

## CHAPTER 6.5.

PREVENTION, DETECTION AND CONTROL OF  
SALMONELLA IN POULTRY

## Article 6.5.1.

**Introduction**

This chapter provides recommendations on the prevention, detection and control of *Salmonella* in *poultry*.

Salmonellosis is one of the most common foodborne bacterial *diseases* in the world. The great majority of *Salmonella* infections in humans are foodborne with *Salmonella* Enteritidis and *Salmonella* Typhimurium accounting for a major part of the problem. *Salmonella* serotypes and prevalence may vary considerably between localities, districts, regions and countries and therefore, *surveillance* and identification of the prevalent *Salmonella* serotypes in humans and *poultry* should be carried out in order to develop a control programme for the area.

In most food animal species, *Salmonella* can establish a clinically inapparent *infection* of variable duration, which is significant as a potential *zoonosis*. Such animals may be important in relation to the spread of *infection* between *flocks* and as causes of human foodborne *infection*. In the latter case, this can occur when *meat* and eggs, or their products, enter the food chain thus producing contaminated food.

## Article 6.5.2.

**Purpose and scope**

This chapter deals with methods for on farm prevention, detection and control of *Salmonella* in *poultry*, and complements the Codex Alimentarius Code of Hygienic Practice for Meat (CAC/RCP 58-2005) and Code of Hygienic Practice for Eggs and Egg Products (CAC/RCP 15-1976). A pathogen reduction strategy at the farm level is seen as the first step in a continuum that will assist in reducing the presence of foodborne pathogens in eggs and *meat*.

Hygiene and biosecurity procedures to be implemented in *poultry flocks farms* and hatcheries are described in Chapter 6.4. **Hygiene and** Biosecurity Procedures in Poultry Production.

The recommendations presented in this Chapter are relevant to the control of all *Salmonella* with special attention to *S. Enteritidis* and *S. Typhimurium*, as these are common *Salmonella* serotypes in many countries. It should be noted that the epidemiology of animal and human salmonellosis in a particular locality, district, region or country is important for effective control of *Salmonella*.

## Article 6.5.3.

**Definitions (for this Chapter only)**

**Breeders:** means *poultry* destined for the production of fertile eggs for incubation for the purpose of producing *day-old birds*.

**Competitive exclusion:** means the administration of defined or undefined bacterial flora to *poultry* to prevent gut colonisation by enteropathogens, including *Salmonella*.

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**Culling:** means the ~~depopulation~~ destruction or slaughter of a *flock* before the end of its normal production period.

**Layers:** means *poultry* during the period of laying eggs for human consumption.

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**Surveillance of poultry flocks for *Salmonella***

Where justified by *risk assessment*, *surveillance* should be carried out to identify infected *flocks* in order to take measures that will reduce the prevalence in *poultry* and the risk of transmission of *Salmonella* to humans. Sampling methods, frequency and type of samples required should be determined by the *Veterinary Services* based on a *risk assessment*. Microbiological testing is preferred to serological testing because of its higher sensitivity in broilers *flocks* and higher specificity in breeders and *layer flocks*. In the framework of regulatory programmes for the control of *Salmonella* in *poultry* and salmonellosis in humans, confirmatory testing may be required.

**Sampling**1. Available methods for sampling

Drag swabs: sampling is done by dragging swabs throughout the *poultry building house*.

Boot swabs: sampling is done by walking throughout the *poultry building house* with absorbent material placed over the footwear of the sampler.

Dust samples: sampling is done by collecting dust from exhaust fans, screens and other equipment in the *poultry building house*.

Faecal samples: multiple fresh faecal/caecal samples collected from different areas in the *poultry building house*.

Meconium, chick box liners ~~papers~~, dead in shell and culled ~~chicks~~ day-old birds at the hatchery.

Hatchery samples: throughout the hatchery, including inside the incubators.

2. Sample size

Refer to the *Terrestrial Manual* (under development).

3. Laboratory methods

Refer to the *Terrestrial Manual* (under development).

4. Time and frequency of testing

Time and frequency of sampling for each *poultry* type are listed below:

## a) Breeders and hatcheries

## i) Breeder flocks before lay

- Before the end of the first week of life when the status of the breeder ing flock farm ~~and/or~~ the hatchery is not known or does not comply with this chapter.

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- Within the four weeks before being moved to another house, or before going into production if the birds will remain in the same house for the production period.
  - One or more times during the growing period if there is a culling policy in place. The frequency would be determined on commercial considerations.
- ii) Breeder flocks in lay
- At least at monthly intervals during the laying period.
  - Additional testing should be determined by the *Veterinary Services*.
- iii) Hatcheries
- Testing at hatcheries should complement on farm testing.
  - The minimal frequency should be determined by the *Veterinary Services*.
- b) Poultry for the production of eggs for human consumption
- i) Flocks grown to be layers
- Before the end of the first week of life when the status of the ~~breeding flock farm~~ ~~and/or~~ the hatchery is not known or does not comply with this chapter.
  - Within the four weeks before being moved to another house, or before going into production if the birds will remain in the same house for the production period.
  - One or more times during the growing period if there is a culling policy in place. The frequency would be determined by commercial considerations.
- ii) Layer flocks
- At expected peak of lay for each production cycle (the period of time in the laying cycle when the production of the *flock* is highest).
  - One or more times if there is a culling policy in place or if eggs are diverted to processing for the inactivation of the pathogen. The minimal frequency should be determined by the *Veterinary Services*.
- c) Poultry for the production of meat
- i) *Flocks* should be sampled at least once ~~before slaughter~~.
- ii) When sampling occurs on farms and when there is a long period (2 weeks or more) between thinning and final depopulation further testing should be considered.
- iii) When sampling occurs on farms, *flocks* should be sampled as late as possible before the first birds are transported to the *slaughterhouse*. In order to allow for the implementation of control measures during processing, this should be done at a time that ensures the results are available before *slaughter*.

Whether sampling occurs on the farm which is more appropriate for consequent control measures or at the processing plant, there should be an integrated system in place that allows for investigation of the source of positive *flocks*.

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- d) ~~Testing of empty building poultry houses testing~~
- i) Bacteriological monitoring of the efficacy of *disinfection* procedures is recommended when *Salmonella* have been detected in the previous *flock*.

As appropriate, sampling of equipment and surfaces as well as boot swabs or drag swabs of the empty ~~building poultry house~~ after depopulation, cleaning and *disinfection*.

Results from *surveillance* may lead to the implementation of additional prevention and control measures to reduce the risk of transmission of *Salmonella* to humans:

- a) In breeders, control measures may be implemented to reduce the transmission of *Salmonella* to the next generation, especially for trans-ovarian transmitted serotypes such as *S. Enteritidis*.
- b) In *layer flocks* control measures will reduce and may eliminate contamination of eggs with *Salmonella*.
- c) In *poultry* for *meat* production, control measures may be implemented at *slaughter* or further down the food chain.

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### Prevention and Control measures

*Salmonella* prevention and control may be achieved by adopting Good Agricultural Practices and Hazard Analysis Critical Control Point (HACCP), and general measures detailed in Chapter 6.4. **Hygiene and Biosecurity Procedures in Poultry Production**, in combination with the following additional measures, where appropriate. No single measure used alone will achieve effective *Salmonella* control.

Additional prevention and control measures include: vaccination, competitive exclusion, ~~flock culling~~, use of organic acids, culling and product diversion to processing.

Antimicrobials should not be used to control *infection* with *Salmonella* in *poultry* because the effectiveness of the treatment is limited, may mask the infection at sampling, has the potential to produce residues in *meat* and eggs and can contribute to the development of antimicrobial resistance. Antimicrobials may also reduce normal flora in the gut and increase the likelihood of colonisation with *Salmonella*. In special circumstances antimicrobials may be used to salvage birds with high genetic value.

1. *Day-old birds* used to stock a *poultry* house should be obtained from ~~breeder~~ *flocks* and hatcheries that have been monitored according to this Chapter and in which no evidence of *S. Enteritidis* and *S. Typhimurium* has been detected.
2. *Layer* and breeder *flocks* should be stocked from *flocks* that have been monitored according to this chapter and in which no evidence of *S. Enteritidis* and *S. Typhimurium* has been detected.
3. Feed contamination with *Salmonella* is known to be a source of *infection* for *poultry*. Therefore, it is recommended to monitor the *Salmonella* status of *poultry* feed, and if found positive to take corrective measures.

~~The use of heat treated feeds with or without the addition of or feeds subjected to other bacteriostatic or bacteriostatic treatments (e.g. addition of organic acids). (e.g. organic acids) is are recommended (e.g. organic acids). Where heat treatment is not possible, the use of bacteriostatic or bactericidal treatments is recommended.~~

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Feed should be stored in clean closed containers to prevent access by wild birds and rodents. Spilled feed should be cleaned up immediately to remove attractants for wild birds and rodents.

4. Competitive exclusion may be used in *day-old birds* to reduce colonisation by *Salmonella*.

When used, competitive exclusion should be administered according to the instructions provided by the manufacturer and in accordance with the standards and recommendations of the *Veterinary Services*.

5. Vaccines are used against *Salmonella* infections caused by different serotypes in various *poultry* species, including single or combined vaccines. Vaccines produced according to the *Terrestrial Manual* should be used.

If live vaccines are used it is important that field and vaccine strains be easily differentiated in the laboratory. If serology is used as the *surveillance* method, it may not be possible to distinguish between vaccination and *infection* with a field strain.

Vaccination can be used as part of an overall *Salmonella* control programme. It is recommended that vaccination not be used as the sole control measure.

When the status of the breeding flock farm and/or the hatchery from which the *flock* originates is not known or does not comply with this Chapter, vaccination of *flocks*, starting with *day-old birds*, against the *Salmonella* serotypes known to be significant should be considered.

Vaccination against the *Salmonella* serotypes known to be significant should be considered when moving *day-old birds* to a previously contaminated shed so as to minimise the risk of the birds contracting *Salmonella* infection.

When used, vaccines should be administered according to the instructions provided by the manufacturer and in accordance with the standards and recommendations of the *Veterinary Services*.

Vaccination against *S. Enteritidis* can cause cross reactions in *Salmonella* Pullorum/*S. Gallinarum* serological tests and needs to be considered when implementing measures for these pathogens.

6. Depending on animal health, *risk assessment*, and public health policies, culling is an option to manage infected breeder and *layer flocks*. Infected *flocks* should be destroyed or *slaughtered* and processed to minimise human exposure to *Salmonella*.

If culling is not applied ~~poultry are not culled~~, eggs for human consumption should be diverted for processing for inactivation of *Salmonella*.

7. *S. Enteritidis* is characterised by its ovarian transmission pattern. Countries should set targets for eradicating (or significantly reducing) *S. Enteritidis* from egg-producing *flocks* through a guided policy for eradication from the top of the production pyramid, i.e. from grandparent *flocks* through breeder *flocks* to *layer flocks*.

8. The responsible *veterinarian* should evaluate the results of *surveillance* testing for *Salmonella* and supervise the implementation of appropriate control measures. ~~This information~~ These results should be available to the *veterinarian* before marketing if a *veterinary certificate* for *flock Salmonella* status is required. When required by the *Competent Authority*, the *veterinarian* or other person responsible for notification should notify the *Competent Authority* if the presence of *Salmonella* of the relevant serotype is confirmed.

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## Article 6.5.6.

**Prevention of *Salmonella* spread from infected flocks**

If a *flock* is found infected with specific *Salmonella* serotypes of concern, the following actions should be taken in addition to general measures detailed in Chapter 6.4. **Hygiene and Biosecurity Procedures in Poultry Production:**

1. According to the epidemiological situation, investigations should be carried out to determine the origin of the *infection*.
2. Movement of *poultry flocks* at the end of the production cycle should only be allowed for *slaughter* or destruction. Special precautions should be taken in the transport, *slaughter* and processing of the birds, e.g. they could be sent to a separate *slaughterhouse* or processed at the end of a shift before cleaning and *disinfection* of the equipment.
3. Litter should not be reused. **Used Poultry litter/faeces, carcasses** and other potentially contaminated farm waste should be disposed of in a safe manner to prevent the direct or indirect exposure of humans, livestock and wildlife to *Salmonella*. Particular care needs to be taken **when utilising** in regard **to used poultry litter/faeces used** to fertilise plants intended for human consumption. If litter is not removed, **then** it should be treated in a manner to inactivate infectious agents, to prevent the spread from one *flock* to the next.
4. Particular care should be taken in cleaning and *disinfection* of the *poultry* house and equipment.
5. Before restocking the facility, a bacteriological examination should be carried out as detailed in this Chapter and the *Terrestrial Manual*.

## Article 6.5.7.

**Recommendations for importation of live poultry (other than day-old birds)**

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

1. the *poultry* originated from an *establishment flock* that participates in a *Salmonella surveillance* programme in accordance with the recommendations in Article 6.5.4.;
2. the *poultry* originated from an *establishment flock* in which no evidence of *S. Enteritidis* and *S. Typhimurium* has been detected prior to shipment and have had no contact with birds or other material from *establishment flocks* that do not comply with this chapter;
3. the *poultry* originated from an *establishment flock* that complies with the recommendations of Chapter 6.4.

## Article 6.5.8.

**Recommendations for importation of day-old birds**

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

1. the *day-old birds* showed no clinical signs of salmonellosis on the day of shipment;
2. the *day-old birds* originated from a breeder *establishment flock* and hatchery that participate in a *Salmonella surveillance* programme in accordance with the recommendations in Article 6.5.4.;

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3. the *day-old birds* originated from a breeder ~~establishment~~ flock and hatchery in which no evidence of *S. Enteritidis* and *S. Typhimurium* has been detected and have had no contact during setting, incubation or hatching with *hatching eggs* or other material from an *establishment* that do not comply with this chapter;
4. the *day-old birds* originated from a breeder ~~establishment~~ flock and hatchery that complies with the recommendations of Chapter 6.4.;
5. the *day-old birds* were shipped in new and clean *containers*.

## Article 6.5.9.

**Recommendations for importation of hatching eggs**

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

1. the *hatching eggs* originated from a breeder ~~establishment~~ flock that participates in a *Salmonella surveillance* programme in accordance with the recommendations in Article 6.5.4.;
2. the *hatching eggs* originated from a breeder ~~establishment~~ flock in which no evidence of *S. Enteritidis* and *S. Typhimurium* has been detected and have had no contact with *poultry* or other material from an *establishment* that do not comply with this Chapter;
3. the *hatching eggs* originated from a breeder ~~establishment~~ flock that complies with the recommendations of Chapter 6.4.;
4. the *hatching eggs* were shipped in new and clean packaging materials.

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## CHAPTER 6.4.

## BIOSECURITY PROCEDURES IN POULTRY PRODUCTION

## Article 6.4.1.

**Introduction**

This chapter provides recommended biosecurity procedures in *poultry* production and is not specifically related to trade.

Infectious ~~disease~~ agents of *poultry* are a threat to *poultry* health and, at times, human health and have significant social and economic implications. In *poultry* production, especially under intensive conditions, prevention is the most viable and economically feasible approach to the control of infectious ~~disease~~ agents.

Biosecurity procedures should be implemented with the objective of preventing the introduction and dissemination of infectious ~~disease~~ agents in the *poultry* production chain. Biosecurity will be enhanced with the adoption and implementation of the principles of Good Agricultural Practices and the Hazard Analysis Critical Control Point (HACCP) system will help to achieve these objectives.

## Article 6.4.2.

**Purpose and scope**

This chapter deals with biosecurity procedures in *poultry* production. It should be read in conjunction with the Codex Alimentarius Code of Hygienic Practice for Meat (CAC/RCP 58-2005) and Code of Hygienic Practice for Eggs and Egg Products (CAC/RCP 15-1976 ~~Revision 2007~~).

~~This chapter provides general recommendations for infectious ~~disease~~ agents of *poultry*. Recommendations on specific ~~diseases~~ may be found in relevant ~~disease~~ chapters in the *Terrestrial Code*.~~

This chapter identifies several ~~relevant~~ biosecurity measures. The choice of measures to be implemented will vary according to national conditions, including *poultry* ~~disease~~ infection status, the risk of introduction and dissemination of infectious ~~disease~~ agents and the cost effectiveness of control measures.

Recommendations on specific infectious agents may be found in relevant ~~disease~~ chapters in the *Terrestrial Code*.

## Article 6.4.3.

**Definitions (for this Chapter only)**

**Breeders:** means *poultry* destined for the production of fertile eggs for incubation for the purpose of producing *day-old birds*.

**Culling:** ~~means the depopulation of a *flock* before the end of its normal production period.~~

**Live bird markets:** means markets where live birds from various sources and species are sold for *slaughter*, ~~or~~ further rearing or production.

## Article 6.4.4.

**Recommendations on the location and construction of poultry establishments**1. All establishments (poultry farms and hatcheries)

- a) A suitably isolated geographical location is recommended, ~~taking into account~~ Factors to consider include the ~~direction of the prevailing winds,~~ location of other *poultry and livestock establishments*, wild bird concentrations and the distance from roads used to transport *poultry*.
- b) *Poultry establishments* should be located and constructed to provide adequate drainage ~~away from~~ for the site. Run-off or untreated site wastewater should not discharge into waterfowl habitats.
- c) *Poultry* houses and hatcheries should be designed and constructed (preferably of smooth impervious materials) so that cleaning and *disinfection* can be carried out effectively. Ideally, the area immediately surrounding the *poultry* houses and hatcheries should be paved with concrete or other impervious material to facilitate cleaning and *disinfection*.
- d) The *establishment* should be surrounded by a security fence to prevent the entry of unwanted animals and people.
- e) A sign indicating restricted entry should be posted at the entrance to the ~~farm~~ establishment.

2. Additional measures for poultry farms

- a) *Establishments* should be designed ~~for use with~~ to house a single species and a single production type purpose. ~~Whenever possible, the design should also consider the~~ 'all-in all-out' single age group principle ~~should be used~~. If this is not feasible ~~and several flocks are maintained on one establishment,~~ the establishment should be designed so that each flock can ~~should~~ be managed as a separate *epidemiological unit*.
- b) *Poultry* houses, and buildings used to store feed, ~~or~~ eggs, or other material, should be constructed and maintained to prevent the entry of wild birds, rodents and ~~insects~~ arthropods.
- c) Where feasible, the floors of *poultry* houses should be constructed using concrete or other impervious materials and designed so that cleaning and *disinfection* can be carried out effectively.
- d) Where feasible, feed should be delivered into the farm from outside the security fence.

3. Additional measures for hatcheries

- a) The design of the hatchery should take account of work flow and air circulation needs, with 'one way flow' movement of eggs and *day-old birds* and one way air flow in the same direction.
- b) The hatchery buildings should include physical separation of areas used for the following:
  - i) personnel changing, showering and sanitary facilities;
  - ii) receipt, storage and transfer of eggs;
  - iii) incubation;
  - iv) hatching;

- v) sorting, sexing and other handling ~~placing~~ of *day-old birds* ~~in boxes~~;
- vi) storage of egg boxes and ~~chick~~ boxes for *day-old birds*, egg flats, chick box ~~pads~~ liners, chemicals and other items;
- vii) ~~washing~~ equipment washing;
- viii) waste disposal;
- ix) dining facilities for personnel;
- x) office space.

Article 6.4.5.

**Recommendations applicable to the operation of poultry establishments**

1. All establishments (poultry farms and hatcheries)
  - a) All establishments should have a written biosecurity plan. Personnel in the establishments should have access to basic training in biosecurity relevant to poultry production and understand the implications to animal health, human health and food safety.
  - b) There should be good communication between all those personnel involved in the *poultry* production chain ~~from breeding to production and consumption~~ to ensure that steps are taken to minimise the introduction and dissemination of infectious *disease* agents. ~~Personnel should have access to basic training in biosecurity relevant to poultry production and food safety.~~
  - c) Traceability at all levels of the *poultry* production chain should be possible.
  - d) Records ~~of production~~ should be maintained: on an individual flock basis and include data on bird health, production. ~~On farm, this includes cleaning and disinfection, treatment medications, vaccination, flock history, mortality and disease surveillance data. This should be maintained on an individual flock basis.~~ In hatcheries, relevant records should include data on fertility, hatchability, vaccination and treatments. Records should be maintained on cleaning and disinfection of farm and hatchery buildings and equipment. Records should be readily available for inspection on site.
  - e) ~~A veterinarian should be responsible for m~~Monitoring of poultry health on the *establishment* should be under the supervision of a veterinarian.
  - f) ~~Access to the establishment should be controlled to ensure only authorised persons and vehicles enter the site.~~
  - g) ~~Establishments should be free from~~ control be free from unwanted vegetation and be free from debris that could attract or harbour pests.
  - h) Procedures for the prevention of entry of wild birds into poultry houses and buildings, and the control of vermin such as rodents and arthropods should be implemented ~~on a routine basis.~~
  - i) Access to the establishment should be controlled to ensure only authorised persons and vehicles enter the site.

## Annex 12 (contd)

- hi) All personnel and visitors entering an *establishment* should follow a biosecurity procedure. The preferred procedure is for visitors and personnel entering the *establishment* to shower and change into clean clothes and footwear provided by the *establishment*. Where this is not practical, clean outer garments (coveralls or overalls, head covering hats and footwear) should be provided.

~~Before entering and after leaving a *poultry* house, personnel and visitors should wash their hands with soap and water use a properly maintained disinfectant footbath. The disinfectant solution in the footbath should be changed on a regular basis to ensure its efficacy, according to the manufacturer's instructions.~~

- ij) Personnel and visitors should not have had recent contact with other *poultry*, *poultry* waste, or *poultry* processing plant(s). This time period should be based on the level of risk of transmission of infectious ~~*disease*~~ agents. This will depend on the *poultry* production purpose, biosecurity procedures and ~~*disease*~~ *infection* status (e.g. the time between visiting a breeder *flock* and then a broiler *flock* would be less than the time between visiting a broiler *flock* and then a breeder *flock*).
- jk) Any vehicle entering an *establishment* should be cleaned and disinfected according to a biosecurity plan. Delivery *vehicles* should be cleaned, and *disinfected* before loading each consignment of *hatching* eggs, ~~*day-old birds*~~ or *poultry*.

## 2. Additional measures for all poultry farms

- a) Whenever possible, the 'all-in all-out' single age group principle should be used. If this is not feasible and several *flocks* are maintained on one *establishment*, each *flock* should be managed as a separate *epidemiological unit*.
- b) All personnel and visitors entering a *poultry* house should wash their hands with soap and water or sanitize them using a disinfectant. Personnel and visitors should also change footwear, use a boot spray or use a properly maintained disinfectant footbath. The disinfectant solution in the footbath should be changed on a regular basis to ensure its efficacy, according to the manufacturer's instructions.
- c) Animals, other than *poultry* of the appropriate (resident) species and age, should not be permitted access to *poultry* houses. No animals should have access to other buildings (e.g. those used to store feed, ~~or~~ eggs or other material).
- bd) The drinking water supply to *poultry* houses should be potable according to the World Health Organization or to the relevant national standard, and microbiological quality should be monitored if there is any reason to suspect contamination. The water delivery system should be cleaned and disinfected between *flocks* when the *poultry* house is empty.
- ce) Birds used to stock a *poultry* house should preferably be obtained from breeder *flocks* and hatcheries that are free from vertically transmitted infectious ~~*disease*~~ agents.
- df) Heat treated feeds with or without the addition of other bacteriocidal ~~static~~ or bacteriostatic ~~cidal~~ treatments (e.g. addition of organic acids) is are recommended (e.g. ~~organic acids~~). Where heat treatment is not possible, the use of bacteriostatic or bactericidal treatments is recommended.

Feed should be stored in a manner to prevent access by wild birds and rodents. Spilled feed should be cleaned up immediately to remove attractants for wild birds and rodents. The movement of feed between *flocks* should be avoided.

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- eg) The litter in the *poultry* house should be kept dry and in good condition.
- fh) Dead birds should be removed from *poultry* houses as quickly as possible ~~but~~ at least daily. These should be disposed of in a safe and effective manner.
- gi) Personnel involved in the catching of birds should be adequately trained in bird handling and basic biosecurity procedures.
- hj) To minimise stress ~~p~~*Poultry* should be transported in well ventilated *containers* and should not be over crowded. Exposure to extreme temperatures should be avoided.
- ik) *Containers* should be cleaned and disinfected between each use, or disposed of in a safe manner.
- jl) When a *poultry* house is depopulated, it is recommended that all faeces and litter be removed from the house and disposed of in a safe manner to minimise the risk of dissemination of infectious agents ~~approved by the Veterinary Services~~.

If litter is not removed and replaced between *flocks* then the litter should be treated in a manner to ~~inactivate infectious disease agents, to prevent~~ minimise the risk of dissemination of infectious ~~disease~~ agents from one *flock* to the next.

After removal of faeces and litter, cleaning and *disinfection* of the *poultry house* building and equipment should be done in accordance with Chapter 4.13.

~~All litter removed from a *poultry* house should be disposed of in a safe manner to prevent the dissemination of infectious agents.~~

- km) For *poultry flocks* that are allowed to range outdoors, feeders, feed and other items which may attract wild birds should be kept indoors. attractants to wild birds should be minimised e.g. feeders should be kept inside the poultry house. *Poultry* should not be allowed access to sources of contamination (e.g. household waste, litter storage areas, other ~~farm~~ animals, stagnant water and water of unknown quality and litter storage areas). The nesting area should be inside the *poultry* house.
- ln) To avoid the development of antimicrobial resistance, antimicrobials should be used according to relevant directions of the *Veterinary Services* and manufacturer's instructions and in accordance with *Terrestrial Code* Chapters 6.8, 6.9., 6.10. and 6.11.

### 3. Additional measures for layers

Refer to Section 3 of the Codex Alimentarius Code of Hygienic Practice for Eggs and Egg Products (CAC/RCP 15-1976).

### 3.4. Additional measures for breeders ~~farms~~

- a) Nest box litter and liners should be kept clean.
- b) *Hatching eggs* should be collected at frequent intervals, at least daily, and placed in ~~a~~ new or clean and *disinfected* packaging material.
- c) Grossly dirty, ~~broken~~, cracked, broken, or leaking eggs should be collected separately and should not be used as *hatching eggs*.

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- d) *Hatching eggs* should be cleaned and sanitized as soon as possible after collection using an approved sanitising agent, in accordance with the manufacturer's instructions.
- e) *Hatching eggs* or their packaging materials should be marked to assist traceability and veterinary investigations.
- f) The ~~sanitised~~ *hatching eggs* should be stored in a dedicated room as soon as possible after cleaning and sanitisation ~~collection~~. Storage conditions should minimise the potential for microbial contamination and growth and ensure maximum hatchability. The room should be well ventilated, kept clean, and regularly *disinfected* using disinfectants approved for this purpose.

45. Additional measures for hatcheries

- a) Dead in shell embryos should be removed from hatcheries as soon as they are found and disposed of in a safe and effective manner.
- b) All hatchery waste, garbage and discarded equipment should be contained or at least covered while on site and removed from the hatchery and its environs as soon as possible.
- c) After use, hatchery equipment, tables and surfaces should be promptly and thoroughly cleaned and *disinfected* with an approved disinfectant.
- d) Egg handlers, ~~chick~~ sexers and ~~chick~~ handlers of day-old birds should wash their hands with soap and water before commencing work and between working with batches of *hatching eggs* or *day-old birds* from different breeder *flocks*.
- e) *Hatching eggs* and *day-old birds* from different breeder *flocks* should be ~~kept separate~~ identifiable during incubation, hatching, sorting and transportation.
- f) *Day-old birds* should be delivered to the farm in new *containers* or in clean, *disinfected containers*.

Article 6.4.6.

**Prevention of further dissemination of infectious ~~disease~~ agents of poultry**

When a *flock* is suspected or known to be infected ~~or determined to be infected~~, in addition to the general biosecurity measures described previously, management procedures should be adjusted to effectively isolate ~~the infected flock~~ it from other *flocks* on the *establishment* and other epidemiologically related *establishments*. The following measures are recommended:

1. Personnel should ~~be trained in the management of~~ suspected or infected *flocks* to ~~prevent~~ minimise the risk of the dissemination of infectious ~~disease~~ agents to other *flocks* and *establishments*, and to humans. ~~(Relevant measures include: handling of an infected flock separately, last in sequence and the use of dedicated personnel, and clothing and equipment).~~
2. A veterinarian should be consulted immediately.
3. When infection has been confirmed, ~~e~~ Epidemiological investigations should be carried out to determine the origin and route of transmission of the infectious ~~disease~~ agent.
34. Poultry carcasses, litter, ~~faeces~~ and other potentially contaminated farm waste should be disposed of in a safe manner to ~~prevent~~ minimise the risk of dissemination of infectious ~~disease~~ agents. The disposal method used will depend on the infectious agent involved.

Annex 12 (contd)

45. Depending on the epidemiology of the ~~disease~~ **infectious agent disease**, the results of a *risk assessment*, and public and animal health policies, ~~culling destruction or slaughter of a flock before the end of the normal production period~~ may be used ~~to manage infected flocks~~. When infected *flocks* are destroyed or *slaughtered* they should be processed in a manner to minimise exposure of humans and other *flocks* to the infectious ~~disease~~ agent, and in accordance with recommendations of the *Veterinary Service* and relevant Chapters in the *Terrestrial Code*. Based on *risk assessment*, non-infected, high risk *flocks* may be ~~culling destroyed or slaughtered before the end of their normal production period~~. Movement of culled *poultry* should only be allowed for *slaughter* or destruction.

Before restocking, the *poultry* house including equipment ~~or establishment~~ should be cleaned, *disinfected* and tested to verify that the cleaning has been effective. Special attention should be paid to feed equipment and water systems.

Microbiological monitoring of the efficacy of *disinfection* procedures is recommended when pathogenic agents have been detected in the previous *flock*.

56. Depending on the epidemiology of the ~~disease~~ **infectious agent disease**, *risk assessment*, vaccine availability and public and animal health policies, vaccination is an option to minimise the dissemination of the infectious ~~disease~~ agent. When used, vaccines ~~poultry~~ should be administered ~~vaccinated~~ in accordance with the directions of the *Veterinary Services* and the manufacturer's instructions. Recommendations in the *Terrestrial Manual* should be followed as appropriate.

## Article 6.4.7.

**Recommendations to prevent the dissemination of infectious ~~disease~~ agents to and from live bird markets**

1. Personnel should be educated on the significance of infectious ~~disease~~ agents and the need to apply biosecurity practices to prevent dissemination of these agents. Education should be targeted to personnel at all levels of operations in these markets (e.g. drivers, owners, handlers, processors).

Programmes should be implemented to raise consumer awareness ~~of consumers~~ about ~~of~~ the risks associated with activities of live bird markets

2. Personnel should wash their hands with soap and water before and after handling birds.
3. Birds from diseased flocks should not be transported to live bird markets.
34. All *containers* and *vehicles* should be cleaned and *disinfected* every time they leave the market.
45. Live birds that leave the market and go to a farm should be housed kept separately from other birds for a period of time to minimise the potential dissemination of infectious ~~disease~~ agents of *poultry*.
56. Periodically the market should be emptied, cleaned and *disinfected*. This is of particular importance when an infectious ~~disease~~ agent of *poultry* deemed significant by the *Veterinary Services* has been identified in the market or the region.

Annex 12 (contd)

67. Where feasible, *surveillance* should be carried out in these markets to detect infectious ~~disease~~ agents of *poultry*, ~~especially those agents of zoonotic significance~~. The *surveillance* programme should be determined by the *Veterinary Services*, and in accordance with recommendations in relevant ~~disease~~ ~~specific~~ chapters of the *Terrestrial Code*.
78. ~~Attempts~~ Efforts should be made to ensure the possibility of tracing all birds entering and leaving the markets.

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