ANIMAL DISEASE SURVEILLANCE

THIRD STANDING GROUP OF EXPERTS MEETING ON CBPP OF THE GF TADS FOR AFRICA

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SCAD

CBPP- THE DISEASE

- Contagious bovine pleuropneumonia (CBPP) is a disease of ruminants (Bos and Bubalus genuses) caused by Mycoplasma mycoides subsp. mycoides (Mmm).
- It is manifested by anorexia, fever and respiratory signs such as dyspnoea, polypnoea, cough and nasal discharges in bovines.
- > Definite diagnosis requires the isolation or detection of the aetiological agent.
- > main problems for control or eradication are:
 - the frequent occurrence of subacute or subclinical infections
 - the persistence of chronic carriers after the clinical phase
 - the lack of extensive vaccine coverage.

CBPP TESTS

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Laboratory methods currently used for diagnosis of CBPP and their purpose

	Purpose					
	Population freedom	Individual animal	Contributio	Confirmati	Prevalence of	Immune status in
Method	from infection	freedom from	n to	on of	infection –	individual animals or
		infection prior to	eradication	clinical	surveillance	populations post-
		movement	policies	cases		vaccination*
Detection of the agent ^(a)						
In-vitro culture isolation	+	_	_	+++	_	-
(followed by species						
identification tests)						
Direct molecular test	-	-	_	++	-	-
(PCR)						
Detection of immune response						
CFT	+++	++	+++	++	+++	_
Immunoblotting	++	++	++	++	++	-
C-ELISA	+++	++	+++	++	+++	-

Complement fixation (recommended for determining disease free status)

The modified Campbell & Turner CFT remains the recommended procedure and it is widely used in countries where infection occurs (Provost *et al.*, 1987). The CFT is most conveniently carried out in a microtitre format and has been harmonised within most countries in the world (European Commission, 2001).

With a **sensitivity of 63.8%** and a **specificity of 98%** (Bellini *et al.*, 1998), the CFT can detect nearly all sick animals with acute lesions, but a rather smaller proportion of animals in the early stages of the disease or of animals with chronic lesions.

PRICIPLES OF SURVEILLANCE

Animal health surveillance is a tool to:

- To monitor disease trends
- Facilitate control of infection/infestation
- Provide data for use in *risk analysis*
- For animal and public health purposes
- Substantiate the rationale for sanitary measures
- For providing assurances to trading partners
- Aims of surveillance:
 - ✓ To demonstrate the absence of infection/infestation
 - ✓ Determine the presence or distribution of infection/infestation
 - ✓ To detect as early as possible exotic diseases or emerging diseases

SURVEILLANCE (cont.)

- The type of surveillance applied will depend on the objectives of the surveillance, available data sources and outputs needed to support decision making
- Wildlife can serve as reservoirs of infection/infestation and also as indicators of risk to humans and domestic animals, therefore there is merit in including them in the surveillance system whenever possible
- Surveillance in wildlife, however, presents challenges that may differ significantly from those in surveillance in domestic animals
- Presence of infection/infestation in wildlife does NOT mean it is necessarily present in domestic animals in the same country or zone or vice versa
- Surveillance, done in accordance with Chapter 1.1 of the TAHC, is a prerequisite for a WOAH member to provide information for the evaluation of its animal health status which must comply with Chapters 3.1 to 3.5 of the TAHC (Quality of Veterinary Services)

SURVEILLANCE SYSTEMS

When considering a surveillance system, in addition to the quality of Veterinary Services, the following components must be addressed:

- 1. Design of the surveillance system
- 2. Implementation of the surveillance system
- 3. Quality Assurance

1. DESIGN OF THE SURVEILLANCE SYSTEM

Factors to consider:

- Populations (susceptible species, samples or all pop., representativeness of sample to target pop)
- Timing and temporal validity of surveillance data: timing, duration and frequency should be determined taking into account factors like
 - Objectives of the surveillance Husbandry practices and production systems
 Biology and epidemiology Disease prevention and control measures
 Risk of introduction and spread Accessibility of target population
 - Geographical factors Environmental factors (incl. climate conditions)
- Case definition (use WOAH case defn, where possible otherwise defn using clear criteria)
- Epidemiological units (sampling unit must reflect defined epid. Unit)

DESIGN OF THE SURVEILLANCE SYSTEM (cont.)

- Clustering (herd, pen bldg.)
- Diagnostic tests (state)
- Analytical methodologies

(appropriate method + organisational level. Must be flexible +based on available data sources)

- Scope of the surveillance systems
- Follow up actions post surveillance



2. IMPLEMENTATION OF THE SURVEILLANCE SYSTEM

Diagnostic tests (specify sensitivity and specificity of tests used, pooling of or individual tests and their interpretation)

> Data collection and management (must be reliable and transparent)

- Distribution of and communication between collectors and central unit.
- Ability of system to detect missing, inconsistent or inaccurate data
- Maintenance of raw data rather than compilation of summary data
- Minimization of transcription errors during data processing and communication

3. QUALITY ASSURANCE



Surveillance systems should be subjected to periodic auditing to ensure that all components function and provide verifiable documentation of the procedures and basic checks to detect deviations from those specified in the design, in order to implement appropriate corrective actions.

SURVEILLANCE METHODS

Use of probability/non-probability methods, single or in combination, different surv. sources. Methods vary in their primary purpose, and type of surveillance information they are able to provide. From:

- 1. Disease reporting system
- 2. Surveys
- 3. Risk based methods (based on R.A)
- 4. Antemortem and Postmortem inspections
 - > May be age specific
 - > Dependant on traceability
 - > Involvement of competent authority in supervision
 - Training and experience of inspectors
- 5. Surveillance of sentinel Units
- 6. Clinical surveillance (standardize case defn for comparison)

Consider:

- 2a Survey design (check for biases)
- 2b Sampling
 - Objective (must be representative)
 - Sample size: will depend on number of factors:
 - Demonstration of presence/absence of disease
 - Pop size
 - Expected prevalence
 - Sample selection (probability/non-probability)

SURVEILLANCE METHODS (cont.)

- 7. Syndromic surveillance
- 8. Other useful data

9. Combination and interpretation of surveillance results

Other useful data

- *i.* Data generated by control programmes
- ii. Lab investigation records
- iii. Biological specimen banks
- iv. Wildlife data
- v. Public health data
- vi. Environmental data
- vii. Additional supporting data (animal movements, history of imports, trading patterns, national animal health regulations etc)

SURVEILLANCE FOR FREEDOM FROM DISEASE, INFECTION OR INFECTATION

- Demonstration of freedom- cannot rely sorely on scientific methods and data analysis but sound and verifiable sufficient evidence to demonstrate to a desired level of confidence that infection/infestation if present, is present in less than a specified proportion of the population or its presence cannot be demonstrated at all
- Requirements to declare a country or zone free from an infection/infestation
 - ➢ 4 prerequisites unless stated in relevant chapter of TAHC
 - Historical freedom (3 points i iii)
 - Where historical freedom CANNOT be demonstrated: i) no detection of the pathogen has been demonstrated even after applying appropriate surveillance ii) 4 prerequisites above have been complied with
- Requirements to declare a compartment free from infection/infestation
 - Pathogen specific surveillance applied
 - Historical freedom points as they relate to the specific pathogen
- Recommendations (5) for the maintenance of freedom from disease, infection or infestation

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Requirements to declare a country or a <u>zone</u> free from an <u>infection</u> or <u>infestation</u>

- a. Prerequisites, unless otherwise specified in the relevant chapters of the *Terrestrial Code*:
 - i. the <u>infection</u> or <u>infestation</u> has been a <u>notifiable</u> <u>disease</u>;
 - ii. an <u>early warning system</u> has been in place for all relevant species;
 - iii. measures to prevent the introduction of the infection or infestation have been in place: in particular, the importations or movements of commodities into the country or zone have been carried out in accordance with the relevant chapters of the Terrestrial Code;
 - iv. the *infection* or *infestation* is not known to be established in *wildlife* within the country or *zone*.

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Historical freedom

Unless otherwise specified in the relevant chapter of the <u>Terrestrial Code</u>, a country or <u>zone</u> may be considered free without formally applying a pathogenspecific <u>surveillance</u> programme when:

- i. for at least the past 10 years:
 - no <u>vaccination</u> against the disease has been carried out;
 - the prerequisites listed in point a) are complied with;
- ii. the pathogenic agent is likely to produce identifiable clinical or pathological signs in susceptible *animals*;
- iii. for at least 25 years there has been no occurrence of *infection* or *infestation*.

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Recommendations for the maintenance of freedom from a disease, *infection* or *infestation*

Unless otherwise specified in the relevant chapter of the <u>Terrestrial Code</u>, a country or <u>zone</u> that has achieved freedom in accordance with the provisions of the <u>Terrestrial</u> <u>Code</u> may maintain its free status provided that:

- a. the *infection* or *infestation* is a *notifiable disease*;
- b. an *early warning system* is in place for all relevant species;
- c. measures to prevent the introduction of the *infection* or *infestation* are in place;
- d. <u>surveillance</u> adapted to the likelihood of occurrence

of *infection* or *infestation* is carried out. *Specific surveillance* may not need to be carried out if supported by a *risk assessment* addressing all identified pathways for introduction of the pathogenic agent and provided the pathogenic agent is likely to produce identifiable clinical or pathological signs in susceptible *animals*;

e. the *infection* or *infestation* is not known to be established in *wildlife*.

SURVEILLANCE IN SUPPORT OF DISEASE CONTROL PROGRAMMES

Surveillance used to assess progress in control/eradication of selected infections/infestations should be designed to collect data about a number of variables such as

- Prevalence or incidence of infections/infestations
- Morbidity and mortality
- Frequency of risk factors and their quantification
- Frequency distribution of results of laboratory tests
- PVM results
- Frequency distribution of infection/infestation in wildlife

THANK YOU

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MUITO OBLIGADO