

CHAPTER 1.4.

ANIMAL HEALTH SURVEILLANCE

Article 1.4.1.

Introduction and objectives

- 1) In general, *surveillance* is aimed at demonstrating the absence of *infection* or *infestation*, determining the presence or distribution of *infection* or *infestation* or detecting as early as possible exotic diseases or *emerging diseases*. Animal health *surveillance* is a tool to monitor disease trends, to facilitate the control of *infection* or *infestation*, to provide data for use in *risk analysis*, for animal or public health purposes, to substantiate the rationale for *sanitary measures* and for providing assurances to trading partners. The type of *surveillance* applied depends on the available data sources and the outputs needed to support decision-making. The general recommendations in this chapter may be applied to all *infections* or *infestations* and all susceptible species (including *wildlife*) and may be refined. *Specific surveillance* is described in some *listed disease-specific* chapters.
- 2) *Wildlife* may be included in a *surveillance* system because they can serve as reservoirs of *infection* or *infestation* and as indicators of *risk* to humans and domestic *animals*. However, the presence of an *infection* or *infestation* in *wildlife* does not mean it is necessarily present in domestic *animals* in the same country or *zone*, or vice versa. *Surveillance* in *wildlife* presents challenges that may differ significantly from those in *surveillance* in domestic *animals*.
- 3) Prerequisites to enable a Member Country to provide information for the evaluation of its *animal health status* are:
 - a) that the Member Country complies with the provisions of Chapter 3.1. on *Veterinary Services*;
 - b) that, where possible, *surveillance* data be complemented by other sources of information, such as scientific publications, research data, animal production data, documented field observations and other data;
 - c) that transparency in the planning, execution and results of *surveillance* activities, is in accordance with Chapter 1.1.
- 4) The objectives of this chapter are to:
 - a) provide guidance on the design of a *surveillance* system and the type of output it should generate;
 - b) provide recommendations to assess the quality of *surveillance* systems.

Article 1.4.2.

Definitions

The following definitions apply for the purposes of this chapter:

Bias: means a tendency of an estimate to deviate in one direction from a true *population* parameter.

Confidence: means the probability that the type of *surveillance* applied would detect the presence of *infection* or *infestation* if the *population* were infected and is equivalent to the sensitivity of the *surveillance*. Confidence depends on, among other parameters, the assumed prevalence of *infection* or *infestation*.

Probability sampling: means a sampling strategy in which every unit is chosen at random and has a known non-zero probability of inclusion in the sample.

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Sample: means the group of elements (sampling units) drawn from a population, on which tests are performed or parameters measured to provide *surveillance* information.

Sampling unit: means the unit that is sampled, either in a random survey or in non-random *surveillance*. This may be an individual *animal* or a group of *animals*, such as an *epidemiological unit*. Together, they comprise the sampling frame.

Sensitivity: means the proportion of infected sampling units that are correctly identified as positive.

Specificity: means the proportion of uninfected sampling units that are correctly identified as negative.

Study population: means the *population* from which *surveillance* data are derived. This may be the same as the target population or a subset of it.

Surveillance system: means the use of one or more *surveillance* components to generate information on the health status of animal populations.

Survey: means a component of a *surveillance* system to systematically collect information with a predefined goal on a sample of a defined population group, within a defined period.

Target population: means the population to which conclusions are to be inferred.

Test: means a procedure used to classify a unit as either positive, negative or suspect with respect to an *infection* or *infestation*.

Article 1.4.3.

Surveillance systems

In designing, implementing and assessing a surveillance system, the following components should be addressed in addition to the quality of *Veterinary Services*.

1. Design of surveillance system

a) Populations

Surveillance should take into account all animal species susceptible to the *infection* or *infestation* in a country, *zone* or *compartment*. The *surveillance* activity may cover all individuals in the *population* or only some of them. When *surveillance* is conducted only on a *subpopulation*, inferences to the target population should be justified based on the epidemiology of the *infection* or *infestation*.

Definitions of appropriate *populations* should be based on the specific recommendations of the relevant chapters of the *Terrestrial Code*.

b) Timing and Temporal validity of surveillance data

The timing and duration of *surveillance* should be determined taking into consideration factors such as:

- objectives of the *surveillance*;
- epidemiology (e.g. *vectors*, transmission pathways, seasonality);
- husbandry practices and production systems;
- accessibility of target population;
- geographical factors;
- climate conditions.

Surveillance should be carried out at a frequency that reflects the epidemiology of the *infection* or *infestation* and the *risk* of its introduction and spread.

c) Case definition

Where one exists, the *case* definition in the relevant chapter of the *Terrestrial Code* should be used. If the *Terrestrial Code* does not give a *case* definition, a *case* should be defined using clear criteria for each *infection* or *infestation* under *surveillance*. For *wildlife infection* or *infestation surveillance*, it is essential to correctly identify and report host animal taxonomy, including genus and species.

d) Epidemiological unit

The relevant *epidemiological unit* for the *surveillance* system should be defined to ensure that it is appropriate to meet the objectives of *surveillance*.

e) Clustering

Infection or *infestation* in a country, *zone* or *compartment* usually clusters rather than being uniformly or randomly distributed through a population. Clustering may occur at a number of different levels (e.g. a cluster of infected *animals* within a *herd* or *flock*, a cluster of pens in a building, or a cluster of farms in a *compartment*). Clustering should be taken into account in the design of *surveillance* activities and considered in the statistical analysis of *surveillance* data, at least at what is judged to be the most significant level of clustering for the particular animal population and *infection* or *infestation*.

f) Analytical methodologies

Surveillance data should be analysed using appropriate methodologies and at the appropriate organisational level to facilitate effective decision-making, whether it be for planning disease control interventions or demonstrating health status.

Methodologies for the analysis of *surveillance* data should be flexible to deal with the complexity of real life situations. No single method is applicable in all cases. Different methodologies may be used to accommodate different host species, pathogenic agents, production systems and *surveillance* systems, and types and amounts of data and information available.

The methodology used should be based on the best data sources available. It should also be in accordance with this chapter, fully documented and, whenever possible, supported by reference to scientific literature and other sources, including expert opinion. Sophisticated mathematical or statistical analyses should only be carried out when justified by the objectives of the *surveillance* and the availability and quality of field data.

Consistency in the application of different methodologies should be encouraged. Transparency is essential in order to ensure objectivity and rationality, consistency in decision-making and ease of understanding. The uncertainties, assumptions made, and the effect of these on the final conclusions should be documented.

g) Scope of the surveillance system

When designing the *surveillance* system consideration should be given to the purpose of *surveillance* and how the information it generates will be used, the limitations of the information it will generate, including representativeness of the study population and potential sources of bias as well as the availability of financial, technical, and human resources.

h) Follow up actions

The design of the *surveillance* system should include consideration of what actions will be taken on the basis of the information generated.

Annex 24 (contd)2. Implementation of the surveillance system

a) Diagnostic tests

Surveillance involves the detection of *infection* or *infestation* according to appropriate case definitions. Tests used in *surveillance* may range from detailed laboratory examinations to clinical observations and the analysis of production records.

Tests should be chosen in accordance with the relevant chapters of the *Terrestrial Manual*.

- i) Sensitivity and specificity: The performance of a test at the *population* level (including field observations) may be described in terms of its sensitivity, specificity and predictive values. Imperfect sensitivity or specificity, as well as prevalence, will have an impact on the conclusions from *surveillance*. Therefore, these parameters should be taken into account in the design of *surveillance* systems and analysis of *surveillance* data.

The sensitivity and specificity values of the tests used should be specified for each species in which they may be used and the method used to estimate these values should be documented in accordance with Chapter 1.1.6. of the *Terrestrial Manual*.

- ii) Pooling: Samples from a number of *animals* or *units* may be pooled and subjected to a testing protocol. The results should be interpreted using sensitivity and specificity values that have been determined or estimated for that particular pool size and testing procedure.

b) Data collection and management

The success of a *surveillance* system is dependent on a reliable process for data collection and management. The process may be based on paper or electronic records. Even where data are collected for non-survey purposes (e.g. during disease control interventions, inspections for movement control or during disease eradication schemes), the consistency and quality of data collection and event reporting in a format that facilitates analysis is critical. Factors influencing the quality of collected data include:

- the distribution of, and communication between, those involved in generating and transferring data from the field to a centralised location; this requires effective collaboration among all stakeholders, such as government or non-governmental organisations, and others, particularly for data involving *wildlife*;
- the ability of the data processing system to detect missing, inconsistent or inaccurate data, and to address these problems;
- maintenance of raw data rather than the compilation of summary data;
- minimisation 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 procedures and basic checks to detect significant deviations of procedures from those specified in the design, in order to implement appropriate corrective actions.

Article 1.4.4.

Surveillance methods

Surveillance systems routinely use structured random and non-random data, either alone or in combination. A wide variety of *surveillance* sources may be available. These vary in their primary purpose and the type of *surveillance* information they are able to provide.

1. Disease reporting systems

Disease reporting systems are based on reporting of animal health related events to the *Veterinary Authority*. Data derived from disease reporting systems can be used in combination with other data sources to substantiate claims of *animal health status*, to generate data for *risk analysis* or for early warning and response. Effective laboratory support is an important component of any reporting system. Reporting systems relying on laboratory confirmation of suspected clinical cases should use tests that have high specificity as described in the *Terrestrial Manual*.

Whenever the responsibility for disease reporting falls outside the scope of the *Veterinary Authority*, for example human cases of zoonotic diseases or *infections* or *infestations* in *wildlife*, effective communication and data sharing should be established with the relevant authorities.

Participatory *surveillance* methods may be useful to collect epidemiological data that can support disease reporting systems.

2. Data generated by control programmes and health schemes

While focusing on the control or eradication of specific *infections* or *infestations*, control programmes or health schemes can be used to generate data that can contribute to other *surveillance* objectives.

3. Risk-based methods

Surveillance activities targeting selected *subpopulations* in which an *infection* or *infestation* is more likely to be introduced or found are useful to increase the efficiency of detection and can contribute to freedom claims, disease control activities, and estimation of prevalence. Risk-based methods can be used for both probability and non-probability selection of sampling units and data collection. The effect of the selection (i.e. its impact on probability of detection) should be estimated.

Risk-based methods are useful to optimise the use of *surveillance* resources.

4. Ante-mortem and post-mortem inspection

Inspection of *animals* at *slaughterhouses/abattoirs* may provide valuable *surveillance* data. The sensitivity and specificity of *slaughterhouse/abattoir* inspection for detecting the presence of specified diseases will be influenced by:

- a) clinical and pathological signs;
- b) the training, experience and number of the inspection staff;
- c) the involvement of the *Competent Authority* in the supervision of ante-mortem and post-mortem inspection;
- d) the quality of construction of the *slaughterhouse/abattoir*, speed of the slaughter chain, lighting quality, etc.; and
- e) independence of the inspection staff.

Slaughterhouse/abattoir inspections are likely to provide good coverage for particular age groups and geographical areas only. *Slaughterhouse/abattoir surveillance* data may only be representative of a particular *subpopulation* (e.g. only *animals* of a particular class and age are likely to be slaughtered for human consumption in significant numbers). Such limitations should be recognised when analysing *surveillance* data.

The usefulness of data generated by *slaughterhouse/abattoir* inspections is dependent on effective *animal traceability* that relates *animals* to their *herd* or *flock* or locality of origin.

Annex 24 (contd)5. Laboratory investigation records

Laboratory investigation records may provide useful data for *surveillance*. Multiple sources of data such as national, accredited, university and private sector *laboratories* should be integrated in order to increase the coverage of the *surveillance* system.

Valid analysis of data from different *laboratories* depends on the existence of standardised diagnostic procedures and standardised methods for data recording and interpretation as well as a mechanism to ensure the traceability of specimens to *herd or flock* or locality of origin.

6. Biological specimen banks

Specimen banks consist of stored specimens, gathered through representative sampling or opportunistic collection. Specimen banks may contribute to retrospective studies, including providing support for claims of historical freedom from *infection* or *infestation*, and may allow certain studies to be conducted more quickly and at lower cost than other approaches.

7. Sentinel units

Sentinel *units* involve the identification and regular testing of one or more *animals* of known health or immune status in a specified geographical location to detect the occurrence of *infection* or *infestation*. Sentinel *units* provide the opportunity to target *surveillance* depending on the risk of introduction, likelihood of *infection* or *infestation*, cost and other practical constraints. Sentinel *units* may provide evidence of freedom from *infection* or *infestation*, or of their distribution.

8. Clinical observations

Clinical observations of *animals* in the field are an important source of *surveillance* data. The sensitivity and specificity of clinical observations are highly dependent on the criteria used to define a suspected case. In order to allow comparison of data, the case definition should be standardised. Training of potential field observers in the application of the case definition and reporting is important. Ideally, both the number of positive observations and the total number of observations should be recorded.

9. Syndromic data

Systematic analysis of health data, including morbidity and mortality rates, production records and other parameters can be used to generate signals that may be indicative of changes in the occurrence of *infection* or *infestation*. Software may offer the prospect of extraction of syndromic data for aggregation and analysis.

10. Other data sourcesa) Wildlife data

Specimens for *surveillance* from *wildlife* may be available from sources such as hunters and trappers, road-kills, *wild animal meat* markets, sanitary inspection of hunted *animals*, morbidity and mortality observations by the general public, *wildlife* rehabilitation centres, *wildlife* biologists and *wildlife* agency field personnel, farmers and other landholders, naturalists and conservationists. *Wildlife* data such as census data, trends over time, and reproductive success can be used in a manner similar to farm production records for epidemiological purposes.

b) Public health data

For zoonotic diseases public health data may be an indicator of a potential change in the *animal health status*. The *Veterinary Authority* should coordinate with human health authorities and share data for integration into *specific surveillance* systems.

c) Environmental data

Relevant environmental data such as rainfall, temperature, extreme climatic events, presence and abundance of potential *vectors* as described in Chapter 1.5., should also be integrated into the *surveillance* system.

- d) Additional supporting data such as:
- i) data on the epidemiology of the *infection* or *infestation*, including host *population* distribution;
 - ii) data on animal movements, including transhumance and natural *wildlife* migrations;
 - iii) trading patterns for *animals* and animal products;
 - iv) national animal health regulations, including information on compliance and effectiveness;
 - v) history of imports of potentially infected material;
 - vi) *biosecurity* in place; and
 - vii) the *risk* of introduction of *infection* or *infestation*.

Article 1.4.5.

Considerations in survey design

In addition to the principles in Article 1.4.3., the following should be considered when planning, implementing and analysing surveys.

1. Types of surveys

Surveys may be conducted on the entire target *population* (i.e. a census) or on a sample.

Surveys conducted in order to document freedom from *infection* or *infestation* should be conducted using probability-based sampling methods so that data from the study *population* can be extrapolated to the target *population* in a statistically valid manner.

The sources of data should be fully described and should include a detailed description of the sampling strategy used for the selection of *units* for testing. Also, consideration should be given to any biases that may be inherent in the survey design.

2. Survey design

The target and study *populations* should first be clearly defined. Depending on the design of the survey, appropriate sampling *units* should be defined for each stage.

The design of the survey will depend on the knowledge of the size, structure and distribution of the *population*, the epidemiology of the *infection* or *infestation* and the resources available.

Data on the size, structure and distribution of *wildlife* populations often do not exist. However, they should be estimated to the extent possible before the survey is designed. Expert opinion can be sought in the gathering and interpretation of such *population* data. Historical *population* data should be updated since these may not reflect current *populations*.

3. Sampling

a) Objective

The objective of probability sampling from a *population* is to select a subset of units that is representative of the *population* of interest with respect to the objective of the study, taking into account practical constraints imposed by different environments and production systems.

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When selecting *epidemiological units* within a *population*, probability sampling, such as a simple random selection, should be used. Where probability sampling is not feasible, non-probability based methods may be applied and should provide the best practical chance of generating a sample that is representative of the target *population*. The objective of non-probability based sampling is to maximise the likelihood of detection of the *infection* or *infestation*. However, this type of sampling will not be representative of the study and target *population*.

The sampling method used at all stages should be fully documented.

b) Sample size

In surveys conducted to demonstrate the presence or absence of an *infection* or *infestation* the method used to calculate sample size depends on the size of the *population*, the design of the survey, the expected prevalence, the level of confidence desired of the survey results and the performance of the tests used.

In addition, for surveys designed to estimate a parameter (e.g. prevalence) consideration should be given to the desired precision of the estimate.

c) A sample may be selected by either:

i) probability-based sampling methods, such as:

- simple random selection;
- cluster sampling;
- stratified sampling;
- systematic sampling; or

ii) non-probability-based sampling methods, depending on:

- convenience;
- expert choice;
- quota;
- *risk*.

Article 1.4.6.

Surveillance to demonstrate freedom from an infection or infestation

This article provides general principles for declaring freedom from an *infection* or *infestation*, including for the recognition of historical freedom.

1. Demonstration of freedom

A *surveillance* system to demonstrate freedom from an *infection* and *infestation* should meet the following, in addition to the general principles outlined in Article 1.4.3.

Freedom implies the absence of the pathogenic agent in the country, *zone* or *compartment*. Scientific methods cannot provide absolute certainty of this absence. Therefore, demonstrating freedom involves providing sufficient evidence to demonstrate (to a level of confidence acceptable to Member Countries) that *infection* or *infestation* with a specified pathogenic agent, if present, is present in less than a specified proportion of the *population*.

However, finding evidence of *infection* or *infestation* at any prevalence in the target *population* automatically invalidates any freedom claim unless otherwise stated in the relevant chapter of the *Terrestrial Code*. The implications for the status of domestic *animals* of *infection* or *infestation* present in *wildlife* in the same country or *zone* should be assessed in each situation, as indicated in the relevant chapter of the *Terrestrial Code*.

Evidence from probability-based and non-probability risk-based data sources, as stated before, may increase the level of confidence or be able to detect a lower prevalence with the same level of confidence as structured surveys.

2. Requirements to declare a country or a zone free from an infection or infestation

- a) Prerequisites, unless otherwise specified in the relevant chapter of the *Terrestrial Code*:
 - i) the *infection* or *infestation* has been a *notifiable disease*;
 - ii) an *early warning system* has been in place for all relevant species;
 - iii) measures to prevent the introduction of the *infection* or *infestation* have been in place;
 - iv) no *vaccination* against the disease has been carried out;
 - v) the *infection* or *infestation* is not known to be established in *wildlife* within the country or *zone*.
- b) Historical freedom: unless otherwise specified in the relevant chapter of the *Terrestrial Code*, a country or *zone* may be considered free without formally applying a pathogen-specific *surveillance* programme when:
 - i) the prerequisites listed in a) are complied with for at least the past 10 years;
 - 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* or eradication has been achieved for the same length of time.
- c) Where historical freedom cannot be achieved:
 - i) the prerequisites listed in a) are complied with;
 - ii) pathogen-specific *surveillance* has been applied as described in this chapter and in the relevant chapter of the *Terrestrial Code*, if it exists, and has not detected any occurrence of the *infection* or *infestation*.

3. Requirements to declare a compartment free from infection or infestation

- a) The prerequisites listed in 2.a) i) to iv) are complied with;
- b) ongoing pathogen-specific *surveillance* has been applied as described in this chapter and in the relevant chapter of the *Terrestrial Code*, if they exist, and has not detected any occurrence of the *infection* or *infestation*.

4. Recommendations for the maintenance of freedom from infection or infestation

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

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- 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) *surveillance* 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 it is likely to produce identifiable clinical or pathological signs in susceptible *animals*;
- e) *vaccination* against the disease is not applied;
- f) the *infection* or *infestation* is not known to be established in *wildlife*. It can be difficult to collect sufficient epidemiological data to prove absence of *infection* or *infestation* in *wild animal* populations. In such circumstances, a range of supporting evidence should be used to make this assessment.

Article 1.4.7.

Surveillance considerations in support of disease control programmes

Surveillance is an important component in disease control programmes and can be used to determine the distribution and occurrence of *infection* or *infestation* or of other relevant health-related events. It can be used to assess progress and aid in decision-making in the control or eradication of selected *infections* or *infestations*.

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

- 1) prevalence or incidence of *infection* or *infestation*;
- 2) morbidity and mortality;
- 3) frequency of *risk* factors and their quantification;
- 4) frequency distribution of results of the laboratory tests;
- 5) post-vaccination monitoring results;
- 6) frequency distribution of *infection* or *infestation* in *wildlife*.

The spatial and temporal distribution of these variables and other data such as *wildlife*, public health and environmental data as described in point 10) of Article 1.4.4. can be useful in the assessment of disease control programmes.

Article 1.4.8.

Early warning systems

An *early warning system* is essential for the timely detection, identification and reporting of occurrence, incursion or emergence of *infections* or *infestations*, and should include the following:

- 1) appropriate coverage of target *animal* populations by the *Veterinary Services*;
- 2) effective disease investigation and reporting;
- 3) *laboratories* capable of diagnosing and differentiating relevant *infections* or *infestations*;
- 4) training and awareness programmes for *veterinarians*, *veterinary paraprofessionals*, livestock owners or keepers and others involved in handling *animals* from the farm to the *slaughterhouse/abattoir*, for detecting and reporting unusual animal health incidents;

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- 5) a legal obligation by relevant stakeholders to report suspected *cases* or *cases of notifiable diseases* or *emerging diseases* to the *Veterinary Authority*;
- 6) effective systems of communication between the *Veterinary Authority* and relevant stakeholders;
- 7) a national chain of command.

Early warning systems are an essential component of emergency preparedness.

Article 1.4.9.

Combination and interpretation of surveillance results

Depending on the objective of *surveillance*, the combination of multiple sources of data may provide an indication of the overall sensitivity of the system and may increase the confidence in the results. The methodology used to combine the evidence from multiple data sources should be scientifically valid, and fully documented, including references to published material.

Surveillance information gathered from the same country, *zone* or *compartment* at different times may provide cumulative evidence of *animal health status*. Repeated surveys may be analysed to provide a cumulative level of confidence. However, the combination of data collected over time from multiple sources may be able to achieve an equivalent level of confidence.

Analysis of *surveillance* information gathered intermittently or continuously over time should, where possible, incorporate the time of collection of the information to take the decreased value of older information into account. The sensitivity and specificity of tests used and completeness of data from each source should also be taken into account for the final overall confidence level estimation.

In assessing the efficiency of the *surveillance* system based on multiple sources, the *Veterinary Authority* should consider the relative contribution of each component to the overall sensitivity, while considering the primary objective of each *surveillance* component.

Results from *animal health surveillance* systems are subject to one or more potential biases. When assessing the results, care should be taken to identify potential biases that can inadvertently lead to an over-estimate or an under-estimate of the parameters of interest.

GLOSSARY

[...]

EARLY WARNING SYSTEM

means a system for the timely detection, identification and reporting of an incursion or emergence of diseases, infections or infestations in a country, zone or compartment.

[...]

CHAPTER 4.Y.

OFFICIAL CONTROL MANAGEMENT OF OUTBREAKS OF EMERGING AND LISTED DISEASES

Article 4.Y.1.

Introduction

When an OIE listed disease or emerging disease occurs in a Member Country, Veterinary Services should implement a response control measures proportionate to the likely impact of the disease and as a result of a risk analysis, in order to minimise its spread and consequences and, if possible, eradicate it. These measures can vary from rapid response to a new hazard and management of outbreaks, to long-term control of an endemic infection or infestation.

The purpose of this chapter is to provide recommendations to prepare, develop and implement official control programmes plans in response to occurrence outbreaks of emerging or listed diseases, including zoonoses. It is not aimed at giving ready-made fit-for-all solutions, but rather at outlining principles to follow when combating animal diseases through organised control programmes plans.

The Veterinary Authority should determine which diseases to establish official control programmes against and at which regulatory level, according to an evaluation of the actual or likely impact of the disease. Disease control programmes plans should be prepared in advance by the Veterinary Authority and Veterinary Services in close collaboration with the relevant stakeholders and other authorities, as appropriate ~~disposing of the necessary~~ regulatory, technical and financial tools.

Control plans ~~They~~ should be justified by rationales developed through risk analysis and considering taking into account animal health, public health, and socio-economic, animal welfare and environmental aspects. They should be supported by relevant cost-benefit analysis and include the necessary regulatory, technical and financial tools.

Official control programmes ~~Control plans~~ should be developed with the aim of achieving defined measurable objectives, in response to a situation in which purely private action alone is not sufficient. Depending on the prevailing epidemiological, environmental and socio-economic situation, the goal may vary from the reduction of impact to the eradication of a given disease infection or infestation.

In any case, the components of plans for management of outbreaks are an early detection warning system (including a warning procedure), and rapid response and quick and effective action, possibly followed by long-term measures. Plans should always include an exit strategy. Learning from past outbreaks and reviewing the response sequence are critical for adaptation to evolving epidemiological situations and for better performance in future situations. Plans should be tested regularly to ensure that they are fit-for-purpose, practical, feasible and well-understood and that field staff are trained and other stakeholders are fully aware of their respective roles and responsibilities in implementing the response. This is especially important for diseases that are not present in the Member Country.

Article 4.Y.2.

Legal framework and regulatory environment

- 1) In order to be able to effectively control emerging diseases and listed diseases, the Veterinary Authority should ensure that:
 - the Veterinary Services comply with the principles of Chapter 3.1., especially the services dealing with the prevention and control of contagious animal diseases, including zoonoses;
 - the veterinary legislation complies with the principles of Chapter 3.4.

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- 2) In particular, in order for the *Veterinary Services* to be the most effective when combatting animal disease *outbreaks*, the following should be addressed in the *veterinary legislation* or other relevant legal framework:
- legal powers and structure of command and responsibilities, including responsible officials with defined powers; especially a right of entry to *establishments* or other related enterprises such as live *animal* markets, *slaughterhouses/abattoirs* and animal products processing plants, for regulated purposes of *surveillance* and disease control actions, with the possibility of obliging owners to assist;
 - sources of financing for epidemiological enquiries, laboratory diagnostic, disinfectants, insecticides, vaccines and other critical supplies;
 - sources of financing and compensation policy for livestock and property that may be destroyed as part of disease control programmes;
 - coordination with other authorities, especially law enforcement and public health authorities.
- 3) Furthermore, the specific regulations, policies, or guidance on disease control activities ~~policies~~ should include the following:
- *risk analysis* to identify and prioritise ~~potential disease risks~~, including a regularly updated list of *notifiable diseases*;
 - definitions and procedures for the reporting and management of a suspected ~~case, or confirmed case,~~ of an emerging disease or a listed disease;
 - procedures for the management of infected establishments, directly or indirectly affected by the disease ~~infected establishment, contact establishment~~;
 - definitions and procedures for the declaration and management of *infected zones* and other *zones*, such as *free zones*, *protection zones*, *containment zones*, or less specific ones such as *zones of intensified surveillance*;
 - procedures for the collection, transport and testing of animal samples;
 - procedures for animal identification and the management of animal identification systems ~~the identification of animals~~;
 - procedures for the restrictions of movements, including possible standstill or compulsory veterinary certification, of relevant *animals* and animal products within, to, or from given *zones* or *establishments* or other related enterprises;
 - procedures for the destruction or *slaughter* and safe disposal or processing of infected or potentially infected *animals*, including relevant *wildlife*, and contaminated or potentially contaminated products and materials;
 - procedures for compensation for the owners of *animals* or animal products, including defined standards and means of implementing such compensation;
 - procedures for cleaning, *disinfection* and disinsection of *establishments* and related premises, *vehicles* or equipment;
 - procedures for the compulsory emergency *vaccination* or treatment of *animals*, as relevant, and for any other necessary disease control actions.

Article 4.Y.3.

Preparedness

Rapid and effective response to a new occurrence or emergence of contagious diseases is dependent on the level of preparedness. The *Veterinary Authority* should integrate preparedness planning and practice as one of its core functions. ~~Rapid, effective response to a new occurrence or emergence of contagious diseases is dependent on the level of preparedness.~~

Preparedness should be justified by *risk analysis*, should be planned, and should include training, capacity building and simulation exercises.

1. Risk analysis

Risk analysis, including import *risk analysis*, in accordance with Chapter 2.1., should be used to determine which diseases require preparedness planning and to what extent.

A *risk analysis* identifies the pathogenic agents that present the greatest *risk* and for which preparedness is most important and therefore helps to prioritise the range of disease threats and categorise the consequent actions. It also helps to define the best strategies and control options.

The *risk analysis* should be reviewed ~~updated~~ regularly to detect changes (e.g. new pathogenic agents, or changes in distribution and virulence of pathogenic agents previously identified as presenting the major *risk* and changes in possible pathways) and be updated accordingly, taking into account the latest scientific findings.

2. Planning

Four kinds of plans, describing what governmental or local authorities and all stakeholders should do, comprise any comprehensive preparedness and response system:

- a) a preparedness plan, which outlines what should be done before an *outbreak* of an emerging disease or a notifiable disease occurs;
- b) a response or contingency plan, which details what should be done in the event of an occurrence of an emerging disease or notifiable disease, beginning from the point when a suspected case is reported;
- c) a comprehensive set of instructions for ~~field~~ staff and other stakeholders on how to undertake specific tasks required by the response or contingency plan;
- d) a recovery plan for the safe restoration of normal activities, possibly including procedures and practices modified in light of the experience gained during the management of the *outbreak*.

3. Simulation exercises

The *Veterinary Services* and all stakeholders should be made aware of the sequence of measures to be taken in the framework of a contingency plan through the organisation of simulation exercises, mobilising a sufficient number of staff and stakeholders to evaluate the level of preparedness and fill possible gaps in the plan or in staff capacity.

Article 4.Y.4.

Surveillance and Early warning detection system

- 4) Depending on the priorities identified by the *Veterinary Authority*, *Veterinary Services* should implement adequate *surveillance* for *listed diseases* in accordance with Chapter 1.4. or listed disease-specific chapters, in order to detect suspected cases and either rule them out or confirm them. The *surveillance* should be adapted to the epidemiological and environmental situation. Early warning systems should be in place for infections or infestations for which a rapid response is desired, and should comply with the relevant articles of Chapter 1.4. *Vector surveillance* should be conducted in accordance with Chapter 1.5.

Annex 25 (contd)

- 2) ~~In order to implement adequate surveillance, the Veterinary Authority should have access to good diagnostic capacity. This means that the veterinarians and other relevant personnel of the Veterinary Services have adequate knowledge of the disease, its clinical and pathological manifestation and its epidemiology, and that laboratories approved for the testing of animal samples for the relevant diseases are available.~~
- 3) ~~Suspected cases of notifiable diseases should be reported without delay to the Veterinary Authority, ideally with the following information:~~
 - ~~the disease or pathogenic agent suspected, with brief descriptions of clinical signs or lesions observed, or laboratory test results as relevant;~~
 - ~~the date when the signs were first noticed at the initial site and any subsequent sites;~~
 - ~~the names and addresses or geographical locations of suspected infected establishments or premises;~~
 - ~~the animal species affected, including possible human cases, and the approximate numbers of sick and dead animals;~~
 - ~~initial actions taken, including biosecurity and precautionary movement restrictions of animals, products, staff, vehicles and equipment;~~
- 4) ~~Immediately following the report of a suspected case, investigation should be conducted by the Veterinary Services, taking into account the following:~~
 - ~~biosecurity to be observed when entering and leaving the establishment, premises or locality;~~
 - ~~clinical examinations to be undertaken (number and types of animals);~~
 - ~~samples to be taken from animals showing signs or not (number and types of animals), with specified sampling and sample handling equipment and sample handling procedures, including for the safety of the investigator and animal owners;~~
 - ~~procedure for submitting samples for testing;~~
 - ~~size of the affected establishment, premises or locality and possible entry pathways;~~
 - ~~investigation of the approximate numbers of similar or possibly susceptible animals in the establishment and its surroundings;~~
 - ~~details of any recent movements of possibly susceptible animals or vehicles or people to or from the affected establishments, premises or locality;~~
 - ~~any other relevant epidemiological information, such as presence of the suspected disease in wildlife or abnormal vector activity;~~

~~A procedure should be in place for reporting findings to the Veterinary Authority and for record keeping.~~

- 5) ~~All suspected case investigations should provide a result, either positive or negative. Criteria should be established in advance for a case definition. Confirmation can be made on clinical and post-mortem grounds, epidemiological information, laboratory test results or a combination of these, in accordance with relevant articles of the Terrestrial Code or Terrestrial Manual. Strong suspicion based on supportive, but not definitive, findings should lead to the implementation of local control measures as a precaution. When a case is confirmed, full sanitary measures should be implemented as planned.~~
- 6) ~~When a case of a listed disease is detected, notification shall be made to the OIE in accordance with Chapter 1.1.~~

Article 4.Y.5.

General considerations when managing an outbreak

Once an outbreak of an emerging disease or a notifiable disease that is subject to an official control programme is confirmed effective risk management depends on the application of a combination of measures that are operating at the same time or consecutively, aimed at:

- 1) eliminating the source of pathogenic agent, through:
 - the *killing* or *slaughter* of *animals* infected or suspected of being infected, and safe disposal of dead *animals* and potentially contaminated products;
 - the cleaning, *disinfection* and, if relevant, disinsection of premises and equipment;
- 2) stopping the spread of *infection*, through:
 - movement restrictions on *animals*, *vehicles*, and equipment and people, as appropriate;
 - *biosecurity*;
 - *vaccination*, treatment or culling of *animals* at risk;
 - communication and public awareness.

Different strategies may be chosen depending on the epidemiological, environmental, economic and social situation. The *Veterinary Authority* should assess the situation beforehand and at the time of the *outbreak* detection. For example, the wider the spread of the disease and the more locations affected at the beginning of the implementation of the measures, the less likely it will be that culling as a main eradication tool will be effective, and the more likely it will be that other control tools such as *vaccination* or treatment, either in conjunction with culling or alone, will be needed. The involvement of *vectors* or *wildlife* will also have a major influence on the control strategy and different options chosen.

In any case, the management plan should consider the costs of the measures in relation to the benefits expected, and should at least integrate the compensation of owners for losses incurred by the measures.

In case of highly contagious or high impact disease events, the management plan should be closely coordinated through an inter-sectoral mechanism such as an incident command system.

Article 4.Y.6.

Culling and disposal of dead animals and animal products

Living infected *animals* can be are the greatest source of pathogenic agents. These *animals* may directly transmit the pathogenic agent to other *animals*. They may and also cause lead to indirect *infection* through the contamination of fomites, including breeding and handling equipment, bedding, feed, *vehicles*, and people's clothing and footwear, or the contamination of the environment. Although carcasses may remain contaminated for a period after death, active shedding of the pathogenic agent effectively ceases when the *animal* is killed or slaughtered. Thus, culling of *animals* is often a the preferred strategy for the control of contagious diseases.

Veterinary Services should adapt any strategy for culling, killing or disposal of animals and their products strategy to the transmission pathways of the *pathogenic* agent. A Stamping-out policy is should be the preferred strategy for highly contagious diseases and for situations where the country or *zone* was formerly free or freedom was impending, while other strategies, such as test and cull, are better suited to less contagious diseases and situations where the disease is endemic.

For control measures, including destruction of *animals* or products, to be most effective, *animal identification* and *animal traceability* should be in place, in accordance with Chapters 4.1. and 4.2.

The *slaughter* or *killing* of *animals* should be performed in accordance with Chapters 7.5. or 7.6., respectively.

Annex 25 (contd)

The disposal of dead *animals* and their potentially contaminated products should be performed in accordance with Chapter 4.12.

1. Stamping-out policy

~~A Stamping-out policy consists primarily in of the killing of all the *animals* affected infected or suspected of being affected infected, including those ~~which that~~ have been directly or indirectly exposed to the causal pathogenic agent. This strategy is used for the most contagious diseases.~~

~~A Stamping-out policy can be limited to the affected *establishments* and, where appropriate, other *establishments* found to be epidemiologically linked with an affected *establishment*, or be broadened to include all *establishments* of a defined *zone*, when pre-emptive depopulation can be used to stop the transmission of a fast spreading pathogenic agent.~~

~~A stamping-out policy can be applied to all the animal species present on an affected establishment, or to all susceptible species, or only to the same species as the infected animals, based on the assessment of associated risks.~~

~~Killing should preferably be performed on site, and the carcasses disposed of on site or transported directly and safely to a rendering plant or other dedicated site for destruction. If to be killed outside of the *establishment* or slaughtered, the *animals* should be transported directly to a dedicated *approved* rendering plant or *slaughterhouse/abattoir* respectively, without any possible direct or indirect contacts with other *animals*. Slaughtered *animals* and their products should be processed separately from others.~~

~~Stamping-out can be applied to all the animal species present on affected premises, or to all susceptible species, or only to the same species as the affected *animals*.~~

~~Products originating from killed or slaughtered *animals*, (ranging from carcasses, *meat*, *milk*, *eggs* or genetic material to hair, wool, feathers or manure, slurry) should be destroyed or processed in a way that inactivates the pathogenic agent. The inactivating process should be carried out in accordance with the relevant articles of the listed disease-specific chapters.~~

~~Stamping-out policy procedures systematically include the cleaning and *disinfection* of *establishments* and *vehicles* used for the transport of *animals*, carcasses or products, as well as of any equipment and material that has been in direct or indirect contact with the *animals*. The procedures may include *disinsection* or *disinfestation* in the case of *vector*-borne disease or parasitic *infestation*. These procedures should be conducted in accordance with the relevant articles of Chapter 4.13.~~

2. Test and cull

~~This strategy consists primarily of finding the ~~proven~~ infected *animals* in order to remove them from the population and either *slaughter* or kill and dispose of them. This strategy is ~~it should be used~~ for less contagious or slow-spreading diseases. Veterinary Services may apply different test and cull strategies based on the epidemiology of the infection or infestation or on the characteristics of available diagnostic tests. In particular, the design of test and cull strategy will depend on the sensitivity and specificity of the tests.~~

~~Apart from the selection of *animals* to be culled, the same principles apply as for *stamping-out policy* in terms of processing, treatment and disposal of dead or slaughtered *animals* and their products.~~

Article 4.Y.7.

Movement control

Disease spread due to the movement of live *animals*, animal products and contaminated material should be controlled by movement restrictions that are adequately enforced.

Annex 25 (contd)

These restrictions can be applied to one or more animal species and their associated products, and to people, *vehicles* and equipment. They may vary from pre-movement certification to total standstill, and be limited to one or more *establishments*, or cover specific *zones*, or the entire country. The restrictions can include the complete isolation of individual *animals* or group of *animals*, and specific rules applied to movements, such as protection from *vectors*.

Specific rules covering movement controls should apply to each of any defined *zones*. Physical barriers ~~should~~ may be installed as needed, to ensure the effective application of movement restrictions.

Movement controls should be in place until the end of other disease control operations, e.g. such as a stamping-out policy, and after *surveillance* and a revised risk assessment ~~has~~ have demonstrated they are no longer needed.

Veterinary Services should coordinate their movement control actions with other relevant authorities such as local authorities, law enforcement agencies and communication media, as well as with neighbouring countries in the case of transboundary animal diseases.

Article 4.Y.8.

Biosecurity

In order to avoid the spread of the pathogenic agent outside of the affected *establishments* or *infected zones*, and in addition to the management measures described in Articles 4.Y.5. to 4.Y.7., *biosecurity* should be applied, in particular measures to avoid the contamination of people's clothes and shoes, of equipment, of *vehicles*, ~~and~~ of the environment or anything capable of acting as a fomite.

When disinfection is applied, ~~S~~specific disinfectant solutions should be used for footbaths or disinfectant baths for *vehicles' wheels*; ~~s~~Single use material and clothes or material and clothes that can be effectively cleaned and disinfected should be used for the handling of *animals* and animal products; ~~p~~Protection of premises from *wildlife* should be ensured; ~~w~~Wastes, waste-water and other effluents should be collected and treated appropriately.

Article 4.Y.9.

Vaccination and treatment

Vaccination in response to a contagious disease *outbreak* should be conducted in accordance with Chapter 4.X.

Vaccination in response to an *outbreak* requires previous planning to identify potential sources of vaccine, including vaccine banks, and to plan the possible strategies for application, such as emergency *vaccination* or ring *vaccination*.

The properties of the vaccines should be well understood, especially the level of protection against *infection* or disease and the possibility to differentiate the immune response produced by the vaccine from that produced by *infection* with the pathogenic agent.

Although *vaccination* may hide ongoing *infection* or agent transmission, it can be used to decrease the shedding of the pathogenic agent, hence reduce the reproductive rate of the *infection*. In particular, when stamping-out is not feasible, *vaccination* can be used to reduce the circulation of the *infection* until levels are low enough for a test and cull strategy.

Whenever *vaccination* is to be used as a tool to control *outbreaks* or spread of disease, the control plan should include an exit strategy, i.e. when and how to stop the *vaccination* or whether *vaccination* should become routine.

Article 4.Y.10.

Zoning

The *Veterinary Authority* should use the tool of zoning in accordance with Chapter 4.3.

Annex 25 (contd)

The use of zoning for disease control is inherently linked with measures of *killing or slaughter*, movement control, *vaccination* and *surveillance*, which apply differently according to the *zones*. In particular, efforts should be concentrated on those parts of a territory affected by the disease, to prevent the spread of the pathogenic agent and to preserve the status of the parts of the territory not affected by the disease.

~~Zones established defined in response to outbreaks of emerging diseases or listed diseases may be~~ are usually infected zones, protection zones, and containment zones. ~~However, of other types of zones, e.g. such as zones of intensified surveillance, or zones of intensified vaccination can also be used.~~

Article 4.Y.11.

Communication in outbreak management

For the best implementation of disease control measures, *Veterinary Services* should ensure good communication with all concerned stakeholders, including the general public. This should be carried out, among others, through awareness campaigns targeted at breeders, *veterinarians*, *veterinary paraprofessionals*, local authorities, consumers and general public.

Veterinary Services should communicate before, during and after *outbreaks*, in accordance with Chapter 3.3.

Article 4.Y.12.

Specific post-control surveillance

Specific *surveillance* should be applied in order to monitor the effectiveness of the *official control programme plan*, and assess the status of the remaining *animal populations* in the different *zones* established by the *Veterinary Services*.

The results of this *surveillance* should be used to reassess the measures applied, including reshaping of the *zones* and re-evaluation of the culling or *vaccination* strategies, and for the eventual recovery of free status, if possible.

This *surveillance* should be conducted in accordance with Chapter 1.4. and with the relevant articles of the *listed disease-specific* chapters.

Article 4.Y.13.

Further outbreak investigation, monitoring, evaluation and review

In order to gather information required for any management information system, *Veterinary Services* should conduct an in-depth epidemiological investigation of each *outbreak* to build up a detailed first-hand, field-based knowledge of how the disease is transmitted, and inform further disease control plans. This requires staff who have been trained in the way to conduct it and the use of the standardised data collection forms.

Information gathered and experience gained should be used to monitor, evaluate and review disease *official control programmes plans*.

SECTION 4. ~~GENERAL RECOMMENDATIONS:~~ DISEASE PREVENTION AND CONTROL

CHAPTER 4.Z.

INTRODUCTION TO RECOMMENDATIONS FOR DISEASE PREVENTION AND CONTROL

Article 4.Z.1.

Effective prevention and control of contagious animal diseases, including zoonoses, is a central mandate of the *Veterinary Services* of each Member Country.

From the extensive experience in combatting contagious animal diseases, *Veterinary Services* around the world, supported by significant progress in veterinary science, have developed and improved a number of tools to prevent, control and sometimes eradicate them.

The following chapters of this section describe these tools and the different aspects of disease prevention and control to be implemented by the *Veterinary Services*.

To prevent effectively introduction and transmission of contagious animal diseases while minimising potential negative impacts of *sanitary measures*, *Veterinary Services* should consider devising a set of measures selected from the recommendations described in this section, taking into account various factors including their impact on trade, public health and environment. In parallel with disease-specific measures, *Veterinary Services* should take into account relevant commodity-based *sanitary measures*.

Furthermore, although the general principles covering the measures described in this section are applicable to multiple diseases, *Veterinary Services* should adapt them to their circumstances, because characteristics of the pathogenic agents and the situations in which they occur are different disease by disease and country by country. To this end, recommendations in this section should be read in conjunction with *listed disease*-specific recommendations in Sections 8 to 15.

Veterinary Services should ensure that any prevention and control programme be proportionate to the *risk*, practical and feasible within the national context and be based on *risk analysis*.

Prerequisites for devising such programmes may include:

- quality *Veterinary Services* including legislative framework and *laboratory* capacity;
- appropriate education to secure *veterinarians* and *veterinary paraprofessionals*;
- close link with research institutions;
- effective awareness of private stakeholders;
- public-private partnerships;
- regional cooperation among *Veterinary Authorities* on transboundary animal diseases.

CHAPTER 7.Y.

KILLING OF REPTILES FOR THEIR SKINS, MEAT AND OTHER PRODUCTS

Article 7.Y.1.

Scope

The recommendations in this chapter address the need to ensure the welfare of chelonians, crocodylians, lacertilians and ophidians, during the process of *killing* them for their skins, *meat* and other products.

Article 7.Y.2.

Definitions

For the purpose of this chapter:

Restraint: means any acceptable physical or chemical method of reducing, or eliminating, voluntary or reactive movement of the reptile, to facilitate efficient *stunning* or *killing*.

Stunning: means the procedure that causes immediate unconsciousness until the animal is dead, or causes the absence of pain, distress and suffering until the onset of unconsciousness, according to the outcomes defined in this chapter for the species covered.

Unconsciousness: means the state of unawareness caused by temporary or permanent disruption of brain function.

Pithing: means a method carried out by inserting a rod or probe through the foramen magnum (or the hole from a penetrative captive bolt or gunshot), into the brain to ensure thorough brain destruction.

Article 7.Y.3.

General considerations

1. Animal Welfare Plan

Facilities in which reptiles are killed should have an *animal welfare* plan and associated procedures. The purpose of such a plan should be to maintain good *animal welfare* at all stages of handling of animals until their *death*.

The *animal welfare* plan should contain standard operating procedures for each step of animal handling to ensure that it is properly implemented, based on relevant indicators shown in Article 7.Y.5. It should also include corrective actions to address specific risks, for example, power failures or other circumstances that could negatively affect the welfare of animals.

2. Competency and training of the personnel

Animal handlers should be competent in handling and moving reptiles, as well as understanding relevant behaviours of these animals and the underlying *animal welfare* and technical principles necessary to carry out their tasks.

There should be sufficient number of personnel, who should be competent and familiar with the recommendations outlined in this chapter and their application within the national context.

Annex 27 (contd)

The manager of the facility should ensure that personnel are competent and carry out their tasks in accordance with the guiding principles for *animal welfare* in Article 7.1.2.

Competence may be gained through formal training or practical experience. This competence should be verified by the *Competent Authority* or an independent body accredited by it.

3. Source of animals

Animals should be acquired legally in accordance with national jurisdictions and international treaties, including the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Relevant documentation related to the source of the animals should accompany the animals.

If animals captured in the wild are to be used, capture and transport techniques should be humane and give due regard to human and animal health, welfare and safety.

4. Behaviour

Handling and *killing* methods should take into account specific reptile behaviours such as:

- reptiles are sensitive to and will respond to visual and tactile stimuli as well as noise and vibrations;
- the restraint and handling of reptiles can be difficult because of their agility and strength;
- reptiles can inflict significant bite wounds to handlers and wound infection or envenomation are not uncommon;
- low body temperatures may result in slow movements, torpor and reduced responsiveness that should not be regarded as indicators of quiescence or unconsciousness;
- absence of vocalisation is common or normal in reptiles, even in highly traumatic situations.

Article 7.Y.4.

Selection of a killing process

In the case of reptiles, the *killing* process may involve a stunning and a subsequent *killing* step or a direct *killing* method.

Criteria which may influence the choice of methods used in the process include:

- level of knowledge and skill required to perform the procedure effectively;
- safety of the operator;
- compatibility with processing requirements and animal product purpose;
- in the case of the use of drugs, the drug availability, licensing and use requirements, possible human abuse, and implications for other product uses such as consumption by animals or humans;
- ability to maintain equipment in proper working order;
- cost of the method;

The *killing* process used should:

- avoid excitement, fear and stress to the animal;
- be appropriate for the species, size, age and health of the animal;
- be reliable and reproducible;
- ensure that any stunning used is in accordance with Article 7.Y.2.; and
- include the use of a *killing* method if the stunning method does not result in death of the animal during unconsciousness.

Article 7.Y.5.

Criteria (or measurables) for the outcome of the stunning and killing of reptiles

The following animal-based criteria (or measurables) can be useful indicators of *animal welfare*. The use of these criteria and their appropriate thresholds should be adapted to the different methods used to stun and kill reptiles. These criteria can be considered as tools to monitor the impact of the method and management used, given that both of these can affect *animal welfare*.

Criteria to measure the effectiveness of stunning and killing methods

Whilst multiple criteria are preferable for the establishment of unconsciousness or *death*, the presence of any of the following criteria should be regarded as sufficient to establish suspicion of consciousness:

- pupillary response to light;
- pupillary response to objects or movement;
- eye movement in response to objects or movement;
- blink or nictitating membrane responses to touch or contact of the cornea;
- spontaneous eyelid opening or closing;
- intentional defensive responses;
- tongue movement.

In addition to the absence of all the criteria above, *death* may be inferred by confirming permanent cessation of the following:

- response to somatic stimuli applied to the head, indicating brain activity;
- respiration;
- cardiac activity (while presence of a heartbeat does not necessarily mean that an animal is alive, permanent cessation of a heartbeat indicates death).

Article 7.Y.6.

Physical restraint

Physical restraint is often required in the process of *stunning* and *killing* of reptiles. Special considerations for the restraint of reptiles are needed due to the physical and behavioural characteristics of this taxonomic group.

Annex 27 (contd)Recommendations for effective physical restraint in relation to animal welfare

The method of restraint should:

- avoid injuries due to excessive pressure applied by equipment or personnel;
- be applied rapidly to avoid excessive or prolonged struggling of the animal;
- exclude features that may cause pain or injury;
- not hoist or suspend animals by the feet, legs, tail or head;
- not restrain only one area of the body (e.g. head or neck) leaving the rest able to move excessively;
- ensure animals can breathe freely through the nostrils where the mouth is restrained;
- adequately support the animal's body when moving it;
- avoid taping or binding the legs or feet of the animals as the sole method of restraint, and where required, the method should not cause injuries or pain;
- not break legs, cut limb tendons or blind animals in order to immobilise them;
- not sever the spinal cord to immobilise animals.

Animal-based criteria (or measurables): excessive struggling, excessive movements, trauma and injuries.

Article 7.Y.7.

Introduction to stunning and killing methods

Stunning may be used to facilitate the *killing* of reptiles. *Stunning* methods may result in the *death* of the animal following unconsciousness, or may require an additional *killing* step.

If *stunning* is used, the method should:

- be appropriate for the species, size, age and health of the animal;
- be reliable and reproducible;
- avoid excitement, fear and stress to the animal;
- avoid or minimise restraint in accordance with Article 7.Y.6.;
- result in the immediate onset of unconsciousness or the absence of pain, distress and suffering until the onset of unconsciousness that lasts until the animal is dead;
- be followed by a killing method if stunning does not result in death of the animal during unconsciousness.

The equipment used should be maintained and operated properly in accordance with the manufacturer's recommendations, in particular with regard to the species and size of the animal. The maintenance of the equipment is the responsibility of the management of the facility, and should be under the supervision of the *Competent Authority* or accredited delegated body. If the primary method of *stunning* fails to produce unconsciousness as described in Article 7.Y.5., a back-up *stunning* or *killing* method should be used immediately (Articles 7.Y.8. to 7.Y.15.).

Animal-based criteria (or measurables): immediate onset of unconsciousness or *death* as described in Article 7.Y.5.

Article 7.Y.8.

Electrical stunning (for crocodilians only)

Electrical stunning is the application of an electric current through electrodes for the purpose of causing immediate unconsciousness that lasts until death.

Recommendations for effective use in relation to *animal welfare*:

- the equipment and the procedure for its application should be approved by the *Competent Authority* an accredited designated authority;
- apparatus should deliver sufficient current through the brain;
- the equipment should be scientifically validated, tested and calibrated prior to use and maintained according to a set protocol;
- minimum electrical parameters (current, voltage and frequency) should be applied;
- minimum stun duration should be achieved;
- animals should be killed in accordance to Articles 7.Y.9. to 7.Y.15. without delay following confirmation of effective stunning to avoid recovery of consciousness.

Animal-based criteria (or measurables): immediate onset of unconsciousness as described in Article 7.Y.5.

Article 7.Y.9.

Penetrative captive bolt

The aim of this method is to produce a state of unconsciousness and cause severe damage to the brain by the impact and penetration of a captive bolt using a mechanical device. The force of impact and the physical damage caused by the passage of the bolt should result in immediate unconsciousness and *death*. If *death* does not occur following the passage of the penetrative bolt, then an additional *killing* method in accordance with Articles 7.Y.9. to 7.Y.15. should be used immediately to ensure *death*.

Recommendations for the effective use in relation to *animal welfare*:

- animals should be effectively restrained;
- the device should be correctly positioned on the head to result in the penetration of the brain by the bolt;
- the bolt should be of appropriate mass, length, diameter and shape;
- cartridge or compressed air specifications should be determined to deliver the correct bolt velocity;
- equipment and charge should be selected to suit the type and size of animal;
- equipment should be cleaned, maintained and stored, following manufacturer's recommendations.

Animal-based criteria (or measurables): immediate onset of unconsciousness and *death* as described in Article 7.Y.5.

Annex 27 (contd)

Article 7.Y.10.

Non-penetrative captive bolt

The non-penetrative captive bolt method is sometimes called 'concussive stunning', although concussion is the underlying principle for both penetrative and non-penetrative methods. The concussion may result in both unconsciousness and *death*. If *death* does not occur following the application of the percussive blow, then an additional *killing* method in accordance with Articles 7.Y.9. to 7.Y.15. should be used immediately to assure *death*.

Recommendations for an effective use in relation to *animal welfare*:

- animals should be effectively restrained;
- the device should be correctly positioned on the head to allow optimum transfer of energy to the brain;
- the bolt should be of appropriate mass, diameter and shape;
- cartridge or compressed air specifications should be determined to deliver the correct bolt velocity;
- equipment and charge should be selected to suit the type and size of animal;
- equipment should be cleaned, maintained and stored, preferably following manufacturer's recommendations.

Outcome-based criteria (or measurable): immediate onset of unconsciousness or death as described in Article 7.Y.5.

Article 7.Y.11.

Percussive blow to the head

A percussive blow to the head to induce cerebral concussion can be achieved manually. A concussive state is normally associated with a sudden loss of consciousness with associated loss of reflexes. Inducing unconsciousness requires the transfer of sufficient energy into the brain to disrupt normal neural function. If the severity of the blow is sufficient then it will result in the *death* of the animal. If *death* does not occur following the application of the percussive blow, then an additional *killing* method in accordance with Articles 7.Y.9. to 7.Y.15. should be used immediately to ensure *death*.

Recommendations for effective use in relation to *animal welfare*:

- animals should be effectively restrained;
- the blow should be correctly applied to result in optimum transfer of energy to the brain;
- the tool should be of appropriate size and weight, and the blow of sufficient force to induce concussion;
- equipment and method should be selected to suit the type and size of animal.

Animal-based criteria (or measurables): immediate onset of unconsciousness or *death* as described in Article 7.Y.5.

Article 7.Y.12.

Gunshot

An effective gunshot, where the projectile enters the brain, can cause immediate unconsciousness and *death*. A gunshot to the heart or neck does not immediately render an animal unconscious and therefore should not be used. If *death* does not occur following the gunshot, then an additional *killing* method in accordance with Articles 7.Y.9. to 7.Y.15. should be used immediately to ensure *death*.

Annex 27 (contd)

Manual restraint of the animal should not be used due to safety concerns for humans in the line of fire.

Recommendations for effective use in relation to *animal welfare*:

- ensure accurate targeting of the brain;
- select firearm and projectile suitable for the type and size of animal;
- equipment should be cleaned and stored following manufacturer's recommendations.

Animal-based criteria (or measurables): immediate onset of unconsciousness or *death* as described in Article 7.Y.5.

Article 7.Y.13.

Pithing

Pithing is a method carried out by inserting a rod or probe through the foramen magnum or shot hole from a penetrative captive bolt or gunshot, into the brain to ensure thorough brain destruction. After insertion of the rod or probe it should be promptly turned four to six times in a centrifugal motion to ensure destruction of the brain tissue.

Recommendations for effective use in relation to *animal welfare*:

- should only be used in unconscious animals;
- movement of the pithing implement should ensure maximum destruction of brain tissue.

Animal-based criteria (or measurables): confirmation of *death* as described in Article 7.Y.5.

Article 7.Y.14.

Decapitation or spinal cord severance

Decapitation involves cutting the neck of the animal, between the skull and the first cervical vertebra using a sharp instrument (guillotine, axe or blade) leading to severance of the head. For some reptile species, this method is not anatomically feasible. For severance of the spinal cord, complete separation of the head from the neck is not necessary. Some reptiles may remain conscious for over an hour after decapitation or spinal cord severance, which makes this method acceptable only in stunned and unconscious animals and when followed by immediate destruction of the brain by pithing or percussive blow.

Recommendations for effective use in relation to *animal welfare*:

- should only be used on unconscious animals;
- should always be followed immediately by physical intervention to destroy the brain, i.e. immediate crushing of the brain or pithing.

Animal-based criteria (or measurables): confirmation of death as described in Article 7.Y.5.

Article 7.Y.15.

Chemical agents

There are a number of acceptable chemical agents that can be used for the restraint or *killing* of reptiles. The use of these agents for either restraint or *killing* should be supervised by *veterinarians* or *veterinary paraprofessionals* in accordance with the requirements of the *Competent Authority*. If *death* does not occur following administration of the agent, then an additional *killing* method in accordance with Articles 7.Y.9. to 7.Y.15. should be used immediately to ensure *death*.

Annex 27 (contd)

Recommendations for effective use in relation to *animal welfare*:

- ensure proper physical restraint is used for administration;
- ensure chemicals and dosage used are appropriate for the animal;
- ensure the route of administration is appropriate for the animal;

Animal-based criteria (or measurables): confirmation of *death* as described in Article 7.Y.5.

Article 7.Y.16.

Methods that are unacceptable for stunning and killing reptiles

Due to particular anatomical and physiological characteristics of reptiles the use of any method other than those described in Articles 7.Y.9. to Article 7.Y15., are considered inappropriate and unacceptable. Some examples of unacceptable methods are:

- exsanguination,
 - freezing or cooling,
 - heating or boiling,
 - suffocation or drowning,
 - inflation using compressed gas or liquid,
 - live evisceration or skinning,
 - constriction bands to induce cardiac arrest,
 - inhaled carbon dioxide (CO₂), carbon monoxide (CO) or nitrogen (N),
 - paralytic agent drugs.
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CHAPTER 7.Z.

ANIMAL WELFARE AND LAYING HEN PRODUCTION SYSTEMS

Article 7.Z.1.

Definitions

For the purposes of this chapter:

Laying hens (hens): means sexually mature female birds of the species *Gallus gallus domesticus* kept for the commercial production of eggs for human consumption. Laying hens kept in village or backyard *flocks* are excluded.

End-of-lay hens: means laying hens at the end of their productive lives.

Layer pullets (pullets): means female birds of the species *Gallus gallus domesticus* raised for commercial layer production purposes from hatch until the onset of sexual maturity.

Article 7.Z.2.

Scope

This chapter covers the production period from the arrival of *day-old birds* on the pullet-rearing farm to the removal of hens from the laying production facilities.

Commercial production systems involve the confinement of birds, the application of *biosecurity* and trade in the eggs or pullets. These recommendations cover pullets or hens kept in cage or non-cage systems, whether indoors or outdoors.

Commercial pullet or hen production systems include:

1. Indoor systems

Pullets or hens are completely confined in a poultry house, with or without environmental control.

2. Outdoor systems

Pullets or hens are kept in premises with or without environmental control that include a designated outdoor area.

This chapter should be read in conjunction with Chapters 6.5., 7.1., 7.2., 7.3., 7.4., 7.5. and 7.6.

Article 7.Z.3.

Criteria or measurables for the welfare of pullets or hens

The welfare of pullets or hens should be assessed using outcome-based measurables. Consideration should also be given to the resources provided and the design of the system. Outcome-based measurables, specifically animal-based measurables, can be useful indicators of *animal welfare*. The use of these indicators and the appropriate thresholds should be adapted to the different situations where pullets or hens are managed, also taking into account the strain of bird concerned.

Annex 28 (contd)

Criteria that can be measured in the farm setting include body and plumage condition, egg shell condition, mortality and morbidity rates, etc. The age at which abnormalities of these criteria are observed can help to determine the origin. Other conditions such as bone and foot problems, disease, *infection* or *infestation* can also be assessed at depopulation or during routine sampling. It is recommended that values for welfare measurables be determined with reference to appropriate national, sectorial or regional standards for pullets or hens.

The following outcome-based criteria and measurables are useful indicators of pullet or hen welfare:

1. Behaviour

The presence or absence of certain chicken behaviours could indicate an animal welfare problem, including fear, pain or sickness. In addition, chickens have evolved behaviours that they are highly motivated to perform and a good understanding of normal chicken behaviour [Nicol, 2015], including their social interactions [Estevez *et al.*, 2007; Rodríguez-Aurrekoetxea A. and Estevez I., 2014], is required. Some behaviours may not be uniquely indicative of one type of problem; they may be exhibited for a variety of reasons.

a) Dust bathing

Dust bathing is an intricate body maintenance behaviour. During dust bathing, birds work loose material, such as litter, through their feathers. This behaviour helps remove dirt and parasites, which contributes to maintaining plumage condition, which in turn helps to maintain body temperature and protect against skin injury. Reduced dust bathing behaviour in the *flock* may indicate problems with litter or range quality, such as the litter or ground being wet or not friable [Olson and Keeling, 2005; Van Liere and Bokma, 1987].

b) Fear behaviour

Fearful pullets and hens show high reactivity to various stimuli [Jones R. B., 1987; Zeltner and Hirt, 2008]. Fearfulness can lead to injury when the birds pile on top of, and sometimes suffocate, one another. Fearful birds may be less productive [Barnett J. *et al.*, 1992]. Methods have been developed for evaluating fearfulness while *animal handlers* walk through the poultry house or bird area [Jones, 1996; Forkman, 2007].

c) Feeding and drinking behaviour

Reduced feeding or drinking can indicate management problems, including inadequate spaces or inappropriate placement of feeders or drinkers, dietary imbalance, poor water quality, or feed contamination. Feeding and drinking are often depressed when birds are ill, and intake may also be reduced during periods of heat stress and increased during cold stress [Garner *et al.*, 2012; Thogerson *et al.*, 2009a; Thogerson *et al.*, 2009b].

d) Foraging activity

Foraging is the act of searching for food, typically by walking and pecking or scratching the litter substrate; reduced foraging activity could suggest problems with litter quality or the presence of conditions that decrease bird movement [Appleby *et al.*, 2004; Lay *et al.*, 2011; Weeks and Nicol, 2006].

e) Injurious feather pecking and cannibalism

Injurious feather pecking can result in significant feather loss and may lead to cannibalism. Cannibalism is the tearing of the flesh of another bird, and can result in severe injury. These behaviours can have multifactorial causes [Hartcher, 2016; Estevez, 2015; Nicol *et al.*, 2013; Rodenburg, 2013; Lambton, 2013].

f) Locomotion and comfort behaviours

Locomotion and comfort behaviours are important for body and plumage development and maintenance, and may include walking, leaping, turning, stretching legs and wings, wing flapping, feather ruffling and tail wagging [Dawkins and Hardie, 2007].

Opportunities to display these behaviours are influenced by housing system and space [Widowski *et al.*, 2016; Lay, 2011].

Annex 28 (contd)

g) Nesting

Nesting is a natural and highly motivated behaviour that includes nest site selection, nest formation and egg laying [Cooper and Albentosa, 2003; Weeks and Nicol, 2006; Cronin *et al.*, 2012; Yue and Duncan, 2003]. Uneven nest box utilisation and egg laying outside the nests may be indicative of problems with environmental or social behavioural factors [Cronin *et al.*, 2012; Cooper and Appleby, 1996; Gunnarsson *et al.*, 1999].

h) Perching

Perching is a natural and highly motivated behaviour. Birds seek elevation during the day; the motivation to seek elevation is particularly strong at night when pullets and hens select a site for resting or sleeping [EFSA, 2015]. Reduced perching behaviour in the *flock* may indicate problems with environmental factors, injuries and pullet rearing experience [Janczak and Riber, 2015; Gunnarsson *et al.*, 1999].

i) Social behaviour

Chickens are a highly social species, engaging in synchronised behaviour [Olsson *et al.*, 2002; Olsson and Keeling, 2005]. Benefits include social learning, protection from predators [Newberry *et al.*, 2001], help in thermoregulation and plumage maintenance. Problems in social behaviour can be assessed using scoring systems for measuring the degree of aggression damage and competition for resources [Estevez, 2002].

j) Spatial distribution

Uneven spatial distribution of the birds may indicate thermal discomfort or uneven availability of resources, such as light, food or water, shelter, comfortable resting locations [Rodríguez-Aurrekoetxea and Estevez, 2016; Cornetto and Estevez, 2001].

k) Thermoregulatory behaviour

Prolonged or excessive panting and wing spreading are observed during heat stress [Mack, 2013; Lara and Rostagno, 2013]. Indicators of cold stress include feather ruffling, rigid posture, trembling, huddling and piling on top of each other and distress vocalisations.

l) Vocalisation

Vocalisation can indicate emotional states, both positive and negative. A good understanding of *flock* vocalisations is useful for good animal care [Zimmerman *et al.*, 2000; Bright, 2008; Koshiba *et al.*, 2013].

2. Body condition

Poor body condition is reflective of poor welfare outcomes for individual birds. At *flock* level, uneven body condition may be an indicator of potential welfare problems. Body condition can be evaluated using on-farm sampling methods for body weight or body condition scores [Gregory and Robins, 1998; Craig and Muir, 1996; Elson and Croxall, 2006; Keeling *et al.*, 2003].

3. Eye conditions

Conjunctivitis can indicate the presence of irritants such as dust and ammonia. High ammonia levels can also cause corneal burns and eventual blindness. Abnormal eye development can be associated with low light intensity [Jenkins *et al.*, 1979; Lewis and Gous, 2009; Prescott *et al.*, 2003].

4. Foot problems

Hyperkeratosis and bumblefoot are painful conditions associated with inappropriate flooring [Lay *et al.*, 2001; Abrahamsson and Tauson, 1995; Abrahamsson and Tauson, 1997].

Excessive claw growth, broken claws and toe injuries affect locomotion and may be associated with pain [EFSA, 2005].

Annex 28 (contd)

Contact dermatitis affects skin surfaces that have prolonged contact with wet litter or other wet flooring surfaces [Tauson and Abrahamson, 1996].

Foot problems are usually manifested as blackened skin progressing to erosion and fibrosis on the lower surface of the footpads and at the back of the hocks. If severe, the foot and hock lesions may contribute to locomotion problems and lead to secondary *infections*. Scoring systems for foot problems have been developed [Blatchford *et al.*, 2016].

5. Incidence of diseases, infections, metabolic disorders and infestations

Ill-health, regardless of the cause, is a welfare concern, and may be exacerbated by poor environmental or husbandry management.

6. Injury rate and severity

The rate and severity of injuries can indicate welfare problems in the *flock* during production. Injuries include those caused by other birds (e.g. scratches, feather loss or wounding), by environmental conditions, (e.g., fractures and keel bone deformation) and by human intervention (e.g., during handling and catching).

7. Mortality, culling and morbidity rates

Daily, weekly and cumulative mortality, culling and morbidity rates should be within expected ranges. Any unforeseen increase in these rates could reflect an *animal welfare* problem.

8. Performance

Daily, weekly and cumulative performance should be within expected ranges. Any unforeseen decreases in these rates could be reflective of the welfare status of the individual birds or the *flocks*.

- a) Pullet growth rate measures average daily mass gain per average pullet and *flock* uniformity.
- b) Pullet feed conversion measures the quantity of feed consumed by a *flock* relative to the total live mass produced, expressed as the mass of feed consumed per unit of body mass.
- c) Hen feed conversion measures the mass of feed consumed by a *flock* relative to the unit of egg production.
- d) Egg production, such as when measured by the number of eggs per hen housed.
- e) Egg quality, such as when measured by shell strength and abnormalities.

9. Plumage condition

Evaluation of the plumage condition of pullets and hens provides useful information about aspects of welfare. Feather loss and damage can result from feather pecking behaviour, nutritional problems and abrasions resulting from faults in the housing system [Rodriguez-Aurrekoetxea and Estevez, 2016; Drake *et al.*, 2010]. Plumage dirtiness may be associated with the environment and production system. Plumage scoring systems have been developed for these purposes [Blokhuys, 2007].

10. Water and feed consumption

Monitoring daily water and feed consumption is a useful tool to indicate disease, *infection* or *infestation* and other welfare conditions, taking into consideration ambient temperature, relative humidity and other related factors. Problems with the water or feed quality and supply can result in wet litter and diarrhoea, dermatitis, dehydration or changes in egg quality, production and body condition.

Article 7.Z.4.

Recommendations

Articles 7.Z.5. to 7.Z.29. provide recommendations for measures applied to pullets and hens.

Each recommendation includes a list of relevant outcome-based measurables derived from Article 7.Z.3. This does not exclude other measures being used when appropriate.

Article 7.Z.5.

Location, construction and equipment of establishments

The location of pullet and hen *establishments* should be chosen to be safe from the effects of fires and floods and other natural disasters to the extent practicable. In addition *establishments* should be located or designed to avoid or minimise disease risks, exposure of pullets and hens to chemical and physical contaminants, noise and adverse climatic conditions.

Pullet and layer houses, outdoor areas and equipment to which birds have access should be designed after consideration of bird behaviour and maintained to avoid injury or pain to the birds.

Pullet and layer houses should be constructed with materials and electrical and fuel installations that minimise the risk of fire and other hazards.

Producers should have a maintenance programme in place for all equipment, the failure of which could jeopardise bird welfare.

Outcome-based measurables: culling and morbidity, fear behaviour, feeding, drinking, foraging, foot problems, incidence of diseases, *infections* and *infestations*, injury rates and severity, locomotion and comfort behaviours, mortality rate, performance, plumage condition, social behaviour and spatial distribution, thermoregulatory behaviour, vocalisations.

Article 7.Z.6.

Matching the birds and the housing and production system

Welfare and health considerations should balance any decisions on performance when choosing a layer strain for a particular location, housing and production system. The pullet rearing system should prepare the bird for the layer production system.

Outcome-based measurables: dust bathing, feeding, drinking, foraging, incidence of *diseases*, injurious feather pecking and cannibalism, injury rate and severity, locomotion and comfort behaviours, mortality rate, nesting, *infestations*, perching, performance, plumage condition, social behaviour, spatial distribution.

Article 7.Z.7.

Stocking density

Pullets and hens should be housed at a stocking density that allows them to have adequate access to resources and to express locomotion and comfort behaviours. The following factors should be taken into account:

- management capabilities,
- ambient conditions,
- housing system,
- production system,
- litter quality,
- ventilation,
- *biosecurity* strategy,
- genetic strain,
- age and bird mass.

Annex 28 (contd)

Outcome-based measurables: drinking, foraging, feeding, incidence of diseases, *infections* and *infestations*, injury rate and severity, locomotion and comfort behaviours, mortality rate, nesting, perching, performance, plumage condition, social behaviour, spatial distribution.

Article 7.Z.8.

Nutrition

Pullets and hens should always be fed a diet appropriate to their age and genetic strain, which contains adequate nutrients to meet their requirements for good health and welfare.

The form and quality of feed and water should be acceptable to the birds and free from contaminants and microorganisms hazardous to bird health.

The feeding and watering systems should be cleaned regularly to prevent the growth of hazardous microorganisms.

Birds should be provided with adequate access to feed on a daily basis. Water should be continuously available except under veterinary advice. Special provision should be made to enable chicks to access appropriate feed and water.

Outcome-based measurables: aggression, feed and water consumption, foraging, incidence of diseases, *infections* and *infestations*, injurious feather pecking, injury rate and severity, metabolic disorders, mortality rate, performance, vocalisations.

Article 7.Z.9.

Flooring

The flooring for the birds should be easy to clean and disinfect and not cause harm or damage to them.

The slope and design of the floor should allow birds to express normal locomotion and comfort behaviours. The floors should support the birds adequately, prevent injuries and ensure that manure does not contaminate other birds. Changes of flooring types from pullet to layer housing should be avoided.

The provision of loose and dry litter material is desirable to encourage dust bathing and foraging by pullets and hens. When litter is provided it should be managed to minimise any detrimental effects on welfare and health. Litter should be replaced or adequately treated when required to prevent *diseases*, *infections* and *infestations*.

Outcome-based measurables: comfort behaviour, dust bathing, foot problems, foraging, incidence of diseases, *infections* and *infestations*, injury rates and severity, locomotion, performance, plumage condition.

Article 7.Z.10.

Dust bathing areas

When dust bathing areas are offered, they should provide suitable friable materials, designed and positioned to encourage dust bathing, allow synchronised behaviour, prevent undue competition and not cause damage or injuries. Dust bathing areas should be easy to inspect and clean [Lentfer *et al.*, 2011].

Outcome-based measurables: dust bathing, injury rate and severity, plumage condition, spatial distribution.

Article 7.Z.11.

Foraging areas

When foraging areas are offered, they should provide suitable materials, designed and positioned to encourage foraging, allow synchronised behaviour, prevent undue competition and not cause damage or injuries. Foraging areas should be easy to inspect and clean.

Outcome-based measurables: foraging, injurious feather pecking and cannibalism, injury rate and severity, spatial distribution.

Article 7.Z.12.

Nesting areas

When nesting areas are offered, they should be built of suitable materials, designed and positioned to encourage nesting, prevent undue competition and not cause damage or injuries. Nesting areas should be easy to inspect, clean and disinfect.

Outcome-based measurables: injurious feather pecking and cannibalism, injury rate and severity, nesting, performance, spatial distribution.

Article 7.Z.13.

Perches

When perches are offered, they should be built of suitable materials, designed and positioned to encourage perching, to prevent keel bone deformation or foot problems and to maintain stability of the birds during perching. In the absence of designated perches, platforms, grids and slats that are perceived by the birds as elevated and that do not cause damage or injuries, may be a suitable alternative. Perches or their alternatives should be easy to clean and disinfect [Hester, 2014; EFSA, 2015].

Perch elevation should be carefully considered to minimise injurious feather pecking, cannibalism, keel deformities and fractures.

Outcome-based measurables: foot problems, injurious feather pecking and cannibalism, injury rate and severity, perching, spatial distribution.

Article 7.Z.14.

Outdoor areas

Pullets can be given access to outdoor areas as soon as they have sufficient feather cover and are old enough to range safely. There should be sufficient appropriately designed exit areas to allow them to leave and re-enter the poultry house freely.

Management of outdoor areas is important. Land and pasture management measures should be taken to reduce the risk of birds becoming infected by pathogenic agents, infested by parasites or being injured. This might include limiting the stocking density or using several pieces of land consecutively in rotation.

Outdoor areas should be located on well-drained ground and managed to minimise swampy conditions and mud. The outdoor area should be able to contain the birds and prevent them escaping. Outdoor areas should allow pullets and hens to feel safe outdoors and be encouraged to optimise utilisation of the range, while mitigating predation and disease risks [Gilani *et al.*, 2014]. Hens should be habituated early to the outdoor area [Rodriguez–Aurrekoetxea and Estevez, 2016]. Outdoor areas should provide shelter for the birds and be free from poisonous plants and contaminants.

Annex 28 (contd)

Outcome-based measurables: fear behaviour, foot problems, foraging, incidence of diseases and *infestations*, injury rate and severity, locomotion and comfort behaviours, morbidity rate, mortality rate, performance, plumage condition, social behaviour, spatial distribution, thermoregulatory behaviour, vocalisation.

Article 7.Z.15.

Thermal environment

Thermal conditions for pullets and hens should be appropriate for their stage of life, and extremes of heat, humidity and cold should be avoided. A heat index can assist in identifying the comfort zones for the pullets and hens at varying temperature and relative humidity levels.

When environmental conditions move outside of these zones, strategies should be used to mitigate the adverse effects on the birds. These may include adjusting air speed, provision of heat or evaporative cooling [Yahav, 2009].

Control of the thermal environment should be monitored frequently enough so that failure of the system will be noticed before it causes a welfare problem.

Outcome-based measurables: morbidity rate, mortality rate, performance, spatial distribution, thermoregulatory behaviour, water and feed consumption.

Article 7.Z.16.

Air quality

Ventilation and manure management can affect air quality. Actions are required to maintain air quality at all times, including the removal of waste gases such as carbon dioxide and ammonia, dust and excess moisture content from the environment.

The ammonia concentration should not routinely exceed 25 ppm at bird level [David *et al.*, 2015; Milles *et al.*, 2006; Olanrewaiu, 2007].

Dust levels should be kept to a minimum [David, 2015]. Where the health and welfare of birds depend on an artificial ventilation system, provision should be made for an appropriate back-up power and alarm system.

Outcome-based measurables: eye conditions, incidence of respiratory diseases, performance.

Article 7.Z.17.

Lighting

There should be an adequate period of continuous light.

The light intensity during the light period should be sufficient and homogeneously distributed for normal development of the birds, for finding feed and water, to stimulate activity, minimise likelihood of feather pecking and cannibalism and to allow adequate inspection [Prescott *et al.*, 2003; Prescott and Wathes, 1999; Green *et al.*, 2000].

There should also be an adequate period of light and darkness during each 24-hour cycle to allow the birds to rest, to reduce stress and to promote circadian rhythms [Malleau *et al.*, 2007].

When changes in lighting are needed, they should be performed in a step-wise fashion, except during induced moulting (if practised) when rapid adjustments to lighting are desired.

Outcome-based measurables: eye conditions, injurious feather pecking, injury rate and severity, locomotion, nesting perching, performance, spatial distribution.

Article 7.Z.18.

Noise

Pullets and hens are adaptable to different levels and types of noise. However, exposure of birds to unfamiliar noises, particularly those that are sudden or loud, should be minimised wherever possible to prevent stress and fear reactions, such as piling up [Bright and Johnson, 2001]. Ventilation fans, machinery or other indoor or outdoor equipment should be constructed, placed, operated and maintained in such a way that it causes the least possible amount of noise [Chloupek *et al.*, 2009].

Location of establishments should, where possible, take into account existing local sources of noise. Strategies should be implemented to habituate the birds to the conditions [Candland *et al.*, 1963; Morris, 2009].

Outcome-based measurables: fear behaviours, injury rate and severity, performance.

Article 7.Z.19.

Prevention and control of injurious feather pecking and cannibalism

Injurious feather pecking and cannibalism are challenges in pullet and hen production.

Management methods that may reduce the risk of occurrence include:

- managing light in rearing and lay [Nicol *et al.*, 2013],
- choosing genetic strain [Craig and Muir, 1996; Kjaer and Hocking, 2004],
- influencing age of onset of lay [Green *et al.*, 2010],
- providing foraging materials in rearing and lay [Huber-Eicher and Wechsler, 1998],
- adapting diet and form of feed in rearing and lay [Lambton *et al.*, 2010],
- reducing stocking density [Zimmerman *et al.*, 2006],
- reducing group size in rearing and lay [Bilcik and Keeling, 1999],
- providing elevated perches in rearing and lay [Green *et al.*, 2010],
- treating beaks in chicks [Gentle and Hughes, 1997],
- minimising fear-related stimuli,
- introducing males [Bestman and Wagenaar, 2003].

Management methods to control the occurrence include the above list, where applicable, and prompt removal of affected birds to a hospital area or euthanasia.

If these management strategies fail, therapeutic beak trimming is the last resort.

Outcome-based measurables: injurious feather pecking and cannibalism, injury rate and severity, mortality rate, plumage condition, vocalisation.

Article 7.Z.20.

Moulting

When induced moulting is practised, techniques that do not involve withdrawal of feed should be used. Hens should have access to water at all times. Only hens in good body condition and health should be moulted. During the moulting period, body mass loss should not compromise hen welfare, including welfare during the subsequent laying period. Total mortality during the moult period should not exceed normal variations in *flock* mortality.

Outcome-based measurables: body condition, feeding, drinking, foraging [Biggs *et al.*, 2004; Saiozkan *et al.*, 2016; Petek and Alpay, 2008], injurious feather pecking and cannibalism, injury rate and severity, morbidity rate, mortality rate, performance, plumage condition, social behaviour.

Annex 28 (contd)

Article 7.Z.21.

Painful interventions

Painful interventions, such as beak trimming, should not be practised unless absolutely necessary and pain mitigation interventions should be used. Other mutilations (e.g., dubbing and toe trimming) should not be performed in pullets and hens. Pain-free alternatives are preferred. If preventive beak trimming is required, it should be carried out by trained and skilled personnel at the earliest age possible and care should be taken to remove the minimum amount of beak necessary using a method that minimises pain and controls bleeding. Current methods include infrared treatment or hot blade cutting [Gentle *et al.*, 1991; Marchand-Forde *et al.*, 2008; Marchand-Forde *et al.*, 2010; McKeegan and Philbey, 2012; Freire *et al.*, 2011; Glatz *et al.*, 1998].

Beak trimming at a mature age can cause chronic pain. If therapeutic beak trimming is required, at whatever age, it should be carried out by trained and skilled personnel and care should be taken to remove the minimum amount of beak necessary using a method that minimises pain and controls bleeding.

Outcome-based measurables: drinking, foraging, feeding, injurious feather pecking and cannibalism, locomotion and comfort behaviours, mortality rate, morbidity rate, performance, plumage condition, vocalisations.

Article 7.Z.22.

Animal health management, preventive medicine and veterinary treatment

Animal handlers responsible for the care of pullets and hens should be aware of the signs of ill-health or distress, such as a change in feed and water intake, reduced production, changes in behaviour, abnormal appearance of feathers, faeces, or other physical features.

If they are not able to identify the causes of disease, ill-health or distress, or to correct these, or if they suspect the presence of a *notifiable disease*, they should seek advice from *veterinarians* or other qualified advisers. Veterinary treatments should be prescribed by a *veterinarian*.

There should be an effective programme for the prevention and treatment of diseases consistent with the programmes established by *Veterinary Services* as appropriate.

Vaccinations and treatments should be administered by personnel skilled in the procedures and with consideration for the welfare of the pullets and hens.

Sick or injured pullets and hens should be placed in a hospital area for observation and treatment or humanely killed in accordance with Chapter 7.6. as soon as possible.

Outcome-based measurables: incidence of diseases and *infestations*, injury rate and severity, metabolic disorders, morbidity rate, mortality rate, performance.

Article 7.Z.23.

Biosecurity

Biosecurity plans should be designed and implemented, commensurate with the best possible bird health status and current disease *risk* (endemic and exotic or transboundary) that is specific to each epidemiological group of pullets and hens and in accordance with relevant recommendations in the *Terrestrial Code*.

These programmes should address the control of the major routes for *infection* and *infestation* such as:

- direct transmission from other *poultry*, domestic *animals* and *wildlife* and humans,
- fomites, such as equipment, facilities and *vehicles*,
- *vectors* (e.g., arthropods and rodents),
- aerosols,

Annex 28 (contd)

- water supply,
- feed,
- the practice of partially restocking the house (back filling), due to catastrophe or incomplete *flock* placement, which should only be performed with due consideration to *biosecurity* and in a manner that prevents commingling of *flocks*.

Outcome-based measurables: incidence of diseases, *infestations*, morbidity rate, mortality rate, performance.

Article 7.Z.24.

Humane killing of individual birds or flocks

When individual or groups of birds are killed for diagnostic purposes, depopulation of end-of-lay *flocks* or for purposes of disease control, techniques used should be performed in a humane manner in accordance with Chapter 7.6.

Article 7.Z.25.

Depopulation of pullet and layer facilities

Birds should not be subjected to an excessive period of feed withdrawal prior to the expected depopulation time [Webster, 2003].

Water should be available up to the time of depopulation.

Birds that are not fit for *loading* or transport because they are sick or injured should be humanely killed.

Catching should be carried out by competent *animal handlers* and every attempt should be made to minimise stress, fear reactions and injury. If a bird is injured during catching, it should be humanely killed.

Birds should be handled and placed into the transport *container* according to Article 7.Z.14.

Catching should preferably be carried out under dim or blue light to calm the birds.

Catching should be scheduled to minimise the transport time as well as climatic stress during catching, transport and holding.

Stocking density in transport *containers* should comply with Chapters 7.2., 7.3. and 7.4.

Outcome-based measurables: fear behaviour, injury rate and severity, mortality at depopulation and on arrival at the destination, spatial distribution, vocalisation.

Article 7.Z.26.

Emergency plans

Pullet and hen producers should have emergency plans to minimise and mitigate the consequences of natural disasters, disease *outbreaks* and the failure of mechanical equipment. Planning may include the provision of fail-safe alarm devices to detect malfunctions, backup generators, access to maintenance providers, alternative heating or cooling arrangements, ability to store water on farm, access to water cartage services, adequate on-farm storage of feed and alternative feed supply and a plan for managing ventilation emergencies.

The emergency plans should be consistent with national programmes established or recommended by *Veterinary Services*. Humane emergency *killing* procedures should be a part of the plan.

Outcome-based measurables: culling, morbidity and mortality rates.

Annex 28 (contd)

Article 7.Z.27.

Personnel competency

All *animal handlers* responsible for the pullets and hens should have received appropriate training or be able to demonstrate that they are competent to carry out their responsibilities and should have sufficient knowledge of bird behaviour, handling techniques, emergency *killing* procedures, *biosecurity*, general signs of diseases, and indicators of poor *animal welfare* and procedures for their alleviation.

Outcome-based measurables: fear behaviour, incidence of diseases, locomotion and comfort behaviours, performance, morbidity rate, mortality rate, spatial distribution, vocalisation.

Article 7.Z.28.

Inspection and handling

Pullets and hens should be inspected at least daily. Inspection should have three main objectives: to identify sick or injured birds to treat or cull them, to detect and correct any welfare or health problem in the *flock*, and to pick up dead birds.

Inspection should be done in such a way that birds are not unnecessarily disturbed, for example *animal handlers* should move quietly and slowly through the *flock*.

When pullets and hens are handled, particularly when birds are placed into or removed from the house, they should not be injured, unnecessarily frightened or stressed (e.g., should be restrained in an upright posture) [Gregory and Wilkins, 1989; Gross and Siegel, 2007; Kannan and Mench, 1996].

Outcome-based measurables: fear behaviour, injury rate and severity, morbidity rate, mortality rate, performance, spatial distribution, vocalisation.

Article 7.Z.29.

Protection from predators

Pullets and hens should be protected from predators in indoor and outdoor areas.

Outcome-based measurables: fear behaviour, mortality rate, injury rate and severity, locomotion and comfort behaviours, performance, spatial distribution, vocalisation.

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CHAPTER 8.X.
**INFECTION WITH *TRYPANOSOMA EVANSI*
(NON EQUINE SURRA)**

Article 8.X.1

General provisions

A wide range of mammals are susceptible to *infection* with *Trypanosoma evansi* (*T. evansi*).

For the purposes of this chapter, 'susceptible animals' means camelids, carnivores, animals of the family Bovidae, pigs, cervids, elephants, lagomorphs, rodents and vampire bats.

For the purposes of the *Terrestrial Code*, *infection* with *T. evansi* is defined as an *infection* of susceptible animals with *T. evansi*.

Infection of equids with the subgenus *Trypanozoon*, including *T. evansi*, is covered by Chapter 12.3.

Mostly mechanically transmitted by biting insects and vampire bats, *T. evansi* may also be transmitted iatrogenically, by contact with mucosal membranes, or by transplacental transmission.

T. evansi can survive for up to 72 hours in *Stomoxys* flies and for up to six hours in tabanids.

The following defines the occurrence of *infection* with *T. evansi*:

- 1) *T. evansi* has been identified in a sample from a susceptible animal;

OR

- 2) antibodies to *T. evansi* have been detected in a sample from a susceptible animal showing clinical signs consistent with *infection* with *T. evansi* or epidemiologically linked to a confirmed case of *infection* with *T. evansi* in susceptible animals or in equids.

For the purposes of the *Terrestrial Code*, the *incubation period* of *infection* with *T. evansi* shall be six months.

Standards for diagnostic tests are described in the *Terrestrial Manual*.

Article 8.X.2.

Safe commodities

When authorising import or transit of the following *commodities*, *Veterinary Authorities* should not require any *T. evansi* related conditions regardless of the *T. evansi* *infection* status of the *exporting country*:

- 1) pasteurised *milk* and *milk products*;
- 2) hair, wool and fibre;
- 3) gelatine;

Annex 29 (contd)

- 4) horns, hooves and claws;
- 5) *meat* from susceptible animals that have undergone ante- and post-mortem inspections as described in Chapter 6.2. with favourable results, and *meat products* thereof;
- 6) hides and skins having undergone standard processing.

Article 8.X.3.

Country or zone free from infection with *T. evansi* in one or more susceptible animal species

- 1) A country or *zone* can be considered free from *infection* with *T. evansi* in one or more susceptible animal species if:
 - a) *infection* with *T. evansi* is a *notifiable disease* in the entire country;
 - b) a *surveillance* programme is in place in the country or *zone* to detect *infection* with *T. evansi* in accordance with Chapter 1.4.;
 - c) the relevant conditions of Article 1.4.6. are complied with for the relevant susceptible animal species;
 - d) no *case of infection* with *T. evansi* has occurred in the relevant susceptible animal species for at least two years in the country or *zone*;
 - e) imported susceptible animals and equids and their *commodities*, except those listed in Articles 8.X.2. and 12.3.2., comply with the requirements in Articles 8.X.5. to 8.X.7. and Articles 12.3.5. to 12.3.8., respectively.
- 2) A free country or *zone* neighbouring an infected one should conduct adequate *surveillance* in an area of appropriate distance from that country or *zone*.

Article 8.X.4.

Recovery of free status

When an *outbreak of infection* with *T. evansi* occurs in a previously free country or *zone*, the country or *zone* may recover its free status once it has implemented a *stamping-out policy* with or without treatment and conditions of Article 8.X.3. are complied with for the relevant susceptible animal species.

Article 8.X.5.

Recommendations for importation of susceptible animals

Veterinary Authorities of importing countries should require the presentation of an *international veterinary certificate* attesting that the susceptible animals exported:

- 1) showed no clinical sign of *infection* with *T. evansi* on the day of shipment;
- 2) have been kept:

Annex 29 (contd)

- a) since birth or for at least six months prior to shipment in a country or a *zone* free from *infection* with *T. evansi* in all susceptible animals and equids;

OR

- b) since birth, or for at least six months prior to shipment in a country or a *zone* free from *infection* with *T. evansi* in the relevant susceptible animal species, were isolated in an *establishment* where no *case of infection* with *T. evansi* has occurred in any susceptible animal species or any equid for at least 30 days prior to shipment, were protected from *vectors* during that period and during transportation to the *place of shipment* and were subjected to a test for *T. evansi* within 10 days prior to shipment with negative results;

OR

- c) in a country or *zone* not free from *infection* with *T. evansi* in the relevant susceptible animal species, were isolated and protected from *vectors* for at least 30 days prior to shipment and during transportation to the *place of shipment*, and were tested twice with negative results, during that period on samples taken at an interval of 21 to 30 days, with the second sample taken not more than 10 days before shipment.

Article 8.X.6.

Recommendations for importation of camelids, animals of family Bovidae and pigs from an infected country or zone for immediate slaughter

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that:

- 1) the animals showed no clinical sign of *infection* with *T. evansi* on the day of the shipment;
- 2) the animals are permanently identified and transported under the supervision of the *Veterinary Services* in a *vector-protected vehicle*, which underwent *disinfection* and dissection before loading, directly from the *establishment* of origin to the *approved slaughterhouse/abattoir* without coming into contact with other susceptible animals or equids.

Article 8.X.7.

Recommendations for importation of semen of susceptible animals

Veterinary Authorities of importing countries should require the presentation of an *international veterinary certificate* attesting that:

- 1) the donor males of the relevant susceptible animal species showed no clinical sign of *infection* with *T. evansi* on the day of entry into an *approved* semen collection facility;
- 2) the donor males of the relevant susceptible animal species have been kept:
 - a) since birth or for at least six months prior to entry into an *approved* semen collection facility in a country or a *zone* free from *infection* with *T. evansi* in all susceptible animal species, and free from *infection* with *Trypanozoon* in equids;

OR

Annex 29 (contd)

- b) since birth or for at least six months prior to entry into the *approved* semen collection facility in a country or a *zone* free from *infection* with *T. evansi* in the relevant susceptible animal species and were tested for *T. evansi* with negative results within 30 days of entry into the *approved* semen collection facility;

OR

- c) in a country or *zone* not free from *infection* with *T. evansi* in the relevant susceptible animal species and:
- i) were isolated and protected from *vectors* for at least 30 days in an *establishment* in which no *case of infection* with *T. evansi* has occurred for at least the past six months prior to entry into an *approved* semen collection facility;
 - ii) were tested twice during that period on samples taken with an interval of 21 to 30 days with the second sample taken not more than 10 days prior to entry into the *approved* semen collection facility, with negative results;
 - iii) were protected from *vectors* at all times while in the *approved* semen collection facility;
- 3) the semen was collected, processed and stored in accordance with the relevant conditions of Chapters 4.5. and 4.6.
-

CHAPTER 12.3.

INFECTION WITH *TRYPANOZOON* IN EQUIDS (DOURINE, EQUINE SURRA)

Article 12.3.1.

General provisions

In terms of genetic differentiation, clinical manifestations and diagnostics, it is not possible to differentiate surra (caused by *Trypanosoma evansi*) and dourine (caused by *Trypanosoma equiperdum*) in equids. In addition, infection with *Trypanosoma brucei* in equids can cause a disease indistinguishable from the latter two.

For the purposes of the *Terrestrial Code* infection with *Trypanozoon* in equids (dourine, equine surra) is defined as an infection of equids with a trypanosome that belongs to the subgenus *Trypanozoon*, either *Trypanosoma evansi*, *Trypanosoma equiperdum* or *Trypanosoma brucei*.

Infection with *T. evansi* in species other than equids is covered by Chapter 8.X.

Transmission can be vectorial, either mechanical or biological (for *T. brucei*), iatrogenic, venereal, or by contact with mucosal membranes.

The following defines the occurrence of infection with *Trypanozoon*:

- 1) the agent has been identified in a sample from an equid;

OR

- 2) antibodies have been detected in a sample from an equid showing clinical signs consistent with infection with *Trypanozoon* or which has an epidemiological link to a confirmed case of infection with *Trypanozoon* in any animal species.

For the purposes of the *Terrestrial Code*, the incubation period of infection with *Trypanozoon* in equids shall be 30 days.

Standards for diagnostic tests are described in the *Terrestrial Manual*.

Article 12.3.2.

Safe commodities

When authorising import or transit of the following equine commodities, *Veterinary Authorities* should not require *Trypanozoon*-related conditions regardless of the *Trypanozoon* infection status of the exporting country:

- 1) pasteurised milk and milk products;
- 2) hair;
- 3) gelatine;
- 4) hooves;
- 5) meat from animals that have undergone ante- and post-mortem inspections as described in Chapter 6.2. with favourable results, and meat products thereof;
- 6) hides and skins having undergone standard processing.

Annex 30 (contd)

Article 12.3.3.

Country or zone free from infection with *Trypanozoon* in equids

A country or *zone* can be considered free from *infection* with *Trypanozoon* in equids if:

- 1) *infection* with *Trypanozoon* in equids is a *notifiable disease* in the entire country;
- 2) a *surveillance* programme is in place in the country or *zone* to detect *infection* with *T. evansi* in equids in accordance with Chapter 1.4.;
- 3) the relevant conditions of Article 1.4.6. are complied with;
- 4) no *case* of *infection* with *Trypanozoon* in equids has occurred for at least two years in the country or *zone*;
- 5) imported equids and equine *commodities*, except those listed in Article 12.3.2, comply with the requirements in Articles 12.3.5. to 12.3.8.

A free country or *zone* neighbouring an infected one should conduct adequate *surveillance* in an area of appropriate distance from that country or *zone*.

Article 12.3.4.

Recovery of free status

When an *outbreak* of *infection* with *Trypanozoon* occurs in a previously free country or *zone*, the country or *zone* may recover its free status once the following conditions are fulfilled:

- 1) appropriate *biosecurity* is in place, in particular *vector* protection, breeding restrictions (natural or artificial), and movement restrictions have been imposed on equids in the affected and epidemiologically linked *establishments*;
- 2) all equids in these *establishments* have been tested for *infection* with *Trypanozoon*;
- 3) a *stamping-out policy* has been applied, which includes the *slaughter* or *killing* of at least all *cases*;
- 4) the remaining equids in the *establishments* have not been moved out of the *establishments*, unless for immediate *slaughter*, until all equids in the affected *establishments* have been tested with negative results to agent identification and serological tests on two samples taken at an interval of three to four weeks, the first sample being taken not less than 30 days after the last serologically positive animal has been slaughtered or killed;
- 5) a *specific surveillance* has been carried out in the six months after measures described in points 1 to 4 have been completed and no *case* of *infection* with *Trypanozoon* in equids has been detected.

When the above conditions cannot be complied with, Article 12.3.3. applies.

Article 12.3.5.

Recommendations for importation of equids

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the animals:

Annex 30 (contd)

- 1) showed no clinical sign of *infection* with *Trypanozoon* on the day of shipment;
- 2) have been kept:
 - a) since birth or for at least 30 days prior to shipment, in a country or zone free from *infection* with *Trypanozoon* in equids and free from *infection* with *T. evansi* in all other species in accordance with Chapter 8.X.;

OR

- b) since birth or for at least 30 days prior to shipment, in a country or zone free from *infection* with *Trypanozoon* in equids but not free from *infection* with *T. evansi* in all other species according to Chapter 8.X., have been kept for at least 30 days prior to shipment in *establishments* where no case of *infection* with *T. evansi* has occurred in any species during that period, were protected from *vectors* during that period and during transportation to the *place of shipment*, and were subjected to a test for *Trypanozoon*, with negative results, within 10 days prior to shipment;

OR

- c) in a country or zone not free from *infection* with *Trypanozoon* in equids, were isolated and protected from *vectors* for at least 30 days prior to shipment and during transportation to the *place of shipment*, and during that period were tested twice for *Trypanozoon*, with negative results, on samples taken at an interval of 21 to 30 days, the second sample being taken not more than 10 days prior to shipment.

Article 12.3.6.

Recommendations for the temporary importation of horses for competition purposes

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the animals:

- 1) showed no clinical sign of *infection* with *Trypanozoon* on the day of the shipment;
- 2) have been kept:
 - a) since birth, or for at least 30 days prior to shipment in a country or a zone free from *infection* with *Trypanozoon* in equids and free from *infection* with *T. evansi* in all other species in accordance with Chapter 8.X.;

OR

- b) in a country or a zone not free from *infection* with *Trypanozoon* in equids or not free from *infection* with *T. evansi* in all other species according to Chapter 8.X., have been kept for at least 30 days prior to shipment in *establishments* where no case of *infection* with *Trypanozoon* has occurred in any species during that period, were protected from *vectors* during that period and during transportation to the *place of shipment*, and were tested for *Trypanozoon* with negative results during the 10 days prior to shipment.

Article 12.3.7.

Recommendations for importation of equids from a country or zone not free from infection with *Trypanozoon* in equids for immediate slaughter

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that:

- 1) the animals showed no clinical sign of *infection* with *Trypanozoon* on the day of the shipment;

Annex 30 (contd)

- 2) the animals are permanently identified and transported, under the supervision of the *Veterinary Services*, in a *vector-protected vehicle*, which underwent *disinfection* and disinsection before loading, directly from the *establishment* of origin to the *place of shipment* without coming into contact with other susceptible species listed in Chapter 8.X.

Article 12.3.8.

Recommendations for importation of semen

Veterinary Authorities of importing countries should require the presentation of an *international veterinary certificate* attesting that:

- 1) the donor males showed no clinical sign of *infection with Trypanozoon* on the day of entry into an *approved* semen collection facility;
- 2) the donor males:
- a) have been kept for at least six months prior to entry into an *approved* semen collection facility in a country or a *zone* free from *infection with Trypanozoon* in equids and free from *infection with T. evansi* in all other species in accordance with Chapter 8.X.;

OR

- b) have been kept for at least six months prior to entry into an *approved* semen collection facility in a country or a *zone* free from *infection with Trypanozoon* in equids but not free from *infection with T. evansi* in all other species in accordance with Chapter 8.X. and were tested for *Trypanozoon* with negative results, within 30 days of entry into the *approved* semen collection facility;

OR

- c) have been kept in a country or a *zone* not free from *infection with Trypanozoon* in equids and:
- i) were isolated and protected from *vectors* for at least 30 days in an *establishment* in which no case of *infection with Trypanozoon* has occurred for at least the past six months prior to entry into an *approved* semen collection facility;
- ii) were tested twice with negative results during that period on samples taken at an interval of 21 to 30 days, the second sample being taken not more than 10 days prior to entry into the *approved* semen collection facility;
- iii) were protected from *vectors* at all times while in the *approved* semen collection facility;
- 3) the semen was collected, processed and stored in accordance with the relevant conditions of Chapter 4.5. and Articles 4.6.5. to 4.6.7.

CHAPTER 11.12.

INFECTION WITH *THEILERIA ANNULATA*, *T. ORIENTALIS* AND *T. PARVA*

Article 11.12.1.

General provisions

Animal susceptible to *infection* with *Theileria* are bovines (*Bos indicus*, *B. taurus* and *B. grunniens*), water buffaloes (*Bubalus bubalis*), African buffaloes (*Syncerus caffer*), sheep (*Ovis aries*), goats (*Capra hircus*), camels (*Camel dromedarius* and *C. bactrianus*) and some *wild* ruminants.

Infection with *Theileria* can give rise to disease of variable severity and to *Theileria* transmission. *Theileria* may persist in ruminants for their lifetime. Such animals are considered carriers.

For the purposes of the *Terrestrial Code*, *infection* with *Theileria annulata*, *T. orientalis* and *T. parva* are defined as a tickborne *infection* of bovines and water buffaloes with *T. annulata*, *T. orientalis* Ikeda, *T. orientalis* Chitose and *T. parva*.

For the purposes of this chapter, *Theileria* means *T. annulata*, *T. orientalis* Ikeda, *T. orientalis* Chitose and *T. parva*.

The following defines the occurrence of *infection* with *Theileria*:

- 1) *Theileria* has been identified in a sample from a bovine or water buffalo; or
- 2) antigen or nucleic acid specific to *Theileria* has been identified in a sample from a bovine or water buffalo showing clinical signs consistent with *infection* with *Theileria*, or epidemiologically linked to a suspected or confirmed case, or giving cause for suspicion of previous association with *Theileria*; or
- 3) antibodies specific to *Theileria* have been detected in a sample from a bovine or water buffalo that either shows clinical signs consistent with *infection* with *Theileria*, or is epidemiologically linked to a suspected or confirmed case or giving cause for suspicion of previous association with *Theileria*.

For the purposes of the *Terrestrial Code*, the *incubation period* for *infection* with *Theileria* shall be 35 days.

Standards for diagnostic tests and vaccines are described in the *Terrestrial Manual*.

Article 11.12.2.

Safe commodities

When authorising import or transit of the following *commodities*, *Veterinary Authorities* should not require any *Theileria* related conditions regardless of the *Theileria infection* status of the animal population of the *exporting country*:

- 1) *meat* and *meat products*;
- 2) *casings*;
- 3) *milk* and *milk products*;
- 4) gelatine and collagen;
- 5) tallow;

Annex 31 (contd)

- 6) semen and embryos;
- 7) hooves and horns;
- 8) bones.

Article 11.12.3.

Country or zone free from infection with *Theileria*

- 1) A country or a *zone* may be considered free from *infection* with *Theileria* when the disease is notifiable in the entire country, importation of bovines and water buffaloes and their *commodities* is carried out in accordance with this chapter, and:
 - a) the country or *zone* is historically free as described in Article 1.4.6.; or
 - b) a *surveillance* programme in accordance with Chapter 1.4. has demonstrated no evidence of *infection* with *Theileria* in the country or *zone* for at least two years; or
 - c) an ongoing *surveillance* programme in accordance with Chapter 1.5. has found no tick *vectors* for at least two years in the country or *zone*.
- 2) A country or *zone* free from *infection* with *Theileria* in which ongoing *vector surveillance*, performed in accordance with Chapter 1.5., has found no tick *vectors* will not lose its free status through the introduction of vaccinated, test-positive or infected bovines or water buffaloes from infected countries or *zones*.
- 3) A country or *zone* free from *infection* with *Theileria* will not lose its status as a result of introduction of seropositive or vaccinated bovines, water buffaloes or their *commodities*, provided they were introduced in accordance with this chapter.

Article 11.12.4.

Recommendations for importation from countries or zones free from infection with *Theileria*For bovines and water buffaloes

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the animals:

- 1) showed no clinical sign of *infection* with *Theileria* on the day of shipment;
- 2) come from a country or *zone* free from *infection* with *Theileria*.

Article 11.12.5.

Recommendations for importation from countries or zones not free from infection with *Theileria*For bovines and water buffaloes

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the animals:

- 1) showed no clinical sign of *infection* with *Theileria* and no *infestation* with tick *vectors* on the day of shipment;
- 2) were kept isolated for at least 35 days prior to shipment, in an *establishment* where no *case* of *infection* with *Theileria* has occurred during the preceding two years;

Annex 31 (contd)

- 3) were treated with a registered acaricide according to manufacturer's instructions 48 hours prior to entry to the *establishment*, no more than two days after entering the *establishment* and three days prior to shipment;
- 4) were subjected to serological and agent detection tests with negative results on samples taken on entry to the *establishment* and five days before shipment.

Article 11.12.6.

Recommendations for importation of hides and skins from countries or zones not free from infection with *Theileria*

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the products have been;

- 1) dry-salted or wet-salted for a period of at least 14 days prior to dispatch; or
- 2) treated for a period of at least seven days in salt (NaCl) with the addition of 2% sodium carbonate (Na₂CO₃);
or
- 3) dried for a period of at least 42 days at a temperature of at least 20°C; or
- 4) frozen to at least -20C for at least 48 hours.

Article 11.12.7.

Recommendations for importation of trophies derived from susceptible wild ruminants from countries or zones not free from infection with *Theileria*

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the products have been processed to ensure the destruction of tick *vectors*.

CHAPTER 14.X.

**INFECTION WITH *THEILERIA LESTOQUARDI*,
T. LUWENSHUNI AND *T. UILENBERGI***

Article 14.X.1.

General provisions

Animal susceptible to *infection* with *Theileria* are bovines (*Bos indicus*, *B. taurus* and *B. grunniens*), water buffaloes (*Bubalus bubalis*), African buffaloes (*Syncerus caffer*), sheep (*Ovis aries*), goats (*Capra hircus*), camels (*Camel dromedarius* and *C. bactrianus*) and some *wild* ruminants.

Infection with *Theileria* can give rise to disease of variable severity and to *Theileria* transmission. *Theileria* may persist in ruminants for their lifetime. Such animals are considered carriers.

For the purposes of the *Terrestrial Code*, *infection* with *Theileria lestoquardi*, *T. luwenshuni* and *T. uilenbergi* are defined as a tickborne *infection* of sheep and goats with *T. lestoquardi*, *T. luwenshuni* and *T. uilenbergi*.

For the purposes of this chapter, *Theileria* means *T. lestoquardi*, *T. luwenshuni* and *T. uilenbergi*.

The following defines the occurrence of *infection* with *Theileria*:

- 1) *Theileria* has been identified in a sample from a sheep or goat; or
- 2) antigen or nucleic acid specific to *Theileria* has been identified in a sample from a sheep or goat showing clinical signs consistent with *infection* with *Theileria*, or epidemiologically linked to a suspected or confirmed case, or giving cause for suspicion of previous association with *Theileria*; or
- 3) antibodies specific to *Theileria* have been detected in a sample from a sheep or goat that either shows clinical signs consistent with *Theileria*, or is epidemiologically linked to a suspected or confirmed case, or giving cause for suspicion of previous association with *Theileria*.

For the purposes of the *Terrestrial Code*, the *incubation period* for *infection* with *Theileria* shall be 35 days.

Standards for diagnostic tests and vaccines are described in the *Terrestrial Manual*.

Article 14.X.2.

Safe commodities

When authorising import or transit of the following *commodities*, *Veterinary Authorities* should not require any *Theileria* related conditions regardless of the *Theileria infection* status of the animal population of the *exporting country*:

- 1) *meat* and *meat products*;
- 2) *casings*;
- 3) *milk* and *milk products*;
- 4) gelatine and collagen;
- 5) tallow;
- 6) semen and embryos;
- 7) hooves and horns;
- 8) bones.

Annex 32 (contd)

Article 14.X.3.

Country or zone free from infection with *Theileria* in sheep and goats

- 1) A country or a *zone* may be considered free from *infection* with *Theileria* when the disease is notifiable in the entire country, importation of sheep and goats and their *commodities* is carried out in accordance with this chapter, and:
 - a) the country or *zone* is historically free as described in Article 1.4.6.; or
 - b) a *surveillance* programme in accordance with Chapter 1.4. has demonstrated no evidence of *infection* with *Theileria* in the country or *zone* for at least two years; or
 - c) an ongoing *surveillance* programme in accordance with Chapter 1.5. has found no tick *vectors* for at least two years in the country or *zone*.
- 2) A country or *zone* free from *infection* with *Theileria* in which ongoing *vector surveillance*, performed in accordance with Chapter 1.5., has found no tick *vectors* will not lose its free status through the introduction of vaccinated, test-positive or infected sheep and goats from infected countries or *zones*.
- 3) A country or *zone* free from *infection* with *Theileria* will not lose its status as a result of introduction of seropositive or vaccinated sheep and goats or their *commodities*, provided they were introduced in accordance with this chapter.

Article 14.X.4.

Recommendations for importation from countries or zones free from infection with *Theileria*For sheep and goats

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the animals:

- 1) showed no clinical sign of *infection* with *Theileria* on the day of shipment;
- 2) come from a country or *zone* free from *infection* with *Theileria*.

Article 14.X.5.

Recommendations for importation from countries or zones not free from infection with *Theileria*For sheep and goats

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the animals:

- 1) showed no clinical sign of *infection* with *Theileria* and no *infestation* with tick *vectors* on the day of shipment;
- 2) were kept isolated for at least 35 days prior to shipment in an *establishment* where no case of *infection* with *Theileria* has occurred during the preceding two years;
- 3) were treated with a registered acaricide according to manufacturer's instructions 48 hours prior to entry to the *establishment*, no more than two days after entering the *establishment* and three days prior to shipment;
- 4) were subjected to serological and agent detection tests with negative results on samples taken on entry to the *establishment* and five days before shipment.

Article 14.X.6.

Recommendations for importation of hides and skins from countries or zones not free from infection with *Theileria*

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the products have been:

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- 1) dry-salted or wet-salted for a period of at least 14 days prior to dispatch; or
- 2) treated for a period of at least seven days in salt (NaCl) with the addition of 2% sodium carbonate (Na₂CO₃);
or
- 3) dried for a period of at least 42 days at a temperature of at least 20°C; or
- 4) frozen to at least -20°C for at least 48 hours.

Article 14.X.7.

Recommendations for importation of wool and fibre of sheep and goats from countries or zones not free from infection with *Theileria*

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the products were subjected to:

- 1) industrial washing, which consists of the immersion of the wool in a series of baths of water, soap and sodium hydroxide or potassium hydroxide; or
- 2) industrial scouring, which consists of the immersion of wool in a water-soluble detergent held at 60–70°C.

Article 14.X.8.

Recommendations for importation of trophies derived from susceptible wild ruminants from countries or zones not free from infection with *Theileria*

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the products have been processed to ensure the destruction of tick *vectors*.

**WORK PROGRAMME FOR
THE TERRESTRIAL ANIMAL HEALTH STANDARDS COMMISSION**

Subject	Issue by priority order (Reason for new work)	Status and Action (Start date, # of rounds for comments)
Restructuring of the Code	1) Work with AAHSC towards harmonisation, as appropriate, of the horizontal parts of the <i>Codes</i> , notably Glossary, User's Guide and Section 4 on disease control and Section 6 on Veterinary Public Health (MCs comments)	Ongoing
	2) Work with BSC for accurate disease description and diagnostic in the <i>Manual</i> and case definitions in the <i>Code</i> and names of diseases and country and zone disease status (MCs comments)	Ongoing
	3) Revision and formatting of chapters (articles numbering, tables and figures) (MCs comments and to improve consistency)	Ongoing
	4) Revision of the Users' guide to address the precedence of chapters (MCs comments)	Preliminary discussion
Glossary	1) Compartment, containment zone, free zone, infected zone, protection zone, vaccination, zone (MCs comments and to improve consistency)	Revised definitions sent for comments and proposed for adoption in 2018 (Feb 2016/4 th)
	2) Disease, infection and infestation (To improve consistency)	Deleted and revised definitions sent for comments and proposed for adoption in 2018 (Sep 2016/3 rd)
Horizontal issues not yet in the Code Sec.4. Disease control	1) New CH on vaccination (MCs comments and implications for status recognition)	Revised new CH sent for comments and proposed for adoption in 2018 (Sep 2016/3 rd)
	2) New CH on official control of emerging and listed diseases (MCs comments and part of restructuring of Section 4)	Revised new CH sent for comments (Feb 2017/2 nd)
	3) New introductory CH in Section 4 (Part of restructuring of Section 4)	New CH sent for comments (Sep 2017/1 st)
	4) New CH on biosecurity	Preliminary discussion
	5) New CH on zoning application (MCs comments)	Preliminary discussion
Horizontal issues not yet in the Code Sec.6. VPH	1) New introductory CH in Section 6 (APFSWG proposal)	Revised new CH sent for comments and proposed for adoption in 2018 (Feb 2017/2 nd)
	2) Control of Shiga toxin-producing <i>E. coli</i> (STEC) in food-producing animals (MCs comments)	Preliminary discussion pending FAO/WHO expert consultation

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Subject	Issue by priority order (Reason for new work)	Status and Action (Start date, # of rounds for comments)
Horizontal issues not yet in the Code Sec.7. AW	1) New CH on AW and pig production systems (MCs comments)	Revised CH sent for comments and proposed for adoption in 2018 (Sep 2016/3 rd)
	2) New CH on slaughter and killing methods of farmed reptiles (MCs comments)	New CH sent for comments (Sep 2017/1 st)
	3) New CH on AW and laying hen production systems (MCs comments)	New CH sent for comments (Sep 2017/1 st)
Horizontal issues in need of revision: Sec.1. Notification	1) Revision of CH 1.4. on Animal Health Surveillance (MCs comments and implications for status recognition)	Revised CH sent for comments (Feb 2016/2 nd)
	2) CH 1.6. on Status: revision and reorganisation (MCs comments and implications for status recognition)	Revised questionnaires sent for editing by experts before further review by SCAD and TAHSC (Feb 2017/1 st) / Preliminary discussion on Article 1.6.1.
	3) CH 1.3. on listed diseases: assess CWD & WNF against the criteria (MCs comments)	Pending HQs advice on CWD / WNF
Horizontal issues in need of revision: Sec.2. RA	1) Revision of Article 2.1.2. (Consequential changes to reflect the proposed deletion of Glossary definition of 'transparency')	Revised article proposed for adoption in 2018 (Feb 2017/2 nd)
Horizontal issues in need of revision: Sec.3. VS	1) Revision of CHs of Section 3 in the light of the return of experience of the PVS Pathway	Pending outcome of discussion at PVS think tank
Horizontal issues in need of revision: Sec.4. Disease control	1) Revision of CH 4.3. on zoning and compartmentalisation (MCs comments and implications for status recognition)	Revised CH sent for comments and proposed for adoption in 2018 (Feb 2016/4 th)
	2) Revision of CH 4.8. on collection and processing of <i>in vitro</i> produced oocytes or embryos from livestock and horses (MCs comments)	Revised CH sent for comments and proposed for adoption in 2018 (Sep 2016/3 rd)
	3) Revision of CH 4.13. on disinfection (MCs comments)	Preliminary discussion
	4) Revision of CH 4.6. on collection and processing of bovine, small ruminant and porcine semen (MCs comments and trade implications)	Pending experts advice
	5) Revision of CH 4.7. collection and processing of <i>in vivo</i> derived embryos from livestock and equids (MCs comments and trade implications)	Pending experts advice
Horizontal issues in need of revision: Sec.5. Trade measures	1) Revision of CHs 5.4. to 5.7. on animal health measures applicable at departure, during transit, quarantine stations and on arrival (MCs comments)	Preliminary discussion and pending decision on AHG
	2) Revision of CH 5.12. on model certificates for competition horses (MCs comments)	Preliminary discussion and pending revision of CHs on horse diseases
	3) Revision CH 5.10. to include a model certificate for petfood (NGO comments)	Preliminary discussion

Subject	Issue by priority order (Reason for new work)	Status and Action (Start date, # of rounds for comments)
Horizontal issues in need of revision: Sec.6. VPH	1) Revision of CH 6.1. on the role of VS in food safety (Planned work by TAHSC)	Revised CH sent for comments and proposed for adoption in 2018 (Feb 2016/3 rd)
	2) Revision of CH 6.7. on AMR surveillance and monitoring programme (MCs comments and to align with Codex work)	Revised CH sent for comments and proposed for adoption in 2018 (Sep 2015/ 4 th)
	3) Revision of Article 6.8.1. on monitoring of AMR in food producing animals (In conjunction with Codex work on AMR)	Revised CH sent for comments and proposed for adoption in 2018 (Feb 2017/ 2 nd)
	4) Revision of CH 6.2. on meat inspection (Planned work by TAHSC)	Pending AHG report
Horizontal issues in need of revision: Se.7. AW	1) Revision of CH 7.5. on slaughter and CH 7.6. on killing of animals for disease control purposes (MCs comments)	Revised CHs to be referred to experts for further advice
	2) Revision of CH 7.12. on AW of working equids (MCs comments)	Pending advice from MCs on Art.7.12.12.
	3) Revision of CH 7.1. on introduction to recommendations on AW (AWWG proposals)	Revised CH sent for comments (Feb 2017 /2 nd)
	4) Revision of CH 7.7 on stray dog population control (Experts comments)	Pending work of AHG on rabies
Diseases issues not yet in the Code	1) New CH on non-equine surra and revision of CH on Dourine (Non-tsetse transmitted Trypanosomosis) (MCs comments)	New/revised CHs sent for comments (Sep 2017/1 st)
	2) New CH on Tsetse transmitted trypanosomosis (MCs comments)	Pending work of AHG
	3) New CH on Crimean Congo hemorrhagic fever (MCs comments, listed disease without chapter)	Preliminary discussion
Listed disease CHs in need of revision: Sec. 8 to 15	1) Revision of CH 10.4. on AI (MCs comments and trade implications)	Pending work of AHG
	2) Revision of CH 12.10. on glanders (outdated CH and trade implications)	Revised CH Sent for comments and proposed for adoption in 2018 (Sep 2014/4 th)
	3) Revision of CH 11.4. on BSE (MCs comments and trade implications)	Pending work of AHG (Feb 2015/1 st)
	4) Revision of CH 8.8. on FMD (MCs comments and implications for status recognition)	Pending outcome of discussion on zoning (Sep 2015/2 nd)
	5) Revision of CH 8.13. on Rabies (MCs comments)	Pending work of AHG
	6) Revision of CH 11.12. on Theileriosis and new CH 14.X. on infection with <i>Theileria</i> in small ruminants (outdated CH)	Revised/new CHs sent for comments (Sep 2017/1 st)
	7) Revision of CH 8.3. on Bluetongue (MCs comments)	Revised CH sent for comments and proposed for adoption in 2018 (Sep 2016/3 rd)

Annex 33 (contd)

Subject	Issue by priority order (Reason for new work)	Status and Action (Start date, # of rounds for comments)
Listed disease CHs in need of revision: Sec. 8 to 15	8) Revision of CH 15.2. on CSF (MCs comments and implications for status recognition)	Revised CH sent back to HQs for evaluation and SCAD review (Feb 2017/1 st)
	9) Revision of CH 14.8. on scrapie (MCs comments)	Pending experts opinion on MCs comments
	10) Revision of CH 10.5. on avian mycoplasmosis (MCs comments and trade implications)	Pending experts' opinion
	11) Revision of CH 11.7. on CBPP (Implications for status recognition)	Pending HQs advice
	12) Revision of Article 8.15.2. on rinderpest (MCs comments and proposal by JAC)	Revised Art. sent for comments and proposed for adoption in 2018 (Feb 2017/2 nd)
	13) Revision of listed disease-specific CHs on safe commodity article	Ongoing
	14) Consistency between articles on disease status	Pending SCAD evaluation
Follow-up revision of CHs adopted at 85th GS:	1) Further revision of CH 15.1. on ASF (MCs comments at 85GS)	Revised CH sent for comments and proposed for adoption in 2018 (Sep 2017/1 st)
	2) Revision of CH 11.11. on LSD (MCs comments at 85GS)	Revised CH sent for comments and proposed for adoption in 2018 (Sep 2017/1 st)
	3) Revision of CH 2.2. on criteria for assessing safety of commodities (MCs comments at 85GS)	Revised CH sent for comments and proposed for adoption in 2018 (Sep 2017/1 st)
	4) Revision of CH 6.13. on <i>Salmonella</i> in commercial pig production systems (MCs comments at 85GS)	Revised CH sent for comments and proposed for adoption in 2018 (Sep 2017/1 st)
	5) Revision of User's guide (MCs comments at 85GS)	Revised User's guide sent for comments and proposed for adoption in 2018 (Sep 2017/1 st)
	6) Revision of CH 8.11. on <i>M. tuberculosis</i> complex ((MCs comments at 85GS)	Pending experts advice

List of abbreviations	
AAHSC	Aquatic Animal Health Standards Commission
AHG	<i>ad hoc</i> Group
AI	Avian influenza
APFSWG	Animal Production Food Safety Working Group
ASF	African swine fever
AW	Animal Welfare
AWWG	Animal Welfare Working Group
BSC	Biological Standards Commission
BSE	Bovine Spongiform Encephalopathy
CBPP	Contagious bovine pleuropneumonia
CH	Chapters

Annex 33 (contd)

CSF	Classical swine fever
CWD	Chronic wasting disease
FMD	Foot and mouth disease
HQs	Headquarters
JAC	FAO-OIE Rinderpest Joint Advisory Committee
LSD	Lumpy skin disease
NGO	Non-Governmental Organisation
PVS	Performance of Veterinary Service
RA	Risk Analysis
TAHSC	Terrestrial Animal Health Standards Commission
VPH	Veterinary Public Health
VS	Veterinary Service
WNF	West Nile fever