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## JOINT FAO/WHO FOOD STANDARDS PROGRAMME CODEX COMMITTEE ON MEAT AND POULTRY HYGIENE

Ninth Session

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### APPENDICES AND ADDITIONAL PROVISIONS TO THE PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR FRESH MEAT

#### PRINCIPLES AND GUIDELINES FOR ESTABLISHING RISK-BASED ANTE- AND POST-MORTEM INSPECTION SYSTEMS FOR PARTICULAR SLAUGHTER POPULATIONS, INCLUDING EXAMPLES

(prepared by New Zealand)

Governments and interested international organisations are invited to comment on the attached Annex II to the Proposed Draft Code of Hygiene Practice for Fresh Meat. Comments should be sent to:

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with a copy to the Secretary, Codex Alimentarius Commission, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy (Fax +39 06 570 54593; e-mail: [codex@fao.org](mailto:codex@fao.org)) **not later than 11 January 2003.**

### BACKGROUND

The 8<sup>th</sup> Session of the Codex Committee on Meat and Poultry Hygiene noted the offer of New Zealand, with the assistance of the Codex Secretariat, to prepare two separate discussion papers<sup>1</sup> for consideration at its next session on the possible addition of Annexes to the proposed draft Code of Hygienic Practice for Fresh Meat. In this regard the Committee, noted that the proposal would be subject to approval as new work by the 50<sup>th</sup> Executive Committee (ALINORM 03/16, paras. 78-79).

The 50<sup>th</sup> Session of the Executive Committee noted that although the addition of appendices to a code under development did not generally require approval as new work, the Committee on Meat and Poultry Hygiene had sought such approval in view of the substantial work involved and to expedite the elaboration process in the Committee. The Executive Committee therefore approved as new work the elaboration of the two appendices to be included in the Code (ALINORM 03/3A, para. 84).

<sup>1</sup> "Principles and Guidelines for establishing risk-based and ante- and post-mortem inspections systems for particular slaughter population"; and "Principles and Guidelines on systems for microbiological process control for meat, including establishment of performance parameters for outcomes of process control and implementation of national microbiological databases"

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## **Annex II to the Proposed Draft Code of Hygienic Practice for Fresh Meat**

### **RISK-BASED<sup>2</sup> POST-MORTEM INSPECTION PROCEDURES FOR FRESH MEAT**

#### **1. INTRODUCTION**

1. Post-mortem meat inspection procedures are a set of food hygiene measures that are unique to the production of fresh meat. Such procedures are regarded as a component of overall process control, which is defined as “all conditions and measures applied during the production process that are necessary to achieve safety and suitability of meat”<sup>3</sup>.

2. The General Principles of Food Hygiene state that “in deciding whether a [food control] requirement is necessary or appropriate, an assessment of the risk should be made, preferably within the framework of the HACCP approach”<sup>4</sup>. Traditional post-mortem meat inspection procedures are often complex, labour-intensive, undifferentiated for different classes of slaughtered livestock, and poorly evaluated in terms of their relative contribution to reducing food-borne risks to public health. For these reasons, competent authorities in a number of countries are carrying out investigations into the scientific basis of current procedures<sup>5</sup>.

3. This Annex should be read in conjunction with Appendix I. Although the principles and guidelines presented in this Annex can be adapted to evaluation of post-mortem inspection procedures for determining the suitability of fresh meat, such methodology is not developed.

#### **2. OBJECTIVES OF RISK-BASED POST-MORTEM INSPECTION PROCEDURES FOR FRESH MEAT**

4. A risk-based approach to development of post-mortem inspection procedures for fresh meat can achieve the following objectives:

- Determination of the level of consumer protection provided by specified post-mortem inspection procedures;
- Relative measurement of the contribution of post-mortem inspection to the overall level of control of hazards in fresh meat (and risks to consumers), thereby allowing risk managers to allocate meat hygiene resources proportionate to their greatest benefit in preventing meat-borne risks;
- Comparison of the effectiveness of different inspection procedures applied for the same purpose and in the same context;
- Provision of information that allows appropriate evaluation of different risk management options e.g. regionalisation of inspection programmes, feasibility and comparative costs of different post-mortem inspection procedures, potential for cross-contamination;
- Full integration of post-mortem inspection procedures into a “production-to-consumption” meat hygiene programme.

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<sup>2</sup> The term “risk-based” can be applied to a food safety measure, a group of measures, a food safety programme or a food safety system. For the purposes of the CCMH, “risk-based” is defined as “containing performance and/or process parameters developed according to risk analysis principles”

<sup>3</sup> Proposed Draft Code of Hygienic Practice for Fresh Meat (CX/MPH 3/4)

<sup>4</sup> General Principles of Food Hygiene CAC/RCP 1-1969, Rev. 3 (1997)

<sup>5</sup> Competent authorities have different approaches to defining the respective roles of industry and competent authority personnel in delivering meat hygiene activities, and this issue is not covered in this Annex

### **3. RISK ANALYSIS**

#### **3.1. RISK MANAGEMENT FRAMEWORK**

5. Development and implementation of risk-based post-mortem inspection procedures should utilise a risk management framework<sup>6</sup>. The four components are: preliminary risk management activities, evaluation of risk management options, implementation, and monitoring and review. Utilisation of a risk management framework is the subject of on-going work within the Codex system, and is described in a number of Codex documents<sup>7</sup>.

#### **3.2. RISK ASSESSMENT**

6. If required, a risk assessment is commissioned during preliminary risk management activities. A risk assessment consists of four steps: hazard identification, hazard characterisation, exposure assessment, and risk characterisation. The output of this process should be qualitatively integrated with all other factors relating to post-mortem meat inspection to make risk management decisions on appropriate procedures for control of hazards.

7. In the ideal situation, risk estimates will be quantified in terms of risks to human health, and risk management decisions on an appropriate level of protection (ALOP) will dictate the nature and intensity of the post-mortem inspection procedures to be applied. However, risk assessment of microbiological hazards in fresh meat is currently limited by a lack of quantitative risk assessment models. Nevertheless, appropriate assembly of scientific information and qualitative risk characterisation as to the probable impacts on human health can provide an objective basis for decision-making. In the latter case, risk management decisions will revolve around the acceptability of the likely human health impact of differences in hazard levels brought about by different inspection procedures.

#### **3.3. PERFORMANCE AND PROCESS PARAMETERS**

8. An understanding of the level of consumer protection that is achieved by particular inspection procedures requires knowledge of the level of control of hazards that is attained in fresh meat. A performance parameter<sup>8</sup> provides a measure of that level of control. Performance attributes for post-mortem inspection procedures (see Section 5.4) may be regarded as process parameters<sup>9</sup> if they can be validated as achieving performance parameters.

### **4. GENERAL PRINCIPLES FOR DEVELOPMENT OF RISK-BASED POST-MORTEM MEAT INSPECTION PROCEDURES**

- i. Risk-based post-mortem inspection procedures should be derived from the application of risk analysis principles.
- ii. Development of risk-based post-mortem inspection procedures should:
  - Involve application of a risk management framework to the greatest extent appropriate and practicable;
  - Include quantitative risk assessment where appropriate and practicable;
  - Take into account all relevant information available from the food chain.
- iii. Inspection procedures should be evaluated for application within a specific context e.g. species and class of slaughtered animal, defined geographical region, defined animal husbandry system.

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<sup>6</sup> Proposed Draft Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius. ALINORM 03/33 Appendix II. FAO Rome 2002

<sup>7</sup> Risk Analysis Policies of the Codex Alimentarius Commission. Twenty-fourth Session of the CAC. ALINORM 01/9. FAO 2001

<sup>8</sup> For the purposes of the CCMH, a performance parameter is defined as “an expression of the required level of hazard control at a specified step that is considered necessary to achieve the appropriate level of protection”

<sup>9</sup> For the purposes of the CCMH, a process parameter is defined as “a measurable or quantifiable characteristic at a specified step or combination of steps that can achieve a performance parameter”

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- iv. Where different inspection procedures that have the same purpose and context are being evaluated:
    - An objective basis for comparison of the level of control of hazards should be established;
    - The efficacy of each inspection procedure in detecting abnormalities affecting the suitability of fresh meat should be taken into account;
    - Other risk management factors should be taken into account as appropriate e.g. potential for inadvertent cross-contamination, feasibility, and practicality.
  - v. Where needed, representative and sufficiently large field trials should be undertaken to determine the performance attributes of specified inspection procedures e.g. sensitivity, specificity, and non-detection rates for grossly-detectable abnormalities.
  - vi. Laboratory investigations of abnormal and grossly-normal tissue should be designed to detect the range of hazards of possible public health importance that have been described in hazard identification.
  - vii. Routine application of post-mortem inspection procedures should not inadvertently increase cross-contamination with microbiological hazards.
  - viii. Irrespective of inspection delivery systems, the competent authority should be responsible for defining the role of personnel involved in post-mortem inspection procedures, and verifying that any process parameters expressed as regulatory guidelines or standards are met.

## **5. GUIDELINES FOR THE DEVELOPMENT OF RISK-BASED POST-MORTEM INSPECTION PROCEDURES**

### **5.1. HAZARD IDENTIFICATION**

9. An empirical hazard identification process should be undertaken to determine the likely range of hazards of public health significance that may be present in grossly-detectable abnormalities in target tissues.

### **5.2. FIELD TRIALS**

10. Field trials should be carried out under appropriate veterinary supervision and employing competent personnel. The number of animals examined by the inspection procedures under evaluation should be sufficiently large so as to give a reliable estimate of the true prevalence of the gross abnormalities of concern.

11. Sampling plans should be representative of the slaughter population, and cater for known biological variation in respect of the type and prevalence of grossly-detectable abnormalities e.g. influence of animal age, geographical region, farming type and season. Different trial designs may be employed, depending on the prevalence of grossly-detectable abnormalities in the slaughter population, the logistics of detailed (“gold standard”) examination, and the number of competent persons available.

12. Where different post-mortem inspection procedures are being compared: all procedures should be applied to the same animals, each inspection station should be designed to provide independent results, and the trial should include enough samples so as to allow definite conclusions as to the consequences of changing inspection procedures. The possibility of target tissues acting as “indicators” for detection of gross abnormalities in other tissues and/or disposition of other tissues should be included in the design of field trials. Detailed recording of trial results is necessary, including appropriate pathological descriptions of all abnormalities detected.

13. Laboratory investigations e.g. microbiological examination and histology, should be designed to identify the range of hazards of possible public health importance that have been identified in the hazard identification process. A representative number and range of samples should be taken from grossly-detectable abnormalities, so as to confirm the outcome of the hazard identification process and provide as much information as possible on the prevalence (and concentration) of hazards in target tissue. Trial design should include representative surveying of the prevalence (and concentration) of hazards in target tissues that are grossly normal, so as to provide a comparison with the prevalence (and concentration) of hazards in those tissues that are grossly abnormal.

#### 5.4. PERFORMANCE ATTRIBUTES

14. The performance attributes of the inspection procedures e.g. visual inspection, palpation, and/or incision, should be determined within appropriate statistical confidence limits. The intended end-use of the target tissues has an important influence on the development of risk-based post-mortem inspection procedures.

15. The sensitivity of an inspection procedure is the probability of correctly identifying gross abnormalities that are likely to contain public health hazards. An inspection procedure with a high sensitivity will result in a low non-detection rate for abnormalities containing hazards i.e. few false negatives.

16. The specificity of an inspection procedure is the probability of correctly identifying gross abnormalities that do not contain public health hazards, and hence only constitute a suitability issue. An inspection procedure with a high specificity will result in a low detection rate for abnormalities that do not contain hazards i.e. few false positives.

17. The true prevalence of grossly-detectable abnormalities affecting the tissues subject to post-mortem inspection (“gold standard”) should be determined as part of the above process.

#### 5.5. RISK MANAGEMENT DECISIONS

18. Risk management decisions on the acceptability or otherwise of specified post-mortem inspection procedures will generally be based on the worst case of non-detection of gross abnormalities included in an appropriate statistical confidence interval. Decisions should take into account the comparative public health risks associated with:

- The prevalence (and concentration) of hazards in target tissues that are grossly abnormal;
- The prevalence (and concentration) of hazards in target tissues that are grossly normal;
- The overall prevalence (and concentration) of hazards being transmitted by all pathways throughout the production of fresh meat.

19. In the general case, new or alternative inspection procedures should provide a level of consumer protection that is at least equivalent to that provided by traditional procedures, unless there are strong mitigating factors that may influence a different risk management choice e.g. unacceptable introduction of new hazards, undue risks from occupational exposure.

20. Required regulatory outcomes for post-mortem inspection may include process parameters expressed as limits on non-detection rates for particular abnormalities. Those process parameters may be derived quantitatively from risk assessment models, or qualitatively from baseline surveys of current industry performance.

21. Where detailed information on the health status of slaughtered animals is available from primary production, risk-based post-mortem inspection procedures may be modified on a lot-by-lot basis.

22. The competent authority should regularly analyse results of post-mortem inspection at both the establishment and national level, and provide appropriate feedback to establishments and other interested parties on the performance of risk-based post-mortem inspection procedures.

23. The competent authority may change presentation requirements and the sequence of inspection procedures as a result of scientific evaluation of different post-mortem inspection procedures, and allow introduction of new inspection tools e.g. mirrors. Alternative technologies for detecting abnormalities e.g. tissue imaging, should be acceptable to the competent authority if validated as being as effective as organoleptic procedures.

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**Examples**

Table 1: Risk-based post-mortem inspection procedures for the heads of adult cattle slaughtered in New Zealand

Tissues	Codex example	New Zealand
External surfaces/oral cavity	V	-
Eyes	V	V
Tongue	V, P	V, P*
Submaxillary lymph nodes	V, I	I
Parotid lymph nodes	V, I	I
Retropharyngeal lymph nodes	V, I	I
Muscles of mastication	V, P, I**	V, P*

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V View  
P Palpate  
I Incise

\* Only if intended for human consumption

\*\* Incised according to the potential for infestation with cysts of *Taenia* spp.

Table 2: Risk-based post-mortem inspection procedures for the viscera of fattening pigs slaughtered in Australia

Tissues	Codex example	Australia
Lungs	V, P	V
Oesophagus	V	V
Trachea	V	V
Bronchial lymph nodes	V, P	V
Mediastinal lymph nodes	V, P	V
Heart	V, P, I*	V
Pericardium	V	V
Liver	V, P	V
Portal lymph nodes	V, P	V
Kidneys	P	V
Renal lymph nodes	-	V
Spleen	V	V
Gastrointestinal tract	V	V
Mesenteric lymph nodes	V, P	V
Genital organs	V	V

V View

P Palpate

I Incise

\*Incised according to the potential for infestation with cysts of *Taenia* spp.

Note: Incision of reactive lymph nodes after removal from the viscera is an optional inspection activity in fattening pigs slaughtered in Australia