# Opinion of the European Food Safety Authority on a surveillance programme for Chronic Wasting Disease in the European Union

**Question N° EFSA-Q-2003-088**

**Adopted on 3rd June 2004**

## SUMMARY OF OPINION

The European Commission (EC) requested the European Food Safety Authority (EFSA) and its Scientific Panel on Biological Hazards for an opinion on a surveillance program for Chronic Wasting Disease (CWD) in the European Union (EU).

The European population of cervids consists of several million free-living cervids and hundreds of thousands of captive cervids. It is theoretically possible for European cervids to be infected by $PrP^{CWD}$, $PrP^{BSE}$, $PrP^{Scrapie}$ or even an unknown TSE strain; however, it is unknown how the phenotype of such a TSE in European cervids would look like. Currently, only a few European countries conduct surveillance programs on TSE in free-living or captive cervids and only a few experimental research studies are conducted to obtain data on the susceptibility of European cervids for TSE.

During the assessment, opportunities and difficulties were discussed and several problems when considering surveillance for CWD in European cervids emerged influencing the implementation of such a surveillance program. These include the existence of various species and sub-species of cervids, and variation in the cervid population distribution and density in the different EU countries. Different diagnostic methods and currently used tests for TSEs in EU and North America were evaluated and discussed. Sensibility and specificity of the test as presented was evaluated as well as their potential for discriminating different TSEs (CWD – BSE – scrapie) if they occur in cervids.

Evaluation of data submitted for six tests suggest that these rapid tests would appear able to detect a case of TSE in European cervids in a properly defined surveillance program. However, since these tests have not been validated for European cervids it is not possible to recommend specific test(s). In addition, Immunohistochemistry (IHC) and Western blotting tests should be used to confirm a diagnosis of CWD. As there might be differences in sensitivity and specificity between brain and lymph node samples and differences in deposition of PrP as observed in different species of cervids infected with CWD, both retropharyngeal lymph node and the obex of the brain (with intact dorsal motor nuclei of the vagus) should be included in the testing.

At present, biological strain typing by transmission to laboratory rodents is the only definite method allowing differentiation between CWD and BSE/scrapie. Current molecular and IHC methods show potential to differentiate these diseases.

It is recommended to initiate as soon as possible an EU-wide experimental screening on TSE using a rapid test and confirmatory methods and targeting at-risk groups of animals, i.e. farmed deer and fallen stock cervid species in Europe older than 18 months. Experimental studies are essential to understand the pathogenesis, tissue distribution of PrP and to ascertain tissue infectivity of TSEs in European cervids before large scale surveillance could be expected to give reliable results. Such experimental studies should start in parallel with any planned surveillance.

It is also recommended to further support and/or initiate research on molecular methods to differentiate between CWD and BSE/scrapie. Even though human TSE-exposure risk through consumption of game from European cervids can be assumed to be minor, if at all existing, no final conclusion can be drawn due to the overall lack of scientific data. The Working Group thus recognises a potential risk to consumers if a TSE would be present in European cervids. It might be prudent considering appropriate measures to reduce such a risk, e.g. excluding tissues such as central nervous system (CNS) and lymphoid tissues from the human food chain, which would greatly reduce any potential risk for consumers. However, it is stressed that currently, no data regarding a risk of TSE infections from cervid products for humans are available.

**Key words: TSE, CWD, Cervids, Elk, Deer, rapid tests, surveillance**

## BACKGROUND

### 1.1. Scientific Steering Committee opinion

At its meeting of 6-7 March 2003, the Scientific Steering Committee (SSC) produced an opinion on "Chronic Wasting Disease and tissues that might carry a risk for human and animal feed chains". In this opinion, the SSC recommended the instigation of a surveillance program in the EU, which might initially target the examination of cervids dying in or culled from zoological collections and fallen stock in farmed cervid populations, prior to decisions on the screening of free-ranging cervids.

### 1.2. EU questionnaire

During the discussions by the SSC working group which produced the report for the above opinion, it emerged that there was a lack of information on Transmissible Spongiform Encephalopathy (TSE) surveillance in cervids in the Member States, and on the type and level of imports from the US and Canada. On 7 April 2003, European Commission Services requested information on both subjects from the Member States (MS). The responses from the Member States, together with a summary of the information, are included in the supporting documentation.

### 1.3. Tests for surveillance in cervids

Based on an evaluation carried out by the Joint Research Centre (JRC), 5 rapid tests for the screening of cattle for Bovine Spongiform Encephalopathy are approved in Regulation (EC) No 999/2001[1]. The Regulation also approves these tests for the monitoring of TSEs in small ruminants, pending a formal evaluation of rapid tests for this purpose. No test has been approved in Europe for screening in species other than bovine, ovine and caprine animals. According to the Regulation, confirmatory testing in cervids should include at least a histopathological examination. Several rapid tests have been validated and licensed for CWD in North America (NA).

## TERMS OF REFERENCE

EFSA is requested to provide advice on the following aspects of surveillance for Chronic Wasting Disease (CWD) in cervids in the EU:

1. What diagnostic methods are suitable for the screening and confirmation of CWD? What are the advantages and disadvantages in terms of sensitivity, specificity, target tissues and any other relevant factors?

[1] E.C.O.J. n° L 147 of 31.5.2001, p. 1

2. Should TSE-positive animals be found in surveillance of cervids in the EU, will it be possible to identify the infection as CWD, definitively or probably, as opposed to other TSEs (BSE, scrapie)? If so, details should be given on the method of differentiation.

3. Are the results of evaluations of screening tests on cervids carried out by administrations outside the EU sufficient to allow the approval of these tests for use in the EU? Can the screening tests be reliably used on varieties of cervid more commonly found in the EU (e.g. farmed red deer, fallow deer and reindeer, wild red deer, roe deer, moose and fallow deer)?

## ASSESSMENT

The Scientific Panel on Biological Hazards refers to the report of the Working Group in **Annex** for background and full details on the assessment.

## CONCLUSIONS

**The Scientific Panel on Biological Hazards concludes**

- All rapid tests listed in this report would appear able to detect a case of TSE in European cervids in a properly defined surveillance program. However, since these tests have not been validated for European cervids it is not possible to recommend specific test(s).

- Evaluation of data submitted for six tests suggest that these tests could also be used for screening for CWD in European cervid species. IHC and Western blotting tests should be used to confirm a diagnosis of CWD. Precise evaluation of the specificity and sensitivity of these tests for CWD is impossible in the context of the European cervid populations because of lack of positive samples.

- There might be differences in sensitivity and specificity between brain and lymph node samples. Differences in deposition of PrP have been observed in different species of cervids infected with CWD. Both retropharyngeal lymph node and the obex of the brain (with intact dorsal motor nuclei of the vagus) should be included in the testing. Special attention should be given to sampling technique and procedure to ensure that the target tissues are submitted and examined.

- At present, biological strain typing by transmission to laboratory rodents is the only definite method which could differentiate between CWD and BSE/scrapie. Current molecular and IHC methods show potential to differentiate these diseases but require further evaluation; ideally both biological and molecular methods require prior validation using tissues from TSE-infected cervids of European species.

- Four tests are currently licensed in the USA for screening for CWD in three species of cervids using retropharyngeal lymph nodes. Only one of these tests has been evaluated satisfactorily in Canada. These tests are also likely to work on cervids more commonly found in Europe. In view of lack of TSE-positive materials from European cervids on which to conduct validation trials, there is currently no reliable alternative to these tests for use in European deer TSE surveillance.

- Experimental studies are essential to understand the pathogenesis and to ascertain tissue infectivity of TSEs in European cervids before large scale surveillance could be expected to give reliable results. Such experimental studies should start in parallel with any planned surveillance.

## RECOMMENDATIONS

**The Scientific Panel on Biological Hazards recommends:**

1. To initiate as soon as possible an EU-wide experimental screening, targeting at-risk groups of animals, using a rapid test and confirmatory methods. Initially, such a survey should focus on farmed deer and fallen stock cervid species in Europe older than 18 months, in particular targeting:

   - Red deer (*Cervus elaphus elaphus*); due to their close genetic relationship to Rocky Mountain elk ((*Cervus elaphus nelsoni*) it is most likely that their $PrP^{res}$ distribution may be found to be identical.

   - White tailed deer (*Odocoileus virginianus*) population e.g. in Finland and Sweden.

   - Animals likely to have been exposed to BSE and/or scrapie in regions or countries (e.g. Britain) where BSE or scrapie appeared at high level and where farmed deer are known to have been given compound feed.

   - Farmed and free ranging cervids with observed neurological symptoms, sick or in poor condition. .

2. In addition, an EU wide survey:

   - Should include all forms of TSE and not only focus on CWD.

   - Needs statistical planning, e.g. as expressed in the SSC opinion on "Requirements for statistically authoritative BSE/TSE surveys" (SSC, 2001).

   - Should seek to match a cut-off value of prevalence of at least 0.5% (for risk populations) or at least 1% for other populations. Such detection limits were sufficient in North America (e.g. Wisconsin) to detect CWD, even though the disease is endemic only in a certain region.

   - Implies different sampling techniques are needed for selected locations and countries and that the accessibility to the potential animals to be tested has to be considered.

   - Needs in parallel, research-based data to be collected on the pathogenesis of TSEs in European cervids and the tissue distribution of PrP. Therefore, it would be advisable to initiate experimental inoculation studies (in vitro and in vivo) and "natural route" transmission studies including introduction of sentinel animals to known 'infected' cervid herds. These studies could also include genetic analysis of prion protein genes from European cervids.

3. Testing for $PrP^{res}$ in cervids is an essential step in detecting and potentially in controlling the disease. Sampling is a key event and because there might be differences in sensitivity and specificity between the materials sampled and in the tissue distribution of PrP, it is recommended that both retropharyngeal lymph nodes (cortex area) and brain stem samples (including dorsal vagus nucleus) are included in the testing.

4. To ensure proper sampling it is advisable that the entire head of animals is sent to veterinary laboratories with a pathology unit.

5. Although biological strain typing is currently the only method which could possibly differentiate between CWD and BSE/scrapie, it is recommended to further support and/or initiate research on molecular methods for discrimination of the different TSEs. Ideally both biological and molecular methods would require prior validation using tissues from cervids of European species infected experimentally with TSEs.

6. Existence of genetic resistance, as is the case in scrapie in sheep, should be further explored.

7. Although some tests have been validated in North America for use in CWD, this information may only be regarded as one basis for a survey for TSE in cervids of Europe. The cervid species to be tested in Europe are not all closely related to the North American cervid species.

8. Even though human TSE-exposure risk through consumption of game from European cervids can be assumed to be minor, if at all existing, no final conclusion can be drawn due to the overall lack of scientific data. In particular the US data do not clearly exclude the possibility of human (sporadic or familiar) TSE development due to consumption of venison. The Working Group thus recognizes a potential risk to consumers if a TSE would be present in European cervids. It might be prudent considering appropriate measures to reduce such a risk, e.g. excluding tissues such as CNS and lymphoid tissues from the human food chain, which would greatly reduce any potential risk for consumers. However, it is stressed that currently, no data regarding a risk of TSE infections from cervid products are available.

## DOCUMENTATION PROVIDED TO EFSA

Letter including annexes (ref D(2003)JM/ D(2003)JM/khk/421001 from the European Commission requesting for an opinion of the European Food Safety Authority related to surveillance for Chronic Wasting Disease in cervids in the EU with supporting documents.

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## ANNEX

Report of the Working Group (WG) which deals in detail with the question on a surveillance program for Chronic Wasting Disease in the European Union:
http://www.efsa.eu.int/science/biohaz/biohaz_opinions/opinion_annexes/500_en.html