

# DEVELOPMENT OF AN ANIMAL HEALTH SURVEILLANCE INFRASTRUCTURE IN BOSNIA AND HERZEGOVINA – CASE REPORT

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**Summary:** Since 1996, Bosnia and Herzegovina has made significant efforts to enhance its national veterinary infrastructure in order to improve animal health, public health, and food safety. Many international agencies and donors have invested substantial funds to rebuild the livestock industry which was devastated during the last war (April 1992 - November 1995). There have also been significant efforts to improve veterinary services in the country. However, improvements only became apparent after the State Veterinary Administration for Bosnia and Herzegovina was established in December 2000. Recent World Trade Organization accession negotiations and efforts to comply with Sanitary-Phytosanitary agreement have underscored the need to further address animal health and disease issues at a national level in Bosnia and Herzegovina. The Animal Health Economics Center of the Veterinary Faculty in Sarajevo has collaborated with the Animal Population Health Institute of Colorado State University since 2001. Since this cooperation began, many activities have been initiated to develop and establish an effective national veterinary infrastructure. Training programs and technical workshops supported through United States Department of Agriculture funding have been organized in Bosnia and Herzegovina, and topics covered to date include: animal health control programs, surveillance, national disease prioritization, food safety, and the initiation of regional cooperation. National surveillance systems are now being developed and implemented for diseases targeted as a result of a disease prioritization workshop.

**Key words:** Bosnia and Herzegovina; veterinary service development

## Introduction

To fully understand agriculture production in Bosnia and Herzegovina (BiH) we must bear in mind the enduring consequences of the war (April 1992 - November 1995). These include a substantial decrease in the human population, massive outward migration and widespread social problems related to refugees. BiH is also a country in transition from a communist regime and suffers substantial weaknesses in public administration, taxation and its general economy. The Dayton peace agreement did

not provide a legal framework for a ministry of agriculture at the state level and instead delegated the responsibilities for most of governmental functions including agriculture to its two Entities, the Federation of Bosnia and Herzegovina (FBiH) and Republic of Srpska (RS) and the independent district of Brčko (BD). This, coupled with a distinct lack of coordination between its three parties, has presented a major handicap to the country's development during the post war period (1).

With respect to veterinary services, the lack of a central level administration and a national disease control and surveillance plan during the period from 1995 to 2003 created negative consequences on the animal health situation and isolated the country

from regional and international markets as well. Reliable animal disease data were almost non-existent during the immediate post-war period (2). Initially, disease information was passively acquired, and collection was sporadic and most commonly initiated in response to public pressure. The usual response to a disease outbreak was through a policy of test and removal of sero-positive animals, but even this was hampered by a lack of sufficient funding.

Improvement in animal disease surveillance and control only became possible once the State Veterinary Administration (SVA) for BiH was established in December 2000 (3). However, the SVA became effective only after a state veterinary law was adopted in October, 2002 (4). Recent World Trade Organization (WTO) accession negotiations and efforts to comply with Sanitary-Phytosanitary (SPS) agreement have underscored the need to further address animal health issues at a national level in BiH.

The Animal Health Economics Center of the Veterinary Faculty in Sarajevo has collaborated with the Animal Population Health Institute (APHI) of Colorado State University since 2001. Since this co-operation began, several activities have been initiated to develop and establish an effective national veterinary infrastructure. Training programs and technical workshops supported through United States Department of Agriculture – Animal and Plant Health Inspection Service (USDA-APHIS) funding have been organized in BiH, and topics covered to date include: animal health control programs, surveillance, national disease prioritization, food safety, and the improvement of regional cooperation. National surveillance systems are now being developed and implemented for targeted diseases as a result of a disease prioritization workshop.

The objectives of this paper are to: 1) present animal health data collected from 1996 through the end of 2005, 2) review the progress made in the development of the national veterinary infrastructure through the cooperation established with international partners, and 3) discuss proposed future activities based on the experience gained.

## Development of surveillance infrastructure

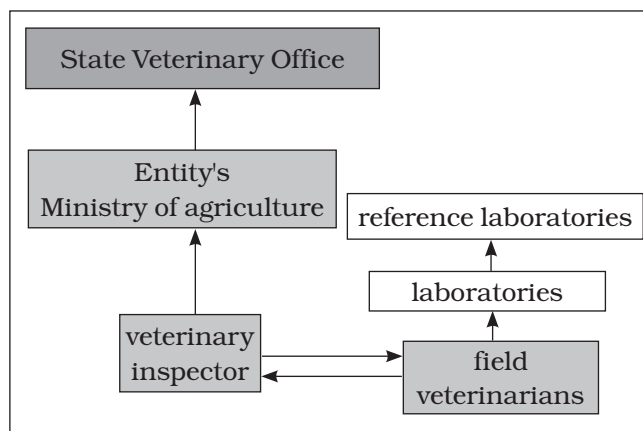
### *Animal disease reporting system in Bosnia and Herzegovina*

The livestock population in BiH was substantially reduced as a consequence of the devastating war that occurred in the early 90's. As reported previously (5), there was a decline in the animal popu-

lation by more than 60% in a large part of the country. Unfortunately, exact population data still do not exist, and available studies provide conflicting figures. A cattle identification and movement control scheme has been in existence since 2003, however, estimates are that only about 50 % of the cattle population has been registered (6). According to current estimates BiH has approximately 400,000 cattle, 1,000,000 sheep and goats, 400,000–600,000 pigs, 17,000–31,000 horses and 3,000,000 poultry (5).

Animal health care is primarily provided by a network of public and private veterinary practices. Disease surveillance is accomplished through a complex arrangement, as laboratory samples are submitted by multiple sources, including veterinary practices, producers, and veterinary inspectors. Laboratory diagnosis is organized through a network of eight animal health diagnostic labs. However, all of these labs essentially provide identical levels of services. There is a need to develop specialization within the laboratory system, to facilitate the development of expertise in the individual labs.

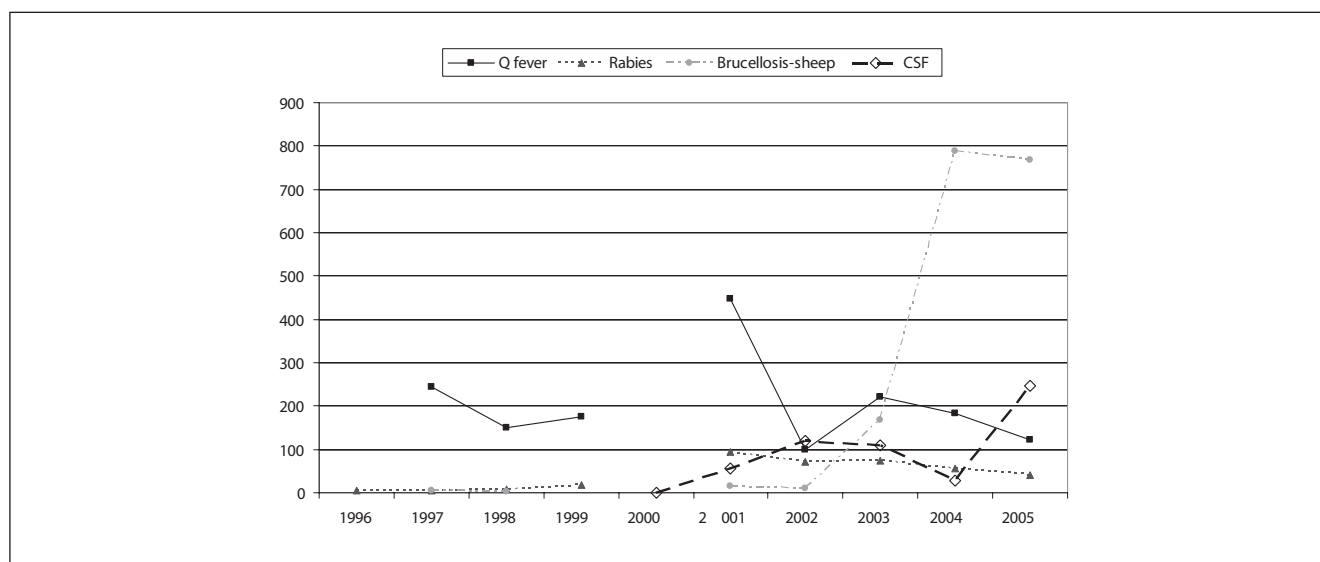
During the period 1995 to 2003, the disease reporting system was organized exclusively at the entity level and data were compiled from various independent sources. Data were collected through a passive system and rarely exchanged between agencies and stakeholders (7). Diseases were reported by sources from the entity veterinary sectors and included leptospirosis, Q fever, rabies, brucellosis of sheep, trichinellosis and Classical Swine Fever (CSF). A centralized disease reporting system was introduced in May, 2003 and improvements were made in the collection of data from both the entity administrations and through laboratory sources (Figure 1).



**Figure 1:** Scheme of sample submission and data flow within current disease reporting system in BiH

Targeted actions on improvements in the reporting of diseases such as brucellosis, bovine leptospirosis and CSF illustrated the importance of developing more comprehensive and scientifically based surveillance. However, the previous lack of scientific approaches to disease surveillance and

current undetected disease occurrence has escalated the number of cases of sheep brucellosis and, consequently, the number of human brucellosis cases. Currently available data indicate rabies, CSF, Q fever and brucellosis may be endemic in the country (Figure 2).



**Figure 2:** Reported outbreaks\* of several important diseases (q fever, small ruminant brucellosis, rabies and classical swine fever) in BiH from 1996 to 2005

\*definition of an outbreak adopted from the current legislation on reporting of the occurrence of animal diseases whereas the outbreak constitutes occurrence of one or more disease cases in the same epidemiological unit (most commonly farm, or backyard)

The increase in sheep brucellosis cases has many possible but no scientifically plausible explanations, as none of the disease or animal population at risk data were collected actively during the reported period.

Steps taken and progress made through international cooperation

International efforts were initiated in 2000 to assist the country in developing capacity in its animal health infrastructure. It was clear that due to its lack of domestic resources, the BiH veterinary community needed to acquire outside knowledge on the epidemiology of infectious diseases and surveillance strategies. An initial mission was conducted in BiH by a team from the APHI of Colorado State University in spring 2001. A plan was then created to address institutional development and approaches for solving significant animal health issues. This plan was presented to all levels of government and to all stakeholders. It placed emphasis on the initiation of educational and training activities and it made

strong recommendations for the establishment of a central veterinary body along with the development of coordination plans between veterinary agencies on different administrative levels within the country. In accordance with this plan activities were conducted during the period from 2001 to 2005:

- In September 2001 a joint USDA-APHIS: Centers for Epidemiology and Animal Health (CEAH) and Colorado State University (CSU): APHI seminar was conducted in Sarajevo on animal health control programs;
- A workshop on animal disease surveillance was held in Sarajevo in September 2003. This was also a joint USDA-APHIS:CEAH and CSU:APHI project;
- A workshop was conducted on animal disease control prioritization in Sarajevo in October 2004;
- A workshop with title “Food safety solutions: status and perspectives in Bosnia and Herzegovina”, was conducted in Sarajevo in May, 2005;

- Two young professionals from the Veterinary faculty Sarajevo successfully completed a master's degree in preventive veterinary medicine (MPVM) and a Master of Science degree at the University of California at Davis and CSU, respectively.

## Results

International efforts delivered within collaboration of above listed scientific institutions from USA and BiH had catalyzed development in the animal health infrastructure and assisted in achievement of several important objectives during reported period:

- A functioning State Veterinary Administration was established under the Ministry of Foreign Trade and Economic Relations (MFTER) in December 2000.
- A state veterinary law was adopted in October, 2002.
- An Animal health economics center was established in 2003 as joint effort of the Veterinary faculty Sarajevo, Animal Health Population Institute of Colorado State University and USDA:APHIS.
- Compilation and distribution of monthly epidemiology reports to domestic and international veterinary authorities and trading partners began in May 2003.
- In fall 2004 an agreement was made with neighboring countries to create a regional task force to develop a regional animal disease surveillance program.
- A surveillance project to detect current levels of brucellosis in sheep was conducted by a member of the Veterinary faculty in 2006 as part of a master's degree program in veterinary epidemiology. During this project it was determined that "official" figures for brucellosis prevalence are far below the true levels. A direct result of this project will be to improve the control of brucellosis in animals and humans.

As a result of the disease prioritization exercise for significant animal diseases conducted during October 2004 disease prioritization matrix was created (Table 1). Prioritization working group was made from representatives of veterinary and public health administration from BiH and neighboring countries (Croatia and Serbia) and animal producers from BiH. The group first selected factors they considered to be significant in prioritizing disease surveillance activities (public health impact, inter-

est to region, impact to animal production, impact on export, etc.). Once this was accomplished, each evaluating factor was ranked according to its relative importance (with five being the most important factor). A discussion was held to determine which diseases would be evaluated by this system. Rabies, brucellosis, Q fever, tuberculosis, CSF, bovine spongiform encephalopathy and bluetongue were selected. The group then weighted consequences of selected diseases on every factor individually using scale of one to three (with three being the most significant consequences). Once the ranking of each disease was established in accordance with each of the evaluating factor, priorities were determined. Score for a disease was tabulated by taking its rank for each factor affection priority level of a disease (column) and multiplying it by the weighting factor for the respective consequences (row). These scores were then totaled for each disease across all prioritization factors (columns). These totals determined the individual disease ranking.

Final evaluation of these diseases considered other factors such as costs and the feasibility of conducting surveillance on multiple disease agents within a single surveillance system. Using prioritization matrix, brucellosis (overall score 50) and bovine spongiform encephalopathy (overall score 50) were identified as the most important diseases, followed by tuberculosis (48), Q fever (45), rabies (43), classical swine fever (41) and bluetongue (26).

## Current and future challenges

Work must progress towards accession to the WTO, and this will require even more dedicated commitment from the veterinary services in the country. As well, work must continue towards harmonization with the EU economic space, another project that will require a significant contribution from the veterinary sector. A major goal will be to reassess the current disease information system and adjust it to prevailing surveillance requirements. The resulting system must involve participation of all agencies within the veterinary services of BiH. This project will include the design and implementation of monitoring and surveillance plans for important infectious animal diseases.

The establishment of scientifically based surveillance for diseases identified as the top priority will result in reliable, complete and timely acquired data and will be a key factor for gaining entry into the WTO and harmonizing with the European Commu-

**Table 1:** Disease prioritization matrix for Bosnia and Herzegovina

Ranking/ weight of consequences		Public health	Interest to region	Impact on production	Impact on export		Feasibility of control	Cost of control	Public opinion
					Animals	Products			
		5	3	3	1	2	2	4	2
High	3	*R, B, Q	TB	CSF	CSF, B, BSE, BT	CSF, BSE	TB	R, BSE, Q	R, TB, BSE, Q
Medium	2	TB, BSE	R, CSF, B, BSE, BT	B, TB	Q	B	R, B, BSE	CSF, B, TB, BT	B
Low	1		Q	BT, BSE, Q	TB	TB, BT, Q	CSF, BT, Q		CSF, BT
No	0	CSF, BT		R	R	R			

Legend: \*- R- rabies, B- brucellosis, Q- Q fever, CSF- Classical Swine Fever, TB- tuberculosis, BSE- Bovine Spongiform Encephalopathy, BT- Bluetongue

nity. In contrast to what are current practices and what is prescribed by outdated legal requirements, future animal disease surveillance activities should rely on systematically collected data from field. The key elements for this include; defining cost-efficient and statistically justified sample size and frequency of samples collection, computerization of data management and clearly defined format and addresses for disease reports distribution. A related goal will be to develop future coordination of activities between animal health and public health agencies. As mentioned earlier, an agreement has been reached with neighboring countries to create and implement a regional task force to develop an animal health reporting system.

## Conclusion

It is evident that transitional and developing countries face great challenges in meeting international requirements for animal health, public health and animal welfare. However, international cooperation and support focusing on the transfer of knowledge on epidemiology and surveillance activities could be very helpful in meeting this goal. Our work demonstrated that the improvement of the animal disease reporting system is requisite for the establishment of a surveillance infrastructure. Future activities might be focused on more specific training

for surveillance and control of diseases identified as national priorities, improvement of diagnostic capabilities and the identification of appropriate funding for surveillance activities.

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## RAZVOJ NADZORNEGA SISTEMA ZA OHRANJANJE ZDRAVJA ŽIVALI V BOSNI IN HERCEGOVINI – STROKOVNO POROČILO

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**Povzetek:** Bosna in Hercegovina se od leta 1996 intenzivno ukvarja s postavitvijo nacionalne veterinarske infrastrukture, da bi izboljšala zdravstveno stanje živali, zdravje ljudi in varnost prehrane. Številne mednarodne agencije in donatorji so namenili precejšnja sredstva za obnovitev živinoreje, ki je bila hudo prizadeta med zadnjo vojno (od aprila 1992 do novembra 1995). Precejšen trud je bil vložen tudi v izboljšanje veterinarske službe v državi. Izboljšave so postale očitne, ko je bila decembra 2000 ustanovljena državna veterinarska uprava. Nedavna pogajanja o priključitvi k Svetovni trgovinski organizaciji (WTO) in prizadevanja, da bi ustrezali sanitarnim in fitosanitarnim sporazumom, so pokazala potrebo po nadaljnji analizi zdravstvenega stanja in nevarnih bolezni na državnem nivoju.

Center za ekonomiko zdravja živali pri Veterinarski fakulteti v Sarajevu od leta 2001 sodeluje z Inštitutom za zdravje živalskih populacij iz Kolorada (Animal Population Health Institute, Colorado State University). V tem času poteka več dejavnosti za razvoj in ustanovitev učinkovite nacionalne veterinarske infrastrukture. Ministrstvo za kmetijstvo iz ZDA (Department of Agriculture) je podprlo učne programe in tehnične delavnice. Do danes so z izobraževanjem pokrili naslednja področja: programe za preverjanje zdravja živali, nadzorstvo, državne prednostne liste bolezni, varnost prehrane in spodbujanje regionalnega sodelovanja. Sedaj se razvijajo in uvajajo državni nadzorni sistemi za bolezni, ki so bile izbrane na delavnicah za prednostne liste bolezni.

**Ključne besede:** Bosna in Hercegovina; veterinarska služba – razvoj