HEMORRHAGIC SEPTICEMIA PREVALENCE AND VACCINATION COVERAGE IN BOHOL, PHILIPPINES, JANUARY 2011 TO JULY 2012

Emerson P. Tapdasan and Caro B. Salces

ABSTRACT

Hemorrhagic Septicemia is a disease among ruminants which is of economic importance that affects livelihood of farmers who mainly rely on livestock raising as a source of income. This study described the spatio-temporal distribution of HS cases and vaccination coverage in Bohol island-province to elicit a holistic control of the disease. Data on HS cases and vaccination coverage were sourced out from the Philippine Animal Health Information System stationed at the Office of the Provincial Veterinarian of Bohol. Simple descriptive statistics were used to analyse animal and spatio-temporal distribution of HS cases and vaccination coverage. Regardless of species, the prevalence was 0.33% (4 per 1,000). Cattle had the highest individual prevalence at 0.65% (7 per 1,000) followed by buffaloes and goats at 0.26% (3 per 1,000) and 0.04% (1 per 1,000) respectively. Majority of cases were reported in February 2011 mostly in municipalities with low topography: Maribojoc, Loon, Panglao and Anda. Vaccination coverage for the whole province was only 3.5%. Vaccination drives must be intensified in municipalities identified with higher disease prevalence particularly in cattle and buffaloes.

Key words: Bohol, hemorrhagic septicemia, prevalence, vaccination coverage

INTRODUCTION

Hemorrhagic Septicemia (HS) is one of several economically important ruminant diseases in the Philippines that seriously affects revenues of livestock farmers particularly smallholders who mainly rely on livestock raising as a source of income. HS is an acute pasteurellosis, caused by particular serotypes of *Pasteurella multocida* and manifested by an acute and highly fatal septicemia principally in cattle and buffaloes and less commonly in goats and sheep. In an effort to control and prevent this dreaded disease, the Bureau of Animal Industry (BAI) produces alum-type precipitated HS vaccines for distribution to different provinces. However, with the limited supply of vaccines coming from BAI, the provincial government through the Office of the Provincial Veterinarian (OPV) procures additional vaccines from private suppliers to compensate for the inadequacy of volume. In turn, OPV distributes these vaccines to different municipalities through the Municipal Agriculturist Office (MAO). In most cases, municipalities with livestock dispersal programs also procure counterpart doses of vaccines. Vaccination is done every six months, depending on the availability of supply.

In 2002, the province experienced Hemorrhagic Septicemia outbreak. Since then vaccination drives have been conducted throughout the province but still, HS cases have been reported in several municipalities. With the adoption of the Philippine Animal Health Information System (Phil-AHIS) in 2011, animal health monitoring reports from the municipalities were standardized before submission to OPV. The diagnosis of HS is based on clinical signs and history, and made either by the municipal livestock technician or the veterinary officer at OPV. After

Philippine Carabao Center at Ubay Stock Farm, Lomangog, Ubay, Bohol, Philippines. (email: emtapz@yahoo.com.ph).

diagnosis or verifications have been made by the veterinary officer, these reports will be inputted into Phil-AHIS, an integrated database reporting system that manages all animal health-related data in the province.

This study aimed to describe HS prevalence and vaccination coverage in the province of Bohol to elicit a holistic control and management of HS. Specifically, it aimed to epidemiologically describe the HS cases and HS vaccination coverage in the province from January 2011 to July 2012, in order to provide recommendations for the prioritization of HS vaccine allocation based on the animal species, time and place distribution of HS cases.

MATERIALS AND METHODS

Data on the affected animal species, time and place distribution of HS cases, plus vaccine distribution by municipal livestock technicians were taken from Phil-AHIS. To compute for HS prevalence, data on total population of each ruminant species (cattle, buffaloes, goats and sheep) per municipality were collected from MAOs. The preceding data were also used to determine the proportion of animals vaccinated against HS. On the other hand, data on HS vaccine allocation by OPV were sourced out from the archives of OPV's Animal and Public Health Division. Only data from January 2011 to July 2012 were utilized as the operation of Phil-AHIS in the province commenced only on January 2011.

Data from Phil-AHIS were extracted and converted into MS Excel® format for descriptive analysis using the latter's statistical functions. Records on HS vaccine allocation were also encoded in MS Excel® and analyzed using the program's functions. To describe the topography, spatial distribution of HS cases and vaccine distribution, Quantum GIS® software was employed.

RESULTS

Six hundred seventy-nine (679) hemorrhagic septicemia cases were reported in Phil-AHIS from January 2011 to July 2012 in cattle, buffaloes and goat. Most number of cases were reported in the first six months (407 cases) with the month of February 2011 having the highest number of cases (158 cases) in the whole observation period (Figure 1). The median number of cases per month was 24. On the other hand, the highest peak of vaccine distribution by OPV was on February 2011 and 2012. It was also in February 2011 when the highest number of HS cases was observed. Cattle were the most affected animals with 70% of all reported HS cases followed by buffaloes and goats with 26% and 4% of total cases, respectively (Table 1). Of the 679 cases, only 20 were recorded to have died due to the disease, with 9 deaths for each bovine and bubaline species or a case fatality of 3%. Moreover, among the cases, animals aged 1-5 yrs old were the most affected (36%) followed by age-group below-1 year old (Figure 2). However, it is important to consider that 30% of cases had no records on the age of animals. In descending order, the most frequent clinical signs reported were anorexia/ inappetence, nasal discharge, hypersalivation/ frothy mouth, lameness, lethargy and fever.

Among the 48 municipalities including 1 city, only 3 municipalities (94%) had no record of HS case - municipalities of Bilar, Loboc and Valencia. However at the barangay level, 263 out of 1,109 barangays (24%) had cases of HS in the same observation period. As can be seen closely in the topography map (Figure 3), majority of cases were distributed in municipalities with low land elevation (Figure 2).

Looking at the individual animal prevalence regardless of species, the prevalence was only 0.33% (4 per 1,000). At the species level, cattle had the highest individual prevalence at 0.65% (7 per 1,000) followed by buffaloes at 0.26% (3 per 1,000) and

Table 1. Measures of morbidity and fatality due to Hemorrhagic Septicemia (HS) by species (January 2011 to July 2012).

Species	Vaccination distribution by species (%)	HS cases, n (%)	Period prevalence (%)	Fatalities from HS, n (%)
Cattle	38	476 (70)	0.65 (7 per 1000)	9 (1.89)
Water Buffalo	51	175 (26)	0.26 (3 per 1000)	9 (5.14)
Goat	11	27 (4)	0.04 (1 per 1000)	2 (7.41)
Unknown[1]	-	1 (0.15)	-	0
Total	100	679	0.33 (4 per 1000)	20 (2.95)

*Species of the animal was not identified in the record.

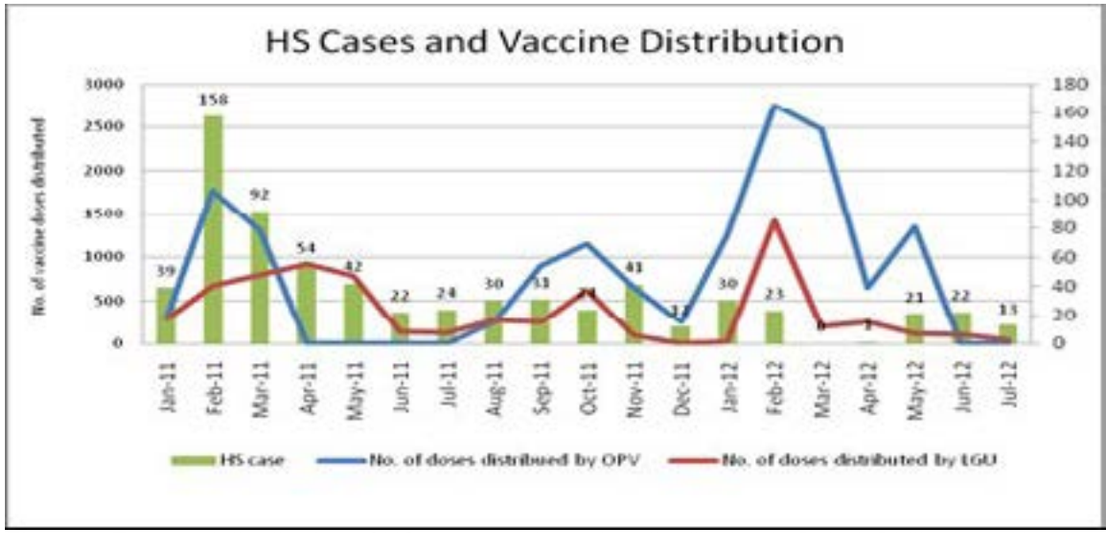

Figure 1. Temporal distribution of HS cases and vaccine distribution in Bohol, Philippines (January 2011 – July 2012).

goats with 0.04% (1 per 1,000) prevalence (Table 1). Herd or farm prevalence could not be determined as there were no available data on the total number of farmers raising ruminants, but there were 586 farmers affected by HS, all in small-scale type of production.

The prevalence of HS among cattle in Bohol from January 2011 to July 2012 was generally low and comparing between towns, Loon and Maribojoc had significantly higher prevalence in cattle (Table 2).

For HS in buffaloes, Panglao and Anda had the highest prevalence.

The best way to control the spread of HS in endemic areas is through vaccination. Although cattle was the most affected species, the proportion of cattle vaccinated against HS was only 38%, unlike in buffaloes and goat wherein the vaccination percentage was approximately more than half of the proportion of animals affected (Figure 2). Looking closely at the municipalities of Dagohoy and Dauis where majority of cases were reported, it can be

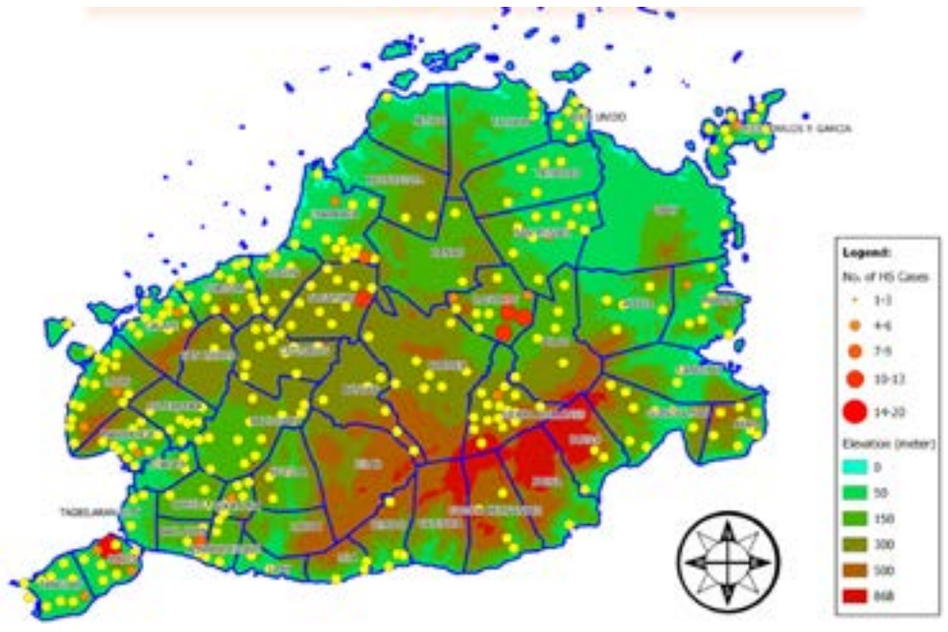

Figure 2. Hemorrhagic Septicemia cases and topography in Bohol, Philippines, (January 2011 – July 2012).

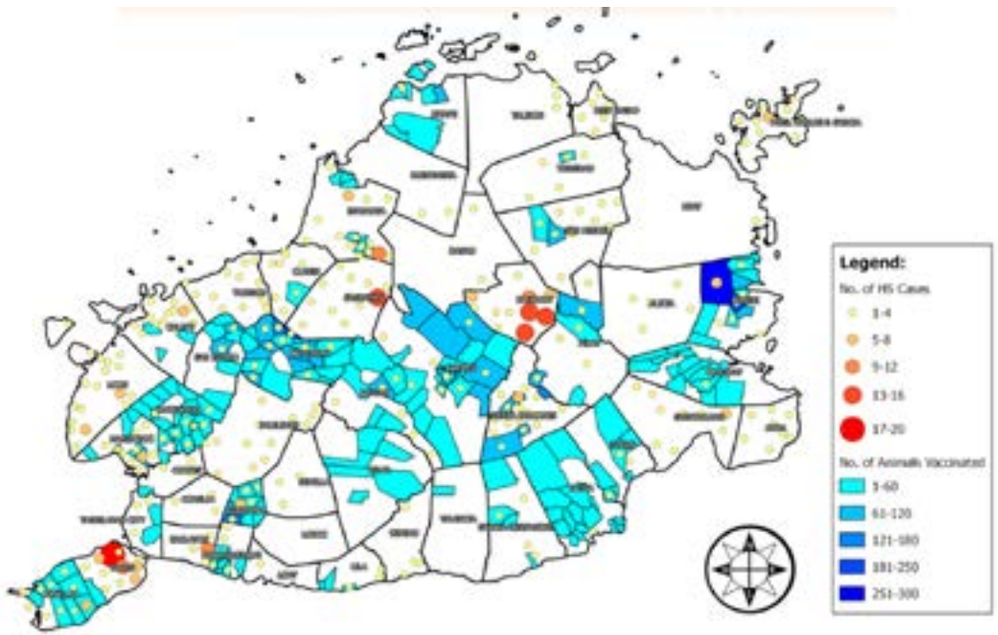

Figure 3. Geographic distribution of Hemorrhagic Septicemia cases and vaccine distribution by Municipal Agriculture Offices in Bohol, Philippines (January 2011 – July 2012).

Table 2. Municipalities in Bohol with significant HS prevalence (January 2011 to July 2012).

Municipality	Animal commodity	Prevalence (%)	95% Confidence Interval
Maribojoc	Cattle	11.11	8.07 – 15.13
Loon	Cattle	9.23	6.30 – 13.37
Panglao	Buffalo	4.44	1.37 – 14.84
Anda	Buffalo	3.26	1.54 – 6.93
Sikatuna	Cattle	2.71	1.45 – 5.07
Calape	Buffalo	2.24	1.27 – 3.97

seen that several barangays were affected but distribution of vaccines were concentrated only in 1 barangay of Dauis and none in Dagohoy (Figure 3). As for vaccine allocation, the OPV had distributed 15,050 doses to MAOs but only 7,133 doses were administered by the latter. The 7,917 (53%) unaccounted doses may not be recorded in the reports during vaccination activities conducted by livestock technicians or the vaccination reports were not yet inputted to Phil-AHIS. Using 2011 ruminant population data from BAS (2012), the overall vaccination coverage for the whole province was only 3.5% (7,133/ 206,387).

DISCUSSION

The country's climate is characterized by relatively high temperature, high humidity and abundant rainfall (Philippine Atmospheric, Geophysical and Astronomical Services Administration, n.d.). In Bohol, rainfall is evenly distributed throughout the year but a very pronounced maximum rain period can be observed from December to February (DARFU-7, 2010). The Center for Food Security and Public Health of Iowa State University (2009) claimed that outbreaks are particularly common during rainy weather, when the organism can spread readily. The World Organization for Animal Health (OIE) (2009) also added that in many Asian countries, HS disease outbreaks mostly occur during the climatic conditions typical of monsoon (high humidity and high temperatures).

From January 2011 to July 2012, the case fatality of HS in Bohol was only 3%. Mortality for HS is nearly 100% unless the animal is treated very early in the disease; few animals survive once they develop clinical signs (OIE, 2009). However, in the province of Bohol, the disease has gained high awareness among local farmers, municipal livestock technicians and barangay livestock aides (BALAs) and the disease has even had a local term called "*hagaw*". This high awareness could have guided the farmers to immediately report their animals suspected of having HS to the MAO for treatment by BALAs, municipal livestock technicians, or veterinarians from OPV. A report from the University of Georgia (2004) stated that several of the sulfonamides and antibiotics such as penicillin and tetracyclines can be used successfully in the early stages. These antibiotics were commonly used by livestock technicians in the field. This claim was supported by OIE (2009) in saying that antibiotic treatment is effective if it is started very soon after the onset of clinical signs. This could be one of the explanations why there was only a very minimal case fatality rate.

Most of the animals affected were aged 1-5 yrs old. In endemic regions, most adults have some immunity to the organism, and clinical cases tend to occur in young animals between the ages of 6 months and 2 years (Iowa State University, 2009). The reported clinical signs are fever, dullness and reluctance to move (OIE, 2009). Salivation and a serous nasal discharge then develop, and edematous swellings become apparent in the pharyngeal region.

Majority of the cases were distributed in areas with low topography (Loon, Maribojoc, Anda and Panglao). During rainy season, these areas served as the catch basin of water coming from mountainous areas. HS spreads quickly in wet conditions particulary if susceptible animals are closely herded (OIE, 2009). However, there could be other underlying factors to consider such as the density of HS susceptible animals in highly elevated areas. The municipalities with highest prevalence had smaller cattle and water buffalo population. Loon and Maribojoc were the fourth and ninth municipalities respectively with smallest cattle population. On the other hand, Panglao and Anda were the second and eighth municipalities respectively with the smallest water buffalo population in the province.

Vaccination drives should be intensified in areas where HS was reported. Having the highest prevalence, Loon, Maribojoc, Anda and Panglao must strengthen their efforts at the soonest possible time to reduce HS incidence. Likewise, vaccination drives should be concentrated in barangays where cases have been reported. It can be seen that although some HS affected municipalities have conducted vaccination drives, these were focused in barangays with no reported cases. Also, cattle and buffaloes need to be prioritized in so far as vaccination is concerned. Although it is encouraged to intensify vaccination in all HS-susceptible animals, it is very important to focus vaccination efforts in animal species that is most commonly affected by the disease. This is in consideration with other limiting factors such as availability of vaccines, logistics and manpower. A very pronounced maximum rain period can be observed from December to February, so vaccination schedules could be set on October or November at the latest to prevent epidemics.

ACKNOWLEDGMENT

The authors would like to thank Dr. Stella Marie D. Lapiz and the staff of the Provincial Veterinarian Office of Bohol, Dr. Romeo S. Gundran and the Food and Agriculture Organization of the United Nations-Regional Office for Asia and the Pacific for the financial support.

REFERENCES

Department of Agriculture, Regional Field Unit-7 (DARFU-7) Agribusiness and Marketing Assistance Division. 2010. *Bohol Provincial Agricultural Profile*. Mandaue City, Cebu.

Iowa State University. 2009. Hemorrhagic Septicemia. Retrieved on 26 November 2012 from http://www.cfsph.iastate.edu/Factsheets/pdfs/hemorrhagic_septicemia.pdf

Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). No date. *Philippine weather condition*. Retrieved on 29 November 2012 from http://kidlat.pagasa.dost.gov.ph/cab/climate.htm.

Philippine Bureau of Agricultural Statistics (BAS). 2012. *Ruminant population inventory.* Retrieved on 22 November 2012 from www.bas.gov.ph.

University of Georgia. 2004. Hemorrhagic Septicemia. Retrieved on 9 August 2012 from http://www.vet.uga.edu/vpp/gray_book/Handheld/hes.htm.

World Organization of Animal Health (OIE). 2009. *Haemorrhagic septicaemia*. Retrieved on 24 November 2015 from http://www.oie.int/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/Disease_cards/HAEMORRHAGIC_SEPTICEMIA.pdf.