



## **International Commission on Trichinellosis** ***Recommendations on Pre-harvest Control of*** ***Trichinella in Food Animals***

December 9, 2016

Infection with *Trichinella* spp. can only occur if an animal or human ingests muscle tissue containing infective larvae. Therefore, transmission of *Trichinella* to domestic livestock, notably pigs, is limited to certain risk factors including feeding of raw meat-containing waste products or animal carcasses and exposure to infected rodents and wildlife. Prevention of infection in food animals is dependent on eliminating risk of exposure to these potential sources of *Trichinella*.

Preventing exposure to sources of *Trichinella* infection requires that animals be raised under principles of controlled management, which includes controlled housing systems. When a production site reduces or eliminates risks of exposure to sources of *Trichinella* through controlled management, animals from that production site are considered to pose a negligible risk for public health purposes. Pigs reared in pork production systems which meet the conditions of controlled management, as described below, satisfy the criteria for classification as being of negligible risk and therefore individual slaughter inspection of animals raised under these conditions is not necessary for purposes of protecting public health and trade. When a group of pork production sites which satisfy the criteria for controlled management are taken together, the animal population raised in these sites may be considered to represent a compartment of negligible risk.

The ICT considers the individual pork production site, or a group of pork production sites (a compartment), as the epidemiological unit in which it is possible to implement effective measures to prevent exposure of domestic pigs to *Trichinella*. Where controlled management is implemented to prevent exposure to *Trichinella*, as described here and in related documents (Pre-Harvest Control of *Trichinella* in Domestic Food Animals and in the *OIE Terrestrial Animal Health Code*, Chapter 8.15 and the Codex Alimentarius, Guidelines for the Control of *Trichinella* spp. in Meat of Suidae, CAC-GL 86-2015), there is a negligible public health risk from consuming pork. When controlled management is implemented and routinely verified, there is sufficient scientific justification that individual testing of pig carcasses (at slaughter) for *Trichinella* infection should not be required.

### **1. Requirements for production of pigs with a negligible risk for *Trichinella***

The specific requirements of controlled management that need to be met for pigs to be considered to pose a negligible risk for *Trichinella* are as follows:

### Controlled housing

Swine housing includes physical barriers which prevent swine from being exposed to wildlife (including birds) and carrion derived thereof and which/that greatly reduces swine from being exposed to rodents.

### Feed and feed storage

- Feed, and feed components, are stored in closed silos or containers, which do not attract or allow rodents or wildlife to enter.
- Feed which is not produced on-site is purchased from an approved facility, which conforms to good production practices (for example, see OIE Terrestrial Animal Health Code, Chapter 6.3).
- Waste food, if fed to pigs, must not contain meat products.

### Rodent control

- A documented rodent control program is maintained by a pest control provider or an employee(s) of the production facility and regular inspection for rodent activity is performed

### Farm hygiene

- Dead animals are promptly removed from the pigs housing areas and disposed of offsite or stored in animal-proof containers for removal from premises.

### New pigs

- New animals, excluding piglets under five weeks of age, entering the production site must originate from farms which also apply controlled management conditions and have attained *Trichinella* negligible risk status.

### Animal identification and traceability

- Documentation exists so that movement of pigs and/or lots can be traced.

## **2. Negligible risk compartment**

Pigs from production systems which adhere to the controlled management requirements in Section 1 will have a negligible risk for exposure to *Trichinella*. Individual pork production sites which adhere to these controlled management requirements may be grouped together into a compartment, and pigs from that compartment may similarly be considered to have negligible risk of infection with *Trichinella*. All animals and production sites within the compartment must adhere to the conditions described in Section 1.

## **3. Verifying/certifying negligible risk pigs**

Verification and/or certification of the negligible risk status of a production site or compartment may be required for purposes such as food safety, marketing, or trade.

### **3.1 Documenting compliance with negligible risk management**

A general framework for assuring the integrity of a negligible risk production site or a negligible risk compartment should include a system for collecting and reviewing documentation from the production site or compartment demonstrating compliance with the requirements for controlled management. Documentation may include records kept during production (e.g., rodent control, animal movement records) and audits of the conditions of controlled management.

### **3.2 Verifying and certifying compliance with controlled management**

Regular review of documentation and auditing of production sites or compartments following the conditions of controlled management should facilitate compliance verification. Auditing and verification should include oversight of the process (i.e., a program of on-farm audits such as described in the *OIE Terrestrial Animal Health Code*, Chapter 8.15) or oversight of the product (i.e., a program of surveillance testing demonstrating absence of infection at a level of risk that is acceptable for protection of public health). For the purposes of certifying negligible risk for a production site or a negligible risk compartment, auditing and surveillance may be used alternatively.

Basic principles of auditing controlled management pig herds are described in Appendix I of this document. Basic principles of surveillance are described in Appendix II of this document.

## **4. Pigs from production sites not practicing controlled management**

Where controlled management of domestic pigs is not implemented and routinely verified, individual carcass testing should be performed as described in the *ICT Recommendations on Quality Assurance in Digestion Testing Programs for Trichinella*.

## **Appendix I – Auditing for verifying negligible risk in a controlled management herd or compartment**

Auditing is one method to assure that the conditions of controlled management are followed on production sites and in compartments establishing or maintaining a designation of having negligible risk for *Trichinella* infection. Audit design should be risk-based, taking into account historical information, pig management systems, slaughterhouse monitoring results, knowledge of established farm management practices and the presence of susceptible wildlife. Audits should address each element of controlled management as described in this guideline and elsewhere.

If the purpose of auditing is to certify negligible risk, the auditing process should be overseen by the competent authority. Auditing should be performed by qualified and trained auditors, according to national or international standards. A regular schedule of audits of production sites/compartments participating in programs of controlled management should be implemented, including unannounced spot audits as appropriate.

## **Appendix II - Surveillance for verifying negligible risk in a controlled management herd or compartment**

Surveillance is a method for assuring that the product of controlled management meets established criteria for having negligible risk for *Trichinella* infection. The design prevalence for surveillance of a negligible risk production site/compartment should support a level of risk that is acceptable for protection of public health.

Surveillance programs for *Trichinella* infection should take into account the provisions of the World Organization for Animal Health (OIE) *Terrestrial Animal Health Code*, Chapter 1.4, Animal Health Surveillance. The OIE in its *Terrestrial Animal Health Code*, Chapter 1.4, Animal Health Surveillance, states that “surveillance is aimed at demonstrating the absence of disease or infection” and “surveillance is a tool ..... to provide data for use in risk assessment, for public health purposes, and to substantiate the rationale for sanitary measures.” In that regard surveillance for *Trichinella* in pigs within a defined epidemiological unit or population (e.g., compartment), can be used to determine public health risk.

### **1. Defining an acceptable level of risk for verifying controlled management**

Guidelines from appropriate international authorities should be used to determine a level of risk to consumers which is acceptable to establish a program for surveillance of animals produced under controlled management conditions.

As an example, the Codex Alimentarius Committee on Food Hygiene considers that “a slaughter surveillance programme [for *Trichinella*] incorporating current testing data demonstrating that prevalence of infection does not exceed 1 infected carcass per 1,000,000 pigs slaughtered with at least 95% confidence” will provide adequate assurance that pigs from a negligible risk compartment truly pose a negligible risk to consumers.

Consumer risk is dependent on a number of factors including prevalence of infection, test sensitivity of meat inspection, larval distribution in infected carcasses, culinary habits and per capita consumption of pork. The risk for consumers should preferably be estimated using a quantitative risk assessment approach, including dose response modelling, taking into account those factors that may vary considerably between countries (see also Franssen et al., 2016).

When verification of controlled management is demonstrated by surveillance, absence of infection at a specific design prevalence (e.g., 1/1,000,000) may be used as an input into a Quantitative Risk Assessment Model to estimate the upper limit for the incidence of trichinellosis in consumers.

### **2. Implementing surveillance using slaughter samples**

To apply a surveillance program to a population of pigs (e.g., pigs raised under conditions of controlled management), the population must be defined and all members of the population must be identifiable. The basic epidemiological unit is the pork production site or the compartment.

When an epidemiological unit of negligible risk pigs has been established, the number of pigs requiring testing must be determined based on the target design prevalence required to achieve the acceptable level of public health risk as described above. This number to be tested can be derived from various tables (e.g., Cannon and Roe, 1982).

When testing, it is important to perform sampling that is adequately representative of the pigs in the herd or compartment. Sampling design should follow recommendations promulgated by the OIE, *Terrestrial Animal Health Code*, Chapter 1.4, Animal Health Surveillance, which include structured population-based surveys, such as systematic sampling at slaughter and random surveys.

### **3. Appropriate use of tests**

Testing should be performed using suitably standardized and validated digestion or serological methods that are fit for purpose. There are various sources of information on appropriate methods and how these methods should be used in a quality assurance system. These references include:

- World Animal Health Organization, Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.
- International Commission on Trichinellosis, Quality Assurance in Digestion Testing Programs for *Trichinella*
- International Commission on Trichinellosis, Recommendations for Serology
- ISO Standard 18743:2015, Microbiology of the food chain – Detection of *Trichinella* larvae in meat by artificial digestion method.

When using a test to determine prevalence, detailed knowledge of the performance characteristics of the test must be incorporated into the surveillance program. The performance of the test should be validated in the laboratory performing the test and an appropriate quality assurance system which includes proficiency testing should be in place.

#### References

Cannon, R.M., Roe, R.T. 1982. Livestock disease surveys. A field manual for veterinarians. Bureau of Range Science, Department of Primary Industry. Australian Government Publishing Service, Canberra.

Franssen, Frits, Swart, Arno, van der Giessen, Joke, Havelaar, Arie and Takuni, Katsuhisa. 2016. Parasite to patient: A quantitative risk model for *Trichinella* spp. in pork and wild boar meat. *International Journal of Food Microbiology*, 241: 262-275.