Terrestrial Animal Health Standards Commission Report February 2015

REPORT OF THE MEETING OF THE OIE AD HOC GROUP ON SALMONELLA IN CATTLE

Paris (France), 16–18 December 2014

The OIE ad hoc Group on Salmonella in cattle (the ad hoc Group) met at OIE Headquarters in Paris from 16 to 18 December 2014.

The members of the ad hoc Group and other participants are listed at Annex I. The adopted Agenda and Terms of Reference are given at Annex II and Annex III, respectively.

The ad hoc Group agreed that the prevention and control of Salmonella in cattle will reduce the burden of disease in cattle and the risk of human illness through food-borne contamination, as well as reducing human infections resulting from direct or indirect contact with cattle. The ad hoc Group therefore considered that the development of the chapter on the prevention and control of Salmonella in commercial cattle production systems was appropriate.

The ad hoc Group developed the draft chapter taking into account the draft Chapter 6.X. Prevention and control of Salmonella in pig herds. The chapter complements the Codex Alimentarius Commission ‘Guidelines for the control of nontyphoidal Salmonella spp. in beef meat’, currently under development.

The objective of this chapter is to provide recommendations for the reduction of Salmonella in cattle in primary production in order to reduce the level of the pathogen (i) entering the slaughterhouse/abattoir (and therefore decrease the risk of beef contamination during slaughter and dressing procedures); (ii) in milk and milk products; and (iii) in the farm environment, thereby reducing the risk of dissemination of Salmonella and contact infections in humans.

The ad hoc Group acknowledged the diversity of commercial cattle production systems. It also recognised the variable prevalence of Salmonella in different cattle populations, the variation in importance of different Salmonella serotypes to cattle and human health, and the differing country approaches to the control of Salmonella in primary production.

The ad hoc Group included an article on definitions for cattle production systems to capture the diversity of cattle production systems, and enable the development of recommendations that take into account of this diversity. These definitions are based on those found in the Terrestrial Code Chapter 7.9. Animal welfare and beef cattle production systems.

The recommendations developed for prevention and control of Salmonella focus on the major sources and transmission pathways within and between cattle establishments. The generic biosecurity principles incorporated in these recommendations are also likely to assist in the control of other pathogens commonly encountered in commercial cattle production systems.
The *ad hoc* Group developed recommendations for different stages of cattle production, feed and water, intensive to extensive cattle production systems, transport, and lairage. They include generic biosecurity procedures as well as specific *Salmonella* prevention and control measures.

Sampling and testing procedures which may be used for detection of *Salmonella* in cattle were also considered where these are not currently covered in sufficient detail in Chapter 2.9.9. of the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*.

The new draft Chapter 6.X. Prevention and control of *Salmonella* in commercial cattle production systems is presented in Annex IV.

### MEETING OF THE OIE AD HOC GROUP ON SALMONELLA IN CATTLE

Paris (France), 16–18 December 2014

---------------

List of participants

#### MEMBERS OF THE *AD HOC* GROUP

**Dr Rob Davies (Chair)**  
Animal and Plant Health Agency  
New Haw, Addlestone  
Surrey KT15 3NB  
Weybridge  
UNITED KINGDOM  
Rob.Davies@apha.gsi.gov.uk

**Dr Katinka de Balogh**  
Senior Officer  
Agriculture and Consumer Protection  
Department  
Animal Production and Health Division -  
FAO  
Viale delle Terme di Caracalla  
00100 Rome  
ITALY  
Katinka.DeBalogh@fao.org

**Dr Guy Heaton Loneragan**  
Professor of Food Safety and Public Health  
Department of Animal and Food Sciences  
College of Agriculture and Natural Resources  
Texas Tech University, Lubbock, Texas 79409-2141  
UNITED STATES  
Guy.Loneragan@TTU.edu

**Dr Moses Gathura Gichia**  
Department of Veterinary Services  
Private Bag 00625  
Kangemi  
NAIROBI  
Phone: +254 733557134  
mosesgichia@gmail.com

**Dr Glen Edmunds**  
Director Food Safety and Animal Health  
Food Exports Branch  
Department of Agriculture  
AUSTRALIA  
Phone: +61 7 3246 8740  
glen.edmunds@agriculture.gov.au

**Dr Gudrun Sandø**  
Food and Feed Safety  
Danish Veterinary and Food Administration  
Stationsparken 31, 2600 Glostrup  
DENMARK  
gus@fvst.dk

#### OTHER PARTICIPANTS
MEETING OF THE OIE AD HOC GROUP ON SALMONELLA IN CATTLE
Paris (France), 16–18 December 2014

Adopted agenda

Welcome

1. The OIE standard setting process and work in animal production food safety and relevant Codex Alimentarius standards.

2. Development of a new draft Chapter 6.X. on the prevention and control of Salmonella in cattle in order to reduce the burden of disease in cattle and the risks to human health.

Terms of Reference

Purpose of the meeting

To develop a new draft Chapter 6.X. Prevention, detection and control of Salmonella in cattle, for Section 6: Veterinary Public Health of the Terrestrial Animal Health Code, dealing with the management of this pathogen in cattle to manage risks to human health, taking account of relevant Codex guidelines, and OIE standards.

OIE standard setting work in animal production food safety

The OIE and the Codex Alimentarius (CAC) are two of the three international standard setting organizations recognized under the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement). In the context of the SPS Agreement, the OIE is responsible for setting standards in the domain of animal health (including zoonotic diseases) and the CAC in the domain of food safety.

Since 2001, at the request of its Members, the OIE mandate has included setting standards for animal production food safety, i.e. the management of risks arising at the level of the farm through to primary processing. In 2002, the OIE established a Working Group on Animal Production Food Safety with the aim of improving the coordination and harmonisation of standard setting activities of OIE and CAC. The Secretary of Codex and, on an observer basis, the Chair of Codex regularly attend the annual meeting of the Working Group. Through this mechanism and through participation in each other’s standard setting procedures, the OIE and CAC collaborate closely in the development of standards relevant to the whole food production continuum, taking care to avoid gaps, duplications and contradictions within and between SPS standards.

Salmonella in cattle

Salmonellosis is one of the most frequently reported food-borne diseases worldwide and cattle meat is considered to be an important source of this food-borne infection.

Since 2010 the APFSWG has been exploring the need for and feasibility of developing OIE standards on the control of Salmonella spp. in food producing animals other than poultry (i.e. pigs, cattle, small ruminants) with the purpose of reducing food-borne illness. Based on a recent literature review requested by the APFSWG, ‘A review of the scientific literature on the control of Salmonella spp. in food producing animals other than poultry’ (Simone Belluco et al., in press) and other publications, the APFSWG noted that a) salmonellosis attributed to cattle and pigs is an important cause of illness in humans, b) effective control measures can be implemented at the farm level and, c) Codex is undertaking work in this area.

They recommended that, should the Codex work proceed, the OIE should develop recommendations for the pre-harvest management and control of Salmonella spp. in pigs and cattle to complement the Codex guidelines and ensure a whole food chain approach to Salmonella risk management in these species.

At the February 2014 meeting of the Terrestrial Animal Health Standards Commission (Code Commission), they agreed that given that the Codex has commenced new work on guidelines for the Control of nontyphoidal Salmonella spp. in pigs and cattle, the OIE should develop recommendations for the pre-harvest management and control of Salmonella spp. in pigs and cattle to complement the Codex guidelines and ensure a whole food chain approach to Salmonella risk management in these species.
Salmonella spp. in pork and beef meat, the OIE should commence work in this area to complement the Codex work to ensure that standards cover the farm to fork continuum for this pathogen.

In September 2014, the OIE convened an ad hoc group to develop a draft chapter on the Prevention and control of Salmonella in pig herds. This chapter was reviewed by the Code Commission, at their September 2014 meeting, and circulated to Member Countries for comments as part of their report.

The OIE agreed that work on standard development for Salmonella in cattle should follow the work undertaken in pigs.
Relevant considerations

- The OIE has a mandate to develop international standards for animal production food safety, with a primary focus on measures applicable to zoonotic pathogens, for which measures can most effectively be implemented at the animal production level.

- As *Salmonella* in cattle is not an OIE listed disease and the impact on animal health (and direct economic impact) is low, this chapter will be part of Section 6: Veterinary Public Health of the *Terrestrial Code*.

- Standards for zoonotic pathogens at the animal production level should take into account:
  - feasible and cost effective means of controlling the pathogen at the animal level;
  - feasible and cost effective measures for animals and animal products that are internationally traded;
  - existing Codex standards and guidelines of the WHO and FAO.

- The *Terrestrial Code* contains general recommendations on veterinary public health and specific recommendations on controlling Salmonellosis in poultry.

- The OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* (2014) includes a chapter on for Salmonellosis (Chapter 2.9.9.) which includes recommendations on diagnostic techniques, vaccines and competitive exclusion.

- The format of the new Chapter X.X. should follow the style of existing *Terrestrial Code* chapters.


Relevant documents

1. A review of the scientific literature on the control of *Salmonella* spp. in food producing animals other than poultry (Simone Belluco *et al*., in press).


5. Draft Codex Guidelines for the Control of nontyphoidal *Salmonella* spp. in pork and beef meat (under development).


Terrestrial Animal Health Standards Commission Report February 2015

**Draft Chapter 6.X.**

**Prevention and Control of Salmonella in Commercial Cattle Production Systems**

Article 6.X.1.

Introduction

Nontyphoidal salmonellosis is one of the most common food-borne bacterial diseases in the world with *Salmonella* Enteritidis and *S*. Typhimurium (including monophasic variants) the predominant serotypes identified in most countries. In addition, a limited number of other serotypes associated with cattle may cause salmonellosis in humans, for example *S*. Dublin and *S*. Newport.

As is the case in most food producing animals, *Salmonella infection* in cattle is mostly subclinical, although clinical *disease* such as enteritis, septicemia or abortion can occur. Subclinical *infection* can be of variable duration including a carrier state and can play an important role in the spread of *Salmonella* within and between herds and pose a public health risk.

*Herd size* and stocking density may influence the *risk* of introduction, dissemination or persistence of *Salmonella*; however, this is also dependent on geographical region, husbandry and other factors such as season and age.

*Salmonella* serotypes and their *prevalence* in cattle may vary considerably between farms, countries and regions. It is important for *Veterinary Authorities* to consider types of *Salmonella*, their occurrence and the *disease* burden in cattle and human populations if developing and implementing strategies for the prevention and control of *Salmonella* in cattle.

Article 6.X.2.

Definitions

**Commercial cattle production systems:** means those systems where the purpose of the operation includes some or all of the breeding, rearing and management of cattle for the production of *meat* and *meat products* or *milk* and *milk products*.

**Intensive cattle production systems:** means commercial systems where cattle are in confinement and are fully dependent on humans to provide for basic animal needs such as food, shelter and water on a daily basis.
**Extensive cattle production systems:** means commercial systems where cattle have the freedom to roam outdoors, and where the cattle have some autonomy over diet selection (through grazing), water consumption and access to shelter.

**Semi-intensive cattle production systems:** means commercial systems where cattle are exposed to any combination of both intensive and extensive husbandry methods, either simultaneously or variably according to changes in climatic conditions or physiological state of the cattle.
Article 6.X.3.

**Purpose and scope**

The purpose of this chapter is to provide recommendations for the prevention and control of *Salmonella* in cattle in order to reduce the burden of disease in cattle and the risk of human illness through food-borne contamination as well as human infections resulting from direct or indirect contact with cattle (e.g. via faeces or abortion material).

This chapter applies to cattle (*Bos taurus*, *B. indicus* and *B. grunniens*), water buffaloes (*Bubalus bubalis*) and wood bison (*Bison bison* and *B. bonasus*) kept in commercial cattle production systems.

This chapter should be read in conjunction with the Codex Alimentarius Code of Hygienic Practice for Meat (CAC/RCP 58-2005) and the Codex Alimentarius Code of Hygienic Practice for Milk and Milk Products (CAC/RCP 57-2004).

Article 6.X.4.

**Objectives of prevention and control measures**

It is recommended that prevention and control be focused on those types of *Salmonella* of greatest consequence to cattle or public health.

Reduction of *Salmonella* in cattle in primary production may reduce the level of the pathogen:

1) entering the *slaughterhouse/abattoir* and therefore decrease the risk of beef contamination during slaughter and dressing procedures;

2) in milk and milk products;

3) in the farm environment, thereby reducing the risk of dissemination of *Salmonella* and contact infections in humans.

Articles 6.X.5. to 6.X.14. provide recommendations for the prevention and control of *Salmonella* in cattle.

These recommendations may also have beneficial effects on the occurrence of other infections and diseases.

Article 6.X.5.

**Location and design of cattle establishments**

When making decisions on the location and design of cattle *establishments*, it is recommended that mitigation of the risk of transfer of pathogens, including *Salmonella*, from major sources of contamination be considered. Sources of *Salmonella* may include other livestock establishments or areas of application or disposal of contaminated waste or effluent. Transfer of *Salmonella* between establishments may involve carriage by wild birds, rodents, flies and other wildlife.

It is recommended that the design of intensive cattle systems consider the following:

1) adequate drainage for the site and control of run-off and untreated waste water;

2) use of materials for construction that facilitate effective cleaning and disinfection;
3) control of the points of entry;
4) cattle handling and movements to minimise stress and spread of *Salmonella infection*;
5) separation of cattle of different risk status;
6) restriction of entry of wild birds, rodents, flies and other relevant *wildlife*.

In extensive cattle production systems, location and design options may be limited; however, applicable biosecurity measures should be considered.

**Article 6.X.6.**

**Biosecurity management plan**

Biosecurity measures that include management and physical factors designed to reduce the risk of introduction, establishment and spread of animal *diseases, infections or infestations* to, from and within an animal population would also be expected to assist with the prevention and control of *Salmonella*.

When developing a biosecurity management plan it is recommended that the following be taken into consideration:

1) Veterinary supervision of cattle health.
2) Management of introduction and mixing of cattle.
3) Training of personnel in their responsibilities and their role in animal health, human health and food safety.
4) Maintenance of records including data on cattle health, production, movements, medications, *vaccination*, and mortality, and cleaning and *disinfection* of farm buildings and equipment.
5) Availability of test results to the farm operator when *Salmonella surveillance* is conducted.
6) Removal of unwanted vegetation and debris that could attract or harbour pests around cattle premises.
7) Minimising the entry of wild birds into cattle buildings and feed stores.
8) Cleaning and *disinfection* procedures for buildings in which cattle are handled or housed. For example, the cleaning and *disinfection* procedures for intensive calf housing, calving areas and sick pens after emptying may include feeders, drinkers, floor, walls, aisles, partitions between pens, and...
ventilation ducting.

When disinfectants are used they should be applied at an effective concentration after a complementary cleaning procedure.

9) Control of pests such as rodents and arthropods when required and regular assessment of effectiveness.

10) Control of persons and vehicles entering the establishment.

11) Cleaning and disinfection of vehicles and equipment identified as a risk.

12) Storage and disposal of cattle carcasses, bedding, faeces and other potentially contaminated farm waste in a safe manner to minimise the risk of dissemination of *Salmonella* and to prevent the direct or indirect exposure of humans, livestock and wildlife to *Salmonella*. Particular care to be taken when cattle bedding and faeces are used as fertiliser for horticultural crops intended for human consumption.

**Article 6.X.7.**

**Management of cattle introductions**

To minimise the risk of introducing *Salmonella* through cattle introductions, it is recommended that:

1) There be good communication within the cattle industry to raise awareness of the risk of introducing *Salmonella* through cattle introductions.

2) The number of separate sources of cattle for breeding or rearing be kept to as few as possible. For example in a closed dairy herd it is possible to introduce new genetic material solely by semen or embryos.

3) If possible, cattle be sourced directly from herds of origin because live animal markets or other places where cattle from multiple properties are mixed for resale may increase the risk of spread of *Salmonella* and other infections among cattle.

4) Newly introduced cattle be kept separate from the rest of the herd for a suitable period before mixing with other cattle, e.g. four weeks.

5) Where appropriate, for example with cattle of unknown status, pooled faecal samples from introduced cattle could be taken to assess their *Salmonella* status.

**Article 6.X.8.**

**On farm cattle management**

To minimise the risk of transferring *Salmonella* among cattle, it is recommended that:

1) Cattle with suspected salmonellosis be separated from healthy cattle.

2) Care of healthy cattle be carried out prior to care of cattle with suspected salmonellosis.

3) Priority be given to the hygienic management of calving areas, for example keeping perinatal cattle separated from sick cattle and maintaining a clean environment.

4) When possible, the ‘all-in-all-out’ principle for production cohorts be used. In particular, the mixing of different age groups during rearing of calves should be avoided.

5) Consideration be given to the potential for between-herd transmission of *Salmonella* via rearing and grazing of cattle from multiple sources on a single site, for example shared pasture and heifer rearing.

6) Consideration be given to the potential for between-herd transmission of *Salmonella* through direct contact between cattle across boundary lines or indirectly through contamination of water courses.
Article 6.X.9.

**Feed and water**

1. **Compound feed and feed ingredients**

   Compound feed and feed ingredients can be sources of *Salmonella* infection for cattle. For the effective control of *Salmonella* it is recommended that:

   a) Where appropriate, compound feed and feed ingredients be produced, handled, stored, transported and distributed according to Good Manufacturing Practices, considering Hazard Analysis Critical Control Points (HACCP) principles and recommendations in accordance with Chapter 6.3.

   b) Compound feed and feed ingredients be transported and stored in a hygienic manner that minimises access by wild birds, rodents and other wildlife.

2. **Water**

   Where there is reason to be concerned about infection of cattle with *Salmonella* from contaminated water, measures be taken to evaluate and minimise the risk. For example sediment in water troughs may act as a reservoir for contamination.

Article 6.X.10.

**Prevention, treatment and control measures**

1) **Antimicrobial agents** may modify normal flora in the gut and increase the likelihood of colonisation by *Salmonella*. If antimicrobial agents are used, they should be used in accordance with Chapter 6.9.

   Antimicrobial agents should not be used to control subclinical infection with *Salmonella* in cattle because the effectiveness of the treatment is limited, they may increase the risk of *Salmonella* colonisation, and their use can contribute to the development of antimicrobial resistance.

2) **Vaccination** may be used as part of a *Salmonella* control programme. Vaccine production and use should be in accordance with the *Terrestrial Manual*. The protective effect of vaccines is generally serotype specific and few licensed vaccines are available for cattle.

3) Use of probiotics may reduce colonisation of cattle by *Salmonella* and shedding of *Salmonella*; however, efficacy is variable.

4) Because conditions such as liver fluke and infection with bovine viral diarrhoea virus may increase the susceptibility of cattle to *Salmonella*, control of these conditions is recommended.
5) The immune status of calves is important and therefore care should be taken to ensure that newborn calves consume adequate amounts of high quality colostrum.

Article 6.X.11.

Transportation

The relevant recommendations in Chapter 7.3. apply.

When transporting animals from multiple establishments, it is recommended that the Salmonella status of the establishments be considered to avoid cross-contamination of cattle.
Article 6.X.12.

Lairage

Relevant aspects of lairage management include consideration of effective cleaning and disinfection between groups, minimising mixing of separate groups and managing stress.

In addition the relevant recommendations in Articles 7.5.1., 7.5.3. and 7.5.4. apply.

Article 6.X.13.

Surveillance in cattle

Surveillance data provide information to assist the Competent Authorities in their decision making regarding the requirement for, and design of, control programmes. Sampling and testing methods, frequency and type of samples required should be determined by the Veterinary Services.

Standards for diagnostic tests are described in the Terrestrial Manual. In addition, other sampling and testing methodologies such as testing of bulk milk or serum samples by ELISA may provide useful information on herd or individual animal status. Boot swab samples from communal areas in cattle housing, slurry samples or lymph nodes collected post-mortem can also be useful for microbiological testing. Some types of Salmonella such as S. Dublin can be difficult to detect through microbiological methods.

If vaccination is used, it may not be possible to distinguish between vaccinated and infected cattle by means of serological testing.

Article 6.X.14.

Prevention and control in low prevalence regions

In regions where Salmonella infection of cattle is uncommon, it may be possible to eliminate infection from herds through a combination of herd surveillance, individual testing, movement controls, and possible removal of persistent carriers.

---

Text deleted.