MoSS: A **Monitoring and Surveillance System** for the early detection and identification of emerging animal diseases

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Introduction

Background: After the unexpected outbreaks of Bluetongue in Belgium in 2006 and 2007 there appeared to be a need for an accelerated disease identification to restrict animal discomfort and economic losses linked with decreased production as a result of emerging animal diseases.

In 2008, the MoSS project was started to develop an online **Monitoring and Surveillance System (MoSS)** to facilitate a more structured communication between field veterinary practitioners (confronted with an emerging disease) and veterinary experts in various institutes.

Objectives

Early detection and identification of emerging animal diseases by:

- development of a web-based application which encourages online reporting of **atypical syndromes** by vets and experts in various fields of expertise
- a **real-time analysis** of notifications via a ascending hierarchical clustering process, which detects **clusters of similar notifications**
- an alert signal provided by **the onset of a new cluster**, followed by efficient communication between vets and experts to rapidly identify the (potentially emerging) disease

MoSS: Web-based notification and analysis

A vet observes an unusual case …

- Atypical combination of symptoms
- Diagnosed disease not responding to treatment
- Unusual expression of a known disease

www.MoSS.be

Online reporting

1. NOTIFICATION

Notification form

- Case location / date
- Symptoms
- Epidemiology
- Possible risk factors
- Pictures, videos

NETWORK OF EXPERTS

Research Institutes
Animal Health Labs
FASFC
Universities
International experts

2. ANALYSIS

Cluster detection

Groups of **similar notifications** via Ascending Hierarchical Clustering Process based on

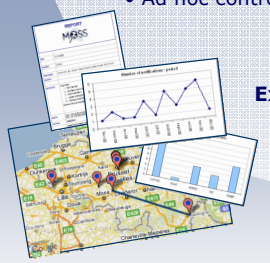
- Clinical description
- Animal typology
- Time / spatial distribution

3. COMMUNICATION

Forum

Communication-tool for vets & experts to

- Discuss the case and its evolution
- Provide treatment advice (expert)
- Upload lab results (vet)
- **Identify causative agent**
- **Determine diagnosis**
- Ad hoc treatment
- Ad hoc control program



Discussion led by one **Expert 'Leader'** per cluster of notifications

For each new cluster of notifications: **selection of experts** based on **expertise, geographical proximity** and **mother tongue.**

Alert signal: onset of a new cluster!

Expected results

1) Built-up of a **strong network** with and among veterinary field practitioners, experts, sanitary authorities respecting the established confidence relationship between vets and farmers.

2) Validation of the **discrimination potential** of the clustering process using historic data of model diseases: Bluetongue, Bovine Spongiform Encephalopathy and Bovine Neonatal Pancytopoenia in calves (currently emerging in Europe).

3) The **forum** should connect all levels of expertise of the experts with the vets and coordinate the diagnostic approach towards a fast identification of the causative agent.

4) Implementation of **data mining aspects** to detect changes in the frequency of reporting, possibly linked to parallel changes in non-specific data (production data, mortality rates, reproduction data) as well as normal fluctuations in disease prevalences.

The MoSS project is granted by the Federal Agency for the Safety of the Food Chain