



**MINISTRY OF LIVESTOCK AGRICULTURE AND FISHERIES**



**GENERAL DEPARTMENT OF LIVESTOCK SERVICES**

**EPIDEMIOLOGY UNIT**



**EPIDEMIOLOGICAL SURVEILLANCE MANUAL**

**I.- BOVINE SPONGIFORM ENCEPHALOPATHY**

**OCTOBER 2002**

## **EPIDEMIOLOGICAL SURVEILLANCE MANUAL**

### INTRODUCTION.-

One of the tasks of the Epidemiology Unit of the General Department of Livestock Services is to develop epidemiological specific surveillance systems applicable to diseases that have the most important economic consequences in our livestock activities.

This is the first plan designed for the surveillance of bovine spongiform encephalopathy. It is intended for official and private veterinarians and producers and it is complemented by the corresponding Contingency Plan.

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## **1.- AIMS OF THE EPIDEMIOLOGICAL SURVEILLANCE ON BOVINE SPONGIFORM ENCEPHALOPATHY (BSE)**

According to the OIE International Animal Health Code, annex 3.8.4. "Surveillance and monitoring systems for bovine spongiform encephalopathy", such systems have, at least, two aims: one is to determine whether the disease is present in a country, and the other, in case the disease has been diagnosed, to observe the evolution of the epizootics, establish control measures and monitor the results of said measures.

The surveillance strategy may call for a combination of several methods for data collection. To meet the aims, information regarding suspicious cases (similar nervous conditions) and regarding samples taken in slaughter houses shall be collected.

The species covered by this system are domestic animals, pets, animals in zoos, circuses or in captivity that show nervous symptoms or locomotive disorders originated in the central nervous system.

## **2.- DESCRIPTION OF THE MAIN CHARACTERISTICS OF BSE**

Bovine Spongiform Encephalopathy (BSE) is a terminal neurodegenerative cattle disease registered for the first time in 1986; its causal agent is the infectious protein called prion. It is characteristic of this protein to resist conventional methods of inactivation and sterilization, to resist the action of proteolytic enzymes and to autoreplicate in the organism.

This disease has long asymptomatic incubation periods of 4 – 6 years. The first clinical signs are nervousness, behavioral changes, sensory problems, locomotive changes, deterioration of the general condition, reduction of milk yield, and death or slaughter *in extremis* due to lesions caused by the animal lying for long periods, traumatism or side complications. Diagnostic procedures are based on conventional histopathological examination and immunohistochemical examination of different areas of the brain. Other procedures based on ELISA and Western Blot techniques, which require premises and equipments of a high biological security, can be used. Other procedures used are electronic microscopical analyses and bioassay in transgenic animals. BSE has expanded to different countries through the trade of live animals or meat and bone meal from infected ruminants. This disease has expanded through meals to several exotic species in zoos, to domestic cats and to the man.

Since 1996, the World Health Organization has included BSE among the zoonoses; the human disease related to BSE has been called New Variant of Creutzfeldt-Jakob Disease (vCJD), due to some similarities with the prionic human disease called Creutzfeldt-Jakob Disease (CJD) which was described for the first time in 1920.

## **3.- DEFINITION OF SUSPECTED CASE AND CONFIRMED CASE**

An animal suspected of being infected by a BSE is any live bovine, slaughtered or which has died, that suffered or has suffered neurological or behavioral anomalies or a progressive deterioration of its general condition, which can be ascribed to a CNS problem, and which cannot be explained by any other diagnosis based on a clinical examination, the response to a treatment or a post-mortem examination or an ante or post mortem laboratory analysis.

A positive bovine is the one in which the disease has been confirmed by means of histopathology and/or immunohistochemistry.

## **4.- PASSIVE COLLECTION OF DATA**

### **4.1.- Compulsory Report of Transmissible Spongiform Encephalopathies (TSE)**

Pursuant to article 2, Law N° 3606 of April 3, 1910 and the Resolution of the General Department of Livestock Services (DGSG) dated January 15, 1996, every owner or holder of a domestic animal, zoo animal, or animal in captivity which shows nervous symptoms or locomotive problems of central origin is bound to report TSEs immediately to the Health Authority – Departmental Animal Health Division, Department of Animal Health Division, and /or Department of Veterinary Laboratories Division (DILAVE) or to the Coordinator of TSE Surveillance. This obligation is applicable to all official or private veterinaries.

Should a neurological case with clinical symptoms of central origin be diagnosed with a sub acute evolution that does not respond to usual symptomatic treatments must be reported to the abovementioned offices.

The General Department of Livestock Service (DGSG) has established that the expenses caused by these actions be exempted from payment of fees.

A set of instructions and a technical form has been established to record anamnesic data, and sample taking and submission. It is essential to submit the data requested and it is mandatory to take note of the DICOSE reference of the establishment affected.

After the report has been submitted and once the form with the information or the assistance request has been filled in, it is possible to submit the requested samples or a technical team from DILAVE or DSA shall visit the establishment to take the same.

#### **4.2.- Procedure in case the disease is suspected (clinical cases originated in the central nervous system in bovines older than 2 years of age)**

Should animals with symptoms originated in the central nervous system according to number 3 above appear, the following circumstances must be taken into account: breed, category, feeding, kind of establishment, handling of animals, reproduction practices and record of incomes and outcomes, exposed animals, and species that integrate the herd of the establishment.

As this is an exotic disease, examinations for a differential diagnosis must be performed, so the sample submitted must contain materials to this purpose. It is expressly recommended to take the whole brain and send the sample according to the laboratory instructions.

Neurological cases in bovines registered in Uruguay include cases of hypoglucaemia, hypocalcemia and hypomagnesemia, "fallen" animals, virus encephalitis due to virus herpes, such as Bovine Infectious Rhinotracheitis (BIR), cerebro-cortical necrosis, Malignant Catarrhal Fever, Babesiosis *Babesia bovis*, Listeriosis, Botulism, micotoxycosis, toxic plants, tetanus and different hepatopathies that appear with neurological cases, traumatismos, hereditary malformations and primary or secondary tumoral pathology (not very frequent).

In Uruguay, cases of Paralytic Rabies have never been diagnosed and cases of Urban Rabies have not been diagnosed since 1966.

BSEs in affected animals have a wide range of symptoms that may be mistaken for those of any of the diseases registered, but the type of spongiform lesion and the place where it appears are characteristic of this disease, so **samples must always have the brain pons, corpora quadrigemina, medulla, obex and at least five centimeters of marrow from its cervical portion.**

#### **4.5.- Sampling at field level**

To make field studies on animals showing neurological symptoms of central origin easier, a form (Form A) and a guide have been designed for the sampling.

Bovines showing signs of neurological diseases must be observed during a reasonable period, one or two weeks if possible, to determine whether symptoms move towards more severe progressive forms. If the animal does not get over and therapeutic treatments do not lead to a progress, the animal must be killed.

#### **4.6.- Submission of samples**

Samples must be submitted to the Central Laboratory of the Veterinary Laboratories Division "Miguel C. Rubino" (DILAVE) or to the Regional Laboratories.

Call the Department of Pathobiology of the Central Laboratory or contact the Coordinator of TSE Epidemiological Surveillance, and ask for advice to perform examinations should a neurological case appear. When submitting samples, the way of submission must be stated as well as personal data for a prompt communication.

## 5.- ACTIVE COLLECTION OF DATA

### 5.5.1.- Selection of animals from which samples shall be taken in slaughter houses

In case of BSE, these examinations are performed in slaughter houses on animals showing symptoms of cachexia, traumatismos of different nature and severity, animals fallen in waiting-pens or which have died in the ante mortem or showed other symptoms that according to the inspectors of the Health and Hygiene Service justify the extraction of the sample. For the sampling and submission of samples, form B shall be used. *In annex I the technique for the extraction of the brain is described.*

**5.5.2.- Submission of samples.** Steps mentioned in 4.6 above must be followed.

## 6.- PRECAUTIONS BEFORE TAKING SAMPLES

1. Use adequate clothes and elements when you work with *post mortem* samples, whatever the cause of death was.

2. When *post mortem* examinations are performed on suspected animals or animals that have suffered from progressive neurological symptoms, with a deterioration of the general condition, samples shall be taken as follows :

- I) Fresh samples cooled for microbiological examinations, bacteriological or viral isolation; containers shall be kept clean and sterilized.
- II) Samples for histopathological examinations shall be submitted in a formol saline solution at 10% (physiological serum 900 ml plus 100 ml of formaline at 40%); use in the proportion of about 3 lts of formol solution per bovine brain. If you submit fragments of bone marrow show clearly which region they belong to.

3. Although the transmission through aerosols may be low, it is recommended to avoid them; precautions in field and laboratory activities must be taken, it is important to avoid contact with open injuries or mucous membranes.

4. In field work make minimal use of sharp objects and keep needles and used materials safe. To obtain the brain follow the instructions.

5. Use adequate rubber gloves. It is advisable to use two pairs of disposable gloves: the first one made of rubber and the second one made of latex. They have to be incinerated after taking the samples. It is also advisable to cover your mouth.

## 7. DATA PROCESSING

The report of suspected cases must be sent to the Animal Health Division which notifies the General Department of Livestock Services. The sample from the suspected bovine is received.

If this sample shows positive results DILAVE shall notify the Animal Health Division and the General Department of Livestock Services. This department puts into practice the Health Emergency National System and shall completely follow the Contingency Manual for BSEs.

If the sample shows negative results, the laboratory shall notify the Animal Health Division and the General Department of Livestock Services for its processing.

Should samples taken in slaughter houses show negative results they must be reported monthly to the offices above mentioned.

Should samples taken in slaughter houses show positive results the above mentioned steps shall be followed.

A monthly and an annual consolidation shall be performed per geographic area, age category and bovine breed.

## ANNEX I

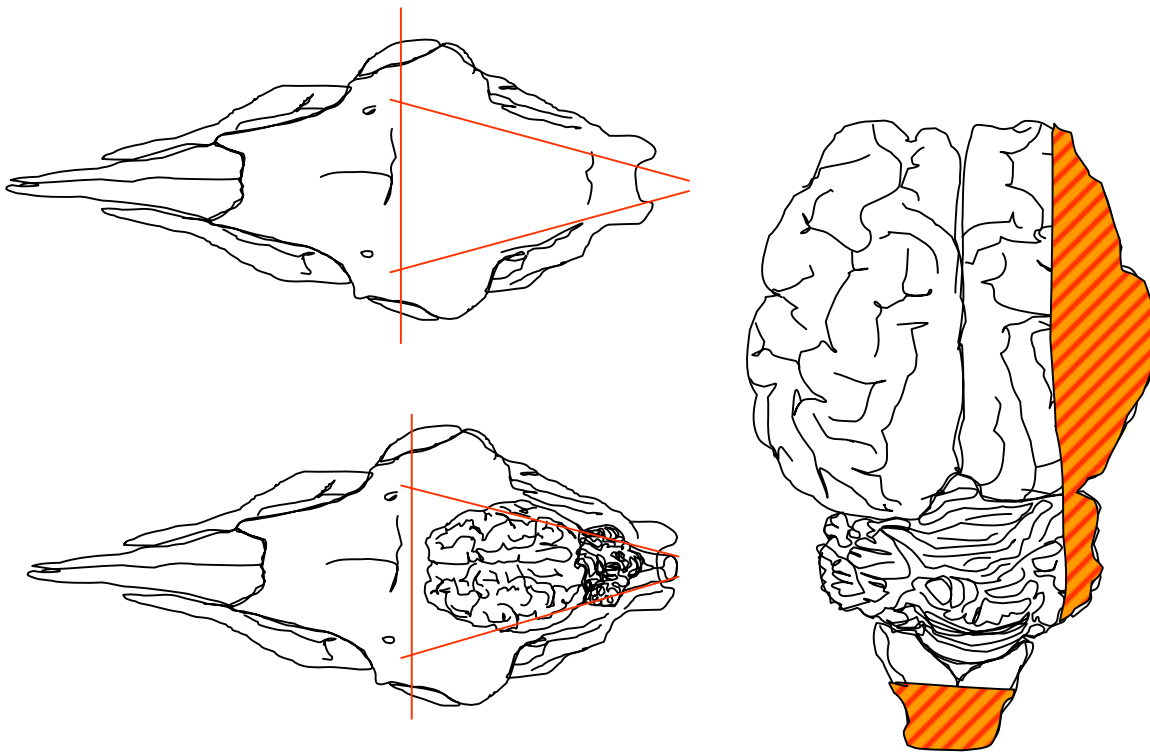
The whole brain must be removed from the skull, together with a portion of the marrow bone. The brain can be divided as follows:

a) the brain is cut in the mesencephalic area – towards the cranium portion of the brain pons, incising the space between the brain hemispheres and the limit between the areas of the thalamus and the mesencephalon; the remaining caudal portion contains the brain pons and the marrow. The brain hemispheres are severed by a longitudinal cut along the medium line. A part of the brain hemispheres must be taken for microbiological or immunological examinations and the remaining portion is placed in a formol solution at 10% in buffered saline solution, without performing any other incision.

b) remove the lateral portion of the cerebellum (1/3) and place it with the portion of the brain hemisphere taken for microbiological and immunological examinations

c) a portion of the marrow must be removed for microbiological and immunological examination. (coloured area).

d) the remaining parts – marrow, brain pons and cerebellum shall be put into the above mentioned formol saline fixative solution.

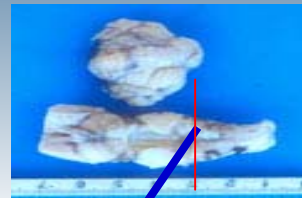


### ***Brief method***

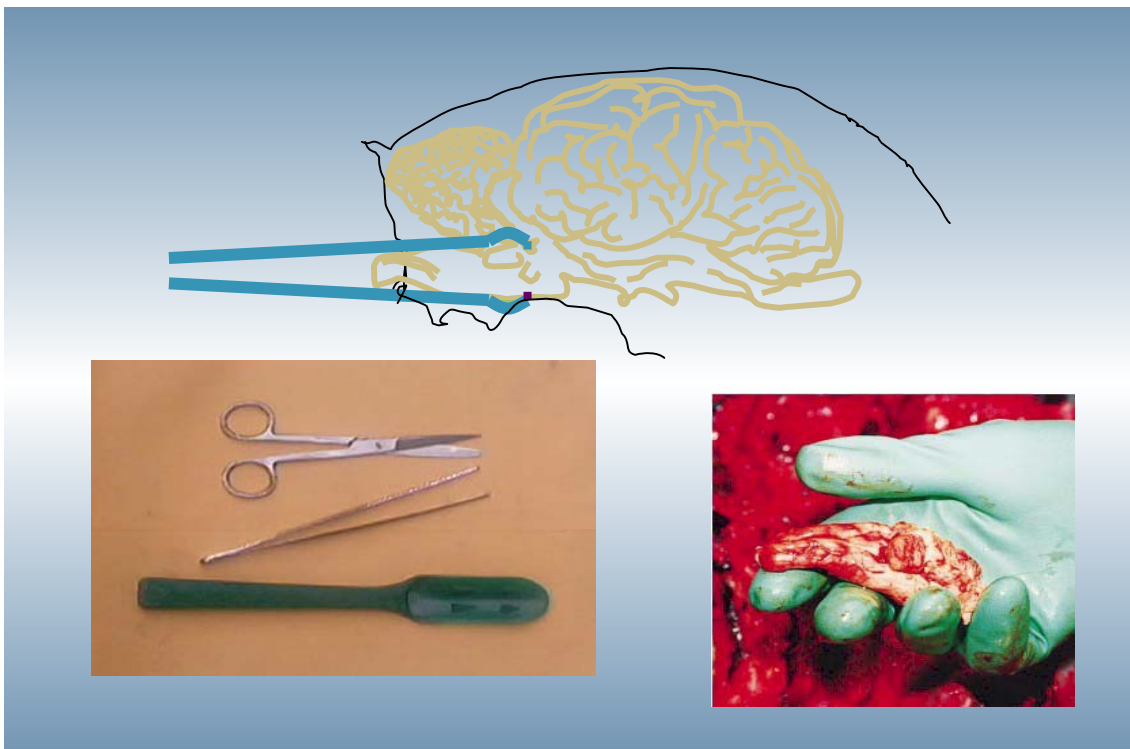
In the process of epidemiological surveillance of bovine spongiform encephalopathies, samples from brains or whole brains must be submitted from the slaughter houses according to number 5 above. In these cases the so-called brief samples taken through the occipital hole may be submitted. In this case part of the brain pons containing the obex and a portion of the marrow and the cerebellum is taken.

# TOMA DE MUESTRAS

OBEX  
99 % DE LAS LESIONES SE  
UBICAN EN ESTA SECCION



Areas from where samples are taken for conventional histopathology and immunohistochemistry



Brief method



**MINISTRY OF LIVESTOCK AGRICULTURE AND FISHERIES**

**GENERAL DEPARTMENT OF LIVESTOCK SERVICES**

**VETERINARY LABORATORIES DIVISION**

**“Miguel C.Rubino”**



**REPORT OF COMPULSORY NOTIFIABLE DISEASE**

Art.2. Law N° 3.606 of April 13, 1910 – Law on Animal Health Police

**Montevideo,**

**Director of Animal Health Division**

**Dr.**

**Dear Sir:**

**According to Article 2, Law N° 3.606 of April 13, 1910 – Law on Animal Health Police, I hereby inform you that the following has been diagnosed:**

**Said disease has been diagnosed according to the following procedures:**

<b>In materials submitted by Dr.:</b>		
<b>Address:</b>		<b>Tel/Fax:</b>
<b>E-Mail:</b>		
<b>Central Laboratory Register</b>	<b>Record N°:</b>	<b>Date:</b>
<b>Lab.Reg:</b>	<b>Record N°:</b>	<b>Date:</b>
<b>Species:</b>	<b>Category:</b>	<b>Breed:</b>
<b>Owner:</b>	<b>DICOSE</b>	
<b>Address:</b>	<b>Tel/Fax:</b>	
<b>Dept:</b>	<b>Establishment:</b>	
<b>Antecedents:</b>		

**Dr.**

<b>CC:</b>
<b>CC:</b>



**MINISTRY OF LIVESTOCK AGRICULTURE AND FISHERIES  
GENERAL DEPARTMENT OF LIVESTOCK SERVICES  
VETERINARY LABORATORIES DIVISION  
"Miguel C. Rubino"**



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Ruta Brig. Gral. Juan A. Lavalleja km 17.500 – Tel 2221063 – 2221078 – Fax 2221157  
CC. 6577 Montevideo E-mail [dilave@adinet.com.uy](mailto:dilave@adinet.com.uy)

Dr. Dept.: Town:		Address: Tel/Fax Email:		Record N° Date:	
Prod.: Dept.: Town:		Address: Tel/Fax Email:		DICOSE	
Species:		Category:		Breed:	
				Cross:	
REASON FOR CONSULTATION <b>RSE EPIDEMIOLOGICAL SURVEILLANCE</b>				PRESUMPTIVE DIAGNOSIS	
HISTORY / ANTECEDENTS				Origin of the animals	
Kind of establishment of				Identification	
N° Animals		N° affected animals		N° dead animals	
				Total of risk animals	
N° Adults > 5 years:		N° Adults < 5 years		Predominant neurological condition / onset date :	
Other categories		Antecedents AI Nacional Semen AI Importado:  ET – Nacional ET: importado		Behavioral changes	
				Blindness:	
				Sensory loss:	
				Amaurosis	
				Aggressiveness:	
				Pruritis:	
				Movement incoordination	
				Hipersensitivity:	
				Ataxia:	
				Light	
				Sound	
				Touch	
Inseminator:		Feed		Feedstuff:	
Other considerations		Natural field		Origin:	
		Prairies		Mineral salts	
		Other:		Origin:	
PATHOLOGY		Sampling: Date:		Necropsie Date:	
				Dead animal Hours dead:	
				Slaughtered animal Period of illness:	
Submission of samples		Date:		FOR LABORATORY USE ONLY	
				Date:	
				Reception:	
				BRM condition of the sample	
Type of sample		Laboratory		Discarded sample	
				Fresh Cooled Fixed	
				Bact	
				P.A.	
				Hist	
				Other	
				Tox	
				Rep	
				Ser:	

CLINICAL EXAMINATION/ CLINICAL RECORD		Identification				
Date:						
Dr.						
Species	Age	Sex	Breed			
Onset of Symptoms						
Evolution						
Stable	Worsens	Improves				
Treatment						
Response						
General Objective Examination						
Neurological examination						
Behavioral change		Yes	No			
YES	Apprehension	Nervousness	Aggressiveness	Apathy		
Sensitivity		Sound	Light	Touch		
Other						
Sensory	Normal	Weakened	Excited	Other		
Posture	Normal	Altered Lying Other	Xiphosis	Opisthotonos	Paresis	Paralysis
Movement	Normal	Altered In circles Other	Incoordination Rigidity	Hypermetria Uncertain	Laterality	Oscillating
Comments						



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 "Miguel C. Rubino"



**VIGILANCIA  
 EPIDEMIOLOGICA**

<b>CENTRAL LABORATORY</b> Ruta Brig..Gral.Juan A.Lavalleja km 17.500 – Tel 2221063 – 2221078 – Fax 2221157 CC. 6577 Montevideo E-mail <a href="mailto:dilave@adinet.com.uy">dilave@adinet.com.uy</a>
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Establishment:		Dr. Dept.: Town:		Record N°		
Authorization N°:				Date:		
Number in the herd Number of Animals	Date of slaughter	Prod.: Dept.: Town:	DICOSE			
Species:	Category	Breed:	Cross:			

REASON FOR CONSULTATION     
 **TSE EPIDEMIOLOGICAL SURVEILLANCE**     
 **SLAUGHTER HOUSE**

<b>HISTORY / ANTECEDENTS</b>	<b>Identification</b>
	<b>PRESUMPTIVE DIAGNOSIS</b>

*ANTE MORTEM* COMMENTS

*POST MORTEM* COMMENTS

Submission of Samples	Date:	<b>FOR LABORATORY USE ONLY</b>			Date:		
		Reception:			Discarded sample		
Type of samples	BRM condition sample	Fresh	Cooled	Fixed	P.A.	Hist	Bact
				Tox	Other		
REPORT		<b>FOR LABORATORY USE ONLY</b>			Date:		
		Reception:			BRM condition sample		
Type of samples	Laboratory						
		Bact			Signature:		
		Tox	Rep	Ser:			

CLINICAL EXAMINATION/ CLINICAL RECORD		Identification	
Date:			
Dr			
Species	Age	Sex	Breed
Onset of Symptoms			
Evolution			
Stable	Worsens	Improves	
Treatment			
Response			
General Objective Examination			
Neurological examination			
Behavioral change		Yes	No
YES	Apprehension	Nervousness	Aggressiveness
			Apathy
Sensitivity	Sound	Light	Touch
Other			
Sensory	Normal	Weakened	Excited
			Other
Posture	Normal	Altered	Xiphosis
		Lying	Opisthotonos
		Other	Paresis
			Paralysis
Movement	Normal	Altered	Incoordination
		In circles	Hypermetria
		Rigidity	Uncertain
		Other	Laterality
			Oscillating
Comments			