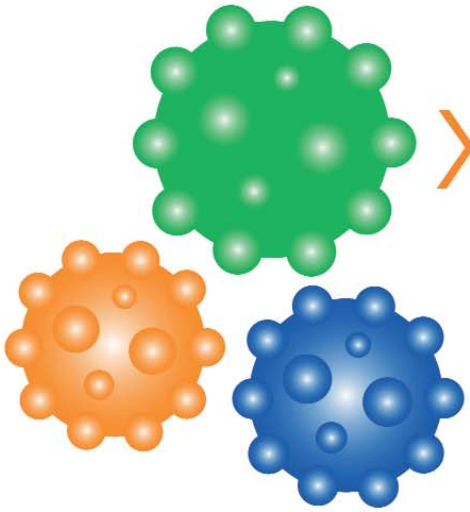

Xth International Congress for Veterinary Virology

9th Annual Meeting of EPIZONE

Changing Viruses in a Changing World

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In areas with high risk level, vaccination campaigns are organized with the Teschen vaccines bought from the Newport Laboratory. Clinically, the severity of the Teschen symptoms has considerably decreased. But, it doesn't mean that there is establishment of a natural immunity as mentioned in the literature. An initiative of active epidemiological surveillance is going to start next September to collect recent data on the evolution of the Teschen disease and Classical Swine Fever, and to develop a program for the eradication of both pig diseases.

Rabies in the Caribbean

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Objective: The Pan American Health Organization (PAHO) regional program introduced to Latin America and the Caribbean (LAC) in 1983 was ratified in 2009 with the goal of eliminating dog-transmitted human rabies by 2015. Despite a >90% decrease in cases, the latter has been extended to 2018 due to persistence in certain areas. In discussions about rabies, LAC are often grouped as one. However, data from Latin America generally obscures the Caribbean situation so that it is inadequately represented in the literature. The present study aims to independently analyse the rabies situation in the Caribbean through use of an internal Caribbean Network (Caribbean Animal Health Network), and to examine the changing epidemiology of the disease in comparison to Latin America.

Methods: A questionnaire was developed and administered in February 2014, to the 33 countries or territories of the Caribbean Animal Health Network (CaribVET), through the Adobe Forms Central Web-based platform. Country submissions were collected from April 2014 to June 2015. Responses from30 countries were analysed from June to July 2015 and results were summarized into a regional situation analysis. Complementary information was obtained through a comprehensive literature review using internet searches and the institutional libraries of the PAHO Office in Trinidad and Tobago and the Caribbean Public Health Agency (CARPHA). Selected literature was then summarized and collated with questionnaire responses.

Results: Rabies is a notifiable disease in almost all islands and territories of the Caribbean region, where the disease is present in ten countries and/territories (Trinidad and Tobago, Belize, Grenada, Guyana, Suriname, Cuba, Puerto Rico, Dominican Republic, French Guiana and Haiti). In most instances, the disease is endemic in wildlife with periodic spill over into domestic animals; however urban (canine) rabies still occurs in Hispaniola (Dominican Republic and Haiti) and Cuba. Caribbean sylvatic rabies is maintained by two main reservoir hosts, the vampire bat and the mongoose. The main reservoir host is the mongoose in Grenada, Puerto Rico and Cuba, and the vampire bat in Trinidad and Tobago, Guyana, Suriname, Belize and French Guiana.

In four (40%) rabies endemic Caribbean countries and/territories (French Guiana, Dominican Republic, Haiti, Cuba) human cases have occurred within the last 10 years. The estimated number of human rabies cases per year was highest in Haiti (6-10 cases) and lowest in French Guiana (0-1 cases). Sporadic human cases also occur in Suriname every 8-10 years, with the last case reported in 1998. Rabies cases were reported in the animal population, within the last 10 years, in all endemic countries except Suriname (last case reported in 2002). The average number of cases reported per year ranged from 0-1 (French Guiana) to 90 (Cuba). Cattle were the most significantly affected species, particularly in countries with vampire bat rabies.

Human bite incidents from potential rabies vectors are reportable in 8 (80%) rabies endemic countries, (exclu-

ding Trinidad and Tobago and Suriname) and in 8 (40%) non-endemic countries. In contrast, animal bite incidents are reportable in 7 (70%) endemic versus 6 (30%) non-endemic countries. All endemic countries/territories (except Suriname) have passive or enhanced passive surveillance programs for animal rabies. Active surveillance in the stray domestic carnivore population is carried out in Cuba, Haiti, Dominican Republic and Grenada, whereas active surveillance is conducted in wildlife (bats and mongoose) exclusively in Trinidad and Puerto Rico. None of the non-endemic countries conduct rabies diagnostic testing for humans or animals. Among endemic countries, only Cuba, Dominican Republic and Puerto Rico conduct human rabies diagnostics, and all but Belize, Suriname and Guyana conduct animal rabies diagnostics.

Most rabies-free countries did not implement rabies control programs to attain their disease free status and the risk of rabies introduction was considered by the local veterinary authorities to be low in 60% of these countries, with illegal importation of dogs being the most relevant route. Conversely, national legislation for animal rabies control and prevention exists in all endemic countries apart from Haiti, Belize and Suriname.

Animal vaccination strategies for the prevention and control of rabies in the Caribbean, mainly target bovine and domestic carnivore animal populations, and governments provide vaccines free of charge in most (60%) rabies endemic countries. Annual mass vaccination programmes are carried out for both cattle and domestic carnivores (dogs and cats) in French Guiana, Grenada, Puerto Rico and Belize. The domestic carnivore populations are targeted in Cuba, the Dominican Republic and Haiti with estimated vaccine coverages of >90%, 80% and 40-50% respectively. The bovine population in Trinidad is largely covered by herd immunity with 70% vaccine coverage, compared to the 10% in Guyana that vaccinates only in outbreak situations. Vaccination is legislatively mandatory for the bovine population of Trinidad, and for both the bovine and domestic carnivore populations in French Guiana.

Almost all countries in the Caribbean have rabies import health restrictions. In these countries the most regulated species are dogs and cats, with rabies vaccination being a requirement for entry. Countries without rabies-related import restrictions are Grenada, Dominican Republic, Puerto Rico and Sint Eustatius.

Conclusion: Canine-transmitted rabies occurs only on two Caribbean islands (Hispaniola and Cuba) compared to five countries in Latin America (Brazil, Bolivia, Peru, Honduras and Guatemala) with disease control in Haiti presenting the major challenge to elimination in the Caribbean. As of 2004, the prevalence of rabies transmitted by wildlife in the Americas exceeded that of domestic dogs which is mainly reflective of bat-transmitted cases in North and Latin America. However, although the mongoose is the main rabies reservoir host in 30% of endemic Caribbean countries, it is often overlooked as a vector in the LAC literature due to the ubiquitous presence of the vampire bat in Latin America. Furthermore, although vampire rabies predominates among existing reports in humans and domestic animals, other bat species should not be excluded from routine surveillance activities when warranted, as they have previously been implicated in rabies viral transmission in the region. Therefore, the long term objectives of rabies elimination programs in LAC therefore need to take into account the diverse rabies epidemiology within the Caribbean.

Results of this study underscore the importance of regional animal health networks such as CaribVET in coordinating expertise and resources, facilitating regional training and sharing of information and knowledge. The Caribbean has limited rabies diagnostic capacity compared to Latin America. However, regional collaboration through CaribVET can increase the laboratory capability in countries without independent diagnostic facilities. Also a recent regional training workshop organized by CaribVET resulted in standardization of the rabies diagnostic testing regime throughout the Caribbean which will increase confidence in results. Regional collaboration can also facilitate the development of common protocols and regulations for the control and prevention of rabies in countries with similar epidemiological circumstances.

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West-Nile in the Caribbean

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Since its discovery in Uganda (1937), West Nile (WN) fever historically remained confined in Africa and Middle East with sporadic incursions in Southern Europe. However, it has expanded in the last decades, and is now one of the most widespread arboviruses in the world. Nowadays WN remains present over six continents.

The disease is produced by a virus (WNV, genus *Flavivirus*) and transmitted by mosquitoes among susceptible hosts, usually birds. The virus can also affect dead-end hosts, like humans and equines. The identification of the drivers for WN emergence and spread is difficult. At local scale, WN transmission cycle can occur through different ecosystems with involvement of different species of vectors and hosts. High viral genetic variation and wide range of vectors and hosts makes WN a complex arthropod-borne disease. Recently, up to nine different WNV lineages have been proposed. WNV has been detected in more than 60 mosquito species in 11 genera. However species in the *Culex* genus are considered the main WNV vectors worldwide. Major amplifying hosts are birds, with more than 300 species of birds supporting infection. Mammals are generally considered as dead-end hosts as they are not efficient WNV amplifiers. Nevertheless, multiple mammalian species, amphibian and reptiles are susceptible to WNV infection.

WNV emerged in the New World in New York, 1999. Since then the virus provoked in the USA the major WNV epidemics ever recorded globally. Disease burden was high, causing significant morbidity and mortality in birds, horses and humans. The disease further spread northward (Canada) and southward. The southern spread of WNV into the Caribbean, Central and South America was apparently silent. In contrast to USA and Canada, WNV has caused no or very limited health impact on animal and human populations in the Caribbean. The apparent absence of bird mortality and clinical manifestations among humans or equines makes difficult to track WNV spread in the region. Thus, evidence for WNV circulation is mostly based on serological evidences in a region with other antigenically cross-reacting viruses potentially co-circulating. In the Caribbean, the disease was recorded for the first time in October 2001 in Cayman Islands, on a patient without previous history of travel. First serological investigations were implemented by 2001/2002 across the Caribbean Sea in Mexico, in the Greater Antilles (Dominican Republic, Jamaica and Puerto Rico) and in the Lesser Antilles (Guadeloupe). Such early wave of activities serologically enabled to detect WNV circulation among birds and equines in the Caribbean. Since then, other serological studies supported evidence for consistent WNV circulation in the Caribbean region, Central and South America, including records of sporadic human and equine cases.

The Great Caribbean region is very diverse and heterogeneous. Wide environmental and climatic variation is found along its number of islands but also some continental countries/territories. The Greater and Lesser Antilles are situated at the Carrefour of North and South America, along the “Mississippi and the Atlantic migratory flyways”. The most likely way of WNV introduction in the region is through infected wild birds flying from North to South America. What remains unclear is whether endemic WNV cycles were established or whether detection follows regular introduction by wild birds. Also in some islands (Martinique at least, Guadeloupe’s sister island) several serological investigations have been conducted in horses. However these investigations never succeeded in evidencing WNV circulation suggesting heterogeneous distribution of WNV in the region due to