Developing a disease prevention strategy in the Caribbean: the importance of assessing animal health-related risks at regional level

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Submitted for publication: 29 December 2010
Accepted for publication: 25 August 2011

Summary

In 2009 CaribVET conducted a survey among Caribbean national Veterinary Services to assess perceptions of risk assessment and to identify the principal exotic diseases of concern in the region and their means of introduction. The results showed that the introduction of live animals was considered the most likely route of introduction of exotic animal pathogens, followed by the uncontrolled introduction of animal products by boat passengers. The results were used to define a regional strategy for assessing animal health risks that highlights the importance of within-region exchanges.

Keywords

Caribbean – Caribbean Animal Health Network – CaribVET – Endemic disease – Exotic disease – Risk assessment – Veterinary Services.

Introduction

Infectious animal diseases are a global threat to livestock productivity and public health, with most human emerging infectious diseases expected to originate in animals (3, 9). Effective surveillance of animal diseases is a priority for the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO) (1, 7, 8). Both organisations promote the integration of national veterinary surveillance systems into regional networks to more effectively prevent diseases from spreading across national borders (1, 4, 10).

The Caribbean Animal Health Network (CaribVET), established in 2003, brings together national Veterinary Services of all Caribbean countries and territories with international organisations working in the field of animal health. Its overall aim is to achieve more effective animal disease prevention and control within the region. The organisation of CaribVET is based on a steering committee defining the overall strategy, a coordination unit organising activities and providing administrative, technical and scientific support, and on technical working groups, one of which is devoted to epidemiology (2). As the scientific basis for risk management (5, 6, 11), risk assessment (RA) is becoming a fundamental element of the network's activities. In order for network members to be able to collaboratively and systematically assess shared animal health-related risks, there is a need to identify priorities and harmonise approaches.

This paper presents the results of a survey among members of the CaribVET network on the ways in which exotic diseases are introduced and the importance of RA tools in preventing and controlling both endemic and exotic disease. The paper also provides an overview of the resulting recommendations to promote harmonised, structured, and integrated assessment of animal health-related risks in the region.

The study

In September 2009 a questionnaire was submitted to the Chief Veterinary Officers (CVO) of 27 Caribbean countries and territories (www.caribvet.net/en/surveillance/risk-analysis-survey/risk-analysis-questionnaire). It included a series of closed questions in which participants were asked to:

a) Indicate whether or not they thought RA tools were important for the control and/or prevention of endemic and/or exotic diseases.

b) Prioritise specific objectives to be pursued by the use of RA methodologies. Proposed objectives included:

– assessment of risk for the introduction of exotic diseases through different means

– optimisation of epidemiological surveillance of endemic diseases

– identification of high-risk areas for exotic disease introduction

– documentation of a compartment, zone or country free from disease for export purposes

– prevention or reduction of contamination of the human food chain

– identification of risk and vulnerability factors for the potential impact of emerging (exotic) and re-emerging diseases in order to improve emergency plans.

For each proposed objective, a score was given by each country between 0 (not important) and 5 (most important). A median score and a total score were calculated for each objective.

c) Rank the perceived major ways of introduction of five exotic diseases; each participant country had to select five exotic diseases considered most important nationally from a list of 25 diseases and evaluate 13 ways of introduction.

For each proposed way of introduction and each selected disease, a score *i* was attributed between 1 (low importance) and 3 (high importance). Score 0 was given when the CVO was not able to evaluate the importance of this specific route. For each country *c*, a score *Scj* was then calculated for each specific way of introduction *j* by summing up all the weighted scores provided, as follows:

$$(1)\ Scj = \sum_{i=1}^{i=3} \mathrm{fi} \times \omega \mathrm{i}$$

where *Scj* = score obtained for the way of introduction *j* in the country *c*, *fi* = frequency of the score *i* and *i* = the weight of score *i*, with $\omega 1 = 1$, $\omega 2 = 2$ and $\omega 3 = 3$.

Scores *Scj* were then combined across countries to obtain an overall ranking *Sj* of the importance of different routes *j* for the introduction of exotic animal diseases in the region, as follows:

$$(2)\ Sj = \sum_{c=1}^{c=17} Scj$$

Survey results were summarised and discussed in December 2009 during a three-day meeting attended by fourteen animal health officers from six countries. The outcomes of the discussions were used as a basis to agree upon a coordinated strategy for the regional assessment of animal health-related risks.

Results

Seventeen countries answered the questionnaire (Fig. 1). Reasons for not responding may include lack of time, lack of involvement by new members in the CaribVET network,

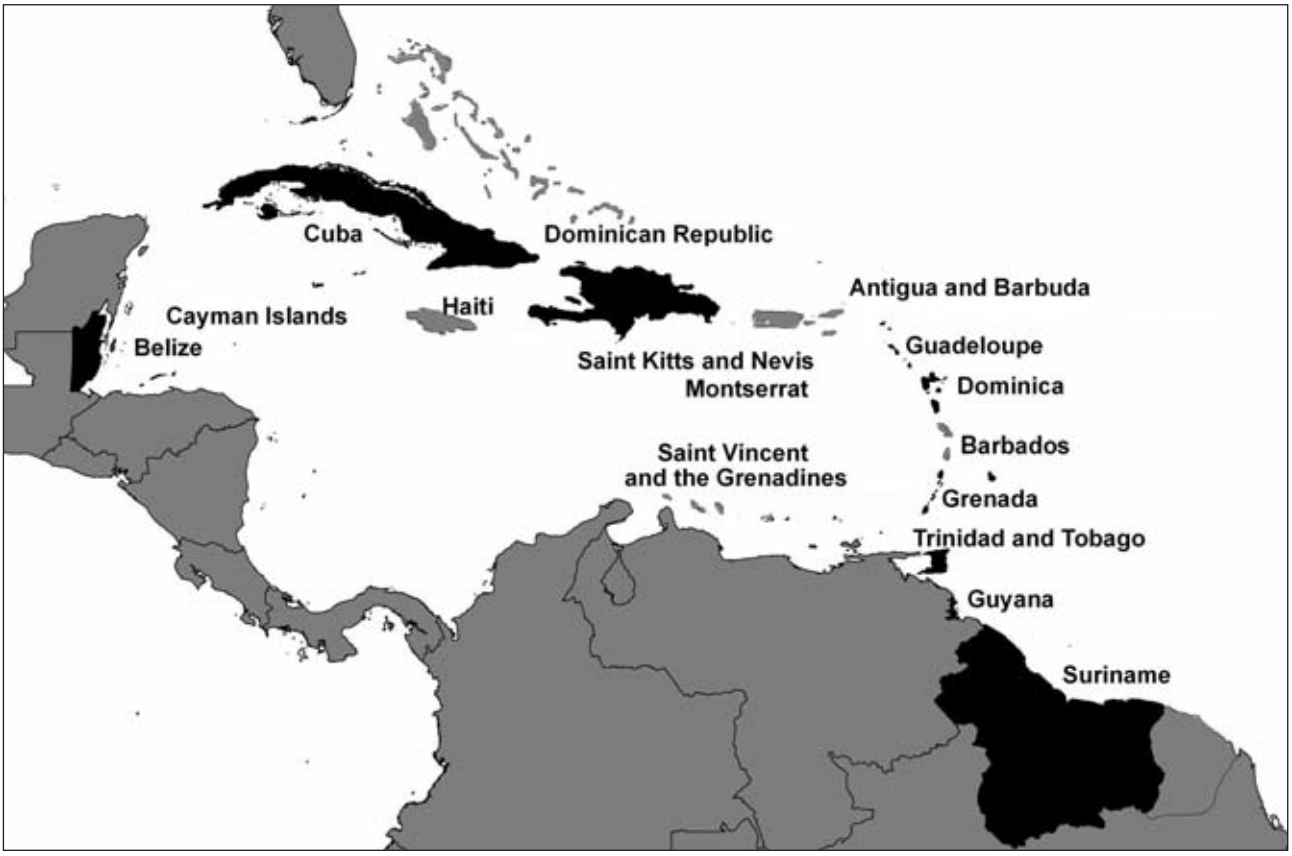

Fig. 1
Map of the Caribbean showing the 17 countries that answered the questionnaire
Countries which participated in the survey are shown in black and have their names written on the map. Saint Kitts and Nevis territories answered the questionnaire separately

Table I
The application of risk assessment methodologies to selected animal health issues: scores given by Chief Veterinary Officers in the Caribbean indicating which issues were a priority for their countries
For each criteria, a score was given between 0 (not important) and 5 (most important)

Animal health objectives	Scores	
	Median score [a]	Total score [b]
To prevent the introduction of exotic diseases through:		
– live animals for trade	5	65
– pets, animals for sport and exhibition	4	59
– movements of humans (tourists, workers…)	3	44
– trade of products of animal origin	4	65
– animal feed	3	44
– wild animals	2	37
To optimise epidemiological surveillance of endemic diseases	4	51
To identify high-risk areas for introduction of exotic diseases	5	61
To document compartments, zones or countries as free from disease for export purposes	3	37
To avoid or reduce contamination of the human food chain (food safety)	5	70
To identify vulnerability factors for potential impact of emerging (exotic) and re-emerging diseases in order to improve emergency plans	5	69

a) Median score represents the median of all scores given by individual countries
b) Total score is calculated for each criterion by adding all the scores given by 17 individual countries

and lack of concern towards animal health surveillance in the smallest islands where there is little development in the livestock industry. There was consensus among all 17 questionnaire respondents that RA has a role in informing strategies to prevent the introduction of exotic diseases. Most respondents – including all the countries in the largest islands (Cuba, Dominican Republic and Haiti) – considered that RA is also useful for the prevention (10/17), control (14/17) and optimisation of surveillance (14/17) of endemic diseases. The reason that the larger countries took this view may be that they have more scope for application of territorial risk assessment than small islands.

The results on the perceived importance of RA in managing various animal health issues are summarised in Table I. Prevention of contamination of the human food chain was identified as the most important area for the application of RA. This concern is probably influenced by the environmental characteristics of this tropical area and the growing importance of tourism in the islands, which regularly receive large numbers of passengers from cruise ships. The issue which received the second highest score was related to the identification of vulnerable targets that should be prioritised in emergency response plans for exotic animal diseases. This is in accordance with recommendations from international organisations that early detection and rapid response to mitigate the impact of transboundary diseases be improved (10). With regard to the prevention of exotic disease introduction, scores may reflect the perceived risk associated with a certain practice, commodity, or route, as well as the scope for management of such risks in a particular country. The fact that RA was seen as less applicable to the prevention of introduction of diseases through wildlife, animal feed and international passenger travel may reflect the assumption that these routes are not particularly important for the introduction of exotic diseases and/or the assumption that the results of an RA are unlikely to influence the way these routes are managed. The area of RA application that was of least interest was its use in documenting disease-free compartments for export purposes. This is not surprising given the limited livestock export potential of most countries in the region.

Table II
Infectious diseases considered a priority for the assessment of associated risks by national Veterinary Services of the Caribbean

The table shows the number of countries that included these diseases among their top 5 priority diseases
Only diseases selected by at least two countries are indicated

Disease	Number of countries
Highly pathogenic avian influenza	16
Foot and mouth disease	10
Rabies	9
Newcastle disease	7
Classical swine fever	6
Bovine spongiform encephalopathy	5
Brucellosis	5
Amblyomma variegatum infestation and associated diseases	4
West Nile fever and other equine encephalitis	4
Teschovirus encephalomyelitis	2
Tuberculosis	2
Leptospirosis	2

With regard to specific diseases of concern, the frequency with which they were perceived as among the most important diseases is presented in Table II. The results indicate that there are country-specific concerns and diseases that all countries consider important. Risk assessments at regional level are potentially very useful, but they do not eliminate the need for country-specific assessments of risk. Moreover, the authors expect this ranking of specific diseases to evolve with time, mainly being influenced by the regional or international health situation and, in particular, global health crises such as the H5N1 (from 2006) or H1N1 (from 2010) epidemics/epizootics.

The questionnaire revealed that most CVOs in the Caribbean consider the introduction of live animals, both official and uncontrolled, to be the most likely route for the introduction of exotic animal diseases, followed by the uncontrolled introduction of animal products by boat (commercial, cargo and private [Fig. 2]). Interestingly, accidental introduction following natural disasters obtained the fifth highest score overall (there was considerable rank variation between countries), which is noteworthy in the current context of environmental changes. However, the questionnaire was completed prior to the increase in awareness of this risk following the 2010 Haiti earthquake and Hurricane Tomas, which hit several Caribbean islands at the end of the same year; this rank would certainly have been different if the questionnaire had been submitted more recently.

Four ways of introducing exotic diseases (transit of international passengers, international waste on shorelines, the import of semen and embryos, and the import of hides, trophies and other animal by-products) were either given a low score or not scored. This result will be taken into account in training programmes supported by CaribVET to improve the knowledge of Veterinary Services about the risk associated with these specific routes.

When interpreting these results, it is important to bear in mind that the focus was on the release of an exotic pathogen into a region or territory. The exact location and mode of release and the frequency and type of contacts between countries within the region would determine the

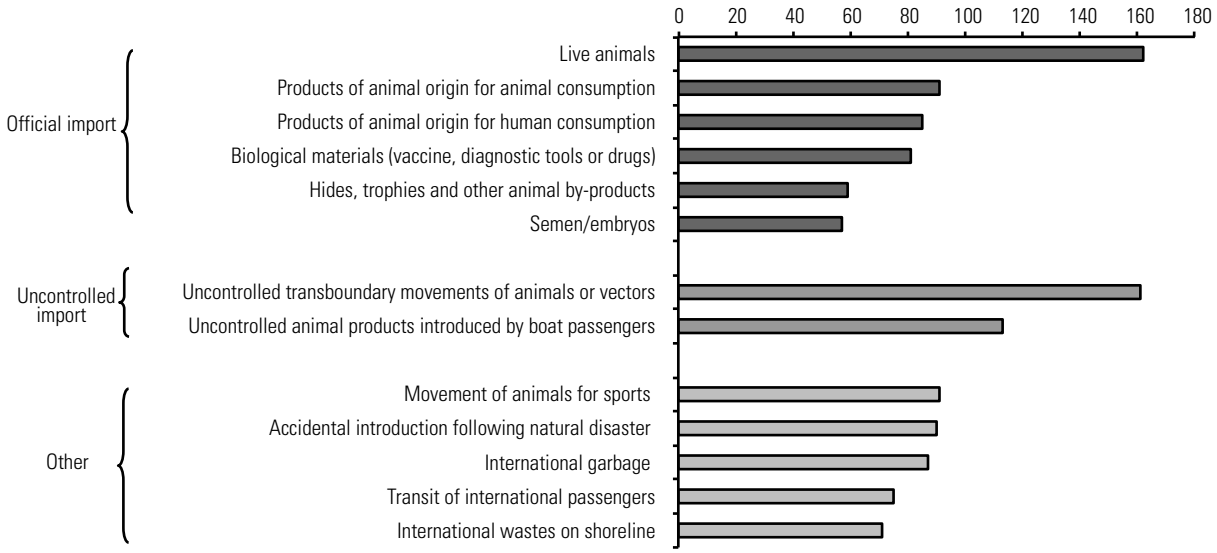

Fig. 2
Major potential routes of exotic disease introduction ranked by survey respondents
The score is calculated for each specific method of introduction by summing up all the weighted scores obtained from each country for the five exotic diseases they considered most important

likelihood of exposure of the livestock population of a specific country or territory following its release elsewhere. For this reason, efforts should be made to achieve a better understanding of within-region exchanges.

Recommendations and conclusion

The survey results and subsequent discussions resulted in two main recommendations for improving the regional assessment and management of animal health-related risks in the Caribbean region:

– Joint formal assessment of the risk of introduction of selected exotic infectious diseases offers the clearest opportunity for collaborative work among Veterinary Services in the Caribbean region and should be a priority. Initial assessments should focus on diseases which are of a shared regional interest, such as highly pathogenic avian influenza, foot and mouth disease or rabies, and should comply with OIE guidelines for import risk assessment. Given the impact of global health crises on the perception of regional priorities, the regional network should take into consideration objective criteria to adapt its disease-specific activities.

– Within the region, a better understanding of the exchanges of animals and products should be a priority, since it would enable network members to understand how the release of an exotic pathogen into a certain territory and via a given commodity may influence the risk of exposure of the livestock populations of other territories.

These recommendations have formed the agenda of the Epidemiology Working Group of CaribVET. The group has assessed the risks of the introduction of foot and mouth disease via importation of deboned beef, the risks of the spread of teschovirus encephalomyelitis, and the risk of the spread of classical swine fever within the region from endemic areas. The group is also characterising the network of animal movements and other exchanges between countries.

The CaribVET strategy of moving towards more coordinated regional work may be a useful example for other regional networks that face similar challenges in the assessment and prevention of animal health-related risks.

Acknowledgements

The authors thank all the Caribbean Chief Veterinary Officers for their active participation in this survey and in the CaribVET network. This work was co-funded by the European Regional Development Fund and Interreg IV Caraïbes 'CaribVET'.

The authors are also grateful to Cristobal Zepeda for his expertise and input in the CaribVET Epidemiology Working Group.

L'élaboration d'une stratégie de prévention des maladies dans la Caraïbe : l'importance d'évaluer les risques associés à la santé animale au niveau régional

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Résumé

En 2009, le réseau CaribVET a réalisé une enquête au sein des Services vétérinaires des pays et territoires de la Caraïbe afin d'évaluer les perceptions associées à l'évaluation du risque et d'identifier les principales maladies exotiques d'intérêt pour la région ainsi que leurs modalités d'introduction. L'étude a montré que l'introduction d'animaux vivants était considérée comme la voie d'accès la plus probable des agents pathogènes exotiques affectant les animaux, suivie de l'introduction non contrôlée de produits d'origine animale par les passagers des navires. Ces résultats ont été utilisés pour définir une stratégie d'évaluation des risques pour la santé animale qui tienne compte de l'importance des échanges intra-régionaux.

Mots-clés

Caraïbe – Évaluation du risque – Maladie endémique – Maladie exotique – Réseau de santé animale de la Caraïbe (CaribVET) – Services vétérinaires.

Elaboración de una estrategia de prevención de enfermedades en el Caribe: la importancia de determinar riesgos ligados a la sanidad animal a escala regional

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Resumen

En el 2009 CaribVET llevó a cabo una encuesta entre los Servicios Veterinarios de los países caribeños para valorar su percepción en relación con la evaluación del riesgo y para identificar cuáles eran las enfermedades exóticas que más preocupaban en la región, así como sus principales vías de introducción. Los resultados indicaron que la introducción de animales vivos se consideraba la vía más probable de introducción de patógenos exóticos para los animales, seguida por la introducción no controlada de productos de origen animal por los pasajeros de las embarcaciones. Estos resultados permitieron definir una estrategia regional para determinar los riesgos zoosanitarios, la cual considera la importancia de los intercambios dentro de la propia región.

Palabras clave

Caribe – Determinación del riesgo – Enfermedad endémica – Enfermedad exótica – Red caribeña de sanidad animal (CaribVET) – Servicios Veterinarios.

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