

# Food control from farm to fork: implementing the standards of Codex and the OIE

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## Summary

The Codex Alimentarius (Codex) international food standards help to ensure food safety and promote fair practices in the international food trade. Implementing these standards using a risk management framework (RMF) approach to decision-making is an increasingly common aspect of the food control programmes of national governments. The Codex Alimentarius Commission (CAC) provides guidance at both the system and food commodity levels. In the case of zoonoses, similarities in the risk analysis methodologies used to underpin standard setting by the CAC and the World Organisation for Animal Health (OIE) are highly enabling of integrated food control systems. The CAC and the OIE are increasingly working together to develop their respective standards for foodborne zoonoses and other hazards so that they are non-duplicative, cohesive and utilise the whole food chain.

There is a clear need for effective integration of food safety and animal health monitoring and surveillance information to better control foodborne zoonoses. This is increasingly supported by Codex and OIE standards working together in a variety of ways and realisation of benefits is highly dependent on coordination and sharing of information between Competent Authorities and other food safety stakeholders at the national level.

## Keywords

Codex – Codex Alimentarius Commission – OIE – Standard – Surveillance – World Organisation for Animal Health – Zoonosis.

## International standards and food safety

### Regulation of food safety

The regulation of foodborne zoonoses and other foodborne hazards has undergone a remarkable transition in the last decade or so. With the central theme being a 'farm-to-fork' approach to food safety, the Codex Alimentarius Commission (CAC) has undertaken a large body of work to develop and review generic and commodity-specific standards in relation to risks to human health. New standards incorporating this approach range from principles of risk analysis (2) through to detailed risk-based guidance on particular zoonotic pathogens, e.g. *Salmonella* and *Campylobacter* in broiler chickens (5). Most aspects of Codex Alimentarius (Codex) standards are equally applicable to food produced for domestic consumption as to food in international trade.

### The World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures

Implementation of Codex standards at the national level must comply with the intent of the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement). Given that Codex standards now encompass risk analysis to the extent possible and practical, implementation by Competent Authorities should be based on public health risks as appropriate to the national situation. Control measures should only be implemented to the extent necessary to protect human health. Where they exist, Codex standards should be used unless:

- there is scientific justification for a more stringent measure
- a country decides that it needs a higher level of consumer protection than provided for in the Codex standard.

## Standard setting by the Codex Alimentarius Commission and the World Organisation for Animal Health

The CAC is one of the three primary international standard-setting bodies recognised under the WTO SPS Agreement, along with the World Organisation for Animal Health (OIE) (for animal health and zoonoses) and the International Plant Protection Convention (IPPC) (for plant health).

The CAC has a broad mandate. Codex standards and related texts, such as guidelines or codes of practice, cover all aspects of food safety and food quality, nutrition and labelling, as well as inspection and certification issues and methods of analysis and sampling. This mandate is clearly much broader than that of the OIE in respect of food commodities. However, there is a very strong overlap in the areas of foodborne zoonoses and good veterinary practice at the farm level in relation to other types of foodborne hazards, e.g. residues of agricultural compounds, foodborne pathogens transmitting antimicrobial resistance.

### The Codex Alimentarius Commission and the World Organisation for Animal Health working together

The CAC and the OIE have an increasingly collaborative and integrated relationship in the setting of standards for food safety and zoonoses and this relationship is reflected at a number of levels (Box 1).

#### Box 1

##### Collaboration between the CAC and the OIE in setting standards

**OIE and CAC Members** participate in standard development work: Representatives of the OIE participate in the development of standards in Codex Committees and Task Forces and Codex representatives participate in the development of OIE standards in OIE *Ad hoc* Groups

**OIE Director General** participates in annual CAC meetings and provides information on activities of common interest

**CAC Chairperson** participates in the annual OIE General Sessions and provides information on relevant Codex activities

**Codex and OIE contact points at the national and regional level** coordinate joint aspects of CAC and OIE work programmes

**OIE Focal Points for Animal Production Food Safety** liaise with their Codex counterparts

**OIE and CAC** work together in intergovernmental task forces, e.g. the Intergovernmental Task Force on Antimicrobial Resistance 2007–2010

**CAC and OIE** cooperate on food safety throughout the food chain, e.g. CAC was a member of the OIE Working Group on Animal Production Food Safety

**Competent Authorities** increasingly harmonise international and national standards as part of 'farm-to-fork' food control systems

CAC: Codex Alimentarius Commission  
OIE: World Organisation for Animal Health

The partnership between the CAC and OIE resulting from these activities is significantly increasing the quality, consistency and utility of the food-safety-related standards of both organisations.

However, although the two organisations are increasingly sharing work programmes and resources, they have different processes for initiating new work and developing standards, and these differences must be taken into account in the alignment of their standard-setting activities (15). In general, new Codex work proposals are developed according to the mandate and priority-setting processes of individual standing committees, critically reviewed by the Codex Executive Committee, and then agreed by the CAC. Identification of any requirement for and availability of expert scientific advice is a key element of any proposal. The proposed time-line for completion of new standards by the individual Committee should not normally exceed five years and there is a formal, step-wise elaboration process, with reporting to and final adoption by the CAC.

The proposal for development of a new chapter or the revision of an existing chapter of an OIE standard may come from various sources and recommendations are developed by small groups of independent experts (*Ad hoc* Groups), usually reporting to a Specialist Commission. Draft texts are provided to Members, whose comments are reviewed and reported back. Texts are proposed for adoption by the World Assembly of Delegates of the OIE at the Organisation's annual General Session, usually within a relatively short time frame.

### Sharing a risk-based approach

Similarities in the risk analysis methodologies used to underpin standard setting by the CAC and the OIE are highly enabling of integrated food control systems that make best use of control options at the farm level and throughout the food chain.

The CAC describes a hazard as 'a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect' (4). Similarly, the OIE describes a hazard as 'a biological, chemical or physical agent in, or a condition of, an animal or animal product with the potential to cause an adverse health effect' (14).

A foodborne risk to human health is described in terms of the probability and severity of an adverse health effect on the consumer (3). However, Codex standards only apply to the food chain, thereby determining the level of exposure of the consumer to hazards. Ideally, the level of consumer protection that is required in a particular food control scenario will be validated by a public health surveillance programme. As the Competent Authority implementing food standards at the national level is often different

from the Competent Authority responsible for public health surveillance, sharing of information is vital to the implementation of a risk-based approach to food safety.

Risk is described by the OIE in similar terms, i.e. ‘the likelihood of the occurrence and the likely magnitude of the biological and economic consequences of an adverse event or effect to animal or human health’ (13). Unlike the situation for Codex standards, the OIE elaborates standards for surveillance of animal populations (11) as well as standards for control of hazards in those populations. Thus, the Competent Authority responsible for implementing OIE standards (usually national Veterinary Services) has direct access to all the information required to implement a risk-based approach to animal health.

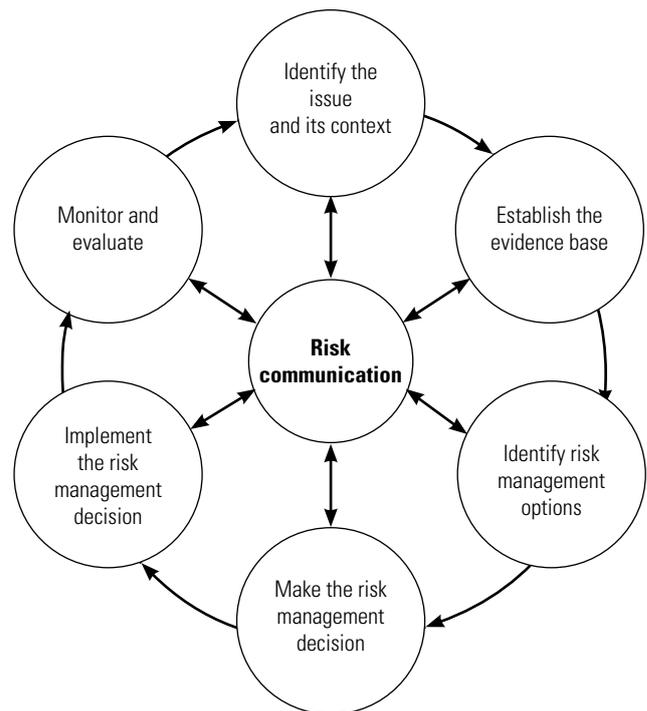
In recent years there has been a paradigm shift in the approach taken by the OIE to the development of standards for animal health (8); a change from a strict emphasis on country-wide freedom to a risk-based approach that enables countries to achieve disease freedom in specific animal sub-populations or to trade safely in specific commodities. Recommendations for specified commodities now focus on risk reduction measures, even though the ultimate goal continues to be the eradication of animal health diseases from a territory. Clearly, effective and efficient surveillance of live animal populations and systematic reporting of results is a key input to the management of risks in these terms.

In the case of foodborne zoonoses, the OIE recognises that a number of priority hazards in food are the inevitable consequence of asymptomatic carriage in animals or contamination during harvesting and are unlikely to be eliminated from food.

**A risk management framework as an implementation tool**

The CAC states that risk management should follow a structured approach, including preliminary risk management activities, evaluation of risk management options, and monitoring and review of the decision taken (3). Systematic application of a risk management framework (RMF) is increasingly recognised as a key process in the development and implementation of food safety standards at the international and national levels (7). An example of an RMF is presented in Figure 1.

An RMF provides a formal step-wise process for considering and integrating all necessary components of food safety risk management systems on an ongoing basis. Monitoring and surveillance information provides valuable inputs to several steps, especially the steps of establishing the evidence base and monitoring and evaluating the risk management decisions. This information will be gained from reports of compliance with regulatory standards and a number of



**Fig. 1**  
New Zealand Ministry of Primary Industries risk management framework process for decision-making

other sources, e.g. food source attribution studies, targeted surveys, outbreak investigations, public health statistics.

Links to surveillance in the implementation of Codex standards

**Value of surveillance information**

There is a clear need for integration of monitoring and surveillance information with other food control activities to better control foodborne human illness. In the case of zoonoses, effective implementation of Codex standards requires the integration of monitoring information from different points of the food chain with surveillance information generated from animal and human populations. (As surveillance of animal and human populations for illness that might be caused by chemical hazards transmitted through the food chain is usually limited to specific investigations, implementation of Codex standards for control of chemical hazards will not be further addressed in this paper.)

The value of this integrated information is expressed in different ways:

- extension of Codex guidelines to develop food control measures appropriate to the national situation

- inputs to risk assessment models
- validation of farm-to-fork food control systems as achieving a required level of consumer protection
- scientific justification of measures that may be required to meet a higher level of consumer protection than that described in Codex standards
- demonstration of the performance of regulatory systems.

Veterinarians involved in food safety can also make a significant contribution to achieving animal health goals through monitoring and surveillance activities, e.g. surveillance for exotic diseases at ante-mortem inspection of slaughter animals, post-mortem inspection for lesions of bovine tuberculosis (9).

### Codex provisions for monitoring of the food chain

Codex general provisions for monitoring of the food chain (1, 6) can make a significant contribution to the risk management decision-making process.

The Codex Draft Proposed Principles and Guidelines for National Food Control Systems state that food control programmes should be subject to ongoing monitoring at all relevant stages in the food chain, thereby allowing continuous evaluation of effectiveness and identification of emerging trends (6). These guidelines also state that a national food control system should be designed to incorporate timely access to information relating to the surveillance and investigation of, and response to, foodborne illness. Regular review of monitoring and surveillance information should lead to continuous improvement in control systems.

Various Codex commodity standards provide specific guidelines on monitoring zoonotic pathogens at different steps in the food chain.

### Linking to OIE standards

Implementation of OIE standards for surveillance of live animal populations and reporting of results (11) can provide a significant contribution to management of food safety risks. The standards of the OIE also cover obligations on timely notification of the results of animal health surveillance.

Some OIE-listed pathogens that may be transmitted through the food chain and that are subject to OIE guidance on surveillance are presented in Table I.

The OIE World Animal Health Information System (WAHIS) incorporates an early warning system that requires Member

**Table I**  
**Some OIE listed and non-listed foodborne pathogens that are subject to OIE guidance on surveillance**

OIE-listed foodborne pathogens	Non-listed pathogens
<i>Echinococcus</i> spp.	<i>Salmonella</i> spp.
<i>Trichinella spiralis</i>	<i>Taenia solium</i>
Avian influenza viruses	
Bovine spongiform encephalopathy agents	
<i>Brucella melitensis</i>	
<i>Mycobacterium tuberculosis</i>	

Countries to provide Immediate Notifications of important epidemiological events, for example:

- first occurrence of a listed disease and/or infection in a country or zone/compartiment
- reoccurrence after freedom has been declared
- other scenarios, e.g. an emerging disease or a change in prevalence of an existing disease.

The OIE distributes the information to its Members and continues to receive weekly reports from the affected country until a particular situation is resolved. In addition to the early warning system, WAHIS includes a monitoring system which requires Member Countries to provide six-monthly reports on the presence or absence of diseases on the OIE List and the prevention and control measures applied.

### Coordination at the national level

The SPS Agreement and relevant standards developed by the CAC and the OIE all refer to the need for a systematic process to gather, evaluate and document scientific and other information as the basis for sanitary measures. Particular attention should be paid to early warning mechanisms, communication with stakeholders and contingency planning (10).

Effective coordination between Competent Authorities in the gathering, sharing and analysis of monitoring and surveillance information from different steps in the farm-to-fork continuum is an obvious part of effective risk management of foodborne zoonoses. In recent years, several structures have emerged in the organisation of food safety, veterinary public health and veterinary animal health services within national Competent Authorities. In some countries, amalgamation of food control regulatory services from farm to fork under a single Competent Authority has enhanced the sharing of food control information.

While organisational structure will inevitably vary from country to country, it is essential that monitoring and surveillance information on foodborne zoonoses be collected and used as intended in Codex and OIE standards. The need for specific actions to achieve this at the national level has been identified by the OIE, the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) (10). These actions include:

- recognising the essential roles of the animal health, food safety and public health sectors
- identifying responsibilities and nominating key contacts
- mapping capability
- implementing an agreed protocol
- evaluating progress in food control and reviewing collaborative plans.

Increasing the awareness of the role of the Codex and OIE national contact points is an important activity going forwards, together with creating links to other stakeholders, e.g. public health agencies, industry organisations and consumers. At a recent WTO workshop on the relationship between the SPS Committee and the ‘Three Sisters’ (CAC, OIE and IPPC), countries identified the effective communication and coordination of the different relevant ministries for trade, food safety, animal and plant health at the national and regional levels as one of their biggest challenges (15).

### **Case study: *Salmonella* spp. in broiler chicken meat**

The recently developed Codex standard, ‘Guidelines for the control of *Campylobacter* and *Salmonella* in chicken meat’, (5) provides comprehensive advice on applying a ‘farm-to-fork’ RMF approach to development and implementation of control measures. The overarching goal of the standard is to provide ‘an enabling framework which countries can utilise to establish control measures appropriate to their

national situation’. Competent Authorities are encouraged to develop risk-based metrics that reflect decisions on the level of public health protection that is required; FAO/WHO have developed a web-based decision support tool to assist in the development of such metrics.

The Codex standard advocates that breeder flocks should be kept free of *Salmonella* infection and refers to the OIE standard, ‘Prevention, detection, and control of *Salmonella* in poultry’ (12), if a flock is found to be *Salmonella*-positive. The Codex standard also defers to the OIE for guidance on surveillance, but does provide detailed guidance on monitoring the level of control of *Salmonella* at appropriate steps in the food chain.

The OIE standard contains detailed guidance on surveillance for *Salmonella* serotypes in poultry flocks, given that serotypes and their prevalence differ considerably between localities, regions and countries (12). Decisions about sampling methods, sampling frequency and the type of samples required should be based on risk assessment, with particular provisions for poultry for the production of meat.

The Codex and OIE standards are highly complementary and together provide for a ‘farm-to-fork’ food safety control system. Both standards point out the importance of integrating information on food safety and animal health monitoring and surveillance to better control *Salmonella* in poultry and poultry meat. Further, availability of human surveillance information is identified as an essential input to the design of risk-based control measures.



## Le contrôle des aliments de l'étable à la table : la mise en œuvre des normes du Codex Alimentarius et de la OIE

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### Résumé

Les normes du Codex Alimentarius (Codex) relatives aux denrées alimentaires ont pour but de contribuer à la sécurité sanitaire des aliments et de promouvoir les pratiques équitables lors des échanges internationaux de produits alimentaires. Le recours à ces normes est de plus en plus fréquent dans les programmes de contrôle des aliments mis en œuvre par les gouvernements nationaux et s'inscrit dans une méthodologie de prise de décisions basée sur la gestion du risque. La Commission du Codex Alimentarius (CCA) fournit des orientations qui portent aussi bien sur les systèmes que sur les catégories de denrées alimentaires. S'agissant des zoonoses, les similitudes entre les méthodologies d'analyse du risque sur lesquelles se fondent aussi bien la CCA que l'Organisation mondiale de la santé animale (OIE) pour élaborer leurs normes créent des conditions extrêmement propices à la mise en place de systèmes intégrés de contrôle des aliments. La CCA et l'OIE travaillent de manière de plus en plus concertée à l'élaboration de leurs normes respectives couvrant les zoonoses transmises par les aliments et d'autres risques, de sorte que ces normes constituent un ensemble cohérent qui couvre la totalité de la chaîne alimentaire, sans duplications inutiles.

L'intégration effective des informations émanant du suivi et de la surveillance de la sécurité sanitaire des aliments et de la santé animale est une nécessité si l'on veut améliorer la lutte contre les zoonoses transmises par les aliments. Les normes du Codex et de l'OIE convergent de plus en plus dans ce sens, de multiples manières ; la concrétisation des résultats dépend fortement de la coordination et du partage d'informations entre les Autorités compétentes et d'autres parties intéressées participant à la sécurité sanitaire des aliments au niveau national.

### Mots-clés

Codex – Commission du Codex Alimentarius – Norme – OIE – Organisation mondiale de la santé animale – Surveillance – Zoonose.



## El control de alimentos de la granja a la mesa: aplicación de las normas del Codex Alimentarius y la OIE

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### Resumen

Las normas internacionales sobre alimentos del Codex Alimentarius (Codex) ayudan a garantizar la inocuidad de los alimentos y a fomentar procederes leales en el comercio internacional de productos alimentarios. En los programas de control de alimentos que instauran los gobiernos nacionales cada vez es más común que esas normas se apliquen utilizando un marco de gestión del riesgo como herramienta de adopción de decisiones. La Comisión del Codex Alimentarius (CCA) establece pautas que se aplican tanto a los sistemas en su conjunto como a los propios productos alimentarios. En materia de zoonosis, las similitudes existentes entre los métodos de análisis del riesgo utilizados para cimentar el proceso normativo por la CCA y por la Organización Mundial de Sanidad Animal (OIE) favorecen sobremanera la existencia de sistemas integrados de control

de los alimentos. Cada vez más, al elaborar sus respectivas normas sobre zoonosis transmitidas por los alimentos u otros peligros, la CCA y la OIE trabajan conjuntamente para evitar redundancias y lograr que el aparato normativo tenga cohesión y abarque la totalidad de la cadena alimentaria.

Está claro que para mejorar la lucha contra las zoonosis de transmisión alimentaria se precisa una integración eficaz de los datos resultantes de la vigilancia y el seguimiento de la inocuidad de los alimentos y de la sanidad animal. Las normas del Codex y la OIE, que actúan sinérgicamente en varios planos, favorecen cada vez más esta dinámica, cuyos frutos dependen en gran medida de que las autoridades competentes y los demás interlocutores del ramo se coordinen entre sí e intercambien información en cada país.

#### Palabras clave

Codex – Comisión del Codex Alimentarius – Norma – OIE – Organización Mundial de Sanidad Animal – Vigilancia – Zoonosis.



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