


<b>Sheep as the Hosts of the Crimean-Congo Hemorrhagic Fever Virus in Kosova</b>			<b>Healthcare</b>
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<b>Abstract</b>			
<p>Crimean-Congo Hemorrhagic Fever (CCHF) virus which cause danger disease in country of Balkan. But also, this disease is none in Asia, Africa, and South Europe in Kosovo, Albania, Macedonia, Greece, Bulgaria, and Serbia. There strong evidence that the Kosovo sheep appear to play a role as virus and tick-vector host. We tested sheep from 5 municipality (Peja, Gjakova, Junik, Prishtina, Hani Elezit). It was tested 137 blood samples of sheep with the immunological ELISA method. Specific IgG antibody were detected in all sampled municipality, and detected high prevalence in municipality Gjakova 100% and Prishtina 83,33%, followed with Peja 25 %, Hani Elezit 12 % and Junik 10%. In basis of result which we receive, we can conclude that the CCHFV is present and circulate in sheep of Kosovo municipality in border of Albania, Serbia, Montenegro and Macedonia.</p>			

## Introduction

Crimean-Congo hemorrhagic fever (CCHF) is tick-borne virus disease with high fatality. The causative agent is the CCHF genus *Orthonairovirus*, family *Nairoviridae*, order *Bunyavirales*, the most tick-borne virus. Cases have been reported in Africa, Asia, Middle East, and South-East Europe (1,3,4,5). Significant incidence of disease increase in the last decades in southern-east Europe in Kosovo (1, 2, 6, 9, 10) Table 1., with endemic and non-endemic zone in central and south part, with dry climate, hot summers and cold winter, abundant rainfall, low bushes and density farming. These conditions provide an ideal of ecosystem condition for epidemiology of CCHF, special for main vector of CCHFV tick *Hyalomma*, *Rhipicephalus*, *Ixodes* and *Haemaphysalis* genus. The aim of the study was the determining the presence and prevalence of CCHF in sheep of 5 municipality (Peja, Gjakova, Juniku, Hani Elezit, Prishtina), which are in the border of 4 neighbor country; Albania, Serbia, Macedonia, Montenegro Fig.1. The aim of our investigation the connection with presence of CCHFV in Kosovo and neighbor country (1, 3, 4,6,7,8, 10,13,14). We tested 137 serum of blood samples, from sheep of non-endemic municipality, Peja, Gjakova, Junnik, Hani Elezit, Prishtina. We investigate possible of relation between presence of CCHFV in the 5 municipality of Kosovo which are in border of 4 neighbor countries of Kosovo, and prevalence of the present cases in Kosovo sheep, and cases in neighbor countries, where cases have been recorded (1, 3, 6).

## Material and Methods

Investigation was done during 2012-2014 in 5 municipality of Kosovo sheep which a in border of the counties; Albania, Macedonia, Serbia and Montenegro. The study are included Peja, Gjakova, Junik, Hani i Elezit, Prishtina. Serum and tick were collected during summer of 2012-2014 from 137 sheep. Animals was note in the system of the identification unit of Kosovo Food and Veterinary Agency. All collect sera were tested using the ELISA for quality and quantity determination IgG and IgM antibody to CCHFV in the Frirch-Loefer Institute (FLI) Greiswald, Germany. Samples with a positive or inclusive result in the in-house ELISA were rerun in a sheep adapted commercial CCHFV-IgG-ELISA. In cases of divergent results samples were tested in a sheep adapted commercial CCHFV-IgG-IFA (Evrooimun Lubeck, Germany) for final confirmation.



Fig. 1. Map of the study area.

## Results

The first description of CCHFV from Kosovo a reported for cases in the municipality Suhareka in the village Nishor and in village Cflik in municipality Hani Elezit on the border with Macedonia (1). There are strong evidence for the sporadic cases have continuously recorded on this area of Balkan Peninsula since 1952 (1). Overall prevalence is comparable to other endemic countries in the Balkan region, Bulgaria 2,8%, Greece 4,2% and Turkey 2,3, and notably lower than in earlier reports from Turkey 10-19,6%. In this investigation we tested 173 sheep from 5 municipality of Kosovo ((Peja, Gjakova, Junik, H. Elezit and Prishtina) they are in border of Montenegro, Albania, Macedonia and Serbia. In Peja 8 sheep, Gjakova 21, Junik 28, Prishtina 30, Hani Elezit 50. However, in 5 area of Kosovo the infection on human in very low compering with endemic municipality of Malisheve 43,63% and Rahovec 25,25% of human cases, but in sheep of municipality in border of Albania-Gjakova was 100%, with Serbia, was Prishtina 83,33%, Montenegro, Peja 25%, Macedonia, H.Elezit 12% (Table 1.). Cases of CCHFV in sheep of Kosovo in border with Albania and Macedonia a in corelacion with cases non in literature (1,2,3,4). The prevalence of IgG special antibody among sheep in Gjakova is extraordinary high. The results of our study clearly show an overlap between the incidence rate of CCHFV in Kosovo, sere prevalence in healthy human population and the sere prevalence in endemic area in sheep. From ecological point of view, the result is consistent with the ecological niches present in Kosovo area. Sere prevalence is highest in areas with low vegetation and high density of farming.

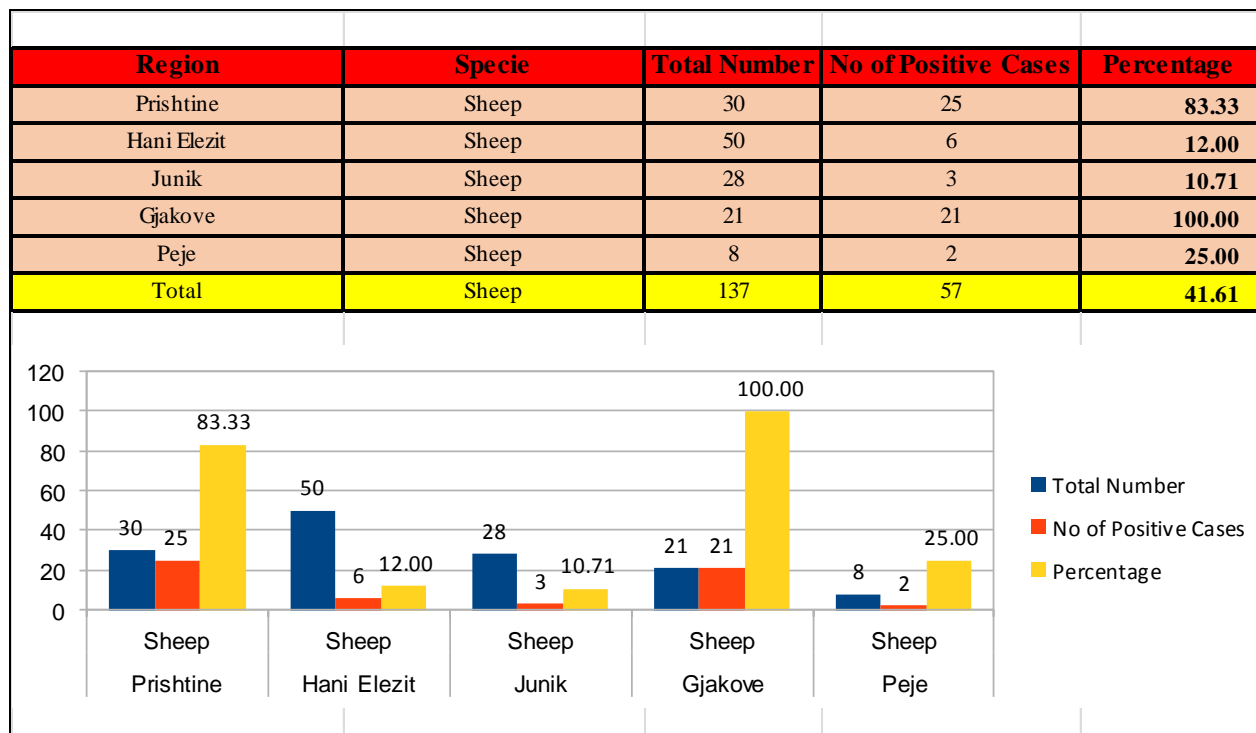


Fig. 2. The results of the study.

## Discussion

Our result of investigation has confirmed that the majority of the seropositive animals located in border of municipality with Albania, Gjakova with 100%, following Prishtina with 83,33 %, in border with Serbia, Peja with 25% in border with Montenegro, Hani Elezit with 12% in border with Macedonia, and Junik with 10%. Thereby prevalence in Gjakova municipality in border with Albania and neighbor endemic municipality Malisheve and Rahovec, is comparable with the data of the literature (1,2). This data is in connection with rates presence of the CCHFV in Albania and neighbor municipality Malisheve and Rahovec (1,2), since the overall sere prevalence rate in both countries is present. Overall sere prevalence is comparable to other endemic countries in Balkan region, Bulgaria 2,8%, Greece 4.2% and Turkey 2,3 % and notably lower than in earlier reports from Turkey (10-19.6%). Thereby, sere prevalence in the hyper-endemic areas in Kosovo is comparable to the report from Turkey. Since the sere prevalence rates in both counties are comparable.

Our investigation suggests that there is a high rate of unapparent infections in Kosovo. From ecological point of view, the results are consistent with the ecological niches present in Kosovo. This result is comfortable also with result of investigation in cattle (1). Sere prevalence in Kosovo is generally consistent with cumulative incidence of CCHF from 1999 to 2013(1) in different municipality, with highest incidence of disease (1). These results suggest that CCHFV could have been present in the sheep in Kosovo region in the past and has not been recognized. Of note are also neighbor municipality with endemic municipality are in correlation with high sere prevalent cases as the Gjakova municipality with neighbor municipality Malisheva and Rahovec.

There is an indication that CCHFV circulate in endemic and non-endemic area with highest prevalence of CCHFV in endemic municipality. From 173 sheep was examined serum of blood with animal IgG enzyme-linked immune sorbent assay (ELISA) at FLI Greifswald, Germany the presence of CCHF specific IgG of high prevalence of CCHF infection in Gjakova 100%, neighbor of Malisheva and Rahovec municipality, Prishtina with 83,33%, neighbor with Malisheva municipality, Peja with 25%, H. Elezit with 12% and Juniku with 10 % of prevalence.

It is important to emphasize that the Gjakova is located near Hasi region in Kukes (Albania), and the circulation of the CCHFV is related with presence of CCHFV among sheep in Has-Albania. We state that the differences between Kosovo and Albania is related with the number of the sheep examined in Kosovo is higher than in Albania. We make this comparable as the climate condition of the mating season is more or less equal.

There is a need for further investigation in order to identify which wild animals play an important role in hosting virus and tick as vector. The results of this study are important for the authority of Kosovo that are responsible for monitoring the CCHFV in Kosovo.

## Conclusions

Crimean-Congo hemorrhagic fever (CCHF) is an acute, tick borne disease often associated with hemorrhagic presentations and high case fatality rate. Kosovo result highly endemic area for CCHF in sheep under ELISA examination. Our result of investigation in Kosovo showed a prevalence 41.61% in total of examined sheep. ELISA results has confirmed that the majority of the seropositive animals located in border of municipality with Albania in Gjakova region, where all sheep result positive (100%). Following Prishtina with 83,33 %, in border with Serbia, Peja with 25% in border with Montenegro and Hani i Elezit with 12% in border with Macedonia. The lowest seroprevalence in the sheep was recorded in Junik with 10% of examined samples.

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