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MODERNIZATION OF CURRENT MEAT INSPECTION PROCEDURES

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INTRODUCTION

The efficiency, cost effectiveness and scientific validity of ante mortem and post mortem inspection in the industrialized countries are currently being scrutinized. (Van Logtestijn, 1984; Grossklaus, 1987; Hathaway and McKenzie., 1991; Snijders et al,. 1989a).
Protection of public health may be considered as one of the main objectives of meat inspection (Berends et al., 1993; Hathaway and McKenzie, 1991; Snijders et al., 1989b). The methods and designs of Western European meat inspection originate from the second half of the nineteenth century, when it became clear that meat could play a role in the transmission of diseases. The ante-mortem inspection is, in fact, a simple clinical examination. Post-mortem inspection is the most laborious, and thus the most expensive part of meat inspection. Improvements in technology, animal husbandry and animal health care have to a significant rise in the numbers of animals kept for animal production, while this production has also become more and more concentrated in large production units and in particular regions. Thus, the slaughter of a few animals, originating from the same farm, has evolved into the slaughter of large numbers of uniform, relatively young and healthy animals often with a common genetic background.

Meat inspection is basically a repressive end-product inspection, which sporadically uses information from earlier stages. However, in modern animal husbandry other problems occurred, i.e., increasing numbers of animals that are healthy carriers of pathogenic microorganisms, increasing numbers of different veterinary drugs.

Responsibility for the quality and, more particularly, the safety of meat cannot entirely lie with the meat inspection service, but the suppliers of the animals also have their own responsibility in the production chain.

On the other hand, information from the meat inspection at the slaughterhouse should be fed back to the farmer and the veterinary practitioner, in order to improve the health care of animals at the farm, the efficiency and profitability of animal production and Good Veterinary Practice.

In order to investigate the possibilities for and the implementation of an Integrated Quality Control (IQC) system in the Netherlands a research programme was started. One of the goals of this programme was to establish an information model by using data from the farm as well from the slaughterhouse (Harbers, 1991; Harbers et al., 1992a; Snijders et al., 1989).

The aim of the IQC study was amongst others:

to select from the farm records those production data that might help to improve meat inspection;
to select those slaughter data that would better serve meat inspection purposes; and
to provide the producer with useful information as a means of improving herd management.

In this paper some results are given, which could be useful for further discussion in modernization of meat inspection procedures.

MATERIALS AND METHODS

Data concerning the post mortem inspection of 1.8 million finishing pigs was collected in three different slaughterhouses. Meat inspectors registered post-mortem abnormalities via computer terminals according to a system described by Harbers et al., 1991 and Elbers et al., 1992.

Regarding pre-selection, experiments were done in which 22 producers preselected pigs not only on the basis of weight but also on the absence of any known or visible abnormalities (Harbers et al., 1992a). They participated on a voluntary basis. Every supplier selected one shipment, which contained 80 to 100 finishing pigs.
On the farm, the pigs were individually inspected by the pig suppliers and subsequently by a veterinarian (the "expert"). These two inspections were carried out independently. In the slaughterhouse ante- and post-mortem inspection procedures were carried out according to "regular" EC Directive (64/433/EEC). This was done by an ante- (AM) and post-mortem (PM) meat inspector.
Also, a post-mortem meat inspection based on visual inspection (without palpation or incision) was compared with traditional post-mortem meat inspection. Three inspection procedures on 31,682 finishing pigs were performed: visual, traditional and extra inspection (a minute pathological anatomical examination with more time allowed for inspection). The reproducibilities, measured with Cohens Kappa (CK), and the accuracies of the visual and traditional inspection methods were compared with those of the extra inspection (Harbers et al., 1992b).

RESULTS AND DISCUSSION

Data collecting

The prevalence of abnormalities in delivered Dutch slaughter pigs, registered via computer terminals on the slaughter line, was relatively low for findings such as: inflammation of the leg, arthritis, atrophic rhinitis, inflammation of the tail, affected liver, abscesses in lungs. The incidence of abnormalities was generally less lower than 1%. However, the incidence of pleuritis and pneumonia varied between 10-15%.

The post-mortem recording system also gave the opportunity to calculate a Meat Inspection Index, which is the total sum of the percentages of the abnormalities in a delivery. In this way it is possible to classify the suppliers of pigs into groups based on the level of pathological findings. More attention could then be paid by the meat inspectorate to those herds with a history of high levels of abnormalities.

Pre-selection

If, however, the efficiency of meat inspection is to be improved it will be necessary to select pigs prior to slaughtering. In general, the agreement between inspection methods on the farm and in the slaughterhouse was poor, except for tail lesions. An important result was that the prevalence of abnormalities registered by the AM inspector was very low compared to the prevalence registered by the pig suppliers and the expert. "Stragglers" were especially difficult to detect for an AM inspector. A straggler is an animal which is retarded by at least 15% with respect to its weight compared to the average weight of the pigs in the same group.

The differences between the percentages of abnormalities registered by the pig suppliers and the expert on the one hand and those registered by the AM inspector on the other hand could be explained by the fact that the pigs in their herd of origin were not excited or stressed by new surroundings. Moreover, the pig supplier may include knowledge of the events that had occurred during the finishing period in his judgement.

The expert and some pig suppliers were able to select those pigs that had abnormalities that were also detected during post-mortem inspection. This indicates that if abnormalities are found on the farm, then there is an increased probability that the animal will also show post-mortem abnormalities. Information about abnormalities supplied by the pig farm could thus be used for meat inspection purposes, particularly if the supplier is experienced in the way animals have to be pre-selected (learning effect).

Visual meat inspection

The reproducibility of the visual inspection (CK) was poor to fair (0.14-0.64) and the traditional inspection also had a poor to fair reproducibility (0.24-0.73). The specificity and sensitivity of the visual and traditional inspection methods did not differ significantly for most of the abnormalities and additional findings. The detection rates for most of the findings detected with the visual or traditional inspection methods were less than those of the extra inspection. However, even the extra inspection did not detect all post-mortem findings which showed that the accuracy of the three inspection methods was less than 100%. Therefore, meat inspection procedures should in future be based on risk assessment.

Implementation and recommendations

Under article 17 of the EC Directive Fresh Meat 91/497/EEC, it is permissible to adapt the meat inspection for uniform deliveries if the new method assures a level of animal health equivalent to that guaranteed by the methods of existing ante-mortem and post-mortem inspection techniques.

At the moment, we are working on a proposal based on the basic rules of the IQC system with additional recommendations, which is based on a guarantee system. Thus, the producer of slaughter animals will be responsible

for the wholesomeness and quality of the delivered animals. With those deliveries meat inspection can be directed more to the control of hygiene during slaughtering and dressing (Snijders, 1988). Batches without guarantees will still require rigid meat inspection procedures of individual carcasses. This will inevitably result in higher costs for the farmer (malus). However, in case the farmer can and does guarantee that the additional requirements are met his effort ought to be rewarded (bonus). Important prerequisites for an adapted visual inspection are that the meat inspection service has insight in to the health status of the delivered animals before the implementation of a visual post-mortem inspection. This can only be achieved in an IQC system. The basic rule for taking part in the IQC system are given in a separate paper by Schouwenburg et al., 1993. Some of the main issues for meat inspection are:

All animal treatments should be registered in a health logbook.
All animals should be delivered with a Quality Information Card. This card contains the most important information of the logbook and can be considered as a specific guarantee.
The meat inspection service registers relevant pathological anatomical abnormalities.
The slaughterhouse has to inform the farmer about pathological anatomical abnormalities.

In addition to these basic IQC rules the farmer must preselect his animals on visible abnormalities. Further, he has to guarantee that the pigs, when delivered, are healthy and have no visible pathological anatomical abnormalities. This should be ascertained in the meat inspection index mentioned above. Finally, the animals should be delivered to the slaughterhouse separately, so that there is no possibility of their being mixed up with animals that are not guaranteed.

If those conditions are fulfilled, the traditional meat inspection can be replaced by a visual post-mortem inspection.

In this way it seems possible to change meat inspection from product control to production control, with a better guarantee for the consumer and lower costs.

During the 40th ICoMST, 1994 in the Netherlands, a special mini symposium will be focused on the topic of modernization of meat inspection procedures.

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