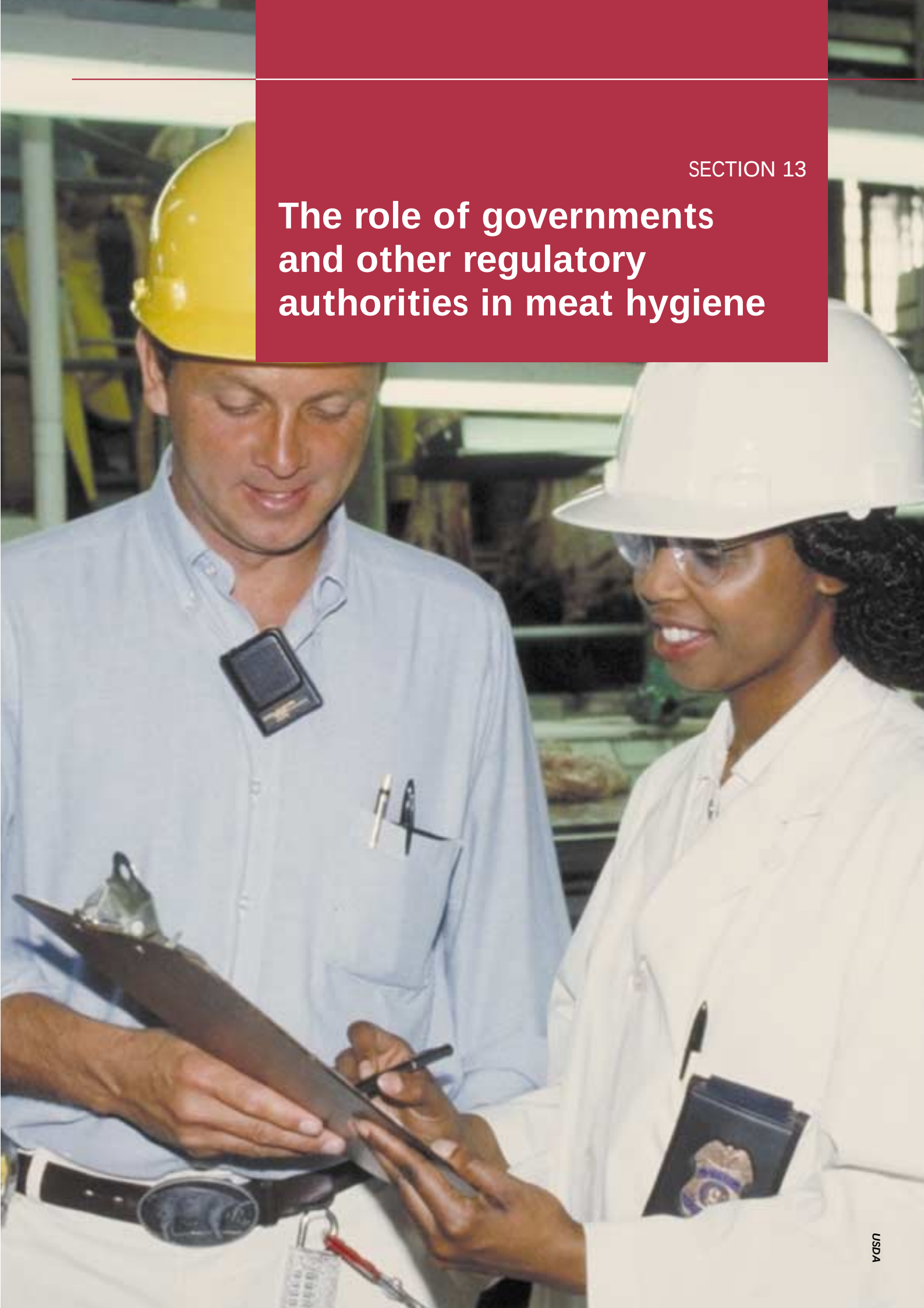
SECTION 13

The role of governments and other regulatory authorities in meat hygiene



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INTRODUCTION

Meat is an essential part of the global food supply and an important element of agricultural commerce and trade in many countries. Commensurate with this, food-borne disease can be a significant public health problem, and inadequate food quality and certification seriously limits the functioning of the marketplace. Meat production can also act as a vehicle for transmission of diseases of animal health importance. For these reasons, civil society demands that government play an official role in meat hygiene.

While the fundamental reasons for government involvement in meat hygiene remain unchanged, the focus of that involvement has changed markedly in the past decade. Recent legislative changes in many countries are a response to public demands for a significant reduction in food-borne risks of animal origin, and new approaches to design and delivery of meat hygiene services are emerging.

In a global regulatory environment that is increasingly intent on placing key meat hygiene responsibilities on industry, governments must still retain final responsibility for ensuring that meat hygiene goals are met. The rapidly increasing trade in meat and meat products at both local and international levels is also resulting in increased government attention to the potential for transmission of diseases of animal health importance via the food chain.

This section focuses on the changing role of government in modern meat hygiene systems. The intense current interest of governments in developing new international standards that delineate their role is a reflection of this changing focus, which will be expressed in different ways in developed and developing countries.

GOVERNMENT INVOLVEMENT IN MEAT HYGIENE

Government, which includes government veterinary services,[1] plays a key role in meat hygiene. This role will be administered by a competent authority that provides a number of essential functions. A competent authority is defined as "The official authority charged by the government with the control of meat hygiene, including setting and enforcing regulatory meat hygiene requirements" (FAO/WHO, 2004a).

Establishment of an institutional structure and legislative framework

Establishment of an institutional structure and legislative framework is a prerequisite for the proper functioning of a meat hygiene programme. Legislation includes acts, regulations, requirements and procedures that cover protection of human (and animal) health, protection of consumer rights and conditions of fair trading.

Institutional structure must successfully interface with non-governmental and private sectors and also facilitate a range of professional inputs, e.g. from veterinarians, human health specialists, food technologists and agricultural scientists.

Establishment of policies and standards

Within an appropriate institutional environment, one or more national competent authorities develop policies and standards for meat hygiene.[2] An array of meat hygiene regulations will describe regulatory requirements and criteria against which safety and suitability will be assessed. Safety standards will need to cover hazards of physical, biological or chemical origin.

Process and product standards should incorporate current scientific knowledge and good practice, and cover all aspects of the food chain that are within the jurisdiction of the competent authorities. This function requires the competent authority to have appropriate scientific and technical capabilities. Policies and standards must also be established for

[1] "Veterinary services" refers to veterinary public and animal health activities irrespective of the organizational arrangements of competent authorities at the national level.

[2] Meat hygiene is defined as "all conditions and measures necessary to ensure the safety and suitability of meat at all stages of the food chain". Safety is described in terms of appropriate application of measures to protect public health, and achievement of any quantitative outcomes for hazard control that may be required. Suitability is described in terms of meat having been produced in a hygienic manner, and meeting any non-safety quantitative standards that may be required.

competencies of inspection personnel and training requirements.

It is clear that veterinary inputs to ante- and post-mortem inspection achieve a duality of public health and animal health objectives. Irrespective of the jurisdiction of the competent authorities involved, veterinary services should integrate their activities to the maximum extent possible and practicable so as to prevent duplication of effort and unnecessary costs.

Design and implementation of ante- and post-mortem meat inspection programmes are primary meat hygiene responsibilities of national veterinary services. In the absence of a risk-based approach (see below), inspection standards are prescribed according to long-standing practice.

Policies and standards include those that are pertinent to meat hygiene throughout all parts of the food chain, e.g. for environmental contaminants, registration and use of veterinary drugs at the farm level, and chemicals that come into contact with the product during processing operations. Surveillance of products for unseen food-borne hazards, e.g. chemical contaminants, must be undertaken by the competent authority so as to identify producers that present non-complying slaughter animals and highlight emerging problems and emergency situations.

Delivery of meat hygiene services

Meat hygiene activities are usually delivered by a competent authority that must provide sufficient numbers of qualified personnel to perform allocated tasks. Resources required to support those tasks include provision of equipment, transport, laboratories and training programmes.

All inspection procedures and judgements must be exercised by personnel who have the appropriate competence. Laboratory support is essential to carrying out meat hygiene. All laboratories should be evaluated and/or accredited under officially recognized programmes to ensure that adequate quality controls and validated methodologies are in place.

Delivery of a meat hygiene service should include appropriate information loops throughout the food chain, with particular attention being paid to feedback of inspection information to producers.

Compliance and enforcement

The competent authority must ensure compliance with regulatory requirements by applying a systematic and functionally independent verification and audit programme. Legislation must provide for the ability to enforce regulatory requirements and impose sanctions in cases of non-compliance.

Public health and animal health assurances

Provision of written or equivalent assurances that meat and meat hygiene systems conform to regulatory requirements is a vital function of the competent authority. Such assurances can be provided by a competent authority which is a government agency having official jurisdiction, or by a competent body. The latter is defined as "A body officially recognised and overseen by the Competent Authority to undertake specified meat hygiene activities" (FAO/WHO, 2004a).

International health certificates providing official assurances for trading of meat should engender full confidence in the country of importation (FAO/WHO, 1995). Importing countries will take commensurate measures to verify certification assurances, e.g. documentary and physical checks at the port-of-entry, and third-party audit of meat hygiene systems in the exporting country.

Animal health surveillance

Animal health surveillance constitutes "continuous investigation of a given population to detect the occurrence of disease for control purposes"; and monitoring constitutes "on-going programmes directed at detection of changes in the prevalence of a disease in a given population" (OIE, 2004). In this context, organoleptic inspection of slaughter animals can provide an important sentinel function for zoonoses, as well as for diseases solely of animal health importance. Further diagnostic tests can be applied in the case of suspect animals.

Conformance with international obligations

The World Trade Organization (WTO) Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) Agreements represent the best efforts of the global community to establish principles and guidelines governing measures for food in international trade. Signing of the

SPS Agreement in 1994 has encouraged meat hygiene measures that are based on an overall assessment of the risks to human and animal health, taking into account risk assessment techniques developed by the relevant international organizations (see below). Along with other WTO SPS obligations, inspection procedures utilized in import/export meat hygiene programmes should be comparable to those used in domestic programmes.

THE CHANGING ROLE OF GOVERNMENT IN MODERN MEAT HYGIENE SYSTEMS

In meeting meat hygiene objectives prescribed in national legislation or required by importing countries, competent authorities contribute in various ways "from the direct performance of necessary [veterinary] tasks to the evaluation of [veterinary] activities conducted by operators in the agro-industrial chain" (Marabelli, 2003). However, the contribution of government to modern meat hygiene programmes is undergoing rapid change. In this context, it should be noted that "Veterinary Services are no longer the sole managers of animal health protection and disease control, but rather guarantors that all parties involved in food production fulfil their respective obligations to guarantee safe food for the consumer" (Marabelli, 2003).

Reorganization

Competent authority

Currently there are widely varying approaches to organization of meat hygiene services within governments (OIE, 1991, 1992, 2003b). The need for clearer delineation of responsibilities between that part of government that deals with economic issues of meat production and trade, and that concerned with public health and consumer protection (WHO, 2002), has been a primary driver in reorganization of the role of government. A consolidation of multiple legislative and functional activities previously spread over several legislative jurisdictions gives practical meaning to multidisciplinary approaches to meat hygiene and implementation of a "production-to-consumption" approach.

Attempts to consolidate and/or better coordinate responsibilities for food regulation have now been under way in a number of countries for several years. The overarching goals are to improve the efficacy of controls and enhance public confidence in the safety of the food supply. Consolidation and simplification of legislation reduce inconsistencies in controls for different foods that cannot be attributed to differences in food-borne risks.

In some countries, the organization of food control (including meat hygiene) at the national level is now falling under a single competent authority that has responsibility for the entire food chain. Concrete benefits have already been reported, particularly in respect of clarifying roles and responsibilities, reducing overlap and duplication of programme functions, improving service delivery and facilitating federal/provincial collaboration (Evans *et al.*, 2003).

Hand in hand with these changes, the meat hygiene activities of the competent authority can be complemented by "outsourcing" of particular services, e.g. laboratory diagnostic services, meat inspection activities and aspects of certification (see below). In these instances, the competent authority will focus on verification and auditing functions that assure consistent delivery of services. In turn, the internal verification systems of industry should be strengthened. The competent authority must also find ways of working that facilitate a high degree of coordination between the private and public sectors. This can most effectively be done within a quality assurance framework that allows for responsible accreditation.

Competent bodies

While responsibility for meat hygiene always rests with the national competent authority, "flexibility should be allowed on how the service is delivered e.g. by the Competent Authority or by an officially recognised Competent Body operating under the supervision and control of the Competent Authority" (FAO/WHO, 2004a). Whatever the arrangement, the competent authority must be able to demonstrate that no conflict of interest exists between public and/or animal health objectives and economic support for the meat industry.

To be officially accredited, an inspection or certification body must be assessed against objective criteria and must comply with all regulatory activities and requirements, especially in relation to the competence, independence

and impartiality of personnel (FAO/WHO, 1995). The performance of officially accredited bodies should be regularly assessed by the competent authority.

Official veterinary inspector

It is now becoming generally recognized that flexibility in the way meat hygiene services are delivered in the slaughterhouse, either by the competent authority itself or by an officially recognized competent body operating under the supervision and control of the competent authority, is a primary goal of a modern meat hygiene programme. However, the role of the "official" veterinary inspector in modern meat hygiene systems is still subject to international debate (FAO/WHO, 2004a). The level of involvement of the "official veterinary inspector", i.e. the veterinary employee of the competent authority who carries out official meat hygiene duties in the slaughterhouse, is changing as structural changes in systems for delivery of meat hygiene services continue.

Whatever the outcome of this debate, it is the official veterinary inspector who has the final responsibility of ensuring that all meat hygiene requirements are met. The competent authority should establish the knowledge and ability requirements of all personnel involved, including the role of the official veterinary inspector. Acceptance of competency standards is becoming a key requirement in judging the equivalence of meat hygiene systems for meat in international trade.

Privatized delivery of meat hygiene

In a modern meat hygiene environment, competent bodies or competent persons may be engaged by industry to undertake prescribed meat hygiene activities, including ante- and post-mortem inspection, as approved by the competent authority (FAO/WHO, 2004a).

Use of private non-veterinary personnel to carry out ante- and post-mortem inspection activities is now well established within a number of national programmes. However, all ante- and post-mortem inspection arrangements should satisfy the principles of independence, competence of inspectors and impartiality, and must be carried out under the overall supervision and responsibility of the competent authority.

The competent authority should specify the competency requirements for all persons engaged in inspection and verify the performance of those persons (FAO/WHO, 2004a).

The Meat Safety Quality Assurance (MSQA) system implemented by industry in Australia is the most comprehensive example of privatized delivery of meat hygiene services (see below). The official veterinary inspector responsible for a specific slaughterhouse ensures that the MSQA system meets regulatory requirements on an ongoing basis. In total, six levels of verification are built into the system:

- company quality assurance teams verifying compliance with MSQA implemented by industry;
- competent authority on-plant supervisors ensuring daily compliance with MSQA;
- competent authority regional veterinary auditors verifying compliance with overarching regulatory requirements on a monthly basis;
- annual independent veterinary audit by the competent authority;
- independent compliance assessment by competent authority;
- external (overseas) audit.

Other examples of privatization of specific meat hygiene functions are increasing on a global basis. Individual health certification of groups of slaughter animals is becoming a common practice in a number of countries, e.g. for zoonotic diseases, veterinary drug residues and vaccination regimes. Veterinary ante-mortem inspection may also be provided by private contractors at the level of livestock production (McKenzie and Hathaway, 2002).

Privatization should only be considered where meat hygiene objectives (including animal health objectives) can be achieved without the burdensome addition of another layer of regulation. There must be clear economic incentives to government and the changes must be acceptable to the competent authorities in importing countries. In this context, concerns have been raised over the potential for privatization of meat hygiene services in developing countries (WHO, 2002).

In the absence of good agricultural and veterinary practice during primary production, and well developed quality assurance systems and risk-based process control (e.g. Hazard

Analysis and Critical Control Point [HACCP]), intensive involvement of government in meat hygiene arguably still presents the most effective way of assuring required outcomes. This may be the situation that exists for some years to come in developing countries.

Enhancing audit and enforcement

A number of institutional models are emerging for the audit and enforcement of regulatory requirements in meat hygiene. It is generally recognized that the effectiveness and consistency of audit and enforcement must be demonstrably improved, especially if consumers are to have ongoing confidence in the safety of the food supply.

The competent authority auditing and enforcing standards may be separate to, or included in, the centralized competent authority promulgating meat hygiene policy and standards. Notwithstanding this, audit and enforcement remains decentralized in some countries, i.e. undertaken by regional or local government. Whatever the organizational structure, a theme of greater centralization of responsibility and "checking-the-checker" is becoming standard audit practice. Procedures and sanctions that are risk-based are becoming more common, and private third parties are emerging as independent auditing bodies.

Uptake of risk analysis

International trends

A risk-based approach to food safety is the contemporary cornerstone of Codex Alimentarius standards for food in international trade (see below) and application of this discipline has irrevocably changed the approach of governments in meat hygiene. While developing technical capability to assess food safety risks and properly benefit from the provisions of the WTO SPS Agreement, competent authorities must also employ other components of risk analysis, i.e. risk management and risk communication, if they are effectively to protect human health and ensure fair trade.

Risk analysis in food safety has its contemporary roots in the emerging global climate of "free trade" that is based on removal of barriers constituting unjustified protection of domestic economic advantage. However, the global community fully recognizes the sovereign right of governments to place appropriate controls on food products crossing their borders so as to protect human health. The WTO SPS Agreement specifies international obligations in terms of the establishment and implementation of such controls.

Risk analysis is increasingly becoming cross-sectoral in nature, and it is generally recognized that all "biosecurity" processes should be applied with the greatest degree of consistency possible. The consolidation of risk-based approaches at the national level has already resulted in significant changes in regulatory policy, infrastructure and scientific endeavour in a number of countries

In a contemporary meat hygiene environment, competent authorities should utilize risk assessment to the greatest extent possible in the development of public health standards. National competent authorities are facing increased demands for technical expertise to develop domestic standards on this basis, while at the same time endeavouring to meet risk analysis obligations as assumed under international trading agreements.

The central role of risk analysis in modern meat hygiene systems has been described in Section 1. As primary producers and processors express concerns about the costs of compliance with new regulatory requirements and their effect on international competitiveness, competent authorities are increasingly pursuing meat hygiene measures that do not unnecessarily restrict business enterprise. Development of standards that are outcome- and risk-based assists achievement of this goal.

Uptake by governments

To date, risk analysis and risk-based standards have been formalized in national legislation to varying degrees. Risk assessments provided by international or regional organizations are increasingly complementing those generated at the national level. National sovereignty is reflected in risk management decisions that reflect agreed public health goals.

In some countries, increasing attention to formalized application of a generic framework for managing food-borne risks has resulted in a legal obligation to routinely include stakeholders other than the competent authority in the risk management decision-making process (see Section 1).

Examples of standard-setting according to risk-based approaches are predominantly found in the areas of primary production and process control. Simulation modelling of risk management interventions in these areas is available for some hazard/product combinations, but quantitative standards resulting from such work are still limited in number. Removal of resource-intensive post-mortem inspection procedures where they have been shown to be of negligible benefit has been the most visible outcome to date. In the absence of a risk-based evaluation, procedures have to remain based on current scientific knowledge and practice.

There is only limited scientific evidence linking traditional ante- and post-mortem inspection with measurable outcomes in terms of human health. Additionally, there has been limited progress in tailoring inspection procedures to the spectrum and prevalence of the diseases/defects present in a particular class of slaughtered livestock from a specific geographical region. A risk assessment approach can be used to address these problems and facilitate the proportional allocation of meat hygiene resources according to level of risk.

Greater emphasis is being placed on risk communication in most countries, and competent authorities are learning important lessons in the translation of complex meat hygiene information into readily understandable messages for the general public. Increasingly, more proactive communication methods are being employed. Provision for broad-based stakeholder consultation is seen as a critical element in an effective risk communication strategy.

The trend towards institutional approaches that bridge the animal and public health sectors/disciplines involved is increasingly apparent at the national level and the traditional focus on regulating individual production systems is shifting to one of ensuring confidence in overall regulatory frameworks at all levels. Development of a more unified approach will have particular benefit in developing countries in assisting general understanding of risk assessment and optimizing the use of scarce technical resources.

Development of integrated "production-to-consumption" meat hygiene systems

Problems exist in many countries and federations not necessarily because of lack of legal meat hygiene instruments, but because of a broad disparity in the means to respond adequately and consistently to food hygiene situations in specific sectors of the food chain, many of which spill over into other sectors. If a "production-to-consumption" approach to meat hygiene is to take root, an integrated, proactive and multidisciplinary response to such situations is required (European Commission, 2000). A "General Food Law" (including relevant aspects of animal feeding) that is readily understandable by all food operators is one means of enhancing food hygiene, including meat hygiene.

There are other reasons why meat hygiene regulation is increasingly focused on the entire food supply chain from primary production (including animal feeding and use of agricultural chemicals) through to consumption. Multiple and integrated interventions are needed to ensure meat products that are safe and suitable, and it is important that those products have not had to be produced under a burdensome regulatory regime. Risk analysis is embedded in design of a production-to-consumption approach, and industry is offered flexibility in the way it achieves specified food safety outcomes at certain points in the food chain (see Section 1).

Good hygienic practice includes the need for a systematic process to gather, evaluate and document scientific and other information as the basis for hygiene measures. Organization and dissemination of information throughout the food chain involves multidisciplinary inputs. As an example, effective implementation of risk-based ante- and post-mortem inspection procedures is dependent on ongoing monitoring and exchange of information involving a range of professionals and non-government sectors.

Contaminants that are not intentionally added to food are increasingly being recognized as hazards of concern in meat and meat products. These may arise as a result of environmental contamination, but they also may arise as a result of agricultural practices, production, processing, storage, packaging, transport or fraudulent practices. Despite widespread occurrence, safety standards for contaminants at each step of the food chain, i.e. from animal feeding through to retail sale, are often lacking or are developed under different legislative jurisdictions. It is clear that a production-to-

consumption approach to control such hazards is imperative.

In the case of the dioxin crisis in Belgium in 1999, it was shown that the high level of dioxin residues in some animal products originated from contaminated feed, but one of the major difficulties encountered in bringing the problem under control was the regulatory inability to impose a single emergency measure. Another major difficulty was the lack of traceability of feed ingredients.

Development of standards based on an integrated production-to-consumption approach to meat hygiene ideally requires application of a generic framework for managing food-borne risks (see Section 1). This is likely to be difficult in developing countries if there is poor communication anong animal health, veterinary public health and medical professionals, and poor monitoring and feedback of information for zoonoses and other food-borne diseases.

Impact of international standards

Under the auspices of FAO and WHO, the Codex Alimentarius Commission (CAC) is the primary standard-setting agency for food in international trade. The Codex Alimentarius, or food code, represents the best efforts of the global community to formulate and harmonize international food standards that ensure protection of public health and promote fair practices in food trade.

Recognition of Codex Alimentarius by the WTO SPS and TBT Agreements (1994) as a benchmark against which national standards and food control systems should be evaluated considerably increased the importance of the code.[3] In recent times, the activities of the CAC have reached much wider than Codex Alimentarius and now directly influence contemporary thinking on food control throughout the global food chain.

In a general context, Codex standards provide direct benefits to the food sector in all countries by:

- providing guidance on cost-effective and efficient production of safe, suitable, high-quality food;
- establishing norms for good agricultural practice (GAP), good veterinary practice (GVP) and good hygienic practice (GHP) throughout the food chain;
- enhancing access to high-value markets by use of harmonized standards (including those for organic products);
- having legal status under the WTO SPS and TBT Agreements,[4] thereby requiring countries to justify non-adoption of Codex standards according to strictly defined criteria;
- facilitating the removal of technical barriers to trade;
- facilitating acceptance of "equivalent" systems and standards.

It is now essential that all countries contribute to the continuing development of the Codex Alimentarius if they are to optimize meat production in terms of meat hygiene and access to international markets. As well as protecting consumers' health, availability of food standards reduces the costs of doing business, e.g. risk of international fraud and the costs of finding reliable trading partners. Consumers are also protected from buying inferior food. In providing such benefits to both producers and consumers, Codex standards promote economic welfare and are a prerequisite to the operation of a well functioning market. If standards are harmonized between countries, they naturally facilitate trade (international and domestic) and trade itself is generally judged to promote economic development (FAO/WHO, 2002).

For many years, FAO and WHO have complemented the activities of the CAC by providing technical assistance to developing countries in the area of food control. Further to this, a recent FAO/WHO Working Group has recommended that FAO and WHO enhance the participation of developing countries from all regions in all aspects of the [Codex] scientific advice process, including prioritization of needs and outreach to scientific experts (FAO/WHO, 2004b). This includes nurturing of regional efforts to generate and collect data for risk assessments.

[3] The WTO TBT Agreement covers all aspects of food standards not covered by the SPS Agreement.

[4] TBT measures must be shown to have a legitimate purpose, be proportional to the desired purpose, and be based on international standards. Codex standards on quality, composition, labelling, nutrition and methods of analysis are all relevant.

The recent FAO/WHO report on the evaluation of Codex Alimentarius (FAO/WHO, 2002) contains far-reaching recommendations in this respect and calls for a strengthening of health risk analysis. The report also identifies that capacity building in risk analysis is essential to developing countries if they are adequately to ensure the protection of their own citizens and benefit from a globalizing market in food.

Recent work by international standard-setting bodies has given clarity to utilization of a precautionary response in the face of potential food safety problems. When available scientific information identifies a hazard in food that may present a human health risk, but the specific nature and the extent of that risk is unknown, the WTO SPS Agreement states that a competent authority may act in a precautionary manner and adopt provisional measures until more complete risk assessment information is available. Thus governments retain broad powers in law to take provisional hygiene measures when faced with new or emerging food safety threats. Such actions are sometimes seen as technical barriers to trade by exporting countries, and this illustrates the need for national risk assessment capability.

Recognition of quality systems by competent authorities

A quality assurance (QA) system is the "organisational structure, procedures, processes and resources needed to implement quality assurance" (FAO/WHO, 2004a). The ISO 8402 Standard states that QA is all the planned and systematic activities implemented within a quality system that provide confidence that an entity will fulfil requirements for quality. Those who benefit from inspection provided by the competent authority or competent body, e.g. farmers and meat-processing companies, are increasingly committing themselves to quality systems due to demand from their customers (Gary, 2003).

Transfer of primary responsibility for meat hygiene to industry is another important driver for the recent emergence of voluntary QA systems. Where industry has demonstrated successful implementation of such systems, the competent authority is increasingly likely to take these systems into consideration when applying its own meat hygiene controls and verification systems.

In some countries, formal QA procedures are being put in place to assure competence and reliability of meat hygiene activities delivered on an ongoing basis (Gerster *et al.*, 2003). Creating a quality system is a simple way of implementing the objectives contained in the quality policies that are written by government managers. Tools such as quality accreditation are seen as necessary components of "modern economic management systems" (Marabelli, 2003).

QA systems can be extended in the case of ante- and post-mortem inspection to "co-regulatory" systems that integrate industry and veterinary service activities (Butler, Murray and Tidswell, 2003). In Australia, these systems are based on HACCP principles, are nationally uniform and extend from "production to consumption". Through a co-regulatory partnership arrangement, the competent authority is responsible for the broad design of the inspection system and its audits and sanctions, while the industry is responsible for further developing, implementing and maintaining the system.

Integrated quality control systems that link information on animal health status at the farm level with selection of slaughter pigs, processing and inspection requirements have been developed in some countries, e.g. rearing and slaughter of finishing pigs in the Netherlands. This approach involves farmers, meat processors and the competent authority responsible for meat hygiene, and the quality systems should be based on internationally accepted norms, e.g. ISO standards. The results from the slaughterhouse are continuously fed back to the farm so as to improve food safety and the profitability of animal production.

Other challenges

A number of other challenges face competent authorities administering modern meat hygiene systems. These include:

- **Facilitating new technologies.** Technological possibilities in meat production and processing are now increasing exponentially. In the past the main goal was to achieve higher productivity and profitability. Now that consumers are increasing their voice in the marketplace, new technologies are often focused on different goals, e.g. higher levels of safety, quality and environmental demands. Competent authorities have the

responsibility of ensuring that such technologies achieve their stated goals, and this often involves detailed risk assessment.

- **Preventing intentional contamination such as bioterrorism**. The food chain is increasingly receiving attention from governments as a potential vehicle for bioterrorism. Strategic responses to the risks of bioterrorism are well advanced in the United States of America and the impact of new food standards to prevent such acts is being felt around the world. The long-term effectiveness of such standards is subject to international debate.
- **Increasing levels of epidemiological surveillance and preparedness for animal health.** Animal health surveillance and monitoring allow veterinary services to identify and control significant endemic or exotic diseases within their territory, and substantiate reports on the animal health situation in their country. Both functions provide essential inputs to import risk analysis.

An example of risk-based monitoring of zoonoses is well illustrated in the World Organisation for Animal Health (OIE) standard for bovine spongiform encephalopathy (BSE) (OIE, 2004). It is stated that surveillance strategies "should be determined by, and commensurate with the outcome of risk assessment" and have two primary goals: to determine whether BSE is present in a country and, once it has been detected, monitor development of the epizootic, direct control measures and monitor their effectiveness.

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