kits were used by people within IL who work outside on a regular basis. They provide data on how many ticks they find on themselves during the day and return ticks to network hubs. Systematic collection was performed by researchers every two weeks in predetermined field locations. Special collections were targeted collections in locations where particular TBDs are of concern. Ticks from all three methods (2282 total) were collected, quantified, and identified in 2018. Of collected ticks, 906 were from I-TICK, 172 from systematic collections in 3 counties, and 1204 were from a special collection. Four species of ticks were identified: *Amblyomma americanum* (1484); *Amblyomma maculatum* (39), *Dermacentor variabilis* (696); *Ixodes scapularis* (63). Ticks were collected in 54/102 (52.9%) IL counties. There were 52 counties for which tick species status (established or reported) changed. We hypothesize, from these findings, that ticks of public health concern are established within every county of the state and *A. maculatum* is established within multiple counties. While TBDs have been relatively rare in the past, we believe that more people within IL are being exposed closer to home.

Abstract

A Cat without Many Lives: One Health Interventions

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Introduction

Ohio Department of Health (ODH), North Carolina Division of Public Health (N.C. DPH) and the Centers for Disease Control and Prevention (CDC) investigated a cat translocated through eight states while incubating rabies. The cat tested rabies positive after owner surrender at a Summit county Ohio animal shelter; a county free of terrestrial rabies. A multi-agency investigation ensued that exemplifies a One Health approach: collaboration among public health, animal health and wildlife agencies.

Methods

ODH investigated persons and animals exposed during the viral shedding period. N.C. DPH investigated the epidemiology and owner's activities while in N.C. CDC conducted phylogenetic analysis of the rabies virus variant (RVV).

Results

Molecular-phylogenetic characterization confirmed that the RVV was consistent with a central N.C. RVV clade, geographically where the stray cat was procured. The stray cat was translocated with 12 other cats; none had a history of rabies vaccination or health certification. Rabies signs developed minimally five months (average rabies incubation is three weeks to three months) after the stray cat departed from N.C. Of 12 cats and two dogs co-translocated, none developed signs of rabies or died.

Conclusions

This investigation highlights the need for One Health interventions to prevent and control rabies. Human-mediated translocation of rabid animals in the late 1970's is the postulated source of the current raccoon rabies epizootic spanning 19 eastern states. A multi-sector collaboration (i.e., public health, agriculture, wildlife and animal health) is proposed to coordinate public education about rabies risks, prevention, and jurisdictional animal rabies and importation laws. Primary rabies prevention requires owner compliance with and jurisdictional enforcement of rabies vaccination laws. Veterinary health certification and rabies vaccination may have pre-empted this incident.

Epidemiology Implementation of health education strategies, interventions and programs Other professions or practice related to public health Planning of health education strategies, interventions, and programs Protection of the public in relation to communicable diseases including prevention or control

