Better **T**raining for **S**afer **F**ood
Initiative

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AFRICAN SWINE FEVER

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Overview

- Early warning
- Aim of surveillance
- Definitions
- High risk periods during an epidemic
- Wildlife
- Passive surveillance in practice
- Critical points
- ASF example
- A final message

EARLY WARNING

AIM: promptly react to a possible presence of the infection

To have the veterinary system alerted

To reduce secondary cases

COMPONENTS

Clear chain of command (who is in charge of what)

Information exchange

Clear management strategy (possibly written)

Early Detection System (OIE)

✓ **A** system for the timely detection and identification of an incursion or emergence of diseases/infections in a country, zone or compartment.

It includes

1. Representative coverage of target animal populations by field services;

2. Ability to undertake effective disease investigation and reporting;

3. Access to laboratories capable of diagnosing and differentiating relevant diseases;

4. **T**raining programme for veterinarians veterinary para-professionals, livestock owners/keepers and others involved in handling animals for detecting and reporting unusual animal health problems;

5. the legal obligation of private veterinarians to report to the Veterinary Authority;

6. A national chain command.

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The detection strategies of ASF might vary in different regions of the world

The EARLY DETECTION STRATEGY needs to be tailored to the epidemiological situation and take into account:

- **The risk of ASF introduction**
- Prevalent type of pig production system
- Presence of wild and feral pigs
- Presence of different species of SUIDAE
- Presence of *Ornithodoros* ticks
- ASFV genotype

Free status Early Detection Eradication/Endemicity

Early detection probability and disease control efficency

Increased when available:

Risk Analysis

✓ We know where and when to expect problems / where and what to look for

Contingency Planning

✓ We know how we would react once we find it

Training / Awareness

✓ Everybody that needs to know about it, is informed and knows what to do

ASF Ideal system

Epidemiological information

Early detection system in place (case definition, farmers and field veterinarians)

Early warning in place (each component alerted: farmers, field veterinarians, laboratories);

Suspected case: investigation, confirmation

Outbreak: response, investigation, eradication

Surveillance

Surveillance in practice

Surveillance: to develop a strategy that maximize the cost benefit ratio

Highest probability to detect the introduction of emergent or –re-emergent infection in a free area (early detection);

Highest precision in measuring epidemiological parameters (i.e. prevalence, n. of seropositive animals etc.);

Sustainable from both implementation and economical terms;

Have a practical approach (actions are foreseen)

Passive (reactive)	Active (proactive)
Animals that belong to the "**Suspect case definition**" are tested **Animal owners report** a suspect case to the Vets The suspect case definition drives the whole detection system	The Veterinarians directly collect animal health data using a defined protocol A population or a part of it (risk based) is actively investigated to detect an infection Vets, go in the farm and take samples, check the animals

Passive or active: which is better?

Passive works better when	Active works better when
An official "suspect case" definition is available and well known among stakeholders Diseases causing evident clinical symptoms with high lethality rate There is high animal owners and Veterinary Service awareness	Clinical symptoms of the disease are not evident, episodic or short lasting Low/null lethality rate Low animal owners awareness

Passive Surveillance

✓ Covers wide areas / entire country
✓ **Covers the entire population**
✓ **Every day of the year**
✓ Can provide timely information
✓ Is cost efficient

… if implemented properly…

Passive Surveillance

PIG OWNERS and PRACTITIONNAIRS have to report suspected cases

✓ Action to report can only be encouraged by veterinary services
✓ Implementation is not under the Vet Service control
✓ Dependence on stakeholder
✓ Requires a sense of responsibility by the farmer

Which animals have to be tested ?
The suspect case definition

1. Does not define the clinical signs of the infection we are interested on;

2. Does not define the population at risk;

3. It defines which are the **characteristics of the animals that will be actively selected** by the surveillance program (investigated, inspected, tested etc.)

BROAD suspect case definition

BROAD DEFINITION: means that we define of interest ANY ANIMAL THAT COULD be infected, even if the shown clinical signs are not totally overlapping the typical signs of the infection we are dealing on;

*All the sick animals in any farm **independently from their clinical signs***

BROAD DEFINITION: implies that a large number of animals will be tested/investigated; high number of negative test; higher costs; **increased probability to early detect the infection**

NARROW suspect case definition

NARROW DEFINITION: means that we define of interest ANY ANIMAL showing clinical signs overlapping the main characteristics of the disease we are dealing on;

Any animals showing fever (>40°C) inappetence, diarrhoea, pneumonia, cyanotic skin, pneumonia etc.

NARROW DEFINITION: implies that a relatively limited number of animals will be tested/investigated; all tested animals hav a high probability to be infected; Low number of negative test; Reduced costs; **Reduced probability to early detect the infection**

Broad or narrow suspect case definition ?
RISK ASSESSMENT

BOARD CASE DEFINITION: to be used in high risk areas; we test EVERY animal that could be infected

Narrow case definition: to be used in a very low risk areas; we test ONLY animals that show the typical signs of the disease; we are not afraid to receive the infection; .

ASF early detection in domestic pigs

PASSIVE SURVEILLANCE

- The most effective tool for detecting ASF [Evident clinical signs, High lethality (94.5-100%)].

- Due to the clinical similarity with other *diseases* (e.g. CSF) passive clinical surveillance always needs to be confirmed by laboratory

In Commercial holdings

➢ *Strict health monitoring programme of pig holdings Reporting of **dead and sick animals***

➢ *Reporting any decreasing of production parameters*

In Backyard holdings

➢ *Reporting of sick or dead animals*

➢ *Vet inspection on pig slaughtering for own consumption*

(pigs with lesions/symptoms examined and tested)

Detection of ASF
in wild boar using two suspect case definitions

A) All individuals found dead => broad suspect case definition

B) All individuals shot showing clinical sign of the diseases => narrow suspect case definition

Expected number of cases?

Do we expect the same number of investigated cases?

Do we expect the same number of positive cases?

A) **A BROAD SUSPECT CASE DEFINITION**: high sensitivity of the surveillance system, but too many laboratory investigations, material for field sampling, travels to the lab etc.

C) **A NARROW SUSPECT CASE DEFINITION**: low surveillance sensitivity since wild boars that could show clinical signs are unlikely to be sighted

Efficency of a surveillance system

The efficiency a surveillance system is modulated according to the characteristics of:

Disease: lethality, spread, clinical signs

Susceptible host population: species, geographical distribution, size, breeding system; biosecurity etc.

and

Risk of introduction/persistence: risk assessment

Efficacy of the passive surveillance

No dead wild boar reported does not mean that wild boar do not die
It means that nobody reports them and thus the passive surveillance is not working;

At present there are no magic recipes

Form the experience gained in infected countries it appears that, in FREE AREAS

0,5-1% of the estimated wild boar population is found dead each year without any infection

Wild boar natural mortality is about 10% (excluding hunting)
The goal would be to find 10% of them
1% of the whole alive population

ASF surveillance in wild boar

Field example

Aim:
a) Early detection
b) evolution of the infection

Suspect case definition and ASF detection

Broader case definition: <u>all found dead animals</u>: N. 227

178 detected cases (78,4%)

49 negative investigations

First case detected 25/07/2014

Narrow case definition: <u>animals shot while showing clinical signs</u>: N. 1

1 detected case (100%)

No negative investigations

Lost 178 cases

Case detected 20/08/2014

Early detection of ASF in wild boars
Passive surveillance vs. active surveillance

**LATVIA: Summary of wild boar data (June-December, 2014)
within the infected areas (Part II and Part III)**

	Number of tested animals	Number of positive results
WB found dead	227	178
WB hunted	2733	39

Efficency of passive vs active surveillance: field data

Virus detection in dead animals: 178/227 = 0,78
Virus detection in shot animals: 39/2733 = 0,014

detection in dead/detection in shot
0,78/0,014 = 55,7

The probability to detected a virus in dead animals is 55 times higher than in shot animals

(55/(55+1)*100 = 98%

98 out of 100 are likely to be detected in **dead** wild boars

Detection probabilities of ASF Virus in a wild boar population: simulated population Prev=2%, Lethality 90%

Ratio and probability between rates				
			ratio	detection probability %=ratio/(ratio+1)
Lethality rate	vs	Hunting rate	8675	99.99
Virus positive Found dead (100%)	vs	Virus positive hunted	174	99.4
Virus positive found dead (10%)	vs	Virus positive hunted	17,4	94.6
Virus positive found dead (10%)	vs	Sero-positive hunted	348	99.7

ASF prevalence estimation

Found dead animals = 78%
Shot animals = 1,4%

Which is the true period prevalence?

Is prevalence revealed by active or passive surveillance?
Which kind of data could be compared among different countries?

Passive surveillance: critical points I

Suspect case definition:

broad definition will increase the sensibility of the surveillance (many false positive cases) whereas narrow definition will reduce the number of false positive cases but might enhance the number false negative cases and thus leaving undetected for some time the infection in the area.

The suspect case definition could be adjusted according to the (perceived or assessed) risk of the area.

Low risk areas => narrow case definition (**possibly undetected positive cases**)

High risk areas => broader case definition (many negative animals investigated but **high probability to early detect the virus**)

Passive surveillance: critical points II

Communication chain: passive surveillance is based on reporting, hence a person willing to report must know to whom to report and how (green lines, mobile of a responsible person, avoid reporting to "Veterinary Service")

To whom it should be reported the finding of a dead wild boar in the forest?

Awareness and acceptance: is the most important step of any passive surveillance. I.e. nobody will report what is unknown, or a disease for which a stamp out policy without compensation will be applied.

The detection of ASF in wild boars poses several restriction when hunting: are hunters willing to participate?

Passive surveillance: critical points III

Evaluation of the passive surveillance efficiency: no reports does not mean no cases; the number of suspected cases to be investigated has to be estimated in advance, same figures should be used to evaluate the efficacy of the surveillance in place;

In peace time, how many dead wild boars should be found in at risk areas?

Duration: it is always difficult to maintain an high level of passive surveillance for any disease absents for a long period in an area or totally unexpected.

When France, Hungary, UK should put in place a efficient surveillance system for the early detection of ASF in wild boars and how long it should run?

Take at home message

Surveillance is a strategy shaped by appropriate techniques

Passive surveillance:

Irreplaceable in the early detection of almost all infectious diseases and in particular for ASF in wild boars;

The suspect case definition is relatively easy to develop

The minimum number of animals that have to be tested must be planned and reached **≈ 1% of the whole alive wild boar population** at risk;

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