CHAPTER 8.13.

RINDERPEST

Article 8.13.1.

General provisions

For the purposes of the *Terrestrial Code*, the *incubation period* for rinderpest (RP) shall be 21 days.

For the purpose of this Chapter, a *case* includes an animal infected with rinderpest virus (RPV).

For the purpose of this Chapter, susceptible animals apply to both domestic and wild artiodactyls.

For the purposes of *international trade*, this chapter deals not only with the occurrence of clinical signs caused by RPV, but also with the presence of infection with RPV in the absence of clinical signs.

Ban on vaccination against rinderpest means a ban on administering a RP vaccine to any susceptible animal and a heterologous vaccine against RP to any large ruminants or pigs.

1. Animal not vaccinated against RP means:

    a) for large ruminants and pigs: an animal that has received neither a RP vaccine nor a heterologous vaccine against RP;

    b) for small ruminants: an animal that has not received a RP vaccine.

2. The following defines the occurrence of RPV infection:

    a) RPV has been isolated and identified as such from an animal or a product derived from that animal; or

    b) viral antigen or viral ribonucleic acid (RNA) specific to RP has been identified in samples from one or more animals showing one or more clinical signs consistent with RP, or epidemiologically linked to an *outbreak* of RP, or giving cause for suspicion of association or contact with RP; or

    c) antibodies to RPV antigens which are not the consequence of vaccination, have been identified in one or more animals with either epidemiological links to a confirmed or suspected *outbreak* of RP in susceptible animals, or showing clinical signs consistent with recent infection with RP.

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

Article 8.13.2.

Rinderpest free country

To qualify for inclusion in the existing list of RP free countries, a Member should:

1. have a record of regular and prompt animal disease reporting;

2. send a declaration to the OIE stating that:

   a) there has been no *outbreak* of RP during the past 24 months,

   b) no evidence of RPV infection has been found during the past 24 months,

   c) no vaccination against RP has been carried out during the past 24 months,

   and supply documented evidence that *surveillance* for both RP and RPV infection in accordance with Articles 8.13.20. to 8.13.27. is in operation and that regulatory measures for the prevention and control of RP have been implemented;

3. not have imported since the cessation of vaccination any animals vaccinated against RP.

The Member will be included in the list only after the submitted evidence has been accepted by the OIE. Retention on the list requires that the information in points 2a), 2b), 2c), and 3 above be re-submitted annually and changes in the epidemiological situation or other significant events should be reported to the OIE according to the requirements in Chapter 1.1.

Article 8.13.3.

Recovery of free status

When a RP *outbreak* or RPV infection occurs in a RP free country, one of the following waiting periods is required to regain the status of RP free country:

1. 3 months after the last *case* where a *stamping-out policy* and serological *surveillance* are applied in accordance with Articles 8.13.20. to 8.13.27.; or

2. 3 months after the *slaughter* of all vaccinated animals where a *stamping-out policy*, emergency vaccination and serological *surveillance* are applied in accordance with Articles 8.13.20. to 8.13.27.; or

3. 6 months after the last *case* or the last vaccination (according to the event that occurs the latest), where a *stamping-out policy*, emergency vaccination not followed by the *slaughter* of all vaccinated animals, and serological *surveillance* are applied in accordance with Articles 8.13.20. to 8.13.27.

Where a *stamping-out policy* is not practised, the above waiting periods do not apply but Article 8.13.2. applies.

Article 8.13.4.

Infected country

When the requirements for acceptance as a RP free country are not fulfilled, a country shall be considered as RP infected.

Article 8.13.5.

Recommendations for importation from RP free countries

for RP susceptible animals

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

1. showed no clinical sign of RP on the day of shipment;

2. remained in a RP free country since birth or for at least 30 days prior to shipment.

Article 8.13.6.

Recommendations for importation from RP infected countries

for RP susceptible animals

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

1. RP is the subject of a national *surveillance* programme according to Articles 8.13.20. to 8.13.27.;

2. RP has not occurred within a 10-kilometre radius of the *establishment* of origin of the animals destined for export for at least 21 days prior to their shipment to the *quarantine station* referred to in point 3b) below;

3. the animals:

    a) showed no clinical sign of RP on the day of shipment;

    b) were kept in the *establishment* of origin since birth or for at least 21 days before introduction into the *quarantine station* referred to in point c) below;

    c) have not been vaccinated against RP, were isolated in a *quarantine station* for the 30 days prior to shipment, and were subjected to a diagnostic test for RP on two occasions with negative results, at an interval of not less than 21 days;

    d) were not exposed to any source of *infection* during their transportation from the *quarantine station* to the place of shipment;

4. RP has not occurred within a ten-kilometre radius of the *quarantine station* for 30 days prior to shipment.

Article 8.13.7.

Recommendations for importation from RP free countries

for semen of RP susceptible animals

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

1. the donor animals:
    a) showed no clinical sign of RP on the day of collection of the semen;
    b) were kept in a RP free country for at least 3 months prior to collection;
2. the semen was collected, processed and stored in conformity with the provisions of Chapter 4.5.

Article 8.13.8.

Recommendations for importation from RP infected countries

for semen of RP susceptible animals

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

1. RP is the subject of a national *surveillance* programme according to Articles 8.13.20. to 8.13.27.;
2. the donor animals:
    a) showed no clinical sign of RP on the day of collection of the semen;
    b) were kept in an *establishment* where no RP susceptible animals had been added in the 21 days before collection, and that RP has not occurred within 10 kilometres of the *establishment* for the 21 days before and after collection;
    c) were vaccinated against RP at least 3 months prior to collection; or
    d) have not been vaccinated against RP, and were subjected to a diagnostic test on two occasions with negative results, at an interval of not less than 21 days within the 30 days prior to collection;
3. the semen was collected, processed and stored in conformity with the provisions of Chapter 4.5.

Article 8.13.9.

Recommendations for importation from RP free countries

for *in vivo* derived embryos of RP susceptible animals

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

1. the donor females were kept in an *establishment* located in a RP free country at the time of collection;

2. the embryos were collected, processed and stored in conformity with the provisions of Chapter 4.7.

Article 8.13.10.

Recommendations for importation from RP infected countries

for *in vivo* derived embryos of RP susceptible animals

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

1. RP is the subject of a national *surveillance* programme according to Articles 8.13.20. to 8.13.27.;

2. the donor females:

   a) and all other animals in the *establishment* showed no clinical sign of RP at the time of collection and for the following 21 days;

   b) were kept in an *establishment* where no RP susceptible animals had been added in the 21 days before collection of the embryos;

   c) were vaccinated against RP at least 3 months prior to collection; or

   d) have not been vaccinated against RP, and were subjected to a diagnostic test for RP on two occasions with negative results, at an interval of not less than 21 days within the 30 days prior to collection;

3. the embryos were collected, processed and stored in conformity with the provisions of Chapter 4.7.

Article 8.13.11.

Recommendations for importation from RP free countries

for *fresh meat* or *meat products* of susceptible animals

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the entire consignment comes from animals which have been kept in the country since birth or for at least 3 months prior to *slaughter*.

Article 8.13.12.

Recommendations for importation from RP infected countries

for *fresh meat* (excluding offal) of susceptible animals

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

1. comes from a country where RP is the subject of a national *surveillance* programme according to Articles 8.13.20. to 8.13.27.;

2. comes from animals which:

a) showed no clinical sign of RP within 24 hours before *slaughter*;

b) have remained in the country for at least 3 months prior to *slaughter*;

c) were kept in the *establishment* of origin since birth or for at least 30 days prior to shipment to the approved *abattoir*, and that RP has not occurred within a ten-kilometre radius of the *establishment* during that period;

d) were vaccinated against RP at least 3 months prior to shipment to the approved *abattoir*;

e) had been transported, in a *vehicle* which was cleansed and disinfected before the animals were loaded, directly from the *establishment* of origin to the approved *abattoir* without coming into contact with other animals which do not fulfil the required conditions for export;

f) were slaughtered in an approved *abattoir* in which no RP has been detected during the period between the last *disinfection* carried out before *abattoir* and the date on which the shipment has been dispatched.

Article 8.13.13.

Recommendations for importation from RP infected countries

for *meat products* of susceptible animals

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

1. only *fresh meat* complying with the provisions of Article 8.13.12. has been used in the preparation of the *meat products*; or

2. the *meat products* have been processed to ensure the destruction of the RPV in conformity with one of the procedures referred to in Article 8.5.32.;

3. the necessary precautions were taken after processing to avoid contact of the *meat products* with any possible source of RPV.

Article 8.13.14.

Recommendations for importation from RP free countries

for *milk* and *milk products* intended for human consumption and for products of animal origin (from RP susceptible animals) intended for use in animal feeding or for agricultural or industrial use

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that these products come from animals which have been kept in the country since birth or for at least 3 months.

Article 8.13.15.

Recommendations for importation from RP infected countries

for *milk* and cream

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

1. these products:

    a) originate from *herds* or *flocks* which were not subjected to any restrictions due to RP at the time of *milk* collection;

    b) have been processed to ensure the destruction of the RPV in conformity with one of the procedures referred to in Articles 8.5.36. and 8.5.37.;

2. the necessary precautions were taken after processing to avoid contact of the products with any potential source of RPV.

Article 8.13.16.

Recommendations for importation from RP infected countries

for *milk products*

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

1. these products are derived from *milk* complying with the above requirements;

2. the necessary precautions were taken after processing to avoid contact of the *milk products* with a potential source of RPV.

Article 8.13.17.

Recommendations for importation from RP infected countries

for blood and meat-meals (from susceptible animals)

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the manufacturing method for these products included heating to a minimum internal temperature of 70°C for at least 30 minutes.

Article 8.13.18.

Recommendations for importation from RP infected countries

for wool, hair, bristles, raw hides and skins (from susceptible animals)

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

1. these products have been processed to ensure the destruction of the RPV in conformity with one of the procedures referred to in Articles 8.5.33., 8.5.34. and 8.5.35.;

2. the necessary precautions were taken after processing to avoid contact of the products with any potential source of RPV.

Veterinary Authorities can authorise, without restriction, the import or transit through their territory of semi-processed hides and skins (limed hides, pickled pelts, and semi-processed leather - e.g. wet blue and crust leather), provided that these products have been submitted to the usual chemical and mechanical processes in use in the tanning industry.

Article 8.13.19.

Recommendations for importation from RP infected countries

for hooves, claws, bones and horns, hunting trophies and preparations destined for museums (from susceptible animals)

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

1. were completely dried and had no trace on them of skin, flesh or tendon; and/or

2. have been adequately disinfected.

Article 8.13.20.

Surveillance: introduction

~~In order to receive OIE recognition of rinderpest freedom, a country's national authority must present for consideration a dossier of information relating to its livestock production systems, rinderpest vaccination and eradication history and the functioning of its *Veterinary Services*. The dossier must contain convincing evidence derived from an animal disease *surveillance* system that sufficient evidence has accrued to demonstrate that the presence of rinderpest virus would have been disclosed were it to be present. Recommendations on the structure and the functioning of *Veterinary Services* and diagnostic support services are provided in Chapters 3.1. and 3.2. of the *Terrestrial Code*. A Member must also be in compliance with its OIE reporting obligations (Chapter 1.1. of the *Terrestrial Code*).~~

Articles 8.13.20. to 8.13.27. define the principles and provides a guide for the surveillance of rinderpest (RP) in accordance with Chapter 1.4. applicable to Members seeking establishment of freedom from RP. Guidance is provided for Members seeking reestablishment of freedom from RP, following an *outbreak* and for the maintenance of RP free status.

Surveillance strategies employed for demonstrating freedom from RP at an acceptable level of confidence will need to be adapted to the local situation. *Outbreaks* of rinderpest in cattle may be graded as per-acute, acute or sub-acute. Differing clinical presentations reflect variations in levels of innate host resistance (*Bos indicus* breeds being more resistant than *Bos taurus*), and variations in the virulence of the attacking strain. Experience has shown that syndromic surveillance strategies i.e. surveillance based on a predefined set of clinical signs (e.g. searching for "stomatitis-enteritis syndrome") are useful to increase the sensitivity of the system. It is generally accepted that unvaccinated populations of cattle are likely to promote the emergence of virulent strains and associated epidemics while partially vaccinated populations favour the emergence of mild strains associated with endemic situations. In the case of per-acute cases the presenting sign may be sudden death. In the case of sub-acute (mild) cases, clinical signs are irregularly displayed and difficult to detect.

In certain areas there are some key wildlife populations, especially African buffaloes, which act as sentinels for rinderpest infection. These subpopulations should be included in the design of the surveillance strategy.

Surveillance for RP should be in the form of a continuing programme designed to establish that the whole country is free from RP virus (RPV) infection.

Article 8.13.21.

Surveillance: ~~definitions~~ general conditions and methods

~~1.~~ ~~Rinderpest~~

~~For the purpose of this Chapter, rinderpest is defined as an *infection* of large ruminants (cattle, buffaloes, yaks, etc.), small ruminants, pigs and various wildlife species within the order Artiodactyla, caused by rinderpest virus. In small ruminants and various species of wildlife, particularly antelopes, *infection* generally passes without the development of frank clinical signs. Characteristic clinical signs and pathological lesions are described in Chapter 2.1.15. of the *Terrestrial Manual*.~~

~~*Outbreaks* of rinderpest in cattle may be graded as per-acute, acute or sub-acute. Differing clinical presentations reflect variations in levels of innate host resistance (*Bos indicus* breeds being more resistant than *Bos taurus*), and variations in the virulence of the attacking strain. It is generally accepted that unvaccinated populations of cattle are likely to promote the emergence of virulent strains and associated epidemics while partially vaccinated populations favour the emergence of mild strains associated with endemic situations. In the case of per-acute cases the presenting sign may be sudden death. In the case of sub-acute (mild) cases, clinical signs are irregularly displayed and difficult to detect.~~

~~Freedom from rinderpest means freedom from rinderpest virus infection.~~

1. A surveillance system in accordance with Chapter 1.4. should be under the responsibility of the *Veterinary Authority*. A procedure should be in place for the rapid collection and transport of samples from suspect cases of RP to a laboratory for RP diagnoses as described in the *Terrestrial Manual*.

~~2.~~ ~~Rinderpest vaccines~~

~~For the purpose of this Chapter and the *Terrestrial Code*, OIE-recognised rinderpest vaccines currently in use, or likely to become so in the forseeable future, are considered to be commercial modified live vaccines produced from attenuated rinderpest virus (referred to as 'rinderpest vaccine') produced in accordance with Chapter 2.1.15. of the *Terrestrial Manual*.~~

2. The RP surveillance programme should:

   a) include an early warning system throughout the production, marketing and processing chain for reporting suspicious cases. Farmers and workers who have day-to-day contact with livestock, as well as diagnosticians, should report promptly any suspicion of RP. They should be supported directly or indirectly (e.g. through private veterinarians or *veterinary para-professionals*) by government information programmes and the *Veterinary Authority*. All significant epidemiological events consistent with "stomatitis-enteritis syndrome" should be investigated immediately. Where suspicion cannot be resolved by epidemiological and

clinical investigation, samples should be taken and submitted to a *laboratory*. This requires that sampling kits and other equipment are available for those responsible for surveillance. Personnel responsible for surveillance should be able to call for assistance from a team with expertise in RP diagnosis and control;

b) implement, when relevant, regular and frequent clinical inspection and serological testing of high-risk groups of animals, such as those adjacent to a~~n~~ RP infected country.

An effective surveillance system will periodically identify suspicious cases compatible with the "stomatitis-enteritis syndrome" that require follow-up and investigation to confirm or exclude that the cause of the condition is RPV. The rate at which such suspicious cases are likely to occur will differ between epidemiological situations and cannot therefore be predicted reliably. Applications for freedom from RPV infection should, in consequence, provide details of the occurrence of suspicious cases and how they were investigated and dealt with. This should include the results of laboratory testing and the control measures to which the animals concerned were subjected during the investigation (quarantine, movement stand-still orders, etc.).

Article 8.13.22.

Surveillance ~~activities~~ strategies

~~General recommendations on animal disease *surveillance* are outlined in Chapter 1.4. of the *Terrestrial Code*.~~

~~Rinderpest must be a *notifiable disease* i.e. notification of *outbreaks* of rinderpest as soon as detected or suspected must be brought to the attention of the *Veterinary Authority*.~~

~~The precise *surveillance* information required for establishing freedom will differ from country to country depending on factors such as the former rinderpest status of the country, the regional rinderpest situation and accreditation status, the time elapsing since the last occurrence of rinderpest, livestock husbandry systems (e.g. extensive pastoralism, nomadism and transhumance versus sedentary agropastoralism) and trading patterns.~~

~~Evidence of efficiency of the *surveillance* system can be provided by the use of performance indicators.~~

~~*Surveillance* results presented will be expected to have accrued from a combination of *surveillance* activities including some or all of the following:~~

~~1. A routine national animal disease reporting system supported by evidence of its efficiency and follow-up - an on-going, statutory, centrally organised system of reporting~~

~~Ideally *disease* reports should be expressed in a Geographical Information System environment and analysed for clustering of observations and followed up.~~

1. Introduction

The target population for surveillance aimed at identifying *disease* and *infection* should cover all significant populations of susceptible species within the country to be recognised as free from RPV infection.

The strategy employed can be based on randomised sampling requiring surveillance consistent with demonstrating the absence of RPV infection at an acceptable level of statistical confidence. The frequency of sampling should be dependent on the epidemiological situation. Targeted surveillance (e.g. based on the increased likelihood of *infection* in particular localities or species) can be an appropriate strategy. The applicant Member should justify the surveillance strategy chosen as adequate to detect the presence of RPV infection in accordance with Chapter 1.4. and the epidemiological situation. It may, for example, be appropriate to target clinical surveillance at particular subpopulations likely to exhibit clear clinical signs. For targeted surveillance consideration should be given to the following:

i) historical disease patterns (risk mapping) – clinical, participatory and laboratory-based

ii) critical population size, structure and density

iii) livestock husbandry and farming systems

iv) movement and contact patterns – markets and other trade-related movements

v) transmission parameters (e.g. virulence of the strain, animal movements)

vi) wildlife and other species demography.

For random surveys, the design of the sampling strategy will need to take into account the expected disease prevalence. The sample size selected for testing will need to be large enough to detect infection if it were to occur at a predetermined minimum rate. The sample size and expected disease prevalence determine the level of confidence in the results of the survey. The applicant Member must justify the choice of design prevalence and confidence level based on the objectives of surveillance and the epidemiological situation, in accordance with Chapter 1.4. Selection of the expected prevalence in particular clearly needs to be based on the prevailing or historical epidemiological situation.

Irrespective of the survey design selected, the sensitivity and specificity of the diagnostic tests employed are key factors in the design, sample size determination and interpretation of the results obtained.

Irrespective of the testing system employed, surveillance design should anticipate the occurrence of false positive reactions. If the characteristics of the testing system are known, the rate at which these false positives are likely to occur can be calculated in advance. There needs to be an effective procedure for following-up positives to ultimately determine with a high level of confidence, whether they are indicative of infection or not. This should involve both supplementary tests and follow-up investigation to collect diagnostic material from the original sampling unit as well as herds which may be epidemiologically linked to it.

The principles involved in surveillance for *disease/infection* are technically well defined in Chapter 1.4. The design of surveillance programmes to prove the absence of RPV infection needs to be carefully followed to ensure the reliability of results. The design of any surveillance programme, therefore, requires inputs from professionals competent and experienced in this field.

~~2. Emergency disease reporting systems and investigation of epidemiologically significant events ('stomatitis enteritis syndrome')~~

~~Emergency reporting systems can be devised to short circuit normal passive reporting systems~~

~~to bring suspicious events to the fore and lead to rapid investigation and tracing. All such investigations should be well documented for presentation as an outcome of the *surveillance* system.~~

2. Clinical surveillance

Clinical surveillance aims at detecting clinical signs of "stomatitis-enteritis syndrome" by close physical examination of susceptible animals. Whereas significant emphasis is placed on the diagnostic value of mass serological screening, surveillance based on clinical inspection should not be underrated. It may be able to provide a high level of confidence of detection of disease if sufficiently large numbers of clinically susceptible animals are examined. It is essential that clinical cases detected be followed by the collection of appropriate samples such as ocular and nasal swabs, blood or other tissues for virus isolation. Clinical surveillance and laboratory testing should always be applied in series to clarify the status of RP suspects detected by either of these complementary diagnostic approaches. Laboratory testing may confirm clinical suspicion, while clinical surveillance may contribute to confirmation of positive serology. Any sampling unit within which suspicious animals are detected should be classified as infected until contrary evidence is produced.

Active search for clinical disease can include participatory disease searching, tracing backwards and forwards, and follow-up investigations. Participatory disease surveillance is a form of targeted active surveillance based upon methods to capture livestock owners perceptions on the prevalence and patterns of disease.

The often underestimated labour intensity and the logistical difficulties involved in conducting clinical examinations should not be underestimated and should be taken into account.

It is essential that all RPV isolates are sent to an OIE reference laboratory to determine the biological characteristics of the causative virus as well as its genetic and antigenic characterization.

~~3. Detection and thorough investigation of epidemiologically significant events ('stomatitis-enteritis syndrome') which raise suspicion of rinderpest supported by evidence of efficiency of the system~~

~~*Laboratory* examination undertaken to confirm or rule out rinderpest is given extra credibility if it is accompanied by the results of differential diagnostic examinations.~~

3. Virological surveillance

Given that RP is an acute infection with no known carrier state, virological surveillance using tests described in the *Terrestrial Manual* should be conducted to confirm clinically suspect cases. Applying virological methods in seropositive animals is not regarded as an efficient approach.

~~4. Searching for evidence of clinical rinderpest~~

~~Active search for *disease* might include participatory *disease* searching combined with village *disease* searching, tracing backwards and forwards, follow-up and investigation.~~

54. ~~Serosurveillance~~ Serological surveillance

Serological surveillance aims at detecting antibodies against RPV. Positive RPV antibody test results can have four possible causes:

a) natural infection with RPV;

b) vaccination against RP;

c) maternal antibodies derived from an immune dam (maternal antibodies in cattle can be found only up to 12 months of age);

d) heterophile (cross) and other non-specific reactions.

~~a) Randomised serosurveys~~

~~Statistically selected samples from relevant strata within the host populations are examined to detect serological evidence of possible virus circulation.~~

~~A sampling unit for the purposes of disease investigation and *surveillance* is defined as a group of animals in sufficiently close contact that individuals within the group are at approximately equal risk of coming in contact with the virus if there should be an infectious animal within the group. In most circumstances, the sampling unit will be a *herd* which is managed as a unit by an individual or a community, but it may also be other epidemiologically appropriate groupings which are subject to regular mixing, such as all animals belonging to residents of a village. In the areas where nomadic or transhumant movements exist, the sampling unit can be the permanent bore holes, wells or water points. Sampling units should normally be defined so that their size is generally between 50 and 1,000 animals.~~

~~i) Criteria for stratification of host populations~~

~~Strata are homogeneously mixing sub-populations of livestock. Any disease *surveillance* activities must be conducted on populations stratified according to the management system, and by *herd* size where this is variable. *Herds*, or other sampling units, should be selected by proper random statistical selection procedures from each stratum.~~

~~ii) Field procedures and sample sizes~~

~~Annual sample sizes shall be sufficient to provide 95% probability of detecting evidence of rinderpest if present at a prevalence of 1% of *herds* or other sampling units and 5% within *herds* or other sampling units. This can typically be achieved by examining 300 *herds* per stratum per year, but procedures for sampling should be in accordance with the "Guide to Epidemiological Surveillance for Rinderpest"[2], or another procedure that would achieve the same probability of detection.~~

~~Where the sampling frame of *herds* is known, *herds* shall be selected for examination by the use of random number tables. Otherwise, samples of *herds* can be selected by taking the nearest *herd* to a randomly selected map reference, provided that the *herds* are evenly distributed. Failing this, any *herd(s)* within a fixed radius of randomly selected map references should be sampled. It must be compulsory for any selected *herd* to be examined or tested as required.~~

In carrying out clinical *surveillance* for evidence of rinderpest, all animals in selected *herds* or sampling units will be examined by a *veterinarian* for signs of the *disease*, especially mouth lesions. Any positive result shall be evaluated using epidemiological and *laboratory* methods to confirm or refute the suspicion of rinderpest virus activity. All animals born after the cessation of vaccination and more than one year old will be eligible for serological testing.

Where operational considerations require it, the number of eligible animals tested within each sampled *herd* may be reduced. This will reduce the probability of within-herd detection and there must be at least a compensatory increase in the number of *herds* sampled, so that the required 95% probability of detecting 1% between-herd prevalence is maintained.

b) Risk-focussed serosurveillance

Risk-focussed serosurveillance differs from randomised serosurveillance in that it increases detection sensitivity by obtaining samples from areas/populations determined to be at higher risk of *infection*, so as to detect serological evidence of possible virus circulation. The operational modalities for risk-based focussing of *surveillance* require definition (randomisation within defined focus, high risk animals, etc.). The extent to which randomisation needs to be retained in the generation of risk-focussed serosurveillance data needs to be established.

Focussing can be achieved by reference to some or all of the following:

i) Historical disease patterns (prior probability mapping) – clinical, participatory and laboratory-based

ii) Critical population size, structure and density

iii) Livestock husbandry and farming systems

iv) Movement and contact patterns – markets and other trade-related movements

v) Transmission parameters (e.g. virulence of the strain, animal movements)

vi) Wildlife and other species demography.

Article 8.13.23.

Selection of cattle and buffaloes for serosurveillance

Ageing cattle and Asian buffaloes for the purpose of serosurveillance:

Mis-ageing of cattle selected for serosurveillance is the most common source of error. Colostral immunity can persist almost up to one year of age when measured by the H c-ELISA. Thus, it is essential to exclude from sampling buffaloes and cattle less than one year of age. In addition, it is frequently necessary to be able to exclude those which are older than a certain age, for example, to select only those born after cessation of vaccination.

Accounts of the ages for eruption of the incisor teeth vary markedly and are clearly dependent on species, breed, nutritional status and nature of the feed.

~~Pragmatically, and solely for the purposes of serosurveillance, it can be accepted that:~~

~~a) cattle having only one pair of erupted permanent central incisor teeth are aged between 21 and 36 months (Asian buffaloes 24-48 months);~~

~~b) cattle having only two pairs of erupted permanent central incisor teeth are aged between 30 and 48 months (Asian buffaloes 48-60 months).~~

~~Thus selecting a cohort of cattle possessing only one pair of permanent incisors will preclude any interference from maternal immunity derived from earlier vaccination or *infection* and ensure that vaccinated cattle are not included if vaccination ceased 3 years or more previously (for Asian buffaloes 4 years or more).~~

It is important to select a cohort of cattle possessing only one pair of permanent incisors to preclude any interference from maternal immunity derived from earlier vaccination or infection and ensure that vaccinated cattle are not included.

Although it is stressed here that animals with milk teeth only are not suitable for *surveillance* based on serology, they are of particular interest and importance in *surveillance* for clinical *disease*. After the loss of colostral immunity, by about one year of age, these are the animals which are most likely to suffer the more severe disease form and in which to look for lesions indicative of rinderpest.

It may be possible to use serum collected for other survey purposes for RP surveillance. However, the principles of survey design described in this Chapter and the requirement for a statistically valid survey for the presence of RPV should not be compromised.

The discovery of clustering of seropositive reactions should be foreseen. It may reflect any of a series of events, including but not limited to the demographics of the population sampled, vaccinal exposure or the presence of field strain infection. As clustering may signal field strain infection, the investigation of all instances must be incorporated in the survey design.

The results of random or targeted serological surveys are important in providing reliable evidence that RPV infection is not present in a country. It is therefore essential that the survey be adequately ~~thoroughly~~ documented.

Article 8.13.24.

Wildlife surveillance where a significant susceptible wildlife population exists

There are some key wildlife populations, especially African buffaloes, which act as sentinels for rinderpest infection. Where a significant population of a susceptible wildlife species exists, serosurveillance data ~~are required~~ should be collected to support absence of *infection*. ~~These populations should be monitored purposively to support the dossiers to be submitted for freedom from rinderpest virus infection.~~ Detection of virus circulation in wildlife can be undertaken indirectly by sampling contiguous livestock populations.

Obtaining meaningful data from wildlife *surveillance* can be enhanced by close coordination of activities in the regions and countries. Both purposive and opportunistic samplings are used to obtain material for analysis in national and reference *laboratories*. The latter are required because ~~most~~ many countries ~~are unable~~ do not have adequate facilities to perform the full testing protocol for detecting ~~rinderpest~~ RP antibodies in wildlife sera.

~~Purposive~~ Targeted sampling is the preferred method to provide wildlife data to evaluate the status of rinderpest infection. In reality, the capacity to perform ~~purposive work~~ targeted surveillance in the majority of countries remains minimal. Opportunistic sampling (hunting) is feasible and it provides useful background information.

Wildlife form transboundary populations; therefore, any data from the population could be used to represent the result for the ecosystem and be submitted by more than one Member in ~~a dossier~~ an application to the OIE (even if the sampling was not obtained in the Member submitting the application). It is ~~therefore~~ recommended therefore that the Members represented in a particular ecosystem should coordinate their sampling programmes.

~~The standards for serosurveillance are different from that set for cattle because the serological tests are not fully validated for wildlife species and financial and logistic constraints of sampling prevent collection of large numbers of samples.~~

Where the serological history of the herd is known from previous work (as might be the case for a sentinel herd), repeat sampling need only focus on the untested age groups, born since the last known infection. The sample needs to be taken according to the known epidemiology of the disease in a given species. Opportunistic samples, which are positive, should not be interpreted without a targeted survey to confirm the validity of these results. Opportunistic sampling cannot follow a defined protocol and therefore can only provide background information.

~~From the collective experience of the *laboratories* and experts over the years, an appropriate test protocol is based on the high expected sero prevalence in a previously infected buffalo *herd* (99% seroconversion of eligible animals within a *herd*), which is detected using a test, which is 100% sensitive. No single test can achieve this; however, combining H c-ELISA to VNT raises sensitivity close to 100%.~~

~~In the order of 1-2% of a *herd* of African buffaloes must be sampled to ensure that no positive case is missed. For example in a *herd* of 300 buffaloes, five animals should be sampled and the above multiple test protocol followed. Where the serological history of the *herd* is known from previous work (as might be the case for a sentinel *herd*), repeat sampling need only focus on the untested age groups, born since the last known *infection*. Appropriate sampling fraction for other wildlife species are less well defined, as social organization (*herd* structure, likely contact rates, etc.) vary. The sample needs to be taken according to the known epidemiology of the *disease* in a given species. Opportunistic samples, which are positive, should not be interpreted without a purposive survey to confirm the validity of these results. Opportunistic sampling cannot follow a defined protocol and therefore can only provide background information.~~

Article 8.13.25.

~~Evaluation of applications for accreditation of~~ Members applying for recognition of freedom from ~~rinderpest~~ RP

~~Evaluation of applications for the status of freedom from rinderpest will be the responsibility of the OIE Scientific Commission for Animal Diseases which can request the Director General if the OIE to appoint an ad hoc group in order to assist in reaching an informed decision to present to the OIE International Committee for approval.~~

~~The composition and method of selection of the ad hoc group shall be such as to ensure both a high level of expertise in evaluating the evidence and total independence of the group in reaching conclusions concerning the disease status of a particular country.~~

In addition to the general conditions described in this Chapter, a Member applying for recognition of RP freedom for the country should provide evidence for the existence of an effective surveillance programme. The strategy and design of the surveillance programme will depend on the prevailing epidemiological circumstances and will be planned and implemented according to general conditions and methods in this Chapter, to demonstrate absence of RPV infection, during the preceding 24 months in susceptible populations. This requires the support of a national or other laboratory able to undertake identification of RPV infection through virus/antigen/genome detection and antibody tests described in the *Terrestrial Manual.*

~~Article 8.13.26.~~

~~**Steps to be taken to declare a country to be free from rinderpest**~~

~~Recognition of the status 'free from rinderpest' is given to a Member. Where traditionally managed livestock move freely across international borders, groups of Members may usefully associate themselves into a group for the purposes of obtaining data to be used for mutually supportive applications for individual country accreditation.~~

~~For the purpose of this Chapter, the following assumptions are made:~~

~~a) that within most previously infected countries, rinderpest vaccine will have been used to control the rate of *infection*;~~

~~b) that within an endemically infected population there will be a large number of immune hosts (both vaccinees and recovered animals);~~

~~c) that the presence of a proportion of immune hosts within a vaccinated population could have led to a slowing of the rate of virus transmission and possibly the concomitant emergence of strains of reduced virulence, difficult to detect clinically;~~

~~d) that the virulence of the virus (and therefore the ease of clinical detection) may or may not increase as the *herd* immunity declines following withdrawal of vaccination; however, continuing transmission will generate serological evidence of their persistence.~~

~~Before accreditation can be considered, countries which have the *disease* by the use of rinderpest vaccine must wait until an unvaccinated cohort is available to allow meaningful serological *surveillance* to be conducted.~~

~~The OIE has concluded that the majority of countries have stopped vaccinating for a sufficient length of time for it now to be feasible that a single submission of evidence gained over 2 years of appropriate *surveillance* shall be sufficient to gain rinderpest free accreditation.~~

~~A Member accredited as free from rinderpest must thereafter submit annual statements to the Director General of the OIE indicating that *surveillance* has failed to disclose the presence of rinderpest, and that all other criteria continue to be met.~~

~~A country previously infected with rinderpest which has not employed rinderpest vaccine for at least 25 years and has throughout that period detected no evidence of rinderpest virus *disease* or *infection* may be accredited as free from rinderpest by the OIE based on historical grounds, provided that the country:~~

~~- has had throughout at least the last 10 years and maintains permanently an adequate animal~~

disease *surveillance* system along with the other requirements outlined in Article 8.13.25.;

- is in compliance with OIE reporting obligations (Chapter 1.1.).

The *Veterinary Authorities* of the Member must submit a dossier containing evidence supporting their claim to be free from rinderpest on a historical basis to the Director General of the OIE for evaluation by the OIE Scientific Commission for Animal Diseases and accreditation by the OIE International Committee. The dossier should contain at least the following information:

- a description of livestock populations, including wildlife;

- the history of rinderpest occurrence in the country and its control;

- an affirmation that rinderpest has not occurred for 25 years, that vaccine has not been used during that time, and that rinderpest is a *notifiable disease*;

- evidence that in the last 10 years the disease situation throughout the Member has been constantly monitored by a competent and effective veterinary infrastructure that has operated a national animal disease reporting system submitting regular (monthly) disease occurrence reports to the *Veterinary Authority*;

- the structure and functioning of the *Veterinary Services*;

- the Member operates a reliable system of *risk analysis* based importation of livestock and livestock products.

Evidence in support of these criteria must accompany the Member's accreditation application dossier. In the event that satisfactory evidence is not forthcoming, the OIE may seek clarification or refer the dossier back to the originators, giving its reasons for so doing. Under such circumstances a fresh dossier would be entertained in due course.

OR

A Member having eradicated rinderpest within the last 25 years, wishing to be accredited free from rinderpest and having ended rinderpest vaccination must initiate a two year *surveillance* programme to demonstrate freedom from rinderpest whilst banning further use of rinderpest vaccine. The step of accreditation as free from rinderpest is subject to meeting stringent criteria with international verification under the auspices of the OIE.

A country historically infected with rinderpest but which has convincing evidence that the *disease* has been excluded for at least 2 years and is not likely to return, may apply to OIE to be accredited as free from rinderpest. The conditions which apply include that an adequate animal disease *surveillance* system has been maintained throughout at least that period.

The *Veterinary Authority* of the Member must submit a dossier containing evidence supporting their claim to be free from rinderpest to the Director General of the OIE for evaluation by the OIE Scientific Commission for Animal Diseases and accreditation by the OIE International Committee showing that they comply with:

- the provisions outlined in this Chapter;

- OIE reporting obligations outlined in Chapter 1.1. of the *Terrestrial Code*.

Other conditions that apply are:

- The Member affirms that rinderpest has not occurred for at least 2 years, that vaccine has not been used during that time, and that rinderpest is a *notifiable disease*.

- The *Veterinary Authority* has issued orders curtailing the distribution and use of rinderpest vaccine in livestock.

- The *Veterinary Authority* has issued orders for the recall and destruction of rinderpest vaccine already issued.

- The *Veterinary Authority* has issued orders restricting the importation of rinderpest vaccine into, or the further manufacture of rinderpest vaccine within, the territory under his jurisdiction. An exception can be made for establishing a safeguarded rinderpest emergency vaccine bank under the control of the Chief Veterinary Officer who can demonstrate that no calls have been made on that vaccine bank.

- The *Veterinary Authority* has set in place a rinderpest contingency plan.

- Over the previous 2 years at least, the disease situation throughout the Member has been constantly monitored by a competent and effective infrastructure that has operated a national animal disease reporting system submitting regular (monthly) disease occurrence reports to the *Veterinary Authority*.

- All *outbreaks of disease* with a clinical resemblance to rinderpest have been thoroughly investigated and routinely subjected to *laboratory* testing by an OIE recognised rinderpest specific test within the national rinderpest *laboratory* or at a recognised reference *laboratory*.

The dossier shall contain:

- the results of a continuous *surveillance* programme, including appropriate serological surveys conducted during at least the last 24 months, providing convincing evidence for the absence of rinderpest virus circulation;

- a description of livestock populations including wildlife;

- the history of rinderpest occurrence in the country and its control;

- an affirmation that rinderpest has not occurred for at least 2 years, that vaccine has not been used during that time, and that rinderpest is a *notifiable disease*;

- evidence that in the last 2 years the disease situation throughout the Member has been constantly monitored by a competent and effective veterinary infrastructure that has operated a national animal disease reporting system submitting regular (monthly) disease occurrence reports to the *Veterinary Authority*;

- the structure and functioning of the *Veterinary Services*;

- the Member operates a reliable system of *risk analysis* based importation of livestock and livestock products.

~~In the event that satisfactory evidence in support of the application is not forthcoming, the OIE may seek clarification or refer the dossier back to the originators, giving its reasons for so doing. Under such circumstances a fresh dossier would be entertained in due course.~~

Article 8.13.~~27~~26.

~~Rinderpest outbreaks after accreditation and recovery of rinderpest free status~~ Members re-applying for recognition of freedom from RP following an outbreak

~~Should there be an *outbreak*, or *outbreaks*, of rinderpest in a Member at any time after recognition of rinderpest freedom, the origin of the virus strain must be thoroughly investigated. In particular it is important to determine if this is due to the re-introduction of virus or re-emergence from an undetected focus of *infection*. The virus must be isolated and compared with historical strains from the same area as well as those representatives of other possible sources. The *outbreak* itself must be contained with the utmost rapidity using the resources and methods outlined in the Contingency Plan.~~

Following an *outbreak*, or *outbreaks*, of rinderpest in a Member at any time after recognition of rinderpest freedom, the origin of the virus strain should be thoroughly investigated. In particular it is important to determine if this is due to the re-introduction of virus or re-emergence from an undetected focus of infection. Ideally, the virus should be isolated and compared with historical strains from the same area as well as those representatives of other possible sources.

After elimination of the *outbreak*, a Member wishing to regain the status 'free from rinderpest' ~~must~~ should undertake serosurveillance according to this Chapter to determine the extent of virus spread. In addition to the general conditions described in this Chapter, a Member re-applying for recognition of country freedom from RP should show evidence of an active surveillance programme for RP as well as absence of RPV infection.

If investigations show the *outbreak* virus originated from outside the country, provided the *outbreak* was localised, rapidly contained and speedily eliminated, and provided there was no serological evidence of virus spread outside the index infected area, accreditation of freedom could proceed rapidly. The Member must satisfy the OIE Scientific Commission for Animal Diseases that the *outbreaks* were contained, eliminated and did not represent endemic *infection*.

~~An application to regain the status free from rinderpest shall not generally be accepted until both clinical and serological evidence shows that there has been no virus transmission for at least 3 or 6 months, depending on whether or not stamping-out or vaccination respectively has been applied.~~

Article 8.3.27.

The use and interpretation of serological tests for serosurveillance of RP

Serological testing is an appropriate tool to use for RP surveillance. The prescribed serological tests which should be used for RP surveillance are described in the *Terrestrial Manual*; these are of high diagnostic specificity and minimise the proportion of false positive reactions. Antibodies to virulent strains and the Kabete O vaccine strain of RPV can be detected in cattle from about 10 days post infection (approximately 7 days after the appearance of fever) and peak around 30 to 40 days post infection. Antibodies then persist for many years, possibly for life, although titres decline with time. In the case of less virulent strains the detection of the antibody response by ELISA may be delayed by as much as three weeks. There is only one serotype of virus and the tests will detect antibodies elicited by infection with all RP viruses but the tests cannot discriminate between antibodies to field

infection and those from vaccination with attenuated vaccines. This fact compromises serosurveillance in vaccinated populations and realistically meaningful sero surveillance can only commence once vaccination has ceased for several years. In these circumstances, dental ageing of cattle and buffaloes is of great value to minimise the inclusion of animals seropositive by virtue of colostral immunity and historic vaccination or infection. The cohort of cattle with one single set of central incisors is the most appropriate to sample[2].

The test most amenable to the mass testing of sera as required to demonstrate freedom from infection is the H c-ELISA. Practical experience from well-controlled serological surveillance in non-vaccinated populations in Africa and Asia demonstrate that one can expect false positive reactions in 0.05 % or less of sera tested. The sensitivity of the test approaches 100 % (relative to the VNT) in Kabete O vaccinated cattle and infection with highly virulent viruses but is lower in the case of low virulence strains. Experience supported by experimental studies indicates that in all cases sensitivity exceeds 70 %.

Only tests approved by OIE as indicated in the *Terrestrial Manual* should be used to generate data presented in support of applications for accreditation of RP freedom. It is necessary to demonstrate that apparently positive serological results have been adequately investigated. The follow-up studies should use appropriate clinical, epidemiological, serological and virological investigations. By this means the investigation should examine all evidence that might confirm or refute the hypothesis that the positive results to the serological tests employed in the survey were not due to virus circulation.

The prescribed serological tests have not been fully validated for use in all wild species. From the collective experience of the reference laboratories and experts over the years, an appropriate test protocol for wildlife is based on the high expected sero-prevalence in a previously infected buffalo herd which is 99 % seroconversion of eligible animals within a herd as detected by use of a 100 % sensitive test. No single test can achieve this but combining the H c-ELISA with the VNT raises sensitivity close to 100 %.

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— text deleted

1. JAMES A.D. (1998). Guide to epidemiological surveillance for rinderpest. *Rev. Sci. Tech.* **17** (3), 796-824.

2. Pragmatically and solely for the purposes of serosurveillance, it can be accepted that:

   (a) Cattle having one pair of erupted permanent central incisor teeth are aged between 21 and 36 months (Asian buffaloes 24 to 48 months);

   (b) Cattle having only two pairs of erupted permanent central incisor teeth are aged between 30 and 48 months (Asian buffaloes 48-60 months)