

# codex alimentarius commission



FOOD AND AGRICULTURE  
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**Agenda Item 7**

**CX/FH 07/39/7  
October 2007**

## **JOINT FAO/WHO FOOD STANDARDS PROGRAMME**

### **CODEX COMMITTEE ON FOOD HYGIENE**

**Thirty-ninth Session**

**New Delhi, India, 30 October – 4 November 2007**

#### **DISCUSSION PAPER ON THE PROPOSED DRAFT GUIDELINES FOR THE CONTROL OF *CAMPYLOBACTER* AND *SALMONELLA* SPP. IN BROILER (YOUNG BIRD) CHICKEN MEAT**

**Prepared by New Zealand and Sweden with the assistance of Australia, Austria, Brazil, Canada, Denmark, the European Community, Finland, Germany, Hungary, Indonesia, Ireland, The Netherlands, Peru, Switzerland, Thailand, United Kingdom, United States of America, FAO, WHO, ALA , IACFO-CSPI**

#### **Background**

The Codex Committee on Food Hygiene (CCFH) at its 38<sup>th</sup> Session, agreed that a single proposal (rather than the separate proposals individually submitted) for the development of Guidelines for the control of *Campylobacter* and *Salmonella* spp. in broiler (young bird) chicken meat, be given highest priority in any new work undertaken. The Committee requested that a revised proposal be submitted to the 30<sup>th</sup> Session of the Codex Alimentarius Commission (CAC) for approval as new work, taking into account the discussion in CCFH and the need for the proposal to conform to the generic CCFH template. The Committee also agreed to establish a physical working group (WG), led by Sweden and New Zealand, to develop a Discussion Paper for the next session of CCFH that presented the framework and expected content of the proposed guidelines.

The 30<sup>th</sup> Session of the CAC (Rome, 2-7 July 2007) decided that the scope of the new work be expanded to cover chicken meat in general (not just young birds).

The CAC noted that this decision would impact on the proposed work plan for the new work and might require a longer time-frame for the completion of the guidelines since the guidelines would follow a novel farm-to-fork approach based on quantitative risk assessment to the widest extent practicable. It was acknowledged that whilst there is considerable existing scientific data and a risk assessment by JEMRA for broiler chickens, there is a lack of information for non-broiler chickens which have different risk profiles, production and processing conditions. A new worldwide call for scientific data for the latter category of chicken meat will be necessary.

The CCFH was invited to consider re-scoping the document, as appropriate, taking into account all relevant factors including the availability of risk assessments.

#### **Working Group**

Given the options open to the WG in developing an approach to the proposed guidelines (see Report of the 38<sup>th</sup> Session of CCFH), preliminary drafting of the Discussion Paper for CCFH prior to the meeting of the WG was not attempted. Instead, two calls for scientific data were made to all Codex Members and the accumulated information, together with existing Codex

texts relevant to the topic<sup>1</sup>, was used to develop technical resource documents to assist the WG (see below). Draft preliminary risk profiles for *Campylobacter* and *Salmonella* spp. in broiler chicken meat were developed according to Codex recommendations for the use of the WG. Example food commodity flow pathways were prepared for consideration and refinement by the WG.

Sweden and New Zealand convened the physical WG in Uppsala, Sweden. Following presentation of the scoping paper, the WG began its work by discussing a number of broad issues relating to development of guidelines for control of *Campylobacter* and *Salmonella* spp. in broiler chicken meat. It was recognised that development of the proposed draft guidelines presented challenges unique to the work of Codex to date but it was also recognised that the proposed work offered the opportunity to take a new approach to development of guidelines for a specified hazard/food commodity combination. This new approach should give effect to the CAC strategic goal of “Promoting widest application of scientific principles and risk analysis” and the principle stated in the Statements of Principle Relating to the Role of Food Safety Risk Assessment that “Health and safety aspects of Codex decisions and recommendations should be based on a risk assessment, as appropriate to the circumstances”<sup>2</sup>.

### **Outputs of the Working Group**

The WG focused on preliminary activities relevant to the development of Codex guidelines for *Campylobacter* and *Salmonella* spp. in broiler chicken meat, as described in the timetable for the proposal for new work presented to the 30<sup>th</sup> Session of the CAC in 2007.

In addition to general material developed in plenary sessions, the WG used the available resource documents to develop:

- Risk profiles
- Material related to potential measures based on Good Hygienic Practice (GHP)
- Material related to potential measures based on hazard control

If the CCFH accepts the suggestions in this Discussion Paper on the approach taken to the new work and the framework and expected content of the proposed guidelines, further WGs will be convened as in the work plan. This will include development of potential control measures based on risk assessment.

### **Principles to guide development of the proposed guidelines**

The WG agreed on a number of principles that would guide development of the proposed guidelines. The draft guidelines would:

- Reflect, to the extent practicable, the four generic activities involved in application of a risk management framework (RMF) to food safety issues.
- Build on general food hygiene provisions already established in the Codex system and develop potential control measures specific for *Campylobacter* and *Salmonella* spp. in broiler chicken meat<sup>3</sup>.
- Incorporate a “production-to-consumption” flow diagram approach so as to identify all steps in the food chain where available control measures can potentially be applied
- Recognise that significant differences occur in production and processing systems between countries and provide a range of possible control measures that can be chosen and implemented at the national level

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<sup>1</sup> *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1 – 1969) and the *Code of Hygienic Practice for Meat* (CAC/RCP 56-2005)

<sup>2</sup> CAC Procedural Manual 16<sup>th</sup> Edition, page 166

<sup>3</sup> Now, and throughout the following text developed by the WG, extended in scope to chicken meat

- Provide guidance on potential control measures for application at single or multiple steps in the following categories:
  - Those based on good hygienic practice (GHP)
  - Those based on hazard control
  - Those based on risk assessment
- Present control measures based on hazard control or risk assessment, either alone or in combination, as examples of the value of a quantitative approach to hazard reduction throughout the food chain and the likely reductions to food borne risks in particular food production and processing scenarios.
- Recognise the high level of involvement of industry in ensuring the safety of broiler chicken meat and tailor the draft guidelines for use by that stakeholder group as well as government Competent Authorities.

The WG considered that by applying the above principles, the proposed guidelines would provide a scientifically sound international tool for robust application of GHP, HACCP and risk assessment approaches to control of *Campylobacter* and *Salmonella* spp. in broiler chicken meat according to national risk management decisions. The guidelines would provide both qualitative and quantitative examples of a range of control options and their potential interactions, both individually and at groups of steps in the food chain, and their likely outcomes in terms of levels of hazard control and/or levels of likely risk reduction<sup>4</sup>. The actual choice of control measures and their level of stringency would be made at the national (and individual food production and processing system) level, according to national risk management inputs.

### **Risk management framework**

The WG agreed that the proposed guidelines should reflect the four generic activities involved in application of a risk management framework (RMF) to a food safety issue<sup>5</sup>. In effect, the CCFH is an international risk manager that firstly carries out “*Preliminary Risk Management Activities*” related to a specific food safety issue, including risk profiling to guide further actions. The second step in the RMF is “*Identification and Selection of Risk Management Options*” and this is reflected in the intention of the WG to develop guidelines on a range of potential controls for selection as relevant by risk managers at the national level. Although Codex itself does not implement measures, guidance on “*Implementation*” of specific measures for control of *Campylobacter* and *Salmonella* spp. in broiler chicken meat at the national level will be valuable to governments and industry. The final step in application of a RMF is “*Monitoring and Review*” and a section in the draft guidelines on this topic provides the opportunity to separate those control measures that are actually related to a “lot” of the food commodity and decisions on its safety (e.g. microbiological testing of the product for specific pathogens) from those monitoring activities that provide information on the ongoing performance of the overall food control system (e.g. national microbiological databases).

### **Flow diagram approach**

Several formats are available to extend the generic guidelines on food hygiene in the Codex system to specific guidance on pathogen/food commodity pairs. Given the general principles developed for this project, the WG decided that a flow diagram format would significantly enhance the practical application of the proposed guidelines and provide maximum flexibility and technical utility at the national (and individual production and processing) level.

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<sup>4</sup> This provides much more flexibility to risk managers, especially in the design of HACCP plans and their validation, than limiting quantitative advice in a Codex guideline document to a single potential measure at a specific step e.g. a microbiological criterion at the end of primary processing

<sup>5</sup> Recommended International Code of Practice - General Principles of Food Hygiene (Section 5.1); Principles and Guidelines for Microbiological Risk Management (CAC/GL 63-2007).

Draft flow diagrams that would form a substantive backbone for development of the proposed guidelines are presented in Annex 1.

## **Linkages with work of the OIE Animal Production and Food Safety Working Group**

The WG in developing a “production-to-consumption” guideline for control of *Campylobacter* and *Salmonella* spp. in broiler chicken meat recognised the importance of links to the work programme of the OIE APFSWG (Animal Production and Food Safety Working Group). All steps in the food chain have to be included and the cooperation with OIE in food safety aspects of live animal production will be sought as the proposed guidelines develop.

The CAC at its 30<sup>th</sup> Session recognised that the OIE would be undertaking work on these pathogens at farm level and that this should contribute to the new work in the CCFH.

### **Risk profiles**

Risk profiles for *Campylobacter* and *Salmonella* spp. in broiler chicken meat were developed as a first step in guiding the development of the proposed guidelines. The WG acknowledged the importance of these tools to the preliminary stages of WG activities and also considered that these considerable technical resources should not be lost in the future. While it is not envisaged that the completed risk profiles would become part of the proposed standard, other options are available for their continuing availability to national risk managers and industry (see Recommendations).

### Objectives

The objectives of this risk profiling work were:

- To ascertain the completeness of the risk profiles in terms of providing a global perspective on the issue, the existing data and possible means of addressing the problem
- To identify additional sources of relevant information and important data gaps
- To identify differences and similarities between *Salmonella* and *Campylobacter* relevant for risk management considerations.

### Conclusions

Data gaps are detailed in the risk profiles and while filling some of these data gaps could be an important task it was also considered that the current risk profiles provide an essential tool for risk managers developing the proposed guidelines. It was recognized that the risk profiles needed further work particularly in relation to information from developing countries and to accommodate the CAC decision on the increase in scope of the guidelines to be developed.

In reviewing the information that is currently available in the risk profile the WG highlighted some of the differences between *Salmonella* and *Campylobacter* that need to be considered in the development of the proposed guidelines for *Campylobacter* and *Salmonella* spp. in broiler chicken meat. These should be revisited once the risk profiles have been further updated:

- The characteristics of *Salmonella* and *Campylobacter* in terms of their behaviour at high and low temperatures are different with *Campylobacter* exhibiting greater sensitivity at each end of the spectrum. This has implications in terms of the use of high or low temperature as risk reduction measures e.g. freezing can only be considered as a possible option for *Campylobacter* which may make it less attractive than other options which address both pathogens

- There is a much clearer picture of the sources of *Salmonella* and their routes of introduction into broilers flocks than for *Campylobacter*. This should facilitate the provision of guidance on biosecurity measures at the primary production stage to reduce *Salmonella*. While environmental sources of *Campylobacter* are considered important and a number of studies are ongoing to identify potential controls the picture is still inconclusive
- Vertical transmission clearly plays a role in the introduction of *Salmonella* into broiler flocks, while there is less evidence that this is a pathway of importance in relation to *Campylobacter*
- The risk profile highlights the fact that the various steps in processing may have a different impact on prevalence and levels of each of the pathogens of concern. This information is summarised in tabular form in the risk profile
- While cross-contamination from contaminated broiler meat during food preparation can be important in the transmission of both pathogens, the available data appears to indicate that it is a more important issue with regard to *Campylobacter* and campylobacteriosis. Several issues have been identified for this including higher levels of surface contamination of the broiler carcass
- There appears to be a difference in the susceptibility to *Campylobacter* in developing countries compared to developed countries with many cases of campylobacteriosis in developing countries occurring in young children. Such differences may influence risk management decisions in different countries.

### **Measures based on GHP**

The technical resource documents submitted to the WG were used to develop initial GHP material<sup>6</sup> for inclusion in the proposed draft guidelines.

### Objectives

The objectives of this work were:

- To discuss how to integrate food safety provisions sourced from primary Codex texts and from scientific documents submitted by Member countries into the proposed draft guidelines that are focused on specific control measures for *Salmonella* and *Campylobacter*
- To discuss mechanisms for categorising a diversity of GHP provisions from different scientific sources, different geographical regions, and for different hazards (*Salmonella* and *Campylobacter*), and present these in a format that could be used in a food commodity flow diagram format
- To identify important data gaps.

### Conclusions

The WG confirmed numerous specific control measures for *Salmonella* and *Campylobacter* (individually or together) based on GHP. This was documented as bullet points only and will need to be converted into explanatory text as it is integrated with the format based on the food commodity pathway diagram.

Draft examples are presented for illustrative purposes in Annex 1 of this document.

Most specific control measures based on GHP are developed from empirical knowledge and experience. In most cases it is not known how effective they are in terms of hazard control i.e. they are not validated as to their effectiveness. The WG is aware of a number of possible control measures that are under trial in commercial situations that may be useful in a GHP

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<sup>6</sup> Available to member countries in electronic form upon request

context or in a more quantitative hazard control context. Information on these measures will be added as it becomes available.

The WG identified that microbiological testing is carried out in many steps across different broiler production and processing systems and this involves both environment and product. Further work is needed on the intent of such testing and the use of the results before specified testing regimes can be considered for incorporation into relevant parts of the guidelines.

### **Measures based on quantifiable levels of hazard control**

The WG reviewed the two resource documents entitled “Hazard Control at Various Steps from Process Flow Diagram: Broiler (young bird) Chicken Meat: *Salmonella*” and “Hazard Control at Various Steps from Process Flow Diagram: Broiler (young bird) Chicken Meat: *Campylobacter*”. The two documents under review were based on information available in published literature, and information submitted to the WG.

### Objectives

The objectives of this work were:

- To identify potential measures based on quantifiable levels of *Campylobacter* and/or *Salmonella* control at a step or group of steps in the production and processing sectors (looking at the steps illustrated in the flow diagram)
- To produce criteria for determining whether control measures should be included in this category for the purpose of further developing the draft guidelines, including evaluation of the acceptability of the information provided on each pathogen
- To document information for each process step against the criteria and decide whether the information:
  - Is lacking and needs further data collection;
  - Indicates GHP rather than a quantifiable level of hazard control at the process step
  - Supports a potential measure that can be categorised on the basis of hazard control but needing further work<sup>7</sup>
  - Allows categorisation of a measure as being based on a quantifiable level of hazard control
- To consider each process step where no information is currently available and decide whether:
  - Measures are limited to GHP; or
  - Further hazard control information should be sought
- To produce examples of measures based on quantifiable levels of hazard control.

### Conclusions

The WG developed ten criteria regarded as essential to categorising a measure as being representative of a quantifiable level of hazard control. These criteria were presented as the following questions:

- Has a referenced paper been viewed?
- Is there a systematic review/peer review of presented work?
- Is the work published/unpublished?
- Is the product under study inoculated or naturally contaminated with the hazard?
- Have log reductions been compared to initial loading?
- [Is there global application?]
- Is the methodology robust?
- Is there evidence of control?

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<sup>7</sup> Ranging from lit search to full systematic review

- Is the control measure practical (feasible to do this in a commercial environment)?

The WG did not consider whether a specific level of reduction for each of the pathogens under study would be needed in order for a potential measure to be included as an example. However, it was recognised that future development of the guidelines may benefit from such ranking criteria in that it would give emphasis to measures of most effectiveness.

The working group also noted that:

- Data gaps existed for many steps in the flow diagram
- Harmonization needs to occur with GHP work at specific steps
- Many measures suggested in the resource documents provided to the WG could not be adequately categorised against the criteria developed and there was a need for systematic review of all proposals
- Some measures were definitely able to be categorised in terms of providing a quantifiable level of hazard control.

## **Annex 1**

The WG developed an annex to the discussion paper which provides a possible framework for the proposed draft guidelines. Example material is included for illustrative purposes, with emphasis on the flow diagram developed by the WG. No decisions have been made by the WG on final format and content.

If the approach to development of the proposed guidelines is endorsed by the CCFH at its 39<sup>th</sup> Session, the next meeting of the WG will further develop the draft format, elements, and substantive content of the guidelines within the Codex standard elaboration process.

## **Annex 2**

The WG developed an annex to illustrate how the overarching CCFH and CCMH standards on food and meat hygiene related to the flow diagram covering the scope of the proposed new work. This annex identifies gaps in the general control measures based on GHP that are present in the above texts and the WG will address these gaps within the proposed new draft guidelines.

## **Workplan**

The attached workplan may change subject to a change in scope being agreed at the 39<sup>th</sup> Session CCFH.

## **Intersession work**

The task before the WG is scientifically demanding and will require a significant amount of intersession work by WG members over the agreed timeline if the timetable for completion of the proposed guidelines is to be achieved.

Suggested work for 2007 -08:

- Agree date and location for next working group meeting
- Request for worldwide information on chicken other than broilers
- Update risk profiles
- Update literature reviews on GHP

- Confirm criteria that determine which measures deliver a quantifiable level of hazard control
- Apply the criteria to each proposed hazard control measure to determine which will be included in the Guideline
- Initiate work on risk assessment (work on control measures based on risk assessment has yet to be started and will be a major component of work initiated at the next WG in 2008)

## **Recommendations to CCFH**

### Overall

The WG recommended that the 39<sup>th</sup> Session of the CCFH:

1. Acknowledge the direction given by the 30<sup>th</sup> Session of the CAC in relation to the scope of the work plan and the timetable
2. Consider the content of this Discussion Paper/ Proposed Draft Guidelines for Control of *Campylobacter* and *Salmonella* spp. in Broiler (Young Bird) Chicken Meat in terms of its overall approach, framework and substantive content, and support elaboration of draft guidelines on this basis.
3. Recognise that the approach taken to development of further modules of the proposed draft standard will be put before CCFH on an annual basis
4. Support the need for a significant level of intersession work by WG members to achieve the completion date in the proposed timetable.

### Specific for risk profiles:

1. Note the limitations of the risk profiles in terms of the lack of global representation and the lack of data on chickens other than broilers
2. Encourage all member countries and in particular countries from those regions where data is lacking in the risk profiles to review the risk profiles and submit additional data where available
3. Support the prospect that risk profiles remaining open for updating in the short term
4. Support the risk profiles not being part of the Codex standard but that other routes should be explored for making them widely available.

### Specific for control measures based on GHP:

1. Support “menus” of available control measures based on GHP being provided within the draft guidelines as relevant to the step or group of steps using the flow path diagram approach
2. Note that proposed draft guidelines will provide appropriate flexibility to risk managers and industry in their choice of GHP in different production and processing situations
3. Support the establishment of criteria for differentiating between specific control measures for *Campylobacter* and *Salmonella* based on GHP and specific measures based on quantified effects on hazard control
4. Note the need for further work to clarify the role of microbiological testing in the application of controls proposed in the draft guidelines

### Specific for control measures based on quantifiable levels of hazard control

1. Note the request for high quality information to support further development of scientifically robust provisions in the proposed draft guidelines, particularly those that most closely satisfy evaluation criteria<sup>8</sup>

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<sup>8</sup> Note that potential control measures will also be evaluated in terms of commercial practicability and flexibility in implementation



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2. Support the need for significant intersession work to produce scientifically robust guidelines for *Campylobacter* and *Salmonella* incorporating this category of control measures
  3. Recognise that the identification of measures based on quantifiable levels of hazard control that can be implemented at a number of steps throughout the food commodity pathway is an important tool in the design of HACCP plans and the selection of critical limits at CCPs.
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## Annex 1

### Suggested framework and content of the Proposed Draft Guidelines for Control of *Campylobacter* and *Salmonella* spp. in Broiler (Young Bird) Chicken Meat

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#### Introduction

[To be further developed from CCFH new work proposal and risk profiles]

Campylobacteriosis and salmonellosis are the two most frequently reported food borne diseases worldwide. Broiler chicken meat is arguably the most important food vehicle. The burden of the disease as well as the cost of the disease are considerable for both pathogens. Trade of broiler chickens and products thereof have been hampered as a consequence of *Salmonella* contaminated broiler meat and there are indications that the same is true for *Campylobacter* contaminated broiler meat.

The usefulness of and need for guidelines for control of the two pathogens in broiler chicken meat is further substantiated by diverse national legislations and the volume of trade between countries.

The draft guidelines will reflect the latest thinking involving application of a risk management framework (RMF) for food safety issues as advocated in the CCFH Draft Microbiological Risk Management guidelines (ref). “Preliminary Risk Management Activities” and “Identification and Selection of Risk Management Options” reflect the guidelines on potential control measures presented in the draft guidelines. Following sections on “Implementation” and “Monitoring and Review” complete application of all the components of the RMF.

It is not the intention of the Guideline to set international limits that all member countries have to apply but rather to provide a framework which countries can apply to set their own limits. This will be particularly so for application of the risk model.

The draft guidelines incorporate a “production-to-consumption” flow diagram approach so as to identify all steps in the food chain where control measures can potentially be applied. As well as facilitating a systematic approach to the identification and evaluation of all potential control measures, consideration of all steps in the food chain allows different combinations of control measures and steps to be developed. This is particularly important where differences occur in production and processing systems between countries and risk managers need the flexibility to choose risk management options that are appropriate in the national context.

The draft guidelines build on general food hygiene provisions already established in the Codex system and develop potential control measures specific for *Campylobacter* and *Salmonella* spp. in broiler chicken meat. In this context, the draft guidelines also give effect to the CAC commitment to developing standards that are based on HACCP and risk assessment<sup>9</sup>. Potential control measures for application at single or multiple steps are presented in the following categories:

- Those based on good hygienic practice (GHP)
- Those based on hazard control
- Those based on risk assessment.

Potential control measures based on hazard control or risk assessment, either alone or in combination, are presented as examples only. They are not intended to be used as quantitative standards for the purposes of broiler chicken meat in international trade. However, their inclusion in the draft guidelines illustrates the value of a quantitative approach to hazard reduction throughout the food chain and the likely reductions to food borne risks in particular food production and processing scenarios at the national level. Thus the guidelines provide a scientifically sound international tool for robust application of HACCP and risk-based approaches to control of *Campylobacter* and *Salmonella* spp. in broiler chicken meat according to national risk management decisions.

Risk profiles for *Campylobacter* and *Salmonella* spp. in broiler chicken meat were developed as a first step in guiding the development of these guidelines. These profiles are appended to the draft guidelines and will provide useful scientific information to risk managers and industry in the design of food control systems tailor-made to individual food production and processing systems.

## **Objectives**

The primary objective of these guidelines is to provide information to governments on the control of *Campylobacter* and *Salmonella* spp in broiler chicken meat that will lead to significant reductions in food borne disease.

The guidelines are presented in a flow diagram format so as to enhance practical application and provide flexibility at the national (and individual production and processing) level.

## **Scope and use of the guidelines**

### **Scope**

These guidelines apply to production of broiler (young bird) carcasses and portions and exclude offals. They apply to all steps in the “production-to-consumption” food pathway for broiler chicken meat produced in a representative industrial system. [Additional provisions are developed for other food pathways; specifically free range primary production, “organic” primary production and halal slaughter systems].

The guidelines address control of all *Campylobacter* and *Salmonella* spp. that may contaminate broiler chicken meat and cause food borne disease.

Linkages with food safety standards developed by OIE for application to live animals should be taken into account in application of these Codex guidelines at the national level.

### **Use**

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<sup>9</sup> Objective 2 of the Codex Strategic Objectives is “Promoting widest application of scientific principles and risk analysis” and the Statements of Principle Relating to the Role of Food Safety Risk Assessment states that “Health and safety aspects of Codex decisions and recommendations should be based on risk assessment, as appropriate to the circumstances” - 16<sup>th</sup> Edition, page 166

The guidelines presented in this document are supplemental to and should be used in conjunction with the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1 – 1969) and the *Code of Hygienic Practice for Meat* (CAC/RCP 56-2005). These general provisions are referenced as appropriate in the guidelines.

The guidelines develop specific guidelines for control of *Campylobacter* and *Salmonella* spp. in broiler chicken meat according to a food pathway approach, with potential control measures being considered at each step, or group of steps, in the process flow.

The guidelines systematically present available control measures in three categories: those based on good hygienic practice, those based on quantitative hazard control, and those based on risk assessment. National risk managers and industry can use controls in the latter two categories to inform decisions on critical control points (CCPs) when applying HACCP principles to a particular food process.

Provision of flexibility in application of the guidelines is an important attribute. They are primarily intended for use by government risk managers in the design and implementation of food control systems according to national risk management options and decisions. The guidelines will also assist industry in the application of HACCP principles to broiler chicken production at the establishment level.

### **Definitions**

[To be developed]

### **Principles applying to control of *Campylobacter* and *Salmonella* spp. in broiler chicken meat**

The principles applying to control of *Campylobacter* and *Salmonella* spp. in broiler chicken meat are subsidiary to the *General Principles of Meat Hygiene* as presented in Code of Hygienic Practice for Meat.

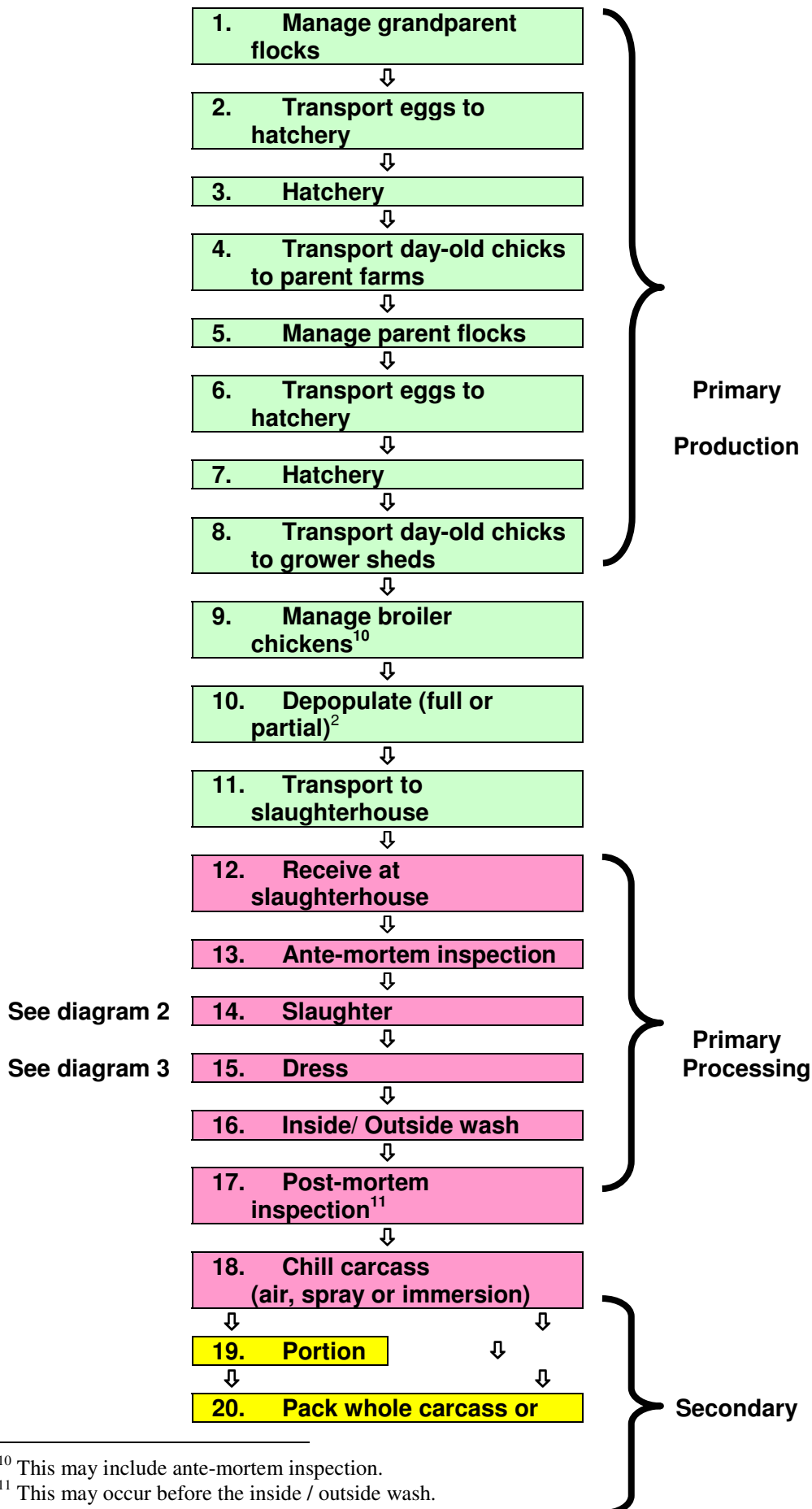
[To be developed]

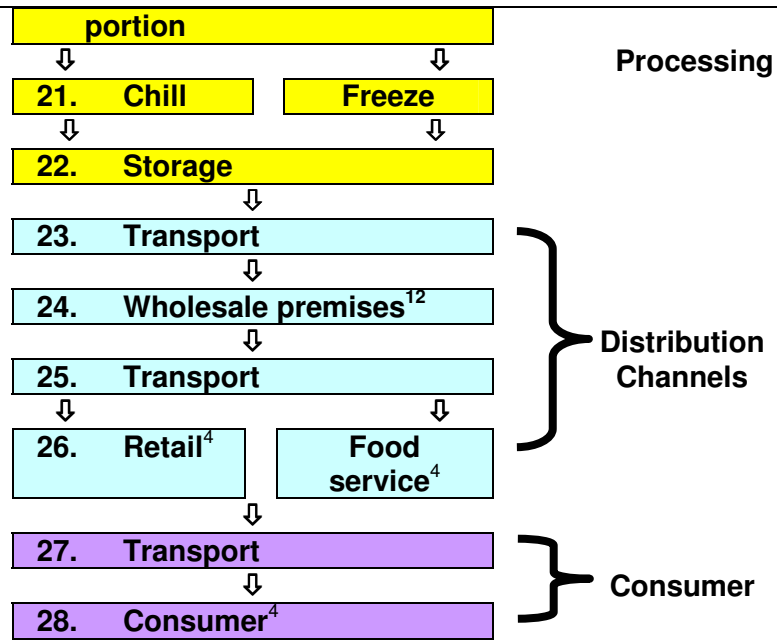
### **Draft Generic flow diagram for application of control measures**

See diagrams on the following 3 pages (these are indicative only and likely to change as further information is provided by countries).

### Draft Process Flow Diagram 1: Production to Consumption

This is a generic process flow. Variations are expected to suit particular operations.

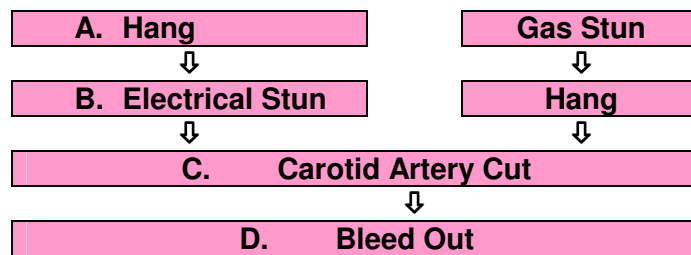




<sup>12</sup> Including storage

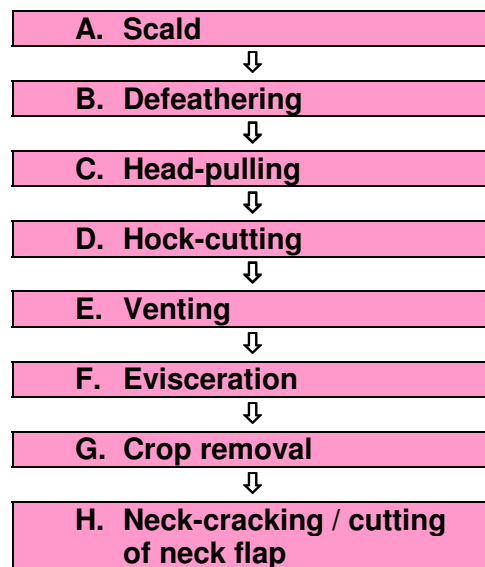
## Process Flow Diagram 2: Broiler (young bird) Chicken Meat

### Step 14: Slaughter



## Process Flow Diagram 3: Broiler (young bird) Chicken Meat

### Step 15: Dress<sup>13, 14</sup>



<sup>13</sup> These process steps are generic and the order may be varied as appropriate.

<sup>14</sup> Washing/rinsing may take place at a number of steps during dressing.

### Control measures based on GHP

The following examples are included only for the purpose of illustrating the kind of information that may be relevant in the final guideline. They reflect the presentation of potential control measures at each step or group of steps in the product flow diagram and they are in no way finalized.

#### **Key:**

**Blue = *Campylobacter* only provision**

**Grey = *Salmonella* only provision**

**No colour = joint *Campylobacter* and *Salmonella* provision**

## 10. Depopulate

#### Process Control:

- Minimise partial depopulation (as each entry into the shed with catching equipment etc increase chances of *Campylobacter* infection and compromises biosecurity)
- Partial depopulation to be carried out in a manner that minimises risks associated with process.
- Crate, truck and module cleaning routines must be changed so that producers receive C-free crates
- Feed withdrawal period must be long enough to minimise faeces and full crops but not so long that intestinal autolysis begins. Consider transportation time....
- Minimise stress to birds during catching and transport.
- Use acids in drinking water during feed withdrawal (lactic, acetic, sodium bisulfate) acids to decrease post-harvest crop contamination.
- Maximum downtime before placement of new birds is recommended.
- Transfer of birds from *Salmonella* positive flocks restricted.
- Repopulation – swab from farm after cleaning - must be free of *Salmonella* before next placement (breeders) and professional cleaners used (broilers).

#### Catching procedures:

- Clothing changes
- Downtime for catchers between poultry operations
- Disinfect all equipment entering sheds
- Disinfection of transport vehicles, forklifts, pallets/modules, catcher's boots, transport crates

## 12. Receive at slaughterhouse

#### Design:

- Minimise cross contamination by design of live bird modules and crates (e.g. using removable solid floors)

#### Cleaning and sanitation of live bird delivery equipment:

- Effective live bird crate, module and truck washing and disinfection.
- Wash live bird crates, modules and trucks away from processing and bird holding areas to minimise cross contamination.
- Allow washed live bird crates and modules to dry for 48 hours before use.
- Crates, modules and trucks to pass visual inspection after cleaning and disinfection.



- Treatment of recycled wash water used for live bird crates.
- 

#### Process Control:

- Minimise stress to birds, e.g. temperature control, no overcrowding, dim lighting, minimise handling.
- Logistic slaughter of positive flocks (end of day, or all on one day – preferably last day(s) of week to maximise cleaning time).

#### Personal Hygiene:

- Restricting employee movement from dirty to clean areas
- Separate facilities for employees (dirty versus clean)
- Separation of duties (dirty and clean areas)
- SOP and employee training re dirty versus clean areas
- Changing boots, clothes

#### Design of Facilities:

- Positive air flow from inside to outside of plant

### Control measures based on hazard control

The following example illustrates how a hazard control measure can be derived and presented.

#### Freezing (based on paper by Sandberg et al, 2005)

##### Criteria for evaluation:

- 1.View paper referenced? **Yes**
- 2.Systematic review/peer review? **Yes**
- 3.Published/unpublished? **Yes**
- 4.Inoculated or naturally contaminated? **Naturally**
- 5.Log reductions comparison with initial loading? **Yes 2 log reduction before and after freezing**
- 6.Global application? **Yes –freezing is universal**
- 7.Methodology robust? **Yes**
- 8.Evidence of control? **Yes**
- 9.Practicability (feasible to do this in a commercial operation) **Yes**
- 10.Product acceptability **Yes**

In the commercial environment, naturally contaminated *Campylobacter* positive broiler chicken carcasses taken from the slaughter line at 6°C and placed in a freezer at -20°C for 4 days has been shown to give a 1.3 log reduction of *Campylobacter*, and for 21 days, has been shown to give a 2 log reduction of *Campylobacter*. Storage under the same conditions beyond 21 days, has been shown to cause no further significant reduction.

#### Control measures based on HACCP

[To be developed]

#### Control measures based on risk assessment

[To be developed]

#### Implementation of control measures

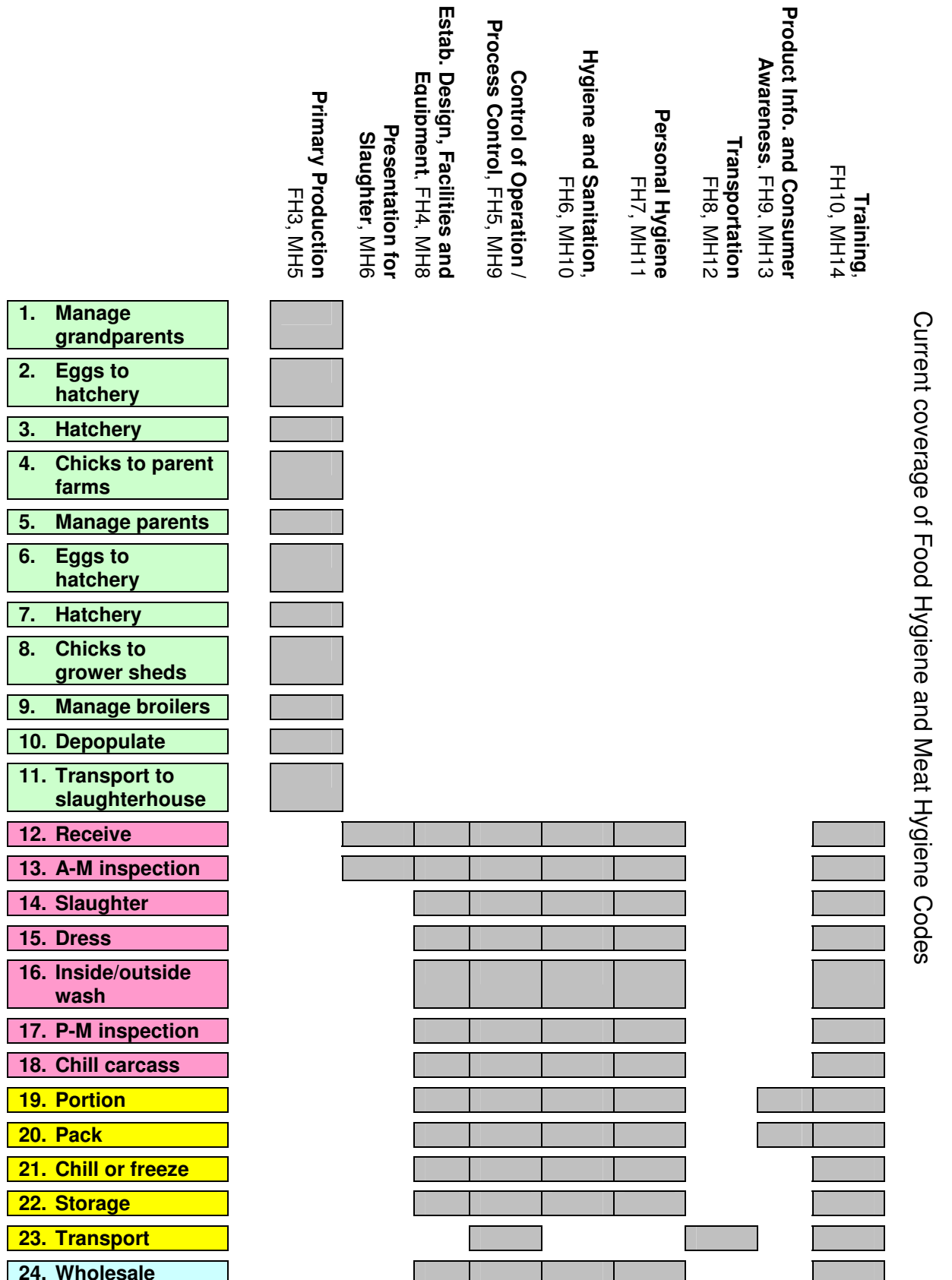
[To be developed]

**Monitoring and review**

[To be developed]

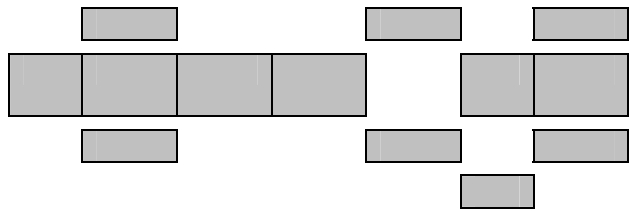
**Annex 2 to Discussion Paper**

Illustrations showing how the overarching CCFH and CCMH texts relate to the flow diagram covering the scope of the work



Current coverage of Food Hygiene and Meat Hygiene Codes

- 25. Transport
- 26. Retail or food service
- 27. Transport
- 28. Consumer





## Workplan for completion of New Work<sup>15</sup>,

**It is expected that the work can be completed within a five-year timeframe.**

A work plan that is achievable with a high level of input from the leading governments is as follows:

December 2006	38 <sup>th</sup> Session CCFH	Agree purpose and scope  Preliminary agreement on risk management instructions  Agree form of draft standard
Intersession 06 /07	New Zealand and Sweden	Complete global risk profile <sup>16</sup>  Call for scientific data from national governments  Complete GHP and HACCP generic components of standard  Convene intersession <b>Working Group</b> to begin assembling generic risk assessment model  Template for the draft standard circulated for government comments as a discussion paper
October 2007	39 <sup>th</sup> Session CCFH	Present discussion paper  Confirm risk management questions  To Step 2
Intersession 07/08	New Zealand and Sweden	Complete components on specific controls based on knowledge of hazard reduction  Reconvene Working Group to develop generic risk assessment model, and develop components of the standard based on risk assessment  Begin work on web-based model (in conjunction with JEMRA?)
December 2008	40 <sup>th</sup> Session of CCFH	Present draft standard for advancement to Step 5

<sup>15</sup> Subject to change in scope to be discussed at 39<sup>th</sup> Session CCFH

<sup>16</sup> Standard format so as to contribute to a library of Codex international risk profiles?

Intersession 08/09	New Zealand Sweden	Continue technical work  Finalise generic risk assessment model and components of the standard based on risk assessment
December 2009	41 <sup>st</sup> Session CCFH	Present draft standard for advancement to Step 5/8  In conjunction with FAO/WHO and JEMRA, provide training session for use of web-based model
June 2010	CAC	Adoption