Regional Workshop on Animal Disease Preparedness

Better Training For Safer Food

Dr Marius Masiulis

Disease preparedness – risk assessment

Tokyo, Japan
12-15 June 2018

Food safety

Terminology

RISK – combination of the probability of occurrence of a hazard generating harm and severity of the harm

- HARM – injury or damage to the health of animals, people, environment
- HAZARD – potential cause of harm
- PROBABILITY OF OCCURRENCE OF THE HARM – the likelihood of the harm occurring

European Commission

Terminology

Risk Assessment: a strategic approach to planning, at all levels and across all functions of an organization, that identifies exposures of activities and assists in making risk adjusted decisions...

Risk Assessment steps

The main steps of a risk assessment are:

- Framing the risk question;
- Identifying the hazard(s);
- Outlining the risk pathways;
- Identifying data needs;
- Collecting data;
- Assessing the risk.

Four components of risk analysis

HAZARD IDENTIFICATION

RISK ASSESSMENT

RISK MANAGEMENT

RISK COMMUNICATION AT ALL STAGES

Hazard identification

- Hazard identification is a **categorization step**, identifying biological agents as hazards or not.

- For exporting country;
- Availability of disease information via OIE;
- Evaluation of Veterinary Services;
- Surveillance and control programmes;
- Zoning and compartmentalization;

Animal identification and movement controls;

Early detection and notification.

Principles of risk assessment

Flexibility – no single method is applicable in all cases.

Both **qualitative and quantitative methods** are valid.

Transparency with all involved parties - cooperation.

Assessment must be based **on best scientific knowledge,** well documented and supported by references to scientific works.

Should be **updated with additional information** available

Risk assessment steps - Entry assessment

- Consists of describing the probability of the „entry" of each of the hazards (pathogenic agents) under each specified set of conditions with respect to amount and timing and how these might change as a result of various actions, events.

- Possible **inputs for entry assessment**.

- **Biological factors**: species, age, breed, vaccination, testing, quarantine .

Entry assessment

Country factors: incidence or prevalence, evaluation of Veterinary Services, surveillance and control programmes and zoning and compartmentalization systems of exporting country;

Commodity factors: quantity of commodity to be imported, ease of contamination, effect of processing, effect of storage and transport.

Exposure assessment

Consists of describing the **pathway necessary for exposure** to the hazards and estimation of **probability of occurring.**

Biological factors: properties of the agent.

Country factors: presence of vectors, human and animal demographics, cultural practices, geographical characteristics.

Commodity factors: quantity of commodity, intended use of animals/products, disposal practices.

Consequence assessment

- Consists of **describing the relationship between specified exposures and the consequences**.
- **Direct consequences:** disease and production losses.
- **Indirect consequences:** surveillance and control costs, compensation costs, potential trade losses, adverse consequences to environment.

Risk estimation

Consists **of integrating the results of entry assessment, exposure assessment and consequence assessment**.

Output may include.

Estimated number of herds, animals, people affected;

Portrayal of the variance of all model inputs;

Sensitivity analysis to rank all inputs;

Analysis of the dependence and correlation between model inputs.

Risk management components

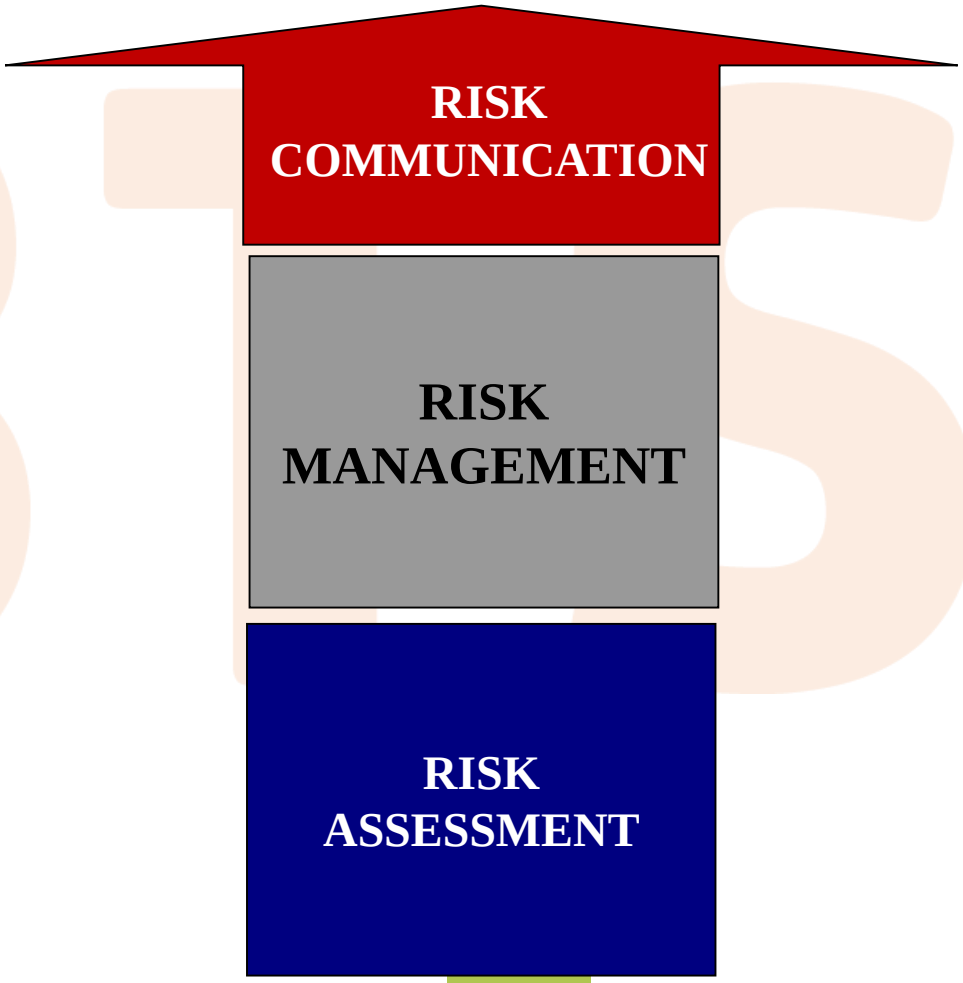
Risk evaluation: comparing the estimated risk in risk assessment with the reduction of risk by expected risk management measures

- **Option evaluation:** identifying, evaluating the efficacy and feasibility of, and selecting measures to reduce the risk.

- **Implementation:** process ensuring that selected risk management measures (finances, manpower, restrictions, culling) are in place.

Monitoring and review: risk management measures are constantly audited to ensure they achieve planned result.

RISK COMMUNICATION



Risk communication

- Process by which information about hazards and risks are gathered from potentially affected and interested parties during the risk analysis and by which the results of risk assessment and proposed risk management measures are communicated to the decision-makers and interested parties.

- Strategy should be in place.

- Peer review is a component of risk communication to obtain scientific critique and to ensure the data, information, methods and assumptions are the best available.

RISK COMMUNICATION

- It’s a consumer right to know, what's happened!
- The preventive effect;
- Gain trust;
- Prevent outrage;
- Find better solutions;
- Obtain understanding and support.

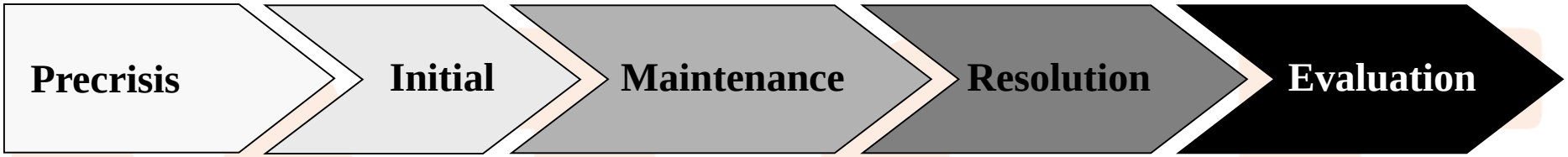
Communication is based on the main principles

- Build trust;
- Announce early;
- Be transparent;
- Respect public concerns;
- Decrease fear;
- Plan in advance.

Risk communication planning: summary

© Peter Sandman

Crisis Communication Lifecycle



- Prepare
- Foster alliances
- Develop consensus recommendations
- Test message
- Evaluate plans

- Express empathy
- Provide simple risk explanations
- Establish credibility
- Recommend actions
- Commit to stakeholders

- Further explain risk by population groups
- Provide more background
- Gain support for response
- Empower risk/benefit decisionmaking
- Capture feedback for analysis

- Educate a primed public for future crises
- Examine problems
- Gain support for policy and resources
- Promote your organization's role

- Capture lessons learned
- Develop an event SWOT
- Improve plan
- Return to precrisis planning

http://www.oahpp.ca/

Source: CDC, September 2002. Crisis Emergency + Risk Communication

THANK YOU !!!

The contents of this presentation are the views of the author and do not necessarily represent an official position of the European Commission.

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Stefano Marangon

Contingency planning

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Epidemic disease emergencies

Emergency: a serious, unexpected and harmful event that requires **immediate action** and availability of **extra resources**

Disease emergency: introduction of a highly contagious disease in a free country or zone (exotic disease) such as FMD, AI, CSF, ASF

The aim of contingency planning is to arrange in advance for an epidemic that may or may not happen, if it happens:

- disease control and eradication actions shall be immediately enforced
- necessary resources must be available
- a legal and administrative framework shall be in place

Control of epidemic diseases of livestock

The efficacy of disease control measures is related to the capacity to limit the initial spread of infection during the **high risk period** of an epidemic:

- application of good biosecurity and hygienic standards (difficult to sustain in the long term)
- rapid identification of virus introduction (early detection)
- prompt enforcement of appropriate disease control policies

Contingency planning

The rapid implementation of adequate disease eradication measures is associated to the **level of preparedness** of the veterinary services in the affected country:

a contingency plan should be developed in times of peace

In case of infection the prompt execution of the measures provided for by the contingency plan is critical in limiting the magnitude of the epidemic mainly in Densely Populated Livestock Areas (**DPLAs**)

Contingency plan

A contingency plan

- Describes the **organization of the system** to be implemented for an effective disease control, and
- Identifies the **resources** which must be available in order to make this system operational (**resource manual**)
- Provides updated information on all the **procedures** to be followed and the **actions** to be carried out with suspect and confirmed outbreaks (**operational manual**)

Contingency plan

- Legal powers
- Financial provisions
- The chain of command
- The establishment of national and local disease control centres
- Expert groups
- The resources required for disease emergencies (personnel, equipment and facilities)
- Instructions for dealing compulsorily notifiable exotic diseases
- Diagnostic laboratories
- Plans for emergency vaccination
- Training
- Publicity – disease awareness

Legal powers

Veterinary services must have legal powers to **guarantee** that the **eradication** of a notifiable disease is promptly successful

Reference to the legislation containing the legal powers relevant for disease eradication shall be made in the contingency plan

The legal powers shall encompass:

- The **notification** of suspected exotic disease
- The **access to holdings** keeping animals

Legal powers

- The access to documents and records required for epidemiological investigation
- The **killing** of infected and contact animals
- The **destruction** of carcasses and contaminated materials, and access to sites to be used for this purpose
- The payment of **compensation**
- Sanitation and other procedures at infected premises
- The control of movements and other restrictions (e.g. establishment of protection and surveillance zones)
- Vaccination

Financial provisions

The costs of an epidemic can be huge

H7N1 HPAI epidemic in Italy 1999-2000

- **413** outbreaks
- **≈ 16** million birds stamped out
- **€ 100**m direct costs
- **€ 500**m total costs

H5N2 HPAI epidemic in USA 2014-2015

- **279** outbreaks
- **≈ 50.5** million birds stamped out
- **$ 1.6**b direct costs
- **$ 3.3**b total impact for the USA economy

Financial provisions

It shall be ensured that a Country has the **budgetary powers** to cover the costs of an epidemic:

- Personnel
- Capital equipment and consumable items
- Laboratory work
- Culling, destruction of carcasses/contaminated material, and sanitation
- Compensation payments to owners of animals
- Emergency vaccination, if needed

The cooperation of farmers is fundamental and it can be relied on only if compensation for depopulated animals is paid promptly

Chain of command

A **clear-cut chain of command** shall be established. It should be:

- Understood by all who are involved with disease eradication
- **Clearly described in the contingency plan**

The chain of command can be different in various countries according to the organization of the veterinary services

The CVO should be ultimately in charge of eradication operations and he/she should establish and coordinate the **National disease control centre**

National disease control centre (NDCC)

The **NDCC** must direct and verify the operations of the **Local disease control centres** (**LDCCs**)

Responsibilities of **NDCC** include:

- Definition and overall direction of control strategies
- Ensuring that the **LDCCs** implement them promptly and effectively
- Deployment of staff and other resources
- Provision of information to National and International authorities and organizations (**transparency**)
- Liaison with diagnostic laboratories, and liaison with the media

Local disease control centre(s)

LDCC(s) shall be established in the affected area(s)-> responsible for the **enforcement of eradication and surveillance measures** within their territory

A veterinarian shall be directly in charge of the centre with the powers to:

- Designate a holding as an "infected premises" and deploy the necessary staff, materials and equipment

Local disease control centre(s)

- Arrange **valuation and culling** of infected and contact animals, disposal of carcasses and contaminated material and sanitation procedures
- Advise on delineation of protection and surveillance zones and **impose movement restrictions**
- Close markets for live animals and abattoirs as necessary
- Liaise with police and other authorities

Disease control centre(s)

NDCC and LDCCs must be adequately staffed and equipped:

- Suitable means of communication
- Maps and other sources of information (access to livestock database, geographical information systems – **GIS**, etc.)
- Updated lists of organizations, staff and other persons who must be contacted
- **Local disease control centres** must have direct availability to all the resources required for disease emergencies (personnel, equipment and facilities)

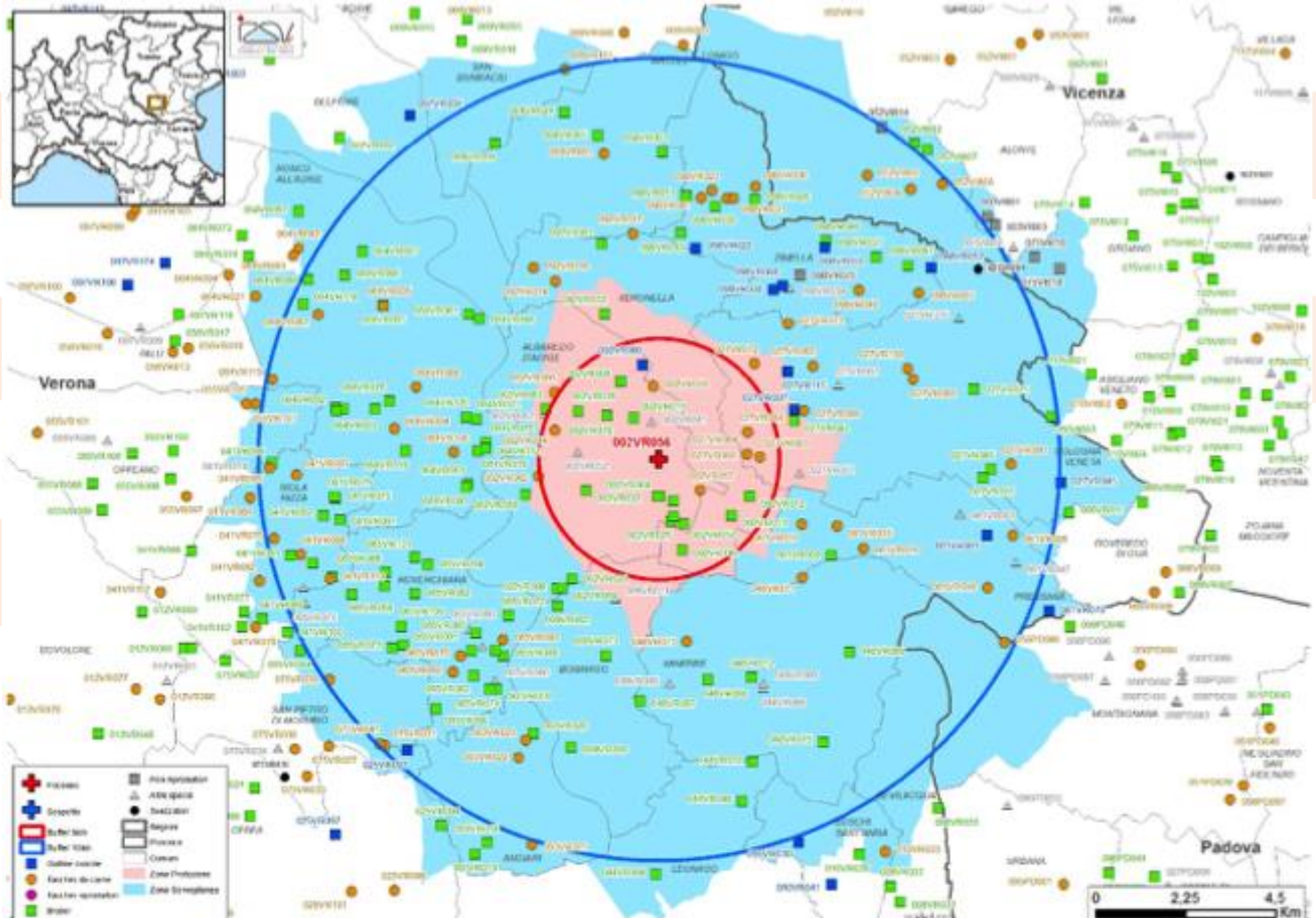
Resources for disease emergencies - personnel

One of the most critical resource factors is the immediate availability of **trained and experienced personnel** → lists of the staff available for a disease emergency shall be established and maintained

Standing arrangements/contracts for **culling and disposal of carcasses**, and cleansing and disinfection of infected premises

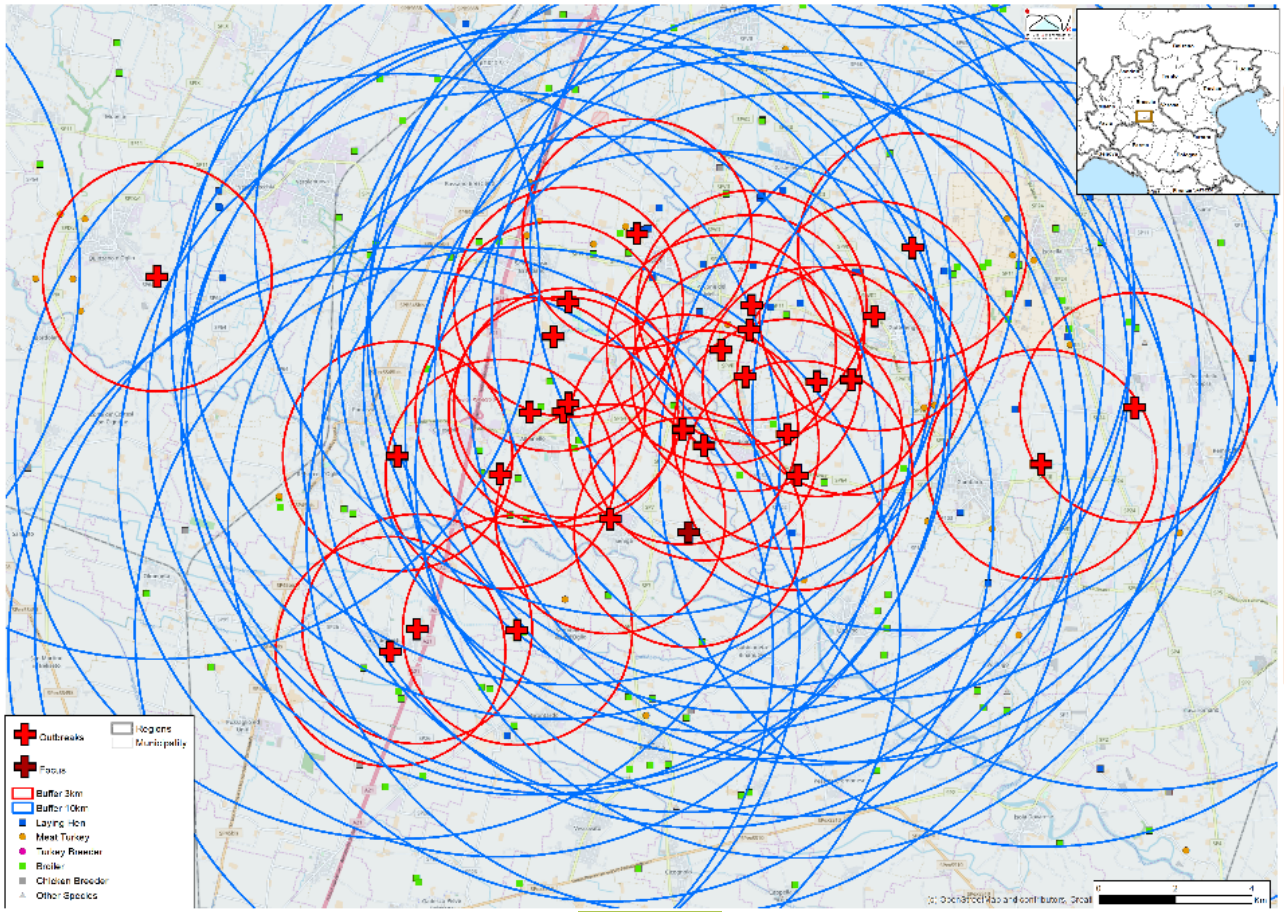
- Culling crews and all equipment and materials to rapidly enforce stamping out measures
- Rendering plants (capacity)
- Equipment and staff for cleansing and disinfection
- …….

DPPA – Restriction areas



European Commission

DPPA – Outbreak eradication and restriction areas



Resources for disease emergencies - equipment

The effective and prompt eradication of epidemic disease requires the **immediate availability** of appropriate equipment such as:

- Protective clothing (**zoonotic infection**)
- Autopsy and sampling equipment
- Disinfectants effective against exotic disease viruses
- …….

LDCC(s) shall have available office equipment including:

- Preprinted proformas such as formal notices of restrictions, **epidemiological questionnaire**(s), etc.

Instructions for dealing with exotic diseases

The **operational manual** contains a set of instructions and **detailed procedures** for dealing with disease outbreaks

When a disease is reported the action to be taken:

- In the event of a suspected case (e.g. submission of samples to laboratories)
- Where disease is confirmed (e.g. notification of local authorities, agricultural associations, etc.)

Instructions for dealing with exotic diseases

Procedures at an 'infected premises'

- Isolation of the premises
- Valuation and compensation
- Culling of animals
- Carcasses and contaminated material disposal
- Sanitation
- Restocking

Instructions for dealing with exotic diseases

Epidemiological inquiry and movement tracing

- A **standardised system** should be used

Creation of restriction zones around the outbreak site

- Census of all livestock holdings
- Regular surveillance of all livestock holdings
- Movement controls
- Prohibition of markets, shows, etc.
- ……

Diagnostic laboratories

Disease control centres must have immediate and continuous access to a **diagnostic facility** for exotic diseases

An **EU network of National Reference Laboratories** coordinated by the EU-Reference Laboratory is in place for each exotic disease

The contingency plan shall contain information on the available resources and the diagnostic capacity (**Laboratory contingency plan**)

Epidemic disease control policies

Control policies are not mutually exclusive:

- Enhanced biosecurity
- Stamping out and pre-emptive culling
- Movement restrictions
- Monitoring and surveillance
- **Emergency vaccination**

There is a clear need to implement prevention and eradication strategies based on a **combination of measures** that may include the use of vaccination

Emergency vaccination

The implementation of an effective **emergency vaccination programme** is related to the level of preparedness

The emergency vaccination programme must:

- be part of the national contingency plan
- include **decision making patterns** in different scenarios in order to allow a rapid decision on whether to vaccinate or not in the face of an epidemic

Training

Staff shall be **regularly trained** in procedures for detecting and eradicating exotic diseases

Publicity and awareness

Awareness of the disease shall be maintained within veterinary profession, agricultural community, etc., to guarantee a **prompt notification** of the possible occurrence of an exotic disease

Conclusions

Contingency planning is not the production of a "fancy" manual but the organization of a coordinated **system** that can become **fully and promptly operational** in case of a disease outbreak

In order to fulfil this objective the plan shall be:

- widely distributed to stakeholders
- regularly updated
- repeatedly tested by means of external audits and **simulation exercises**

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Thierry van den Berg

Laboratory quality control

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Definition

Laboratory quality control is designed to detect, reduce, and correct deficiencies in a laboratory's internal analytical process prior to the release of patient results, in order to improve the quality of the results reported by the laboratory.

Quality control is a measure of precision, or how well the measurement system reproduces the same result over time and under varying operating conditions.

Laboratory quality control material is usually run at the beginning of each shift, after an instrument is serviced, when reagent lots are changed, after calibration, and whenever results seem inappropriate

Wikipedia

Main requirements for NRLs in the Reg. 625/2017

- **Competent Authorities responsible for designating a NRL for each EURL (Total network in EU >1300) (art 100)**
- **Assist Competent Authorities in outbreaks! (art 101)**
- **Ensure the dissemination to the competent authorities and official laboratories of information that the European Union reference laboratory supplies**
- **NRLs to comply with:**
  - ISO 17025 (art.100 and 37)
  - obligations to participate successful in trainings & proficiency tests with EURLs (art. 101);
  - Coordinate activities of official laboratories (art 101)
- **NRLs to be equipped with biosecurity standards (art 100)**
- **Conduct training courses for Official Labs**
- **NRLs subjects to audits by Competent Authorities in the Member States (art. 39)**

Definitions

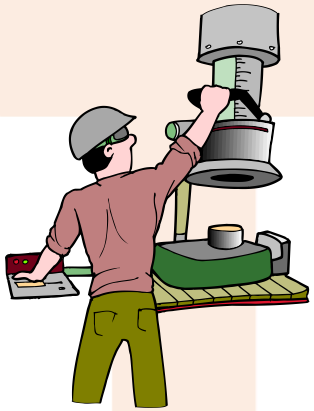
- "The aim of quality control is simply to ensure that the results generated by the test are correct. However, quality assurance is concerned with much more: that the right test is carried out on the right specimen, and that the right result and right interpretation is delivered to the right person at the right time"
- **Quality Control** - QC refers to the measures that must be included during each assay run to verify that the test is working properly.
- **Quality Assurance** - QA is defined as the overall program that ensures that the final results reported by the laboratory are correct.
- **Quality Assessment** - quality assessment (also known as proficiency testing) is a means to determine the quality of the results generated by the laboratory. Quality assessment is a challenge to the effectiveness of the QA and QC programs.

Norms

R & D

- GLP, GCP
- ISO 9001

Production



- ISO 9001
- GMP
- HACCP

Control

- ISO 9001
- ISO 17025
- ISO 17043
- ISO 15189
- ISO 17020

Management

- ISO 9001
- ISO 14001
- EMAS
- OHSAS

Important norms for laboratories

ISO 17025 (LABs): General requirements for the competence of testing and calibration laboratories

ISO 9001 (R&D): is the standard that outlines the requirements an organization must maintain in their quality system

ISO 17043 (PTs):specifies general requirements for the competence of providers of proficiency testing schemes and for the development and operation of proficiency testing schemes.

ISO 14001 (Environment): international standard that specifies requirements for an effective environmental management system (EMS).

Processes

Accreditation /certification is a dynamic process, not a switch on/off

Lab activities and management can be grouped in 10 processes:

General managment (all norms)

Continue improvement (all norms)

Evaluation of expert dossier (ISO 9001)

Follow-up of an epidemiological project (ISO 9001)

Chemical, microbiological, molecular labanalyses (ISO 14001, ISO 17025, ISO 15189)

Organisation of Proficiency Tests (ISO17043)

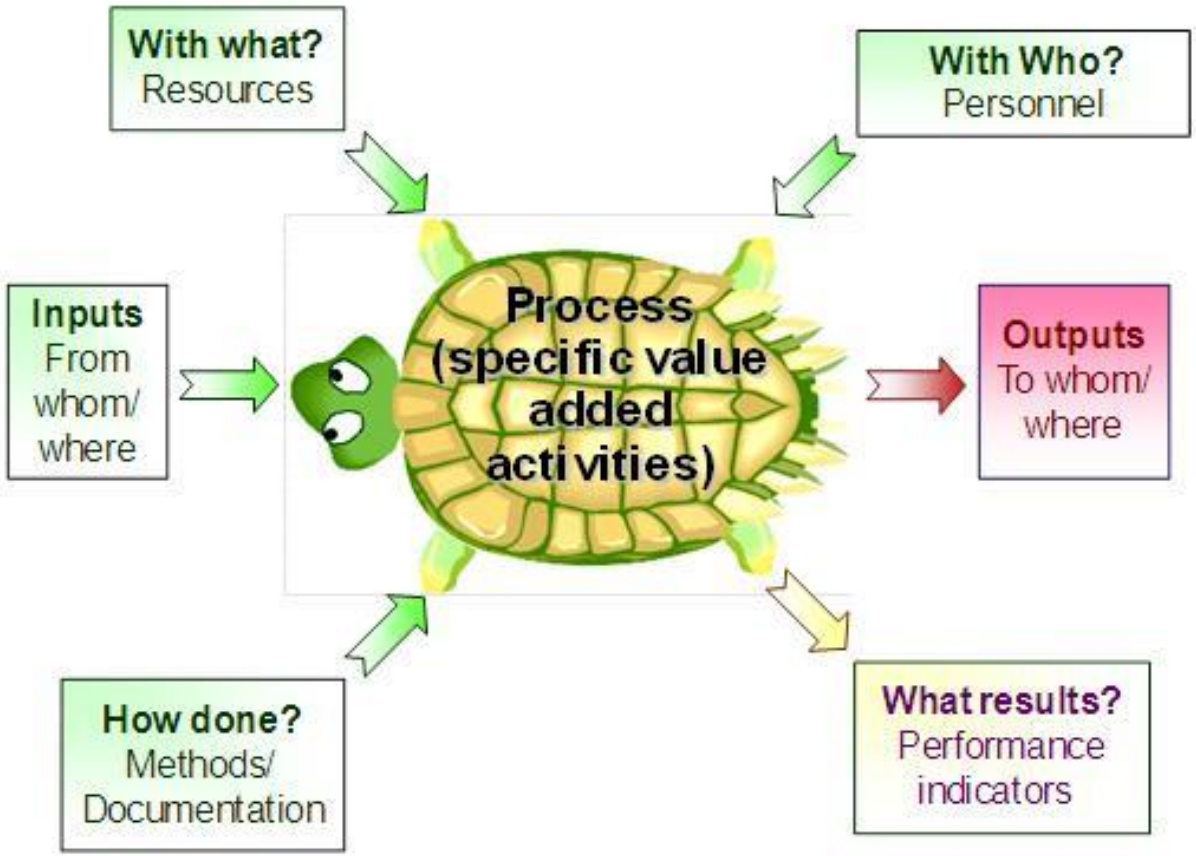
Management of external services (all norms)

HRM (all norms)

ICT (all norms)

Documentation (all norms)

Process Auditing "Turtle Diagram"



"I have some paperwork to catch up. If I'm not back in two days, organize a search and rescue team!"

Audits

"What makes you think I have something to hide?"

Quality control, or QC for short, is a process by which entities review the quality of all factors involved in production. ISO 9000 defines quality control as "A part of quality management focused on fulfilling quality requirements".

This approach places an emphasis on three aspects (cfr ISO 9001):

1. Elements such as controls, job management, defined and well managed processes, performance and integrity criteria, and identification of records
2. Competence, such as knowledge, skills, experience, and qualifications
3. Soft elements, such as personnel, integrity, confidence, organizational culture, motivation, team spirit, and quality relationships.

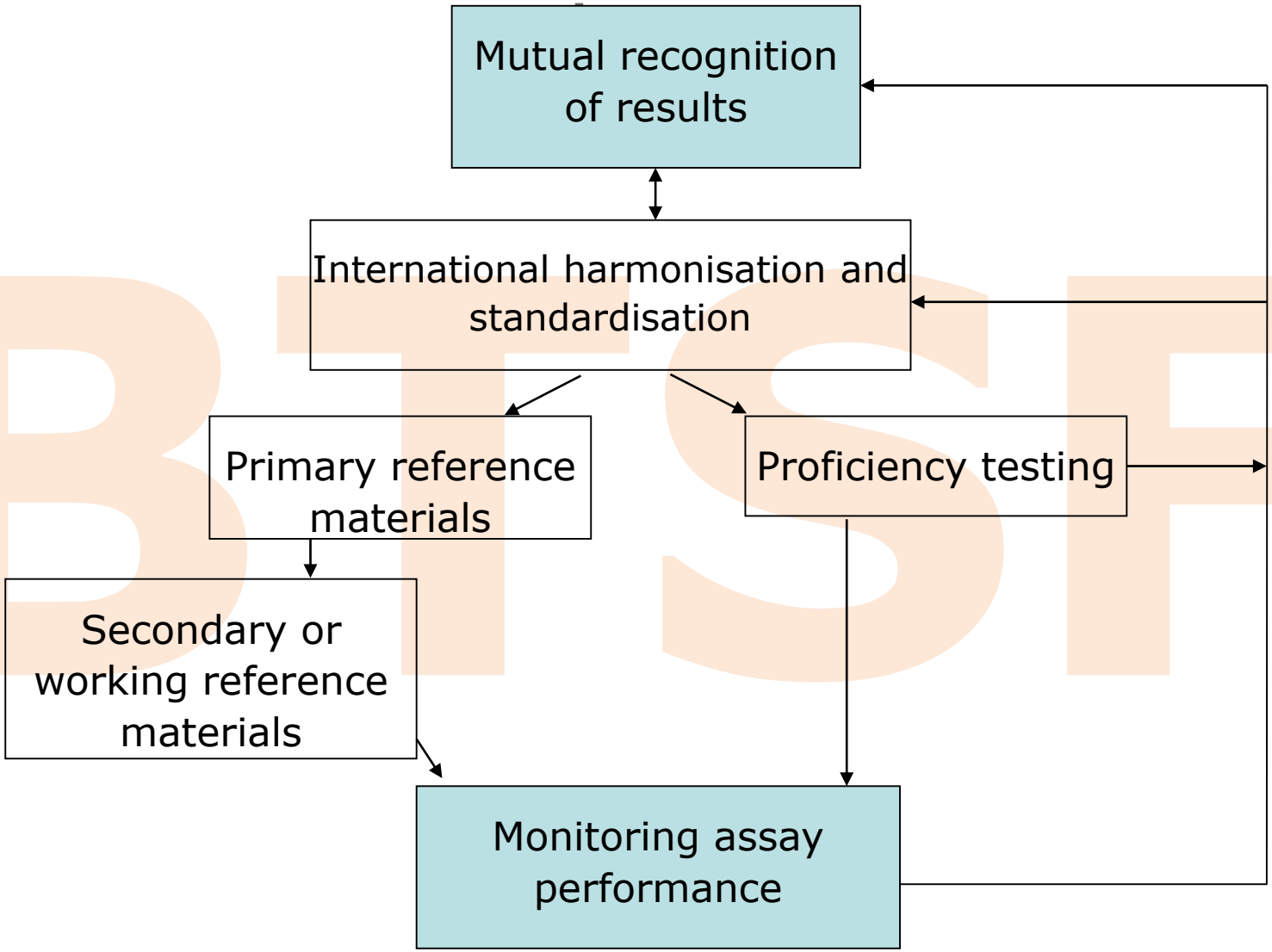
Inspection is a major component of quality control, where physical product is examined visually (or the end results of a service are analyzed).

	Pre-analytical	Analytical	Post-analytical
INTERNAL QUALITY CONTROL: Set of procedures undertaken by the staff to ensure quality of reports	Investigation Specimen Collection technique Storage and transportation Quantity Labeling Laboratory	Proficiency of personnel Reagents stability, integrity and efficiency Equipment reliability Specificity & sensitivity of selected test Procedural reliability using standard operating procedures Use of appropriate controls Documentation Assessment	Recording and reporting Interpretation Turnaround time
EXTERNAL QUALITY ASSESSMENT: a system of objectively checking laboratory results by means of an external agency	External quality assessment scheme Rechecking On-site visits Combination of any two or more of the above		
ACCREDITATION: Process of inspection of laboratories and their licensing by a third party to ensure conformity to pre-defined criteria	Laboratory license		

Focus on the laboratory

Validation
=
the evaluation of a process to determine its fitness for a particular use

("Fit for purpose ")


Mutual recognition of results
International harmonisation and standardisation
Primary reference materials
Proficiency testing
Secondary or working reference materials
Monitoring assay performance

Stages Of Assay Validation

PART I

- - Feasibility studies => initial estimates of repeatability, analytic sensitivity/specificity
- - Assay development and standardisation => selection of reagent concentration, protocol parameters, repeatability studies, determination of analytic sensitivity/specificity
- - Determining assay performance characteristics => diagnostic sensitivity (300 samples) and specificity (1000 samples), standards of comparison ("gold standard"), precision and accuracy, cut-off selection

PART II

4. Monitoring validity of assay performance
   => charting method using data generated by reference materials
5. Maintenance and enhancement of validation criteria
   => proficiency testing

OIE Manual C H A P T E R 1.1.04 : intro

"The principles of validation discussed in this chapter will focus primarily on methods to detect antibody in sera using an ELISA as an example. However, these same principles are applicable to validation of tests for other analytes in sera or tissues."

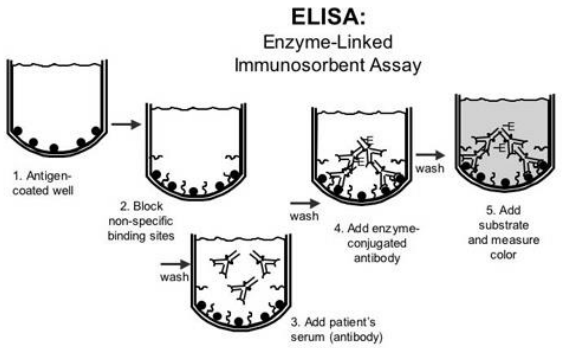
Enzyme linked ImmunoSorbant Assay

Cheap

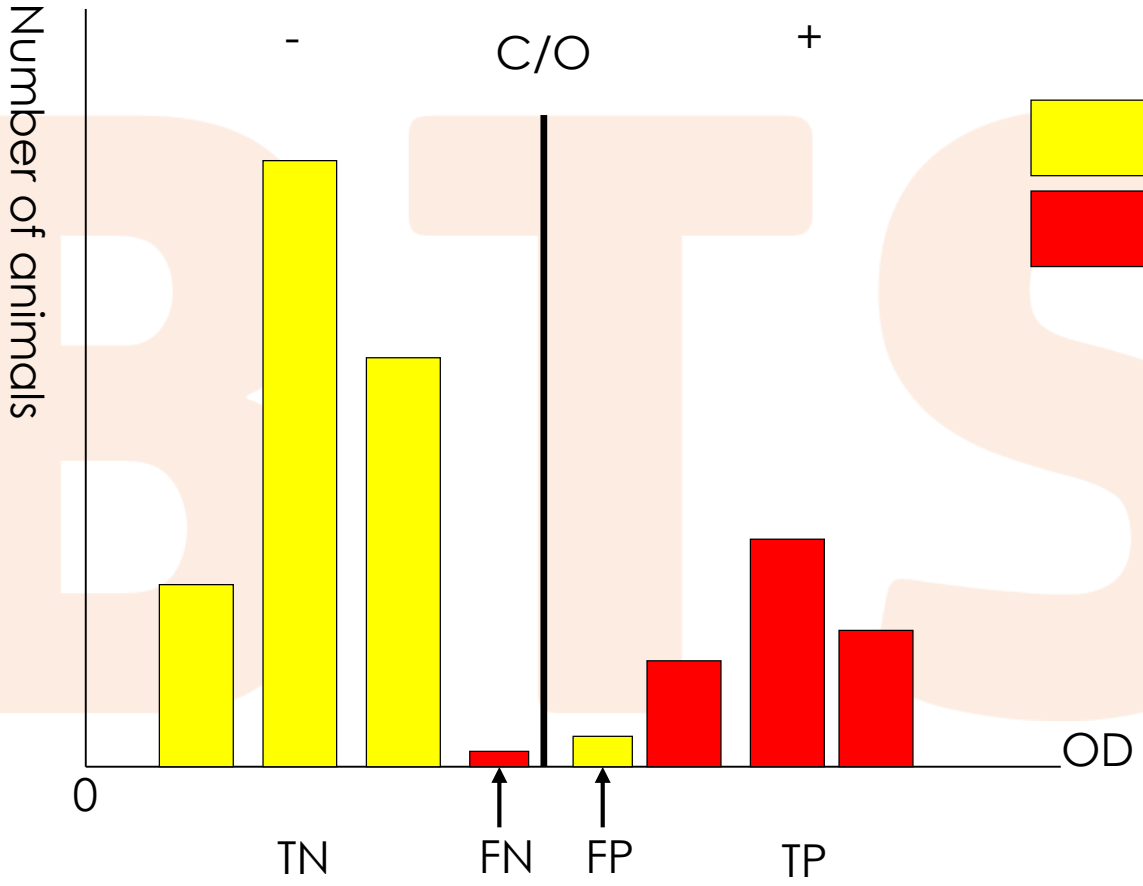
Fast results

Automatisation (robots)

Large scale



Determining Assay Performance Characteristics



uninfected animals

infected animals

Sensibility = TP/(TP+FN)

Specificity = TN/(TN+FP)

What Is Quality Control (QC)?

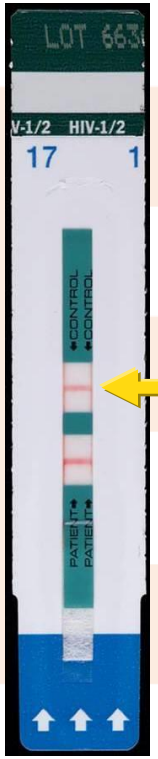
Measures taken to monitor the quality of the test itself

Example: QC for Rapid Testing includes:

- Testing of samples with known results to verify if the procedure is working properly
- Interpreting the presence or absence of control bands/lines within the device itself

If an error occurs, do not release or report results until you have corrected the error.

Internal and External Quality Control



Internal Control

Included in testing device or as part of the kit

Control Band

External Control

Known positive and negative samples that are used to validate the reliability of the test system – prepared by Eu or NRL or commercially

Variables that affect the quality of results

- The educational background and training of the laboratory personnel
- The condition of the specimens
- The controls used in the test runs
- Reagents
- Equipment
- The interpretation of the results
- The transcription of results
- The reporting of results

Errors in measurement

True value - this is an ideal concept which cannot be achieved.

Accepted true value - the value approximating the true value, the difference between the two values is negligible.

Error - the discrepancy between the result of a measurement and the true (or accepted true value).

Sources of error

Input data required - such as standards used, calibration values, and values of physical constants.

Inherent characteristics of the quantity being measured - e.g. CFT and HAI titre.

Instruments used - accuracy, repeatability.

Observer fallibility - reading errors, blunders, equipment selection, analysis and computation errors.

Environment - any external influences affecting the measurement.

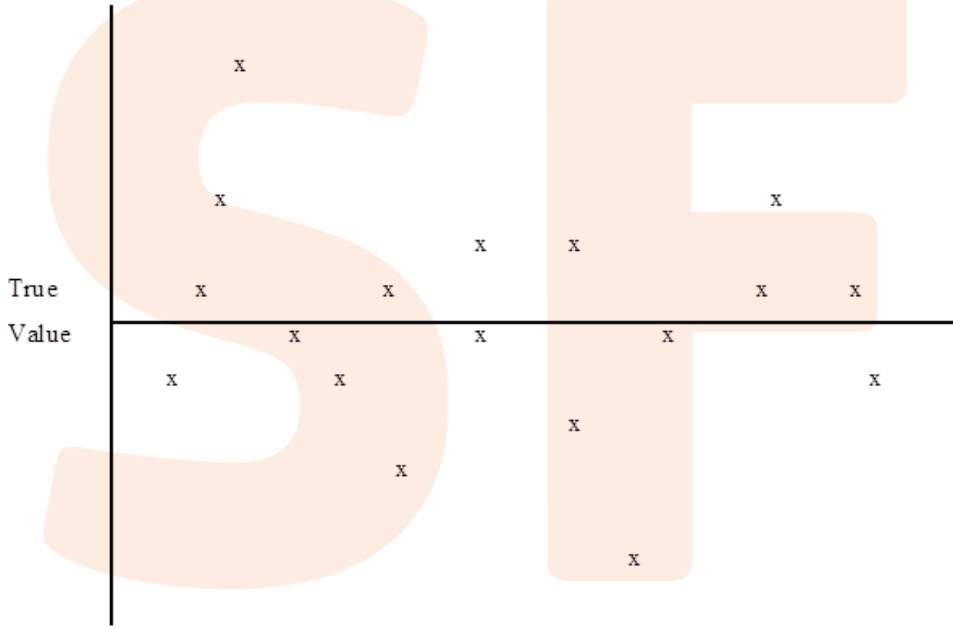
Theory assumed - validity of mathematical methods and approximations.

Random Error

An error which varies in an unpredictable manner, in magnitude and sign, when a large number of measurements of the same quantity are made under effectively identical conditions.

Random errors create a characteristic spread of results for any test method and cannot be accounted for by applying corrections. Random errors are difficult to eliminate but repetition reduces their influence.

Examples of random errors include errors in pipetting and changes in incubation period. Random errors can be minimized by training, supervision and adherence to standard operating procedures.

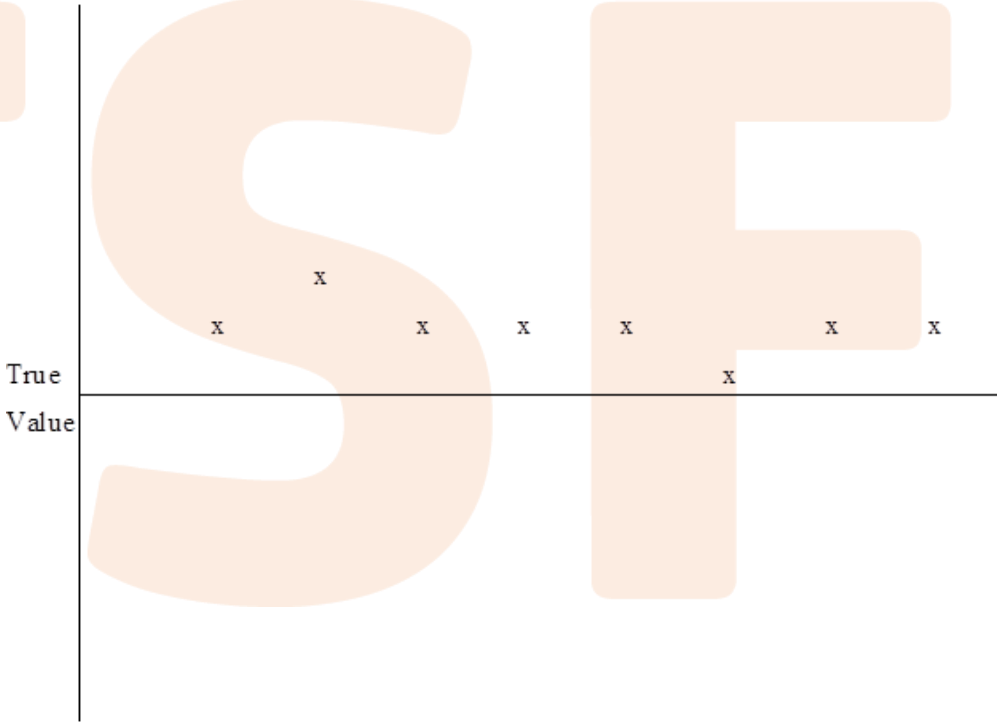


Systematic Error

An error which, in the course of a number of measurements of the same value of a given quantity, remains constant when measurements are made under the same conditions, or varies according to a definite law when conditions change.

Systematic errors create a characteristic bias in the test results and can be accounted for by applying a correction.

Systematic errors may be induced by factors such as variations in incubation temperature, blockage of plate washer, change in the reagent batch or modifications in testing method.



Proficiency testing

- According to the ISO definition, *Proficiency testing* (PT) also known as *External quality Assessment (*EQA) or *EQ Control* (EQC) or *Third line testing* refers to:
  - a system of objectively checking laboratory results by means of an external agency
  - including comparison of a laboratory's result at intervals with those of other laboratories
  - the main objective being the establishment of trueness

Generating Secundary Or Working Reference Materials

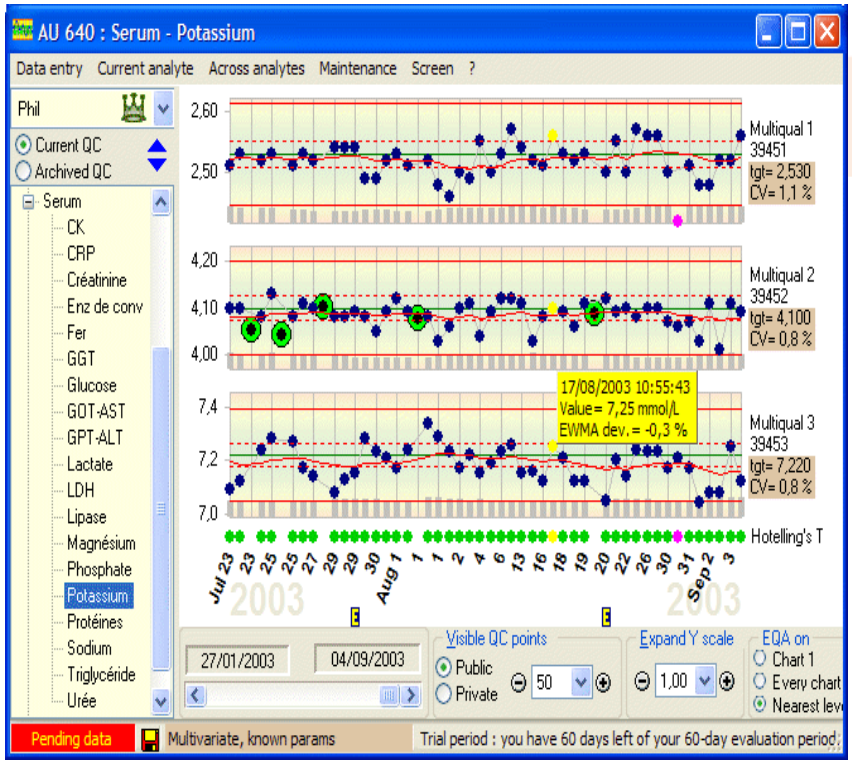
In Practice

Preparing National and Working Reference Materials

e.g. SPCE ELISA for the detection of antibodies against FMDV

1. Vaccination of calves against a serotype of FMDV
2. 1) Titration of their sera in ELISA and, for comparison, in VNT
3. 2) Expression of results as percentage of inhibition
4. 3) Selection of certain dilutions that give PI comparable to those obtained by the primary reference sera
5. 4) Making single dilutions in NBS and test again in ELISA
6. 5) Adding a pool of negative sera as negative control
7. 6) Selection of those dilutions that give practically identical PI as the primary sera and test them 3 times in ELISA
7) Aliquot the desired dilutions and test them, again 3 times, in ELISA before routine use
8) Import all normalised control values in a quality control chart

Advantages of Quality Control Charts

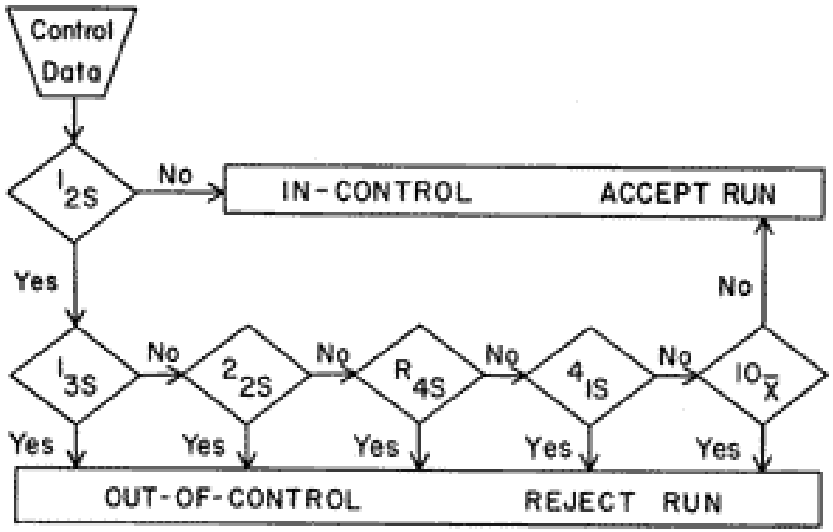


- Visualisation of assay performance in time (Shewhart charts)
- Continuous monitoring of assay
- Helpfull tool in deciding to accept or to reject a run
- Multi-rule procedure
- Westgard rules (1:2s, 1:3s, 2:2s, R:4s, 4:1s, 10:x)
- Evaluation of staff competence
- Assay in or out of statistical control
- International mutual recognition of results

Decision Criteria

Accept or reject an analytic run?

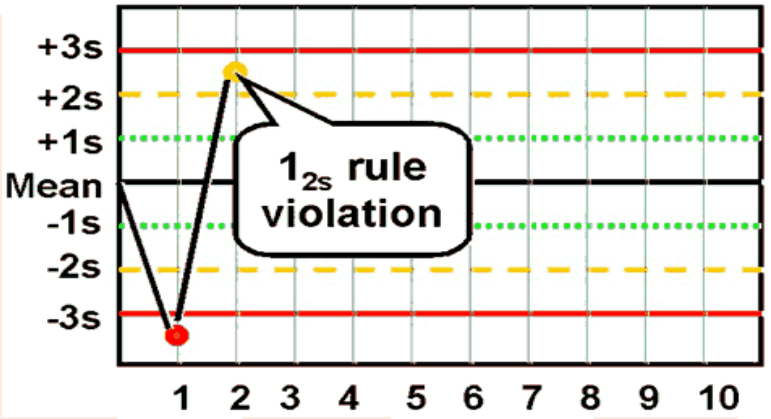
- 1:2s warning → detailed inspection of the data
- 1:3s random error → reject run
- 2:2s within the same control or across levels → systematic error
- R:4s within the same control or across levels → systematic error
- 4:1s within the same control or across levels → systematic error
- 10:x within the same control or across levels → systematic error (shift of the mean)



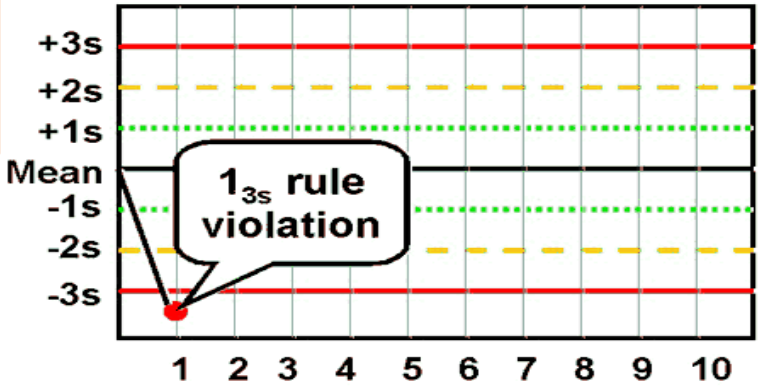
Westgard rules

- The formulation of Westgard rules were based on statistical methods. Westgard rules are commonly used to analyse data in Shewhart control charts.
- Westgard rules are used to define specific performance limits for a particular assay and can be use to detect both random and systematic errors.
- There are six commonly used Westgard rules of which three are warning rules and the other three mandatory rules.
- The violation of warning rules should trigger a review of test procedures, reagent performance and equipment calibration.
- The violation of mandatory rules should result in the rejection of the results obtained with patients' serum samples in that assay.

Accept or Reject?

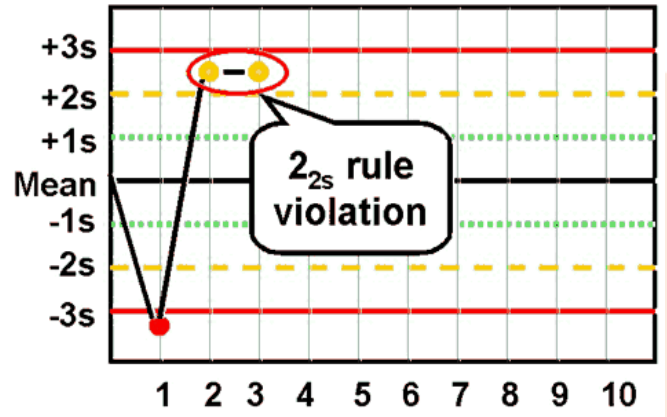


The control observation exceeds the 2s limit. Warning of possible problems

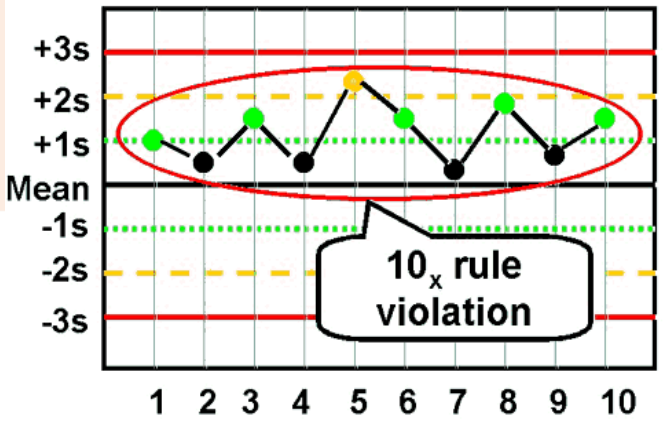


Reject run, the control observation exceeds the -3s limit. A random error has occured

Accept or Reject?

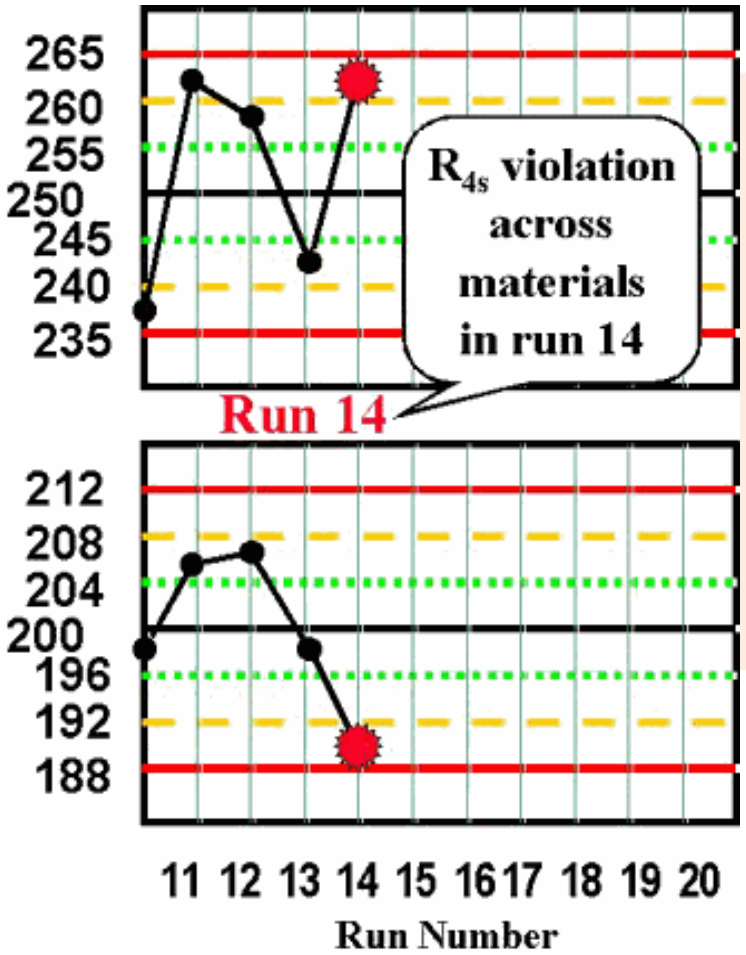


Reject run, a systematic error has occured. Two consecutive point of the same control observation exceed the 2s limit



Reject run, a systematic error has occured. 10 successive points fall on the same side of the mean. A possible shift of the mean?

Accept or Reject?

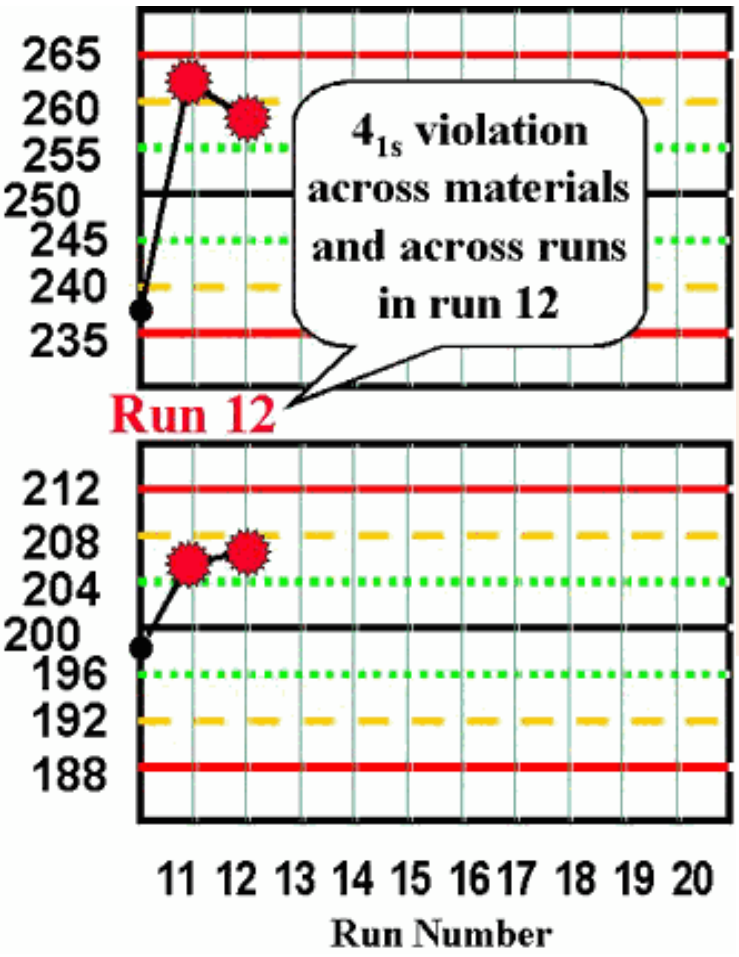


The first control observation exceeds the 2s limit, while the second exceeds the –2s limit. The difference/range between both observations exceeds 4s.

Reject run due to likelihood of random error

(across levels)

Accept or Reject?



Across control materials 4 consecutive points exceed the 1s limit. A systematic error is probably occuring throughout the concentration range covered by the controls. Run should be rejected.

Quality Control Without Control Chart Software Programme

e.g. Monitoring the performance of VNT assay

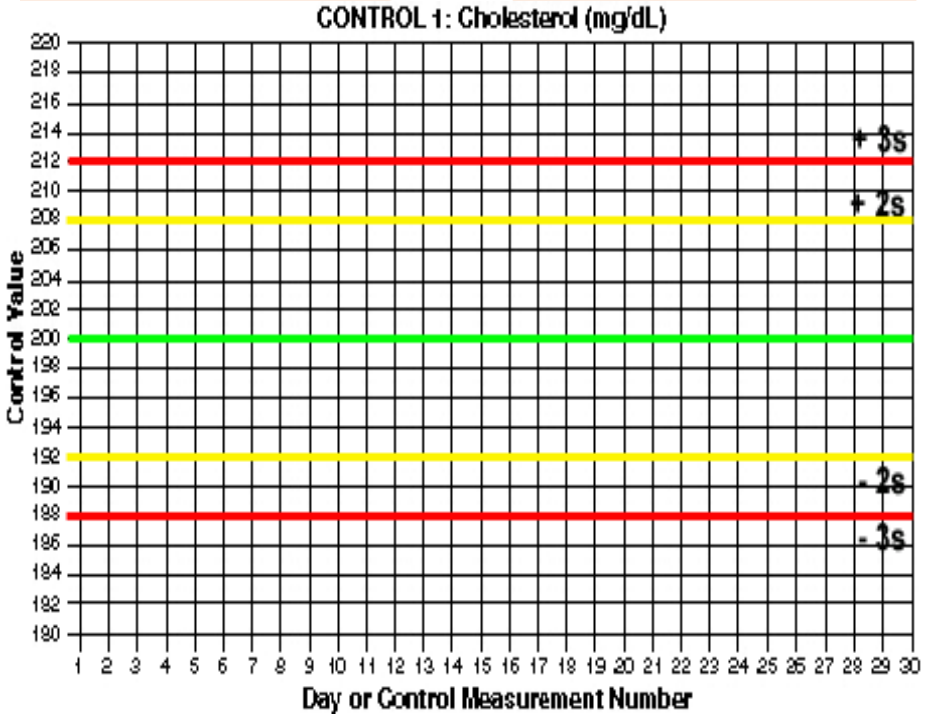
1. Titration of the positive control serum (PC)
2. Write down the daily titre of the PC in a table
3. Periodically visualise these titre logs on a chart (using e.g. Microsoft Excel)

Analyse the chart using the 1:2s, 1:3s, 2:2s, R:4s, 4:1s and 10:x rules

→ BUT: time-consuming + retrospective

<u>Note:</u> before analysing these titres at least 20 PC titres need to be obtained in order to calculate a reliable mean and standard deviation!!!

Making of an In-house QC Chart



1. Select appropriate control materials (e.g. secondary/working standards)
2. Characterise method performance by collecting a minimum of 20 measurements
3. Calculate the mean and standard deviation of those data
4. Select the number of control measurements (e.g. 4 per control)
5. Select the control rules applied (e.g. 1:2s and 1:3s)
6. Calculate the control limits
7. Analyse analytic run results

Advantages and Disadvantages of Control Charts

Advantages

1. *Monitoring assay performance in time*
2. *Valuable tool in obtaining accreditation*
3. *Visualisation*
4. *Evaluation of staff competence*
5. *Multi-rule*
6. *Helpful tool in deciding to accept an analytic run*

Mutual recognition of results

- *Disadvantages*

1. *Expensive software programme*
2. *Risk of rejecting analytic runs that are in statistical control*
3. *Not applicable to test such as VN (nominal test results)*

Keys to successful quality control

- Adequately trained, interested and committed staff.
- Common-sense use of practical procedures.
- Willingness to admit and rectify mistakes.
- Effective communication.

Take-home messages

A quality assurance (QA) programme is essential for improving the reliability, efficiency and use of laboratory services in order to achieve the required technical quality in laboratory diagnosis.

The process of quality assurance should be continuous and monitored

Quality assurance is the responsibility of all laboratory technicians and supervisors.

It is useful periodically to calculate indicators to evaluate the performance of the laboratory.

It is not sufficient in QC simply to identify errors or weaknesses in laboratory services; remedial action must be taken to permanently remove them.

"I think we're in good enough shape to start making the same mistakes again."

The contents of this presentation are the views of the author and do not necessarily represent an official position of the European Commission.

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BTSF

European Commission
Consumers, Health, Agriculture and Food Executive Agency
DRB A3/042
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Food Safety

Regional Workshop on Animal Disease Preparedness

Better Training For Safer Food

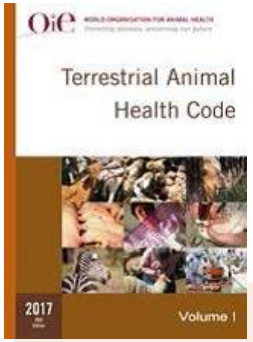
Silvia BELLINI

Surveillance

Tokyo, Japan
12-15 June 2018

Food Safety

Content



- Introduction (OIE)
- General principles on surveillance in the Terrestrial Animal Health Code
- Surveillance in the disease specific chapters of the Terrestrial Animal Health Code (ASF)

What is Surveillance?

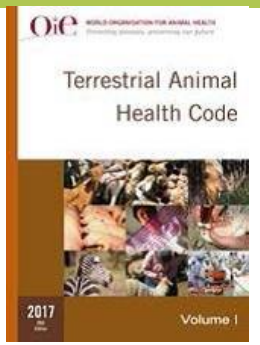
(OIE: Terrestrial Animal Health Code, 2017)

OIE Terrestrial Animal Health Code Definition

"Means the systematic ongoing **collection**, **collation** and **analysis** of information related to animal health and the timely **dissemination** of information so **action** can be taken"

Essential part of any disease control programme

European Commission



Introduction and objectives

Aims of Surveillance:

- demonstrating absence / presence of disease or infection
- detecting as early as possible exotic or emerging diseases

Prerequisites for reliable information:

- comply with Chapter 3.1. (Veterinary Services);
- surveillance data complemented by other sources (scientific publications, research data)
- transparency of surveillance activities (Chapter 1.1. - Notification of diseases, infections and infestations, and provision of epidemiological information)

The general recommendations of chapter 1.4 may be refined by the specific approaches described in the disease chapters.

Surveillance (OIE)

- The most common type of surveillance: **passive surveillance**
- Vet Services learn of the occurrence of a disease through notification: abbattoir, vets in the field, farm producers, labs
- Passive surveillance remains the cornerstone of surveillance systems in all OIE member countries
- It is the most likely way in which new or emerging diseases will be detected

However:

Most surveillance systems incorporate,
to a greater or lesser extent, elements of active surveillance, depending on

1) Prioritisation of the disease by Vet Services,
2) Charactheristics of the disease

Surveillance: Wildlife

The presence of a disease in wildlife does not mean it is necessarily present in domestic animals. Wildlife may be included in a surveillance system because they can serve:

- as reservoirs of infection
- as indicators of disease risk to humans and domestic animals.

..in practice surveillance is specifically required for:

Disease freedom (Country- Zone):

- Initial declaration
- Maintenance

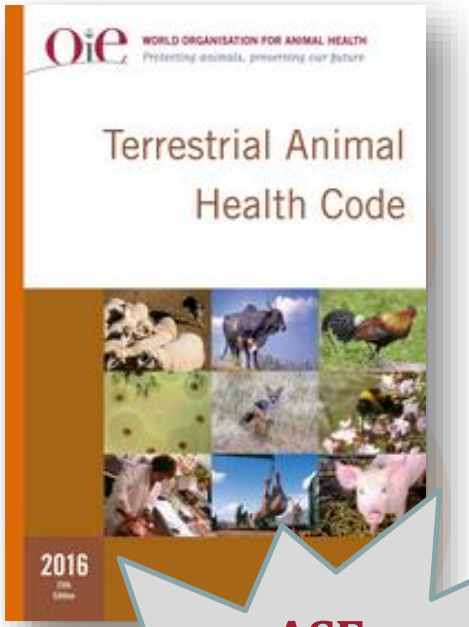
Compartmentalization:

- Internal and
- external surveillance

Outbreak surveillance

To be effective surveillance systems should adapt to the changing situations

OIE International Standards



e.g : ASF (chapter 15.1)

Content Volume 2

Specific chapters on diseases:

- Susceptible species, definition of infection, incubation period (determining quarantine period and other risk mitigation procedures)
- *Surveillance*
- Determining status of a country, zone or compartment (establishment; suspension; recovery)
- Recommendations for imports, depending on statuses, for the different commodities (live animals, genetic material, products of animal origin)

Terrestrial Animal Health Code: Chapter 15.1.
Infection with African swine fever virus

Specific Article on Surveillance: 15.1.27

- Introduction to surveillance (Article 15.1.27.)
- General conditions and methods for surveillance (Article 15.1.28.)
- Surveillance strategies (Article 15.1.29.)
- Surveillance for recovery of free status (Article 15.1.30.)
- Surveillance for ASFV in wild and feral pigs and African wild suids (Article 15.1.31.)
- Surveillance for arthropod vectors (Article 15.1.32.)

The impact of ASF varies in different regions of the world

The **surveillance strategy** needs to be tailored to the situation and take into account:

- Prevalent type of pig production system
- Presence of wild and feral pigs
- Presence of African wild suids
- Presence of Ornithodoros ticks
- ASF situation in adjacent territories
- ASFV genotype

Free status

Early Detection

Eradication/Endemicity

ASF Surveillance

An increased likelihood of infection in particular localities or subpopulations exists, targeted sampling could be appropriate. This may include:

- Specific high-risk feral pigs populations
- Pigs reared outdoors
- Farms which feed swill
- Areas in which the disease has been previously detected
- Evidence of involvement of ticks
- …

ASF Surveillance

Target Animals in the EU

Domestic Pigs:

- commercial farms
- backyards

Wild Boar

- **Surveillance Methods:**

(a) clinical, (b) virological, (c) serological

Based on the situation

ASF Surveillance

Due to the characteristics of ASF: High Morbidity and Lethality

Passive Surveillance
Key role in Early Detection

any *cases* where clinical signs or lesions are suggestive of ASF should be investigated without delay

Clinical Surveillance

Is the most effective tool for detecting ASF [Mortality (94.5-100%)]. However, due to the clinical similarity with other *diseases*, it should be supplemented by serological and virological *surveillance*.

DOMESTIC PIGS

In Commercial Holdings

- *Strict health monitoring programme of pig holdings (pigs sick/dead examined and tested)*

In Backyards

- *Vet inspection on pig slaughtering for own consumption*

  (pigs with lesions/simptoms examined and tested)

Virological Surveillance

It is important for early detection, differential diagnosis and for systematic sampling of target populations. It should be conducted:

- ✓ to investigate clinically suspected cases
- ✓ to monitor at risk populations
- ✓ to follow up positive serological results
- ✓ sentinel animals (to confirm eradication after stamping-out)

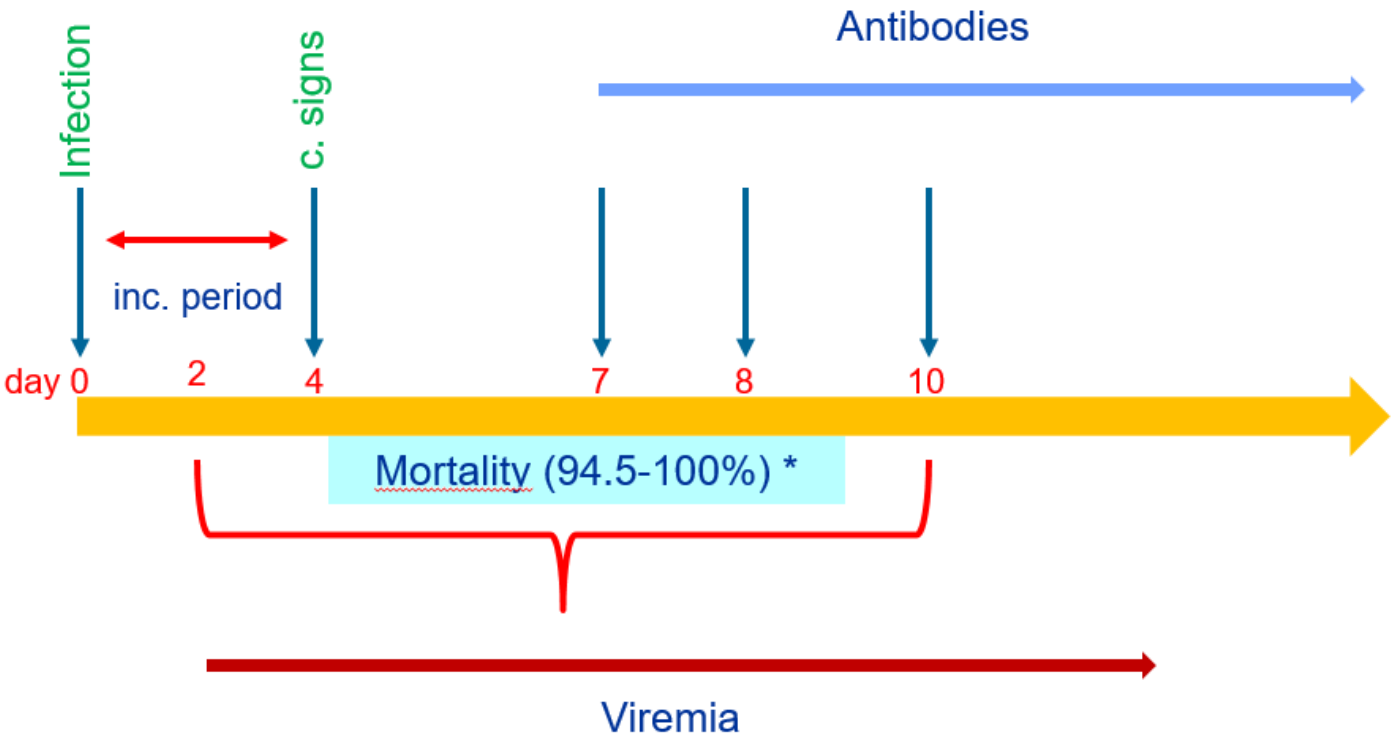
Serological Surveillance

Serological surveillance aims at detecting antibodies against ASFV.

- Positive ASFV antibody test results can indicate an ongoing or past outbreak, if some animals recover they may remain seropositive for life.

Serology is not suitable for Early Detection

ASF pathogenesis



*Gallardo C., et al. 2014; Blome S., et al 2012..

Surveillance in Domestic Pigs (Example)

Based on the biological properties of ASFV

In commercial farms <u>independently of their size</u> following tests are carried out on a monthly basis:

- 10 randomly selected pigs for the presence of ASF antibodies (ELISA test)
- 5% of dead pigs for PCR testing (organ material) ← OK
- 4% of the slaughtered animals at the abattoir: PCR tested.

Backyard pigs are inspected during home slaughtering by a veterinarian. In case of suspicion organ samples are taken for ASF testing.

?

Sero-prevalence: 25-30%

Healthy Animals (??)

Article 15.1.31. Terrestrial Code
Surveillance for ASFV in wild and feral pigs and African wild suids (1)

- The **objective is to demonstrate** that *infection* with ASFV is **not present** in ***wild* and *feral* suids or, if** known to be **present**, to estimate the geographical distribution of the *infection*.
- The **geographic distribution and estimated size** of wild and feral suid populations should be assessed
- the **limits of the area** over which wild and feral pigs range should be defined.
- The surveillance programme may include animals found dead, road kills, animals showing abnormal behaviour and hunted animals,
- The surveillance programme may also include **awareness campaigns targeted at hunters and farmers**.

Article 15.1.31.
Surveillance for ASFV in wild and feral pigs and African wild suids (2)

There may be situations where a targeted *surveillance* can provide additional assurance. The criteria to define high risk areas for targeted *surveillance* include:

- areas with past history of ASF;
- sub-regions with large populations of *wild* or *feral* pigs or African *wild* suids;
- border regions with ASF affected countries or *zones*;
- interface between *wild* and *feral* pig, and domestic and *captive wild* pig;
- areas with farms with free-ranging and outdoor pigs;
- areas with a high level of hunting activity, where animal dispersion and feeding as well as inappropriate disposal of waste can occur;
- other risk areas such as ports, airports, garbage dumps and picnic and camping areas.

Article 15.1.32.:
Surveillance for arthropod vectors

Vector surveillance aims at defining the type and distribution of ticks of the genus *Ornithodoros*.

The Veterinary Authority should have knowledge of the presence, distribution and identity of *Ornithodoros*

When vector surveillance is necessary, a sampling plan in accordance with Chapter 1.5. should take into account: the biology and ecology of species, in particular, the favoured habitat (burrows and structures associated with pig production). The plan should also take into account the distribution and density of pigs in the country or zone.

Sampling methods include CO2 trapping and flagging, and vacuuming of burrows or structures.

Surveillance in the EU affected countries

Due to the characteristics of ASF: Morbidity, Lethality

Passive Surveillance (all country)

Key role in early detection: domestic pigs and wild boar

Feral pigs

Territories under restriction

- Testing of all the animals sick or found dead (PASSIVE)
- Serological and virological testing of shot animals (ACTIVE)

Domestic pigs

Territories under restriction

- Strict health monitoring programme of pig holdings (pigs sick/dead examined and tested for ASF - CD 2003/422/EC)
- Each week, virological testing of the first 2 dead pigs
- Vet inspection on pig slaughtering for own consumption

Period Jan 2014 – July 2017: 257,305 tests in Baltic countries and Poland (85,697 in domestic pigs, 173,594 in wild boar). EFSA (2017): Epidemiology of ASF in eastern EU.

Results of surveillance activities

(example)

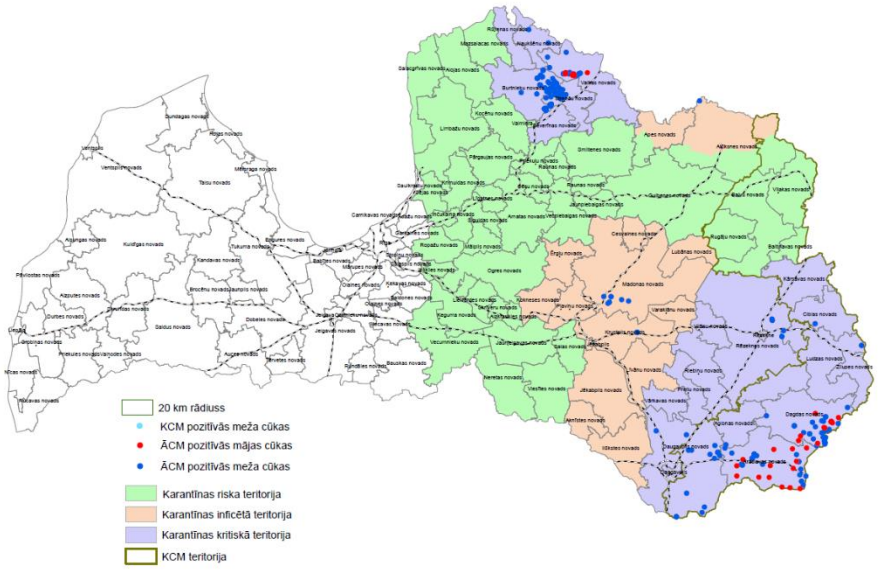
Wild Boar

On 1.04.14, the population density ranged from 12,82 to 4,2 WB/10 km2. A decrease in WB was reported in 2015, max in Burtnieku county (from 11,35 to 0,6 WB/10 km2).

Despite the decrease, ASF cases were still occurring in that Unit.

Surveillance 2015 (January/May)

- 119 WB found dead, 98 virus pos. (82, 4%) [PASSIVE]
- 487 WB hunted, 3 virus pos. (0,62%) [ACTIVE]



An Effective Passive Surveillance

Requires: REPORTING

the trust of pig owners that report the disease to the Veterinary Authorities:

..rapid diagnosis, eradication

AWARENESS CAMPAIGN

AWARENESS CAMPAIGN

Focused on:

- ✓ Explaining the risks
- ✓ Explaining the role of bio-securtity: domestic pigs, during hunting
- ✓ Involve hunters in the strategy
- ✓ Production of info material: farmers, hunters, borders, airport, ports
- ✓ Training

European Commission

Thank you very much for your attention!

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DRB A3/042
L-2920 Luxembourg

Regional Workshop on Animal Disease Preparedness

Better Training For Safer Food

Tsviatko Alexandrov

Stakeholders involvement and enhanced passive surveillance

Food Safety

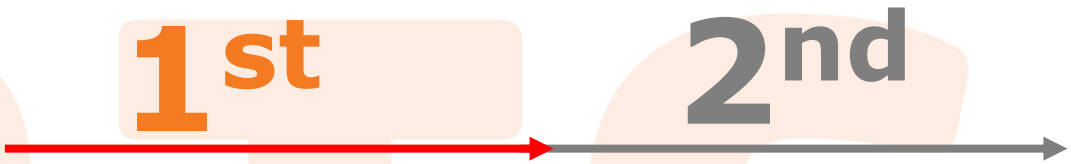
Tokyo, Japan
12-15 June 2018

Content

- High risk periods
- Surveillance in practice
- Stakeholders
- Awareness
- Conclusions

What is that cannot stay hidden……

High risk periods



The period between the introduction of an infection and the first detection of the infection

Efficiency of surveillance

The period between the first animal has been detected as infected and the establishment of measures to prevent virus spreading

Outbreak management

Surveillance in practice

Active surveillance	Passive surveillance
• regular active veterinary surveillance • Usually targeting to detect 5% prevalence with 95 % confidence	Trainings and awareness targeted to farmers, vets, all stakeholders

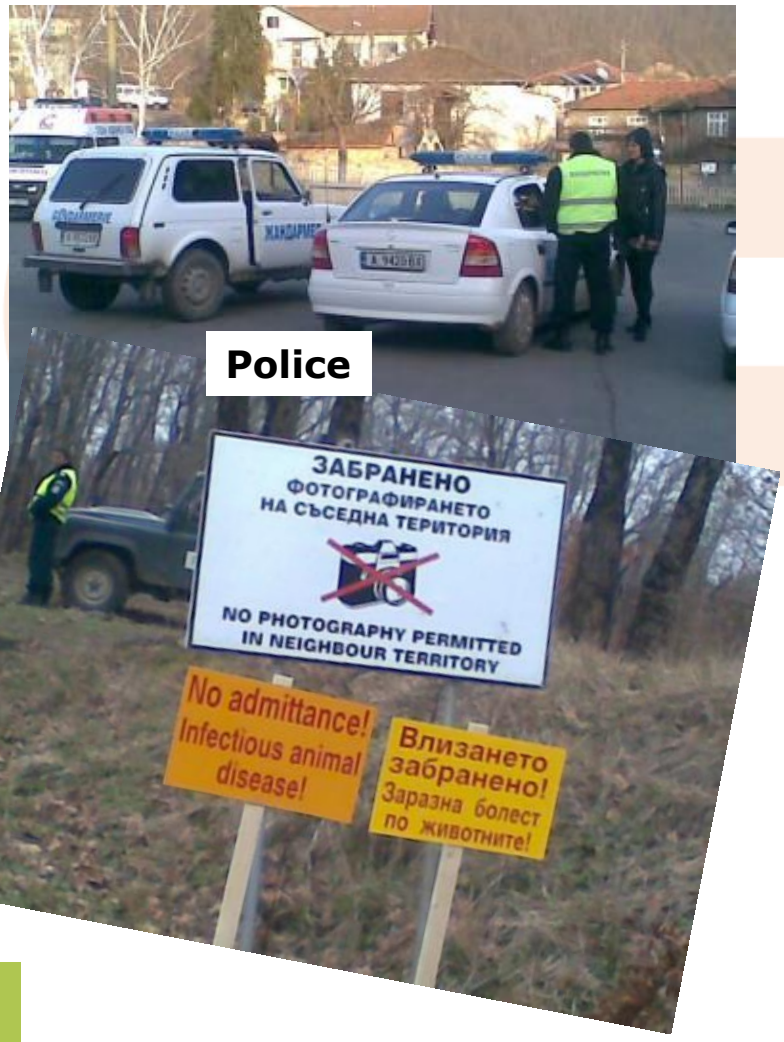
Focused on detection of clinical signs


BT, 2014
CSF, 2008
FMD, 2011
All first outbreaks reported by farmers!
SGP, 2013
LSD, 2016
NCD
HPAI, 2005, 2016 -2018

Networking during Pre-epidemic, Epidemic and Post-epidemic

- Ministries (Agriculture, Financial, Internal affairs etc.),
- Agencies
- Regional and municipal epidemiological Commissions
- NDCC and LDCC
- Farmers associations
- Hunting organization
- other

Example: FMD outbreak, Bulgaria 2011



Stakeholders at greatest importance for passive surveillance

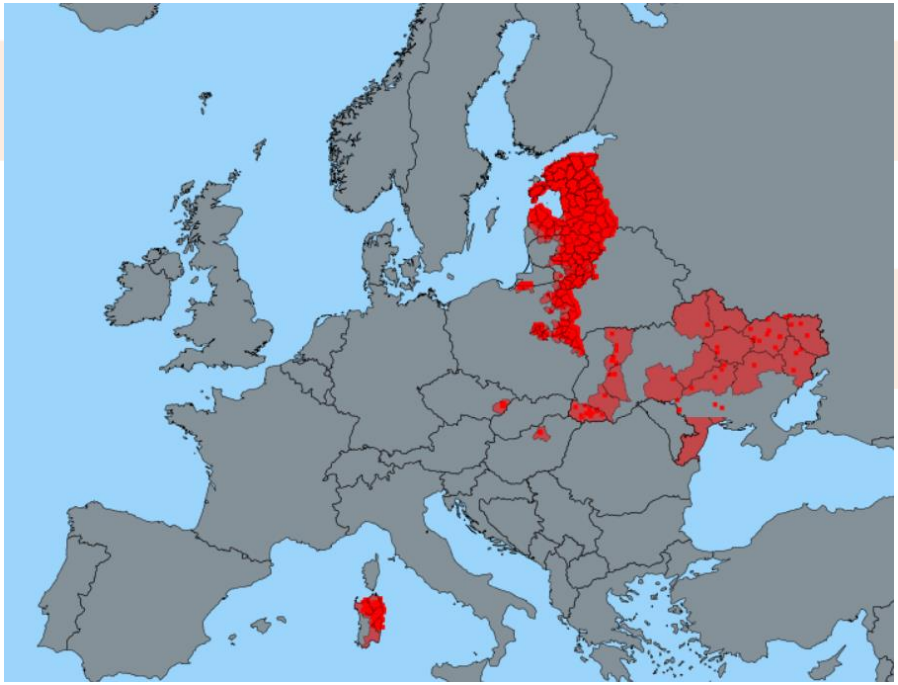
- Farmers
- Hunters
- Animal transport drivers
- Other…….

Crucial role and responsibilities from Animal Health & Welfare perspective

Hunters

Surveillance and control of:

- ASF,
- CSF,
- FMD,
- BT,
- Rabies
- AI
- Other…….



ASF cases and affected regions in wild boar in Europe, 2014 – 1st May 2018 (Source: ADNS)

Example: FMD in wild boar, Bulgaria 2011

Until 2011

- No evidence of wildlife involvement in the recent major epidemics in Europe 1920s-2007
- It was assumed wildlife will have limited role in domestic FMD outbreaks (spillovers of limited consequence)

However…… !!!! FMD in Bulgaria - 2011

- Detected first in hunted wild boar
- Lesions in wild boar detected by hunters and reported
- 11 villages affected
- Free status lost and ban for trade for year and a half

Tools for stakeholders' involvement (1)

- Legal obligations
- Controls
- Prescriptions
- Penalties

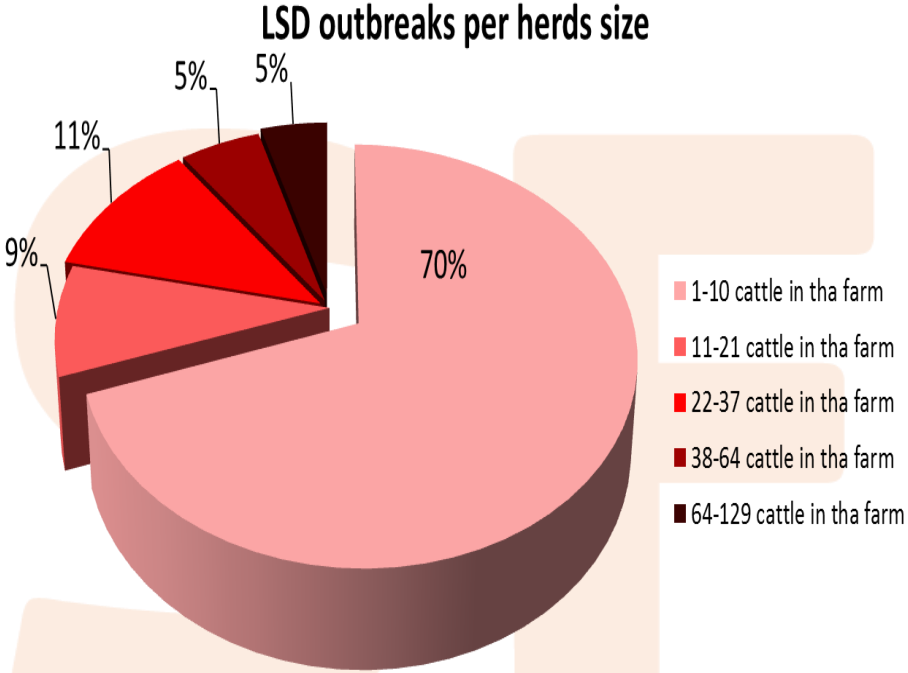
Tools for stakeholders' involvement (2)

"**Awareness** is the ability to directly know and perceive, to feel, or to be cognizant of events. More broadly, it is the state or quality of being conscious of something"

From Animal Health point of view **awareness** helps for:

- **Improve of passive surveillance**
- Higher level of biosecurity
- Control measures
- Decision making

LSD epidemic in Bulgaria in 2016



- 217 outbreaks – most of them detected and reported by farmers
- Small herds (up to 10 animals) with low biosecurity mainly affected

Awareness Why?

1. Do we really need to campaign?

Yes, Increasing public awareness of animal health care is a core element of any successful animal disease control and prevention strategy

2. Can we get what we want by other means ?

Disease control is impossible without good cooperation with stakeholders

3. Awareness is critically important to :

- *Engage the public in combating the animal diseases*
- *Facilitate the cooperation between industry (stakeholder organizations) and government*
- *Ensure higher preparedness*
- *Maximize the case detection*
- *Achieve animal health status*

Awareness Tools

- Trainings (Real time, Desktop, Workshops, BTSF, Simulation exercises, Webinars, Cascade trainings)
- Meetings (face to face ..)
- Leaflets, posters, booklets
- Media, radio
- website

Шап по чифтокопитните животни
Foot-and-mouth disease

Фигура 1. Обилно отделяне на слюнка

Фигура 2. Лезии по езика и устната кухина

Фигура 3. Лезии по езика

БОЛ

Шапът е най-силно боляване по домаш питни животни.

Боледуват:
- говеда и биволи
- овце и кози
- домашни и диви
- елени, сърни
- други

Клинично болестта
- висока температ
- обилно отделян
- мехурести изри ранявания (лез (фиг. 2), езика (ните, копитния р копитното прос мето (фиг. 6).

НАЧИН НА

Източник на инфек вотни, които отдел мляко, изпражнени то и разпростране ва:
- чрез контакт м животни;
- механично, чре фураж, инвентар ва, постеля и др

Телефони за контакт:
e-mail: АН
http://www.ba

Българска агенция по безопасност на храните, гр. София, 1606, бул. "Пенчо

Заразен нодуларен дерматит
Lumpy skin disease

Фигура 1. Слизести изтечения от очите

Фигура 2. Възловидни изменения по кожата на цялото тяло

Фигура 3. Разязвени изменения по кожата

БОЛЕС

Заразният нодуларен заразна вирусна боле живни животни, хара треска и изрив от въз ния по кожата.

Болестта води до нам млеконадой, вреди на жата и нанася големи губи, вследствие огра вията и невъзможнос едри преживни живо тях, от засегнатите рег

НАЧИН НА ЗА

Предаването и разпр лестта става механичн хи и други насекоми така и чрез директе здрави и болни живот ни с вируса фуражи, в не, превозни средств могат да бъдат източн

КЛИНИЧНО ПР

По-тежко боледуват м ди говеда, в пика на л животни. Характерна е жена от депресия, за чение и слизести из (фиг. 1), които може да от конюнктивит, а в слепота. Обикновено видимо уголемени.

Българска агенция по безопасност на храните, гр. София, 1606, бул. "Пенчо Слав

Шарка по овце и кози

БОЛЕСТТА

Шарката по овцете и козите е силно заразно вирусно заболяване.

Клинично при овцете и козите болестта протича с:
- треска и депресия;
- генерализиран изрив от папули (възловидни образувания) по кожата на цялото тяло;
- пневмонични огнища в белите дробове.

Кожните изменения (лезии) се наблюдават по главата и обезкосмените части на тялото — коремната област, основата на опашката, вимето, гениталиите, вътрешните части на крайниците.

Главата изглежда уголемена и деформирана.

Протичането на болестта може да завърши със смърт.

НАЧИН НА ЗАРАЗЯВАНЕ

Източник на инфекция са болните животни.
Предаването на болестта става с:
- директен контакт между болни и здрави животни;
- контаминирани с вируса фуражи, оборудване, превозни средства, постеля.

ПРЕДПАЗНИ МЕРКИ

Избягвайте:
- контакт с животни от други стада;
- посещение на други животновъдни обекти;
- размяна и споделяне на животни, инвентар, превозни средства с други животновъдни обекти.

Телефони за контакт: 02 915 98 20; 02 915 98 42
e-mail: AHWFC@bfsa.bg
http://www.babh.government.bg/

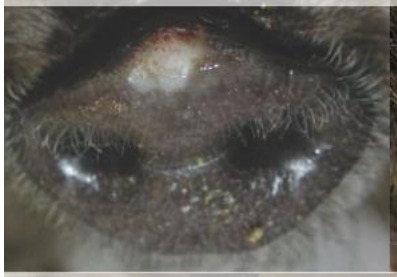
ВНИМАНИЕ!
Всяко съмнение за Шарка по овцете и козите, трябва незабавно да се съобщава на официален ветеринарен лекар. По този начин може да спасите хиляди животни и да предотвратите огромни икономически загуби за страната!
Обявяването на болестта е задължително и е от съществено значение за ограничаване на по нататъшното й разпространение!

Българска агенция по безопасност на храните, гр. София, 1606, бул. "Пенчо Славейков" № 15А

Decision Number SANTE/EM/AH/2017/10527/EXOTIC DISEASES/BG

European Commission for the Control of Foot-and-Mouth Disease (FMD)

Фиг. 1. Диво прасе, заболяло от шап. Мехурче по рилото. (© FLI)



Фиг. 2. Мехурче в между пръстовото пространство на копито на диво прасе (© FLI)

Фиг. 3. Шапна лезия върху копито на диво прасе (© FLI)

Фиг. 4. Шапна лезия върху копито на диво прасе (© FLI)

Фиг. 5. След инфекциозно заздравяване и деформация на копитата на диво прасе

Ако видите някои от тези изменения при диви чифтокопитни животни, незабавно информирайте най-близкия ветеринарен лекар до мястото, където ловувате. По този начин може да спасите хиляди животни и да предотвратите огромни икономически загуби за страната!

European Commission

sozial MINISTERIUM

AGES

ВНИМАНИЕ!

Африканска чума по свинете

Африканската чума по свинете (АЧС) е много опасна епидемия по животните и е разпространена в голяма част на Източна Европа. Междувременно тази епидемия е достигнала Чешката република и е само на 80 км от австрийската държавна граница. **За хората болестта е абсолютно безвредна, но избухването в Австрия би имало катастрофални въздействия за селскостопанските предприятия!**

Със спазването на определени предпазни мерки може да се противодейства, тази епидемия по животните да не се довлече от засегнатите страни в Австрия. Заетите в селското стопанство могат да имат много важен принос!

- Вирусът на АЧС е много дълго устойчив в продуктите от свинско месо. Ако свинете ядат замърсена храна, те ще се заразят с тази епидемия по животните. Не изхвърляйте остатъци от храна в природата – дивите прасета биха могли да я поемат!
- Храненето на домашните прасета с остатъци от храна в Австрия е забранено!
- Особен риск произтича от собственото производство на салами и шпек от районите на избухване. Вземайте за Австрия само съответно контролирани стоки!
- Ако Вие самите сте притежател на прасе или ловец: Почиствайте облеклото, обувките и принадлежностите, които са били носени в районите на избухване, основно – вирусът на АЧС е много устойчив и може напр. лесно чрез мръсни ботуши да бъде предаден
- Ако сте заети в предприятия държатели на животни в Австрия, то използвайте във всеки случай собствени облекло за обора и ботуши! Ако е възможно, избягвайте контакт с отглежданите свине
- Ако намерите умрели диви прасета, не ги докосвайте а информирайте веднага Вашия работодател

BULGARISCH

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European

Workshop on Animal H

fesass.eu/fr/actualite/31374/workshop-animal-health-how-can-we-make-wildlifeand-livestock-live-together

Site officiel - fesass.eu

Contact | Espace Membre | Version Mobile

Organisation · Activités · Publications

A+ A-

Bienvenue

- Organisation
- Activités
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Mot du Président

Le calendrier de travail de la Commission européenne en matière de réglementation de la Santé Animale s'annonce particulièrement chargé pour 2018 et 2019. La Commission doit adopter les textes clefs pour l'application de la Loi de Santé

> Actualités > Workshop on Animal Health : How can we make wildlife and livestock live together ?

Workshop on Animal Health : How can we make wildlife and livestock live together ?

Recherche

Contactez-nous

Place du Nouveau Marché aux Grains, 21 - 1000 - Bruxelles et
37 rue de Lyon
75 000 Paris
Tél : 32 27 59 44 07
→ Contact email

EPRUMA

ENG 20:50 03.05.2018 г.

Conclusions

Stakeholders involvement

- should be long term and continuous!
- helps to create a broad societal commitment to engaging in disease control
- is of crucial importance for successful Animal diseases control and prevention strategy
- should be planned in each routine control programme

The contents of this presentation are the views of the author and do not necessarily represent an official position of the European Commission.

Thank you!

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Better Training for Safer Food
BTSF

European Commission
Consumers, Health, Agriculture and Food Executive Agency
DRB A3/042
L-2920 Luxembourg

Food Safety

Regional Workshop on Animal Disease Preparedness

Better Training For Safer Food

Stefano Marangon

Presentation of a practical experience of surveillance - Risk-Based Surveillance for Avian Influenza

Tokyo, Japan
12-15 June 2018

Food Safety

Background – "AI free" Definition

OIE Terrestrial Animal Health Code

Article 10.4.2.

The avian influenza status of a country/zone/compartment can be determined on the basis of the following criteria:

1) avian influenza is notifiable in the whole country……
……

2) **appropriate surveillance is in place** to demonstrate the presence of infection in the absence of clinical signs ……..
……..

3) consideration of all **epidemiological factors** for avian influenza occurrence and their historical perspective

AI Surveillance in the European Union (EU)

Decision 2010/367/EU on "

"

Avian Influenza Surveillance

Poultry

- Passive surveillance
- Active surveillance
  - Representative sampling (to demonstrate freedom)
  - **Risk Based Surveillance**

Wild birds

- Passive surveillance (RBS)

AI surveillance in EU

Domestic poultry – Objectives

- To complement early detection systems
- To inform the competent authority of circulating AIV with a view to controlling the disease

Risk-based surveillance (RBS)

Risk-based surveillance - The most efficient way to find a disease is to survey the animal populations that are most likely to be affected

Risk-based surveillance means "looking for something where it is mostly likely to be found" (FAO, 2014)

(Decision 2010/367/EU)

2.1. *Risk-Based Surveillance (RBS)*

RBS shall be the preferred method for the carrying out of surveillance for avian influenza in a targeted and resource efficient way.

Member States choosing that method shall specify the relevant risk pathways for infection of poultry flocks and the sampling frame for poultry holdings identified as being at a higher risk of becoming infected with avian influenza.

Criteria and Risk Factors for AI RBS

Introduction

- Proximity to wetlands
- Proximity to wintering/nesting sites for migratory waterfowl
- Free-range farms
- Low levels of biosecurity

Spread

- Poultry species reared
- Presence of more than one species
- Farm density

These criteria and risk factors are **NOT EXHAUSTIVE**

Depending of the individual animal health situation in the Country concerned, they may need to be **WEIGHTED DIFFERENTLY**

Risk Based Surveillance - Issues

Differences between Countries

Differences in poultry production sector

- Production types and types of premises
- Distribution and density of poultry farms
- Organization of poultry production
- (e.g. vertical integration, industrial/rural, free-range)

Different environmental risk factors

- Composition and dynamics of wild water bird populations
- Proximity of poultry farms to wetlands
- Possible persistence of AI virus in the environment

Data availability, accuracy and management

- Poultry farms registry
- Rural, ornamental, pet birds
- Census/AIV monitoring of wild birds

A standardised RBS approach is almost impossible

European Commission

AI Risk Based Surveillance Case-study - Italy

Risk based surveillance – Definition of AI risk at an *area-level*

AIMS

risk factors

- Farm Density
- Poultry production type
- Contacts with wild waterfowl
- Previous occurrence of AI cases

active

PROCEDURE

Estimation of **risk levels** per province (NUT 3) for each separate risk factor

Summing the 'individual' risk levels to obtain an '**overall**' risk level

Reclassification of the overall risk level into High, Medium, and Low (supervised and filtered by an **expert opinion** approach)

Risk-based surveillance – Definition of risk factors

- Farm Density
  - Densely Populated Poultry Areas (**DPPA**)
- Species and production type
  - Higher susceptibility (e.g. turkeys)
  - Long lived poultry (e.g. layers and breeders)
- Contacts with wild waterfowl
  - Proximity to wetlands considered as proxy for presence of wild waterfowl nesting/resting sites
- Previous occurrence of AI cases
  - Number of **LPAI** and **HPAI** cases in the last five years

Risk-based surveillance – Inclusion of risk factors

Identification of densely populated poultry areas (DPPAs)

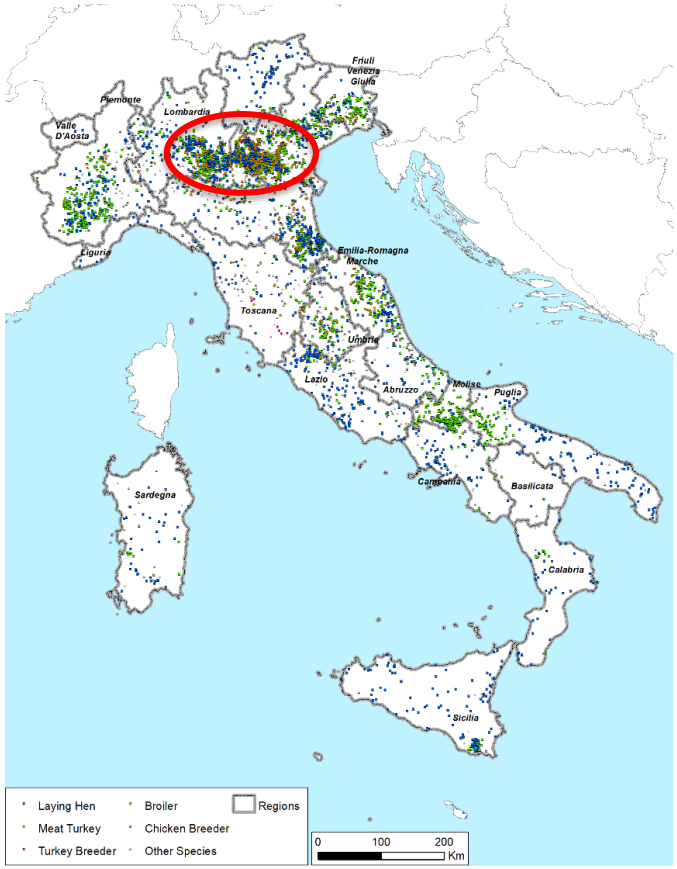
Data derived from the **National Farm Registry**

- Number of poultry farms in each Italian province

laying hens
outdoor laying hens
broilers
breeders
fattening turkeys
turkey breeders
quails and quail breeders
guinea fowl and guinea fowl breeders
fattening ducks
duck breeders
fattening geese
goose breeders
farmed game birds (gallinaceans) and breeders
ratites
……..

Geographical distribution of commercial poultry farms

- The DPPA located in the Po valley accounts for up to 70 % of the Italian poultry production, with more than 3,300 industrial poultry farms and about 95 million bird places



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ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

The Veterinary Journal 181 (2009) 171–177

The Veterinary Journal

www.elsevier.com/locate/tvjl

Risk factors for highly pathogenic H7N1 avian influenza virus infection in poultry during the 1999–2000 epidemic in Italy

Luca Busani [a,b,*], Maria Grazia Valsecchi [c], Emanuela Rossi [c], Marica Toson [a], Nicola Ferrè [a], Manuela Dalla Pozza [a], Stefano Marangon [a]

[a] *Istituto Zooprofilattico delle Venezie, viale dell'Università 10, 35020 Legnaro, Padova, Italy*
[b] *Istituto Superiore di Sanità, viale Regina Elena, 299, 00161 Rome, Italy*
[c] *Unit of Medical Statistics, Department of Clinical Medicine and Prevention, University of Milano-Bicocca, Via Cadore 48, 20052 Monza, Italy*

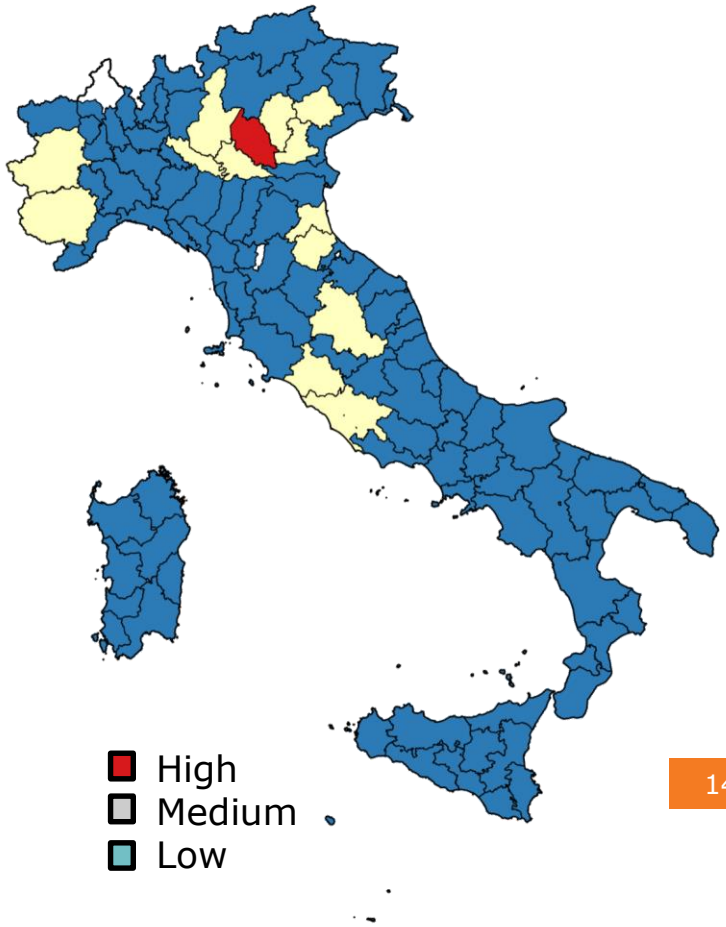
Accepted 13 February 2008

National Surveillance Plan – Inclusion of risk factors

Densely Populated Poultry Areas

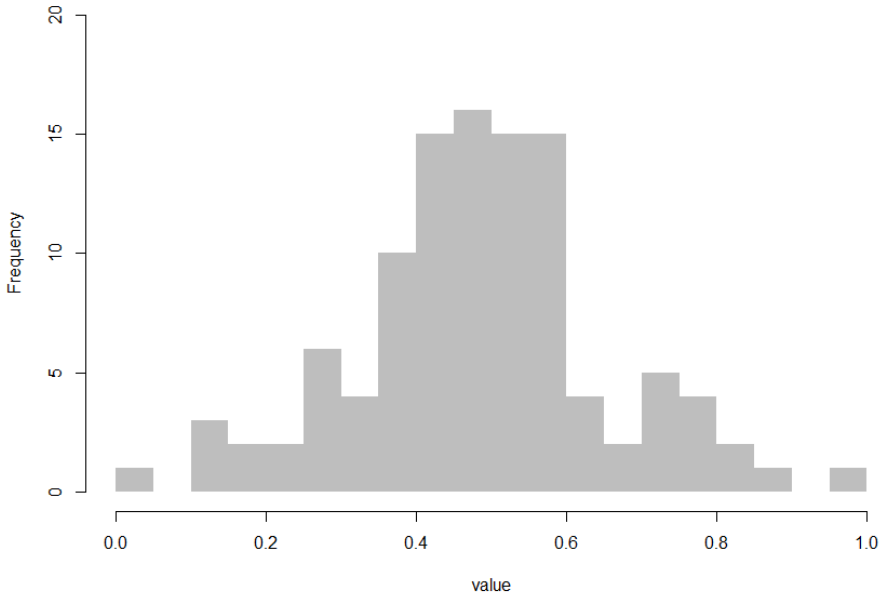
- Data derived from the National Animal Registry
  - **Number** of poultry farms per province
  - Weighted for **Species/Production type**

Production type	Cumulative % infection (A)	Weighting (A/max(A))
Fattening Turkeys	35.3	1.00
Laying Hens	31.2	0.88
Breeders	19.2	0.54
Broilers	4.9	0.14
Other Species	4.9	0.14
Growers	**-**	***1.00***

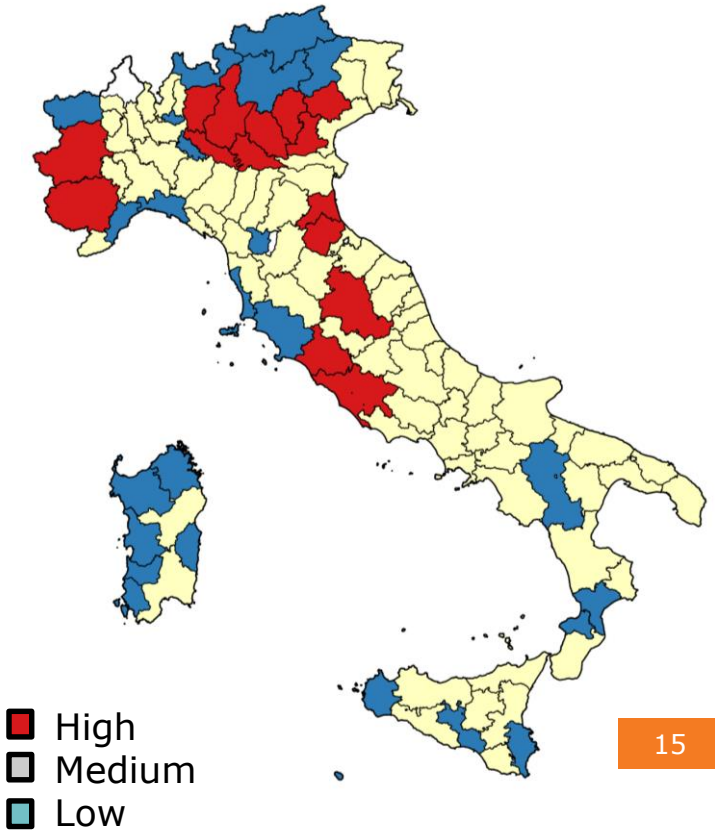


DPPAs – RF weighting

The value indicating the risk level per province is then normalised and standardised to 1



Map showing the normalised level of risk per province

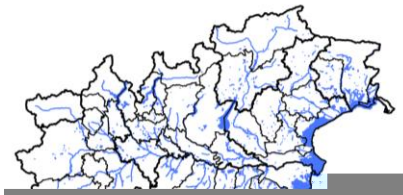


Proximity to wetlands – RF inclusion

- Census of (migratory) wild waterfowl is not regularly updated
- The proximity to wetlands was used

- The total area (sq km) of wetland per province was used as proxy as a measure of "potential attraction" for wild waterfowl

Geographical distribution of wetlands (RAMSAR)



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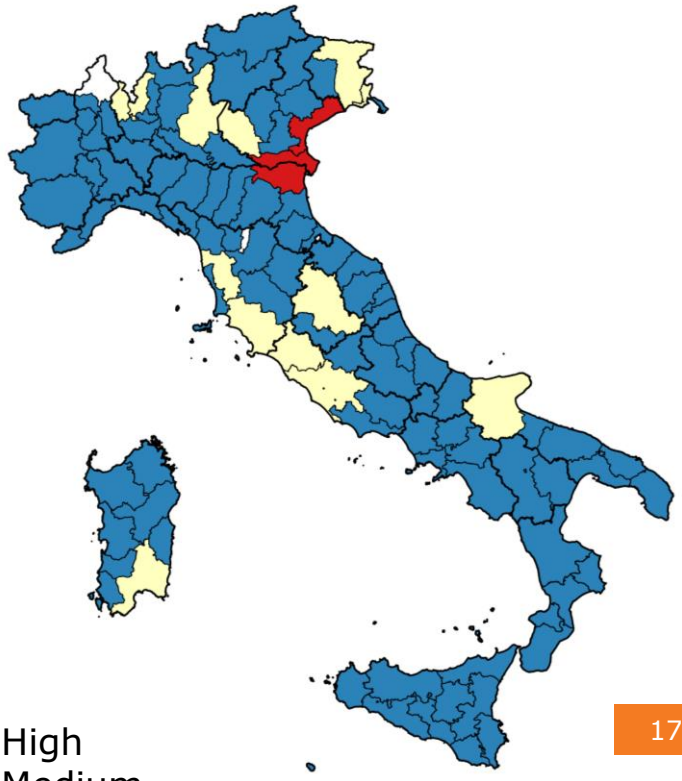
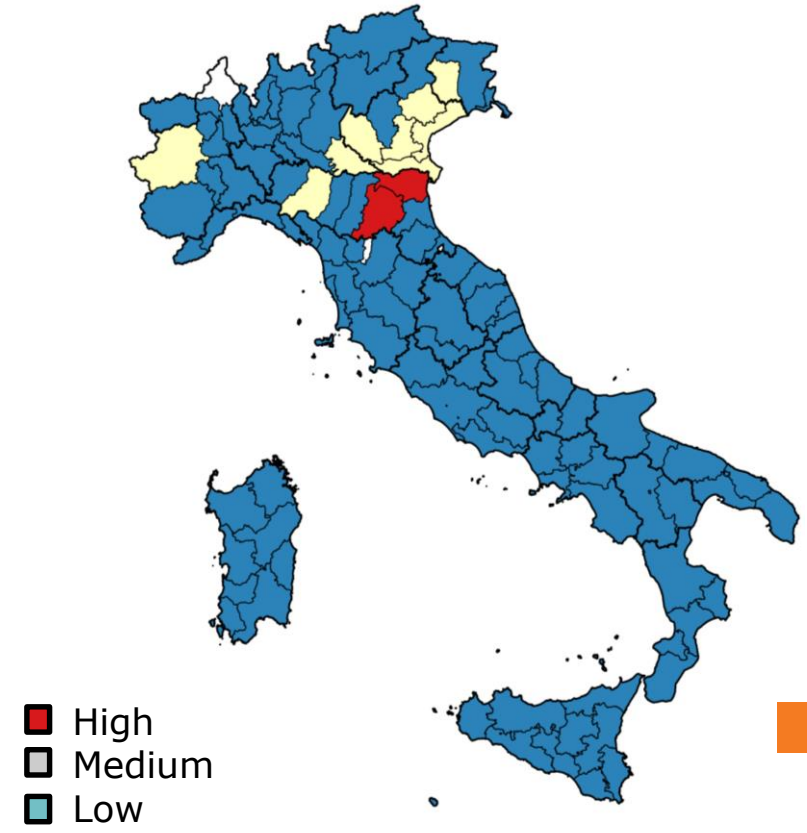
Level of risk associated to presence of wetlands per province



2012-2016 Epidemiological situation – RF weighting

- Number of LPAI and HPAI outbreaks per province in the last five years
- Collected and evaluated separately
  - HPAI is generally detected through passive surveillance
  - Active surveillance has the main goal to promptly detect LPAIV exposure
- The number of outbreaks per province is standardised to 1

Number of HPAI cases per province



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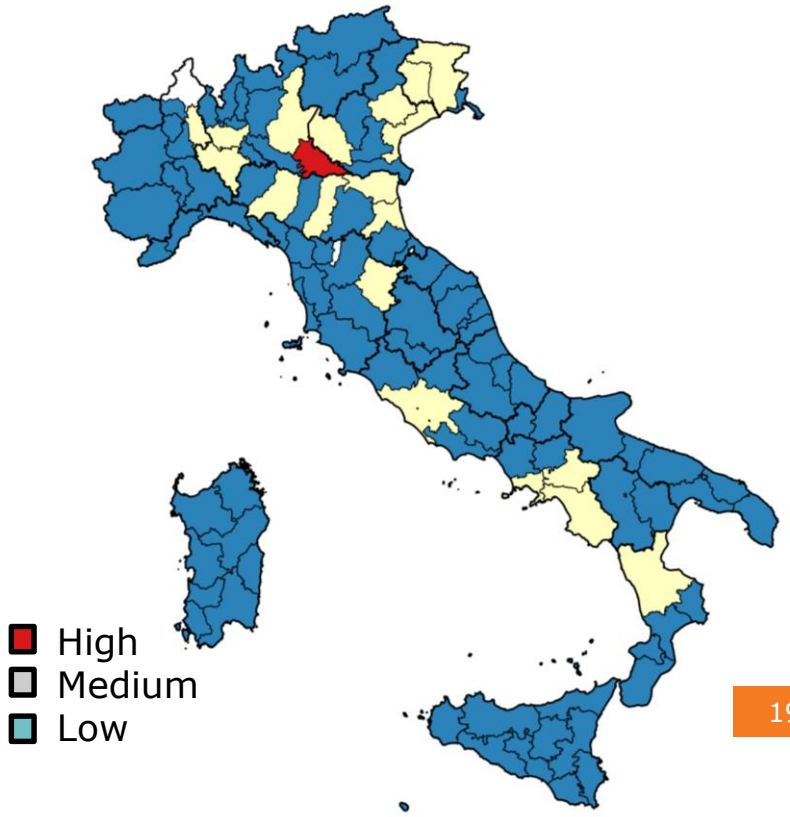
- Number of LPAI and HPAI outbreaks per province in the last five years
- Collected and evaluated separately
  - HPAI is generally detected through passive surveillance
  - Active surveillance has the main goal to promptly detect LPAIV exposure
- The number of outbreaks per province is standardised to 1

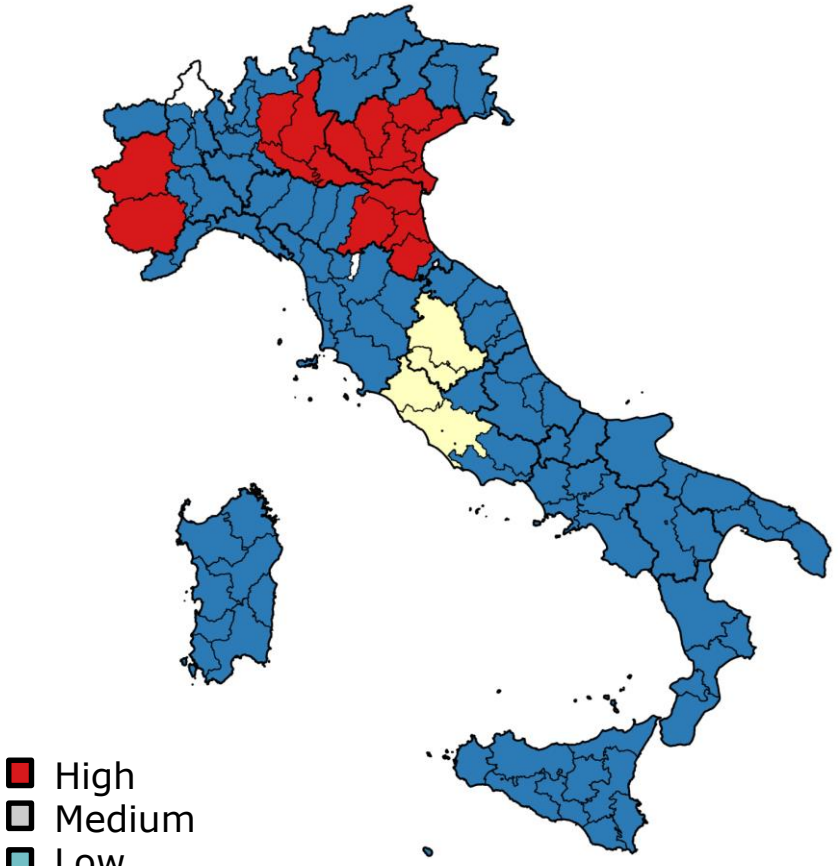
Number of LPAI cases per province



Definition of the overall risk level

- All of the data related to each risk factors are **scaled to 1**, and **summed together**, to obtain the overall AI risk per province
- The risk is further classified into **three classes**, according to a Jenk classification (Natural Breaks)
  - High risk
  - Medium risk
  - Low risk
- The results are then re-evaluated on the basis of an expert opinion
- The final classification is transmitted to National/Regional Veterinary Authorities, for any observations and comments

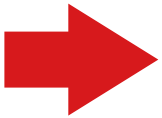
Risk map - Areas subjected to active surveillance



Risk-based surveillance

High risk areas

- Veneto
- Lombardy
- Emilia Romagna
- Piedmont



Active surveillance on all commercial poultry farms (excluding broilers) and passive surveillance

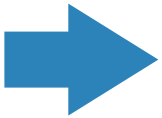
Medium Risk areas

- Lazio
- Umbria

Active surveillance on a representative sampling basis and passive surveillance

Lower risk areas

- Remaining areas



Only passive surveillance

Active surveillance in high risk areas
Target population and sampling scheme

Commercial poultry farms (except broilers) are **serologically** tested

Number of samples per poultry farm

- Expected within farm prevalence: ≥ 30 % (Confidence Level: 95%)
- 10 blood samples per holding, but at least 5 blood samples per shed

Sero-positive farms -> investigation and follow-up sampling for virus detection

Ducks, geese and quails: at least 20 samples (cloacal and tracheal swabs) per holding are **PCR** tested

Active surveillance in medium risk areas
Target population and sampling scheme

Active surveillance on a **representative sample of poultry farms** (except broilers)

- Expected between farms prevalence: 5%
- Geese and Ducks farms: 99% confidence level (90 farms per area)
- Other poultry farms: 95% confidence level (60 farms per area)

Number of samples per poultry farm

- As in high risk areas

Active surveillance plan
Timing and type of tests

Fattening turkeys

- Before loading for slaughter

Laying hens/breeders

- Biannual
- Before movements
- Before loading for slaughtering

Ducks and geese, quails, and game birds

- Biannual

Gallinaceous birds

- Screening → ELISA type A
- Confirmation → HI (H5 and H7)

Ducks, Geese, Quails

- PCR

AI passive surveillance

AI is a **compulsorily notifiable** disease

- Clinical signs for AI must be notified

Early warning – Passive surveillance for **exclusion diagnostics**

- Increased mortality (e.g. in layers a mortality ≥0.5% daily for two succeeding days - for other species slightly different threshold)
- Birds showing general clinical signs for other pathogens and AI cannot be excluded
- Drop in feed, water intake, egg production
- **Sampling for exclusion diagnostics shall be performed**

Summarising…

RBS is preferable to a representative sampling approach:

- Increases the chance to early detect AI introduction and spread
- Optimizes the use of resources

RBS approaches largely vary according to different Risk Factors (and sampling/testing schemes):

- Different situations may demand different RBS approaches

The contents of this presentation are the views of the author and do not necessarily represent an official position of the European Commission.

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Better Training for Safer Food
BTSF

Food Safety

ASF on farm in China near Russian border

13 June 2018

Pathways

- Animal movement
- Swill feed
- Vectors (ticks)
- Contact with contaminated humans
- Fomite (straw, equipment etc.)

Biosecurity Protocol at Farm Level

- Check animal confinement e.g. fencing
- Contact between domestic and wild pigs
  - Prevent where necessary
- Human access to affected farm
  - Restrict if possible
- Check type of feed used e.g. swill or commercial feed
- Replacement stock
  - Avoid infected sources
- Straw and other fomites

Biosecurity Protocol at Regional Level

- Surveillance
  - Enhance both passive and active
- Animal movement
  - Impose restrictions
- ASF status
  - Confirm existence of virus
- Pork and pork products
  - Restrict importation into region
- Animal feed
  - Restrict importation from infected areas

Biosecurity Protocol at Country Level

- Surveillance
  - Enhance both passive and active
- Animal movement
  - Impose restrictions
- Live pig importation
  - Impose restrictions
- Pork and pork products
  - Restrict importation into country

Preparedness - Current Situation

- Live animal importation
  - Able to check record of importation
  - Able to quarantine animals from involved country
  - Able to appropriate destroy and dispose
- Pork and pork product
  - Able to check record of importation
  - Able to safely destroy products
- ASF diagnosis
  - **Not able to conduct**
- Farm depopulation and decontamination
  - Able to conduct

Outbreak control – farm level

- Create restriction zone around infected farm
- Trace animal contacts to and from infected farm
- Trace movement of animal transportation vehicle
- Test for ASF in restriction zone
  - Send samples to reference laboratory for confirmation of infection

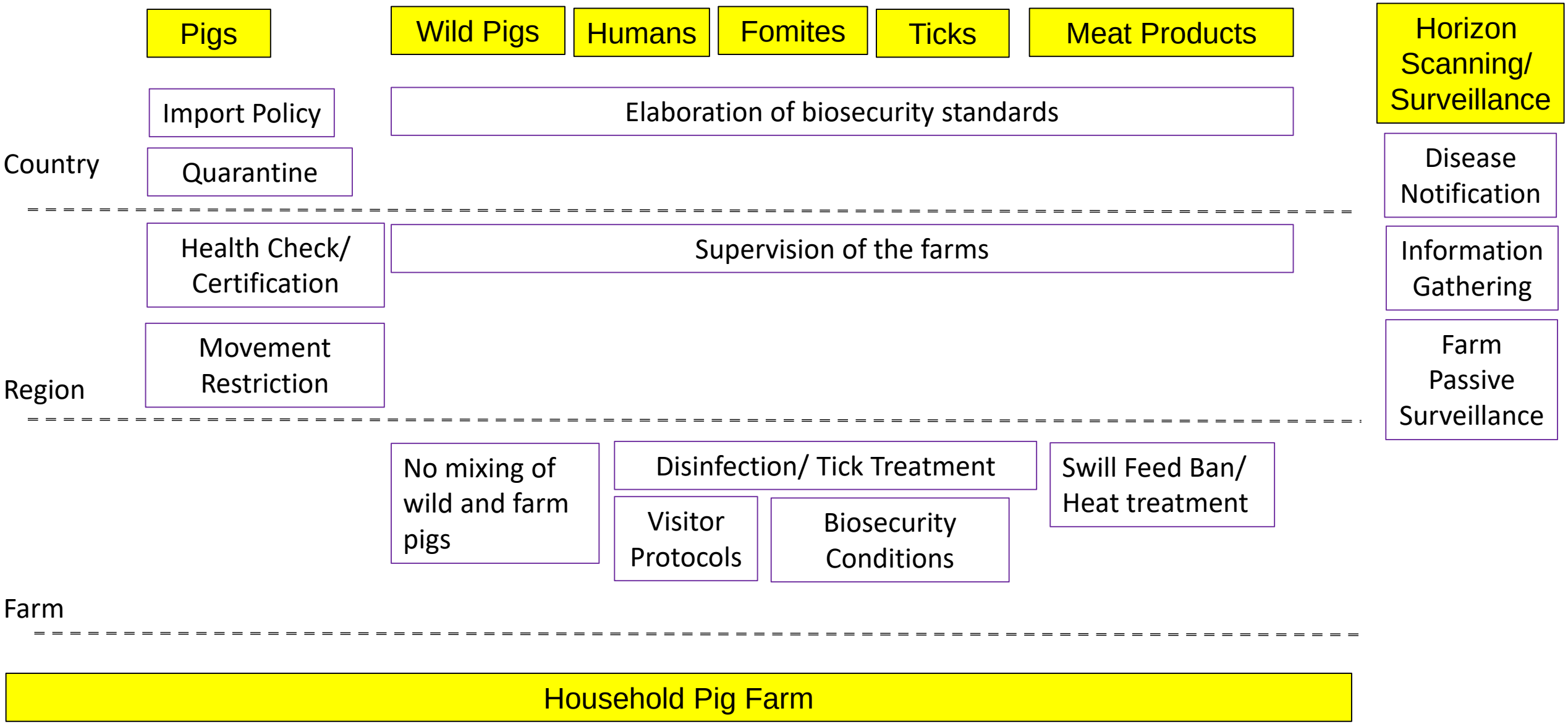
Preventive measures

- Recommend regionalization in involved country
- Enhanced certification process of imports
- Conduct awareness campaign
  - For farmers and traders

General

- Check legislation and regulation
- Report or communication to OIE
- Diagnostic capacity
  - Create capacity i.e. import testing kit and train lab personnel

Identification of pathways and the relevant preventive measures



Risk of disease incursion

Pathway	Country factor	Regional factor	Farm factor	Risk
Pigs	Low	Low	Low	LOW
Pork (Feed / Swill)	Low	Low	Low	LOW
Wild Pigs	High	High	Moderate	HIGH
Humans	Low	Low	Low	LOW
Fomites	Low	Low	Low	LOW
Ticks	High	High	Moderate	HIGH

Level of Preparedness

Increase the level biosecurity.

Wild boar surveillance, ask cooperation to hunters, buffer zone (building fence)

Strengthened surveillance in certain area (identified as high risk area)

Warning, disseminating information

Review the current system, functioning well. Providing emergency kit.

Emergency outbreak

- Laboratory in place to conduct confirmatory test
- Ready to disseminate outbreak information stakeholders inside outside country terminate the export
- Contingency plan
  Movements and shipping restriction, disinfection, culling, incineration and burying, monitoring farms