Leptospirosis in the Caribbean: A One Health Approach


PURPOSE:
Leptospirosis is a globally re-emerging zoonotic disease, caused by pathogenic spirochetes bacteria called leptospires. It is common in the tropical and sub-tropical areas such as the Caribbean where there is significant rainfall. Humans can contract the disease by direct or indirect contact with infected urine from rodents or by consumption of contaminated food or water. The purpose of this study was to describe the risk factors for the transmission of Leptospirosis from animals to humans and develop One Health guidelines to reduce the risk of transmission in the Caribbean.

According to the American Veterinary Medical Association, One Health is “the collaborative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people.” This differs from the traditional approach in that the root cause(s) of problems are analyzed in order to develop prevention, control and mitigation strategies.

MATERIALS AND METHODS
The Caribbean Animal Health Network (CaribVET) is a collaborative network that includes veterinary services, laboratories, research institutes, and regional and international organizations. The goal is to improve animal and veterinary public health in all the countries and territories of the Caribbean. For more information, see www.caribvet.net.

The CaribVET Veterinary Public Health Working Group conducted a subregional workshop to describe and analyse the prevalence and distribution of Leptospirosis in the Caribbean, describe the transmission and develop recommendations to reduce the risk of transmission from animals to people. The risk factors for Leptospirosis transmission from animals to people were identified from the prevalence data from Caribbean countries, categorised and described.

RESULTS

LEPTOSPIROSIS IN HUMANS

Human Risk Factors
Human risk factors included occupational exposure, recreational exposure and sex. The risk was increased by exposure to rodents, rodent urine or contaminated stagnant water. Occupations such as agricultural workers, garbage collectors, sewage workers, abattoir workers and veterinarians, and food warehouse workers were at higher risk for contracting Leptospirosis. Recreational exposure included walking through flood waters especially barefoot, hiking in tropical forests, gardening without gloves and hunting or trapping wildlife. The incidence was twice as high in males as in females. Men were at higher risk as they dominate these occupations and as males are more likely to walk in flood waters without protective footwear.

CONCLUSIONS AND RECOMMENDATIONS

An risk factors include human, agricultural and environmental exposure, an effective prevention program should address all three sectors, which is a One Health approach.

Specific recommendations were formulated for each risk factor in order to prevent transmission.

One Health Recommendations to prevent the transmission of Leptospirosis to Humans

RECOMMENDATIONS FOR PHYSICIANS AND PUBLIC HEALTH DEPARTMENTS:
- Improve and integrate surveillance in humans and animals.
- Improve laboratory investigation by determining national baseline data in humans and animals and environmental source of infection.
- Improve laboratory diagnosis in humans by reinterpreting modified Fahn’s criteria or WHO guidelines for all confirmed leptospires especially if Dengue rapid test is negative.
- Improve case management by implementing WHO guidelines for case management of all possible and presumptive cases. Isolate leptospires before treatment as early as possible based on clinical suspicion.

RECOMMENDATIONS FOR VETERINARY SERVICES:
- Determine which animals species are infection source and direct control measures to target local reservoir.
- Research and surveillance to determine which Leptospira serovars are prevalent in rodents, humans, dogs, domestic animals and wildlife and detect outbreaks and trends.

Domestic Animal Risk Factors
Leptospirosis can be transmitted from domestic animals, wild animals and rodents through exposure to animal urine. The causative organisms have been found in a variety of both wild and domestic animals, including rodents, insects, dogs, cats, pigs and horses. Rodents are the main reservoir, and the mongoose may also be a reservoir.

Environmental Risk Factors
Outbreaks of Leptospirosis in humans and animals are frequently found in flood conditions, usually associated with high rainfall and humidity. Recent Leptospirosis outbreaks in Dominica (2011) and Guyana (2009) occurred under persistent flood conditions. Climate change is believed to contribute to rising ambient temperature and humidity. Inadequate drainage can also contribute to flooding, particularly in low-lying areas. Increased rodent or mongoose populations increase the probability that ground water (springs, creeks, streams) is contaminated with Leptospira-infected urine, and can lead to outbreaks in animals and humans who are exposed to the contaminated water.

Recall and storage facilities, food transportation, and storage facilities, food service establishments.

RECOMMENDATIONS FOR PLANNING DEPARTMENTS TO PREVENT FLOODING:
- Proper planning to consider location, orientation of buildings and drainage systems.
- Effective and efficient drainage systems.

Supplies, danger of water flowing through flood waters, and rodent proofing of flood-prone areas.

Figure 1: Dark field microscopic image of Leptospira

Figure 2: Risk factors for transmission of Leptospirosis to humans

Figure 3: CaribVET Veterinary Public Health working group, Dominica, 2011