



## A qualitative risk assessment for visual-only *post-mortem* meat inspection of cattle, sheep, goats and farmed/wild deer



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### ABSTRACT

The UK Food Standards Agency is currently funding research to build the evidence base for the modernisation of meat inspection. This includes an assessment of the risks to public health and animal health/welfare of moving to a visual-only post-mortem meat inspection (PMMI), where routine mandatory palpation and incision procedures are omitted. In this paper we present the results of a risk assessment for a change from current to visual-only PMMI for cattle, sheep/goats and farmed/wild deer.

A large list of hazard/species pairings were assessed and prioritised by a process of hazard identification. Twelve hazard/species pairings were selected for full consideration within the final risk assessment. The results of the public health risk assessment indicated that all hazard/species pairings were Negligible with the exception of *Cysticercus bovis* in cattle, which was judged to be of low-medium increased risk for systems not conforming to criteria as laid down by EC Regulation 1244/2007, compared to systems that do conform to Regulations for visual-only PMMI.

Most hazard/species pairings were concluded to pose a potential increased risk to animal health/welfare, including *Mycobacterium bovis* (very low – low increase in risk, but with considerable uncertainty), *Fasciola hepatica* (negligible – very low) and *Cysticercus bovis* (very low – low). Due to low feedback rates to farmers, the real risk to animal health/welfare for *F. hepatica* and *C. bovis*, including animals in non-conforming systems under visual-only PMMI, is probably negligible. That then leaves *M. bovis* as the only confirmed non-negligible animal health and welfare risk.

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### 1. Introduction

Official meat inspection is important for assuring the safety of meat and is also required to ensure access to international trade. However, current *post-mortem* meat inspection (PMMI) that employs typical macroscopic inspection techniques, namely visual examination, palpation and incision, cannot detect the foodborne hazards that are of importance today, e.g. *Salmonella*, *Campylobacter* and *Escherichia coli* O157 (EFSA, 2009).

The European Commission (EC) has recognised a need to develop a more effective, risk-based approach to meat inspection (EC, 2000). This would improve efficiency in controlling the most important public health hazards associated with meat at abattoirs whilst maintaining surveillance of animal health/welfare issues.

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The subsequent Food Hygiene Regulations (Regulations (EC) 852/2004, 853/2004 and 854/2004) enabled implementation of different approaches to PMMI for pigs, calves and lambs, provided certain criteria were met and that it was based on a sound risk assessment. These regulations included the requirements to supply Food Chain Information (FCI) (epidemiological data, herd health data, production data), from farmers to the slaughterhouse operator and Official Veterinarian (OV) before arrival of animals at the slaughterhouse. EC Regulation 854/2004 allowed officials to conduct visual-only PMMI (i.e. without mandatory use of incision and/or palpation techniques in routine slaughter) of fattening pigs reared indoors from controlled housing conditions and integrated production systems. EC regulation 1244/2007 extended the principle of visual-only PMMI to cattle and sheep/goats, provided certain age and management conditions are met (including 'all-in-all-out' production and cattle/sheep being less than 8/12 months old respectively).

A previous risk assessment (Hill, Donaldson, et al., 2013), addressing the risk arising from moving to visual-only PMMI of all pigs in the UK, concluded that the risk in relation to all public health hazards detectable by current PMMI (including *Mycobacterium bovis*) would be negligible. It was also concluded that there would be a very low increased risk to animal health/welfare due to tuberculosis (TB) lesions being missed by meat inspectors (colloquial name for Official Auxiliaries in the UK) if they omitted incision of the head lymph nodes, because current PMMI is the only surveillance mechanism for identifying the presence of TB pathology in pigs. As part of the UK Food Standards Agency's (FSA's) continuing process to modernise meat inspection a similar risk assessment has been conducted for other livestock species where visual-only meat inspection has been allowed by current legislation, specifically cattle, sheep/goats and, in addition, farmed/wild deer.

The specific risk question asked by the FSA was:

“What is the change in risk for i) public health and ii) animal health/welfare if the derogation for visual only *post-mortem* meat inspection, established in EC Regulation 1244/2007 for cattle and sheep/goats under certain age and management criteria, are extended to all age groups and quality-assured production systems of these species and farmed/wild deer in the UK?”

While the study was focused on the UK, many of the results/conclusions will be applicable to other countries, especially within the EU. We highlight where results may be transferable across countries.

## 2. Materials and methods

### 2.1. Definitions

For clarity, we first define relevant terminology, concordant with the relevant EU legislation and risk analysis frameworks. To undergo visual-only PMMI there are several requirements as specified in Annex II of Regulation (EC) 1244/2007, including that animals are raised under “controlled and integrated production systems”. An integrated system is defined as a herd that has detailed information available for all the animals from birth to slaughter and their management conditions. There are also several other criteria relating to ‘all-in-all-out’ systems, feed and bedding that make up the definition for a “controlled” system.

Expert opinion from the English Beef and Lamb Executive (EBLEX) suggests that all quality-assured farms in England and Wales, regardless of production type, would currently meet the criteria for a fully integrated system. This is due to meeting feed and management requirements, the traceability between farm and abattoir provided by FCI, and the various animal movement licence systems for cattle and sheep.

We define all production systems that meet the criteria as laid down by EC Regulation 1244/2007 as “conforming” systems and those that do not as “non-conforming” systems. For example, only those cattle slaughtered at an age of less than 8 months and produced in an integrated and controlled production system will be classed as “conforming”.

Another important clarification is that while a system may be conforming, not all batches/animals are able to be visually-only inspected. Only non-suspect animals would be eligible for routine/normal slaughter and visual-only PMMI. These animals are: a) NOT considered as posing higher risk according to FCI, b) NOT showing relevant abnormalities at *ante-mortem* inspection and c) NOT showing relevant abnormalities at visual PMMI. Hence, if visual-only PMMI was implemented for all red meat animals slaughtered in the UK, then some animals will still be diverted to a category where carcasses/organs would be palpated/incised in addition to visual-only PMMI.

Sensitivity of detection of infection is defined as the ability of PMMI to detect an infected animal, rather than the sensitivity of detecting visible lesions (in the context of TB, for example). That is, the sole concern is the ability to detect true infection of an animal. We define categories of risk as published previously by EFSA (EFSA, 2006). Finally, for parsimony, all further references to animal health are taken to include both health and welfare issues.

### 2.2. Risk assessment framework

The risk assessment framework used in this assessment is identical to that carried out for visual-only PMMI for pigs (Hill, Donaldson, et al., 2013). Briefly, there are two main criteria that determine whether the risk will change: i) is the sensitivity of detecting a hazard affected as a consequence of switching from current to visual-only PMMI? and ii) is the hazard of concern more prevalent in non-conforming systems than conforming systems? If the answer to one or both of these questions is no, then non-conforming production systems pose no greater risk than conforming systems.

We define two risk terms: the “impact” of a hazard on either public health and/or animal health/welfare under current PMMI legislation (i.e. for conforming systems), and the “relative risk” of extending current provisions for visual-only PMMI to all age groups and quality-assured production systems (i.e. including non-conforming systems). Therefore, the “impact” rating, where applicable, acts as a baseline, from which we compare the relative risk (i.e. an impact of a certain will be rated between “negligible” and “very high”, but will also be assigned an additional rating between “negligible” and “very high” based on the increase in risk posed by allowing more animals to be processed via visual-only PMMI). Each rating from negligible to very high is awarded via the subjective assessment of the risk assessment team, based on the current scientific evidence available.

We assume 100% compliance with legislation and a 100% action taken by farmers in order to address animal health issues. This is the only realistic way to make direct comparisons on the impact of the change from current to visual-only PMMI on animal health and welfare. The risk assessment framework, shown in Fig. 1, largely follows the OIE guidelines for microbiological risk assessment (OIE, 2004), with an additional Hazard Identification stage.

During the Hazard Identification and Release Assessment stages of the framework a number of decision criteria were used to identify hazards where there may be a significant change in public/

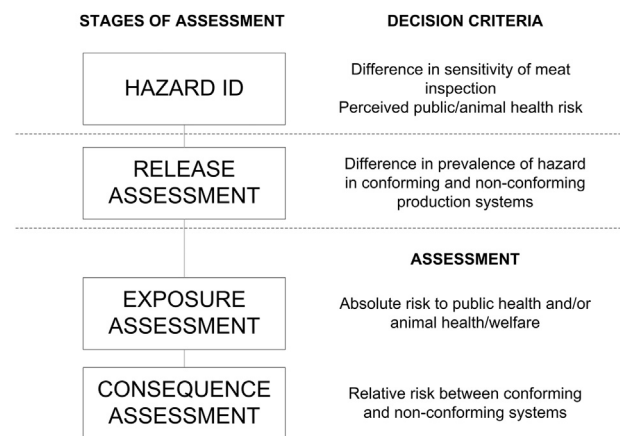


Fig. 1. Risk assessment framework. At each stage specific decision criteria are used to assess the relative risk against the current public health and animal health/welfare impact of relevant hazards.

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