Nordic Meeting on the Modernisation of Meat Control and Animal Welfare Inspection at Slaughterhouses

7-8 March 2018, Uppsala, Sweden
## Program

### WEDNESDAY 7 MARCH

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<td>15.15-15.40</td>
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Modernisation of meat inspection of pigs by use of risk assessments

L. Alban\textsuperscript{1,2}, J.V. Petersen\textsuperscript{1}, A.K. Bækbo\textsuperscript{1}, T.Ø. Pedersen\textsuperscript{2}, A.B. Kruse\textsuperscript{1,2}, M.H. Larsen\textsuperscript{2}.

\textsuperscript{1}Danish Agriculture & Food Council, Copenhagen, Denmark
\textsuperscript{2}Department of Veterinary and Animal Sciences, University of Copenhagen, Denmark

Adoption of the EU Meat Inspection Regulation 854/2004 created opportunities to use risk assessment as documentation for change in the meat inspection procedure for finishing pigs raised under controlled housing.

In Denmark, such risk assessments have been undertaken using the OIE approach involving hazard identification followed by an assessment of release, exposure, and consequences, integrated into a risk estimate. To address these elements, we collected samples from abattoirs and subjected them to laboratory investigation, and we used slaughterhouse statistics, literature, and expert opinions. The work was undertaken in collaboration between academia, industry, and veterinary authorities.

We have looked individually at 1) the mandibular lymph nodes, 2) the heart, 3) the intestinal lymph nodes, 4) the lungs, and 5) the liver. For each of these organs, we looked at what would happen if incisions and palpations would no longer be undertaken routinely but only upon suspicion.

Lately, focus has been on carcasses with embolic pneumonia and handling of purulent lesions indicative of prior septicaemia in finishing pigs or sows. These lesions may be the result of a tail bite months earlier. According to the Danish meat inspection circular, acute cases should be condemned, whereas chronic cases should be subjected to de-boning. We have investigated whether de-boning could be replaced by local condemnation, and results show that it would not put the food safety at risk. At current, an implementation study is being undertaken.

The approach enabled us to introduce a gradual shift in inspection from traditional inspection to visual-only. In this way, we have continuously been able to document the safety of the new system to authorities, trade partners and meat inspectors.
Future meat inspection and hygiene – thinking outside the box to put in inside

Ole Alvseike
Animalia – The Norwegian Meat & Poultry Research Centre, Norway

Thinking outside the box is a metaphor that means to think differently, unconventionally, or from a new perspective (Wikipedia). It could be that society realize that improvement is needed, or it could be that an inventor imagines a possibility no one has requested, e.g. smart phones.

The biggest challenge of all sectors is to improve sustainable productivity. The old solution; improvement by scale enlargement, concentration and division of labour are being reduced in a mature market, which means we have to work smarter. The world looks for cost effective flexible automation for relevant volumes. The solutions should also save and improve meat quality, improve hygiene and improve meat inspection.

In the project “Meat 2.0” we have proposed the Meat Factory Cell:

1. Work partly organised in cell stations instead of lines
2. Combine and merge elements of the today’s separate processes and disciplines, namely "slaughter" and "meat primal cutting".
3. “Disassemble” the carcass from outside-in without removal of internal organs before removal of most primary cuts.

We expect that the meat inspection in the MFC approach can be significantly improved compared to procedures in conventional slaughterhouses. The suggested MFC meat inspection procedures fulfil Codex alimentarius’ “Code of hygienic practice for meat” and public health targets. In addition, improved hygiene and risk reduction from important undetectable foodborne pathogens are expected from the MFC, as limbs, neck and loin are removed first and are not subject to faecal contamination from intestinal content. However, the rind might still carry some faecal contamination as the singeing and polishing do not possibly eliminate contamination fully. The MFC provides opportunities for customized chilling regime for different parts, targeted decontamination or pathogen killing processing that should contribute to safer meat products and less energy consumption. But, the MFC is not legal.

Today’s meat inspection is the basic level for access to market. However, alternative documented approaches should be allowed and appreciated. Inventions are highly needed and several core technologies are available but not exploited. Legislative demands should be worded in functional terms. If legislation is lagging behind technological advances, it will impede improvement of hygiene and food safety.
Animal welfare and food safety – how can we utilize the synergies?

Charlotte (Lotta) Berg,
Department of Animal Environment and Health, Swedish University of Agricultural Sciences
PO Box 234, 532 23 Skara, Sweden.

To the consumers, food safety is of utmost importance and hence there is a long tradition of monitoring the hygiene of the slaughter process, from ensuring that the animals arriving at the slaughterhouse are healthy to evaluating the bacterial load and any evidence of contamination of the processed meat when ready for distribution to retailers and shops. However, to many consumers animal welfare is also vital, and consumers tend to rely animal welfare legislation and official control to safeguard the welfare of production animals. Since the introduction of the Hygiene Package (Regulation (EC) No 852/2004, 853/2004 and 854/2004) in 2006, more emphasis have been put on ensuring that the Food Business Operators are fulfilling the requirements not only meat control but also on animal welfare at the time of slaughter. Furthermore, the tasks of the Official Veterinarians relate not only to safeguarding animal welfare at the actual time of killing, i.e. during lairage, handling, stunning and exsanguination at the slaughterhouse in accordance with the EU Regulation 1099/2009, but also to the identification of animal welfare problems originating from the farm. In many cases, there are links between food safety and animal welfare. The most obvious example is perhaps very dirty or soiled animals, where it is difficult to carry out the slaughter process in a hygienic way, and where there are also reasons to suspect that the conditions has been detrimental for the welfare of the animals while still on the farm. Dirty animals often suffer from inflammatory reactions of the skin, from hair loss and inability to thermoregulate properly in a cold climate, and from general discomfort. To increase the awareness of the links between food safety and animal welfare and to ensure reasonable standardization of the assessment criteria, the Swedish Board of Agriculture has, together with veterinarians from the Swedish University of Agricultural Sciences and the National Food Administration, developed guidelines to aid the Official Veterinarians at the slaughterhouses in how to handle various animal welfare issues emanating from the farm. This material will be presented and discussed at the meeting.
Official control effectiveness for microbiological criteria at slaughterhouses

Christian Berking, Senior Veterinary Inspector, Örjan Johansson, Veterinary Inspector, National Food Agency, Sweden

Consumers living in the European Union (EU) expect to buy safe food at all times. According to EU regulation EC No. 178/2002 (General Food Law), it is the obligation of food business operators (FBOs) to produce safe food. In addition, consumers also expect no food fraud and the FBO’s wants equality and fairness in the implementation of food control legislation. In this regard, EU regulation EC No. 882/2004 requires the competent authorities i.e., national food safety authorities in each member state to conduct official control checks throughout the food chain to verify that FBOs comply with relevant EU regulations, thereby ensuring safe food.

Article 8 in EU regulation (EC) No, 882/2004 stipulates that national food safety authorities must verify the effectiveness of their official controls. However, the regulation provides no guidance on how to verify whether the food controls are applied in the same way and whether inspections are done in a fair and equitable manner, regardless of type of food business establishment and their geographical location and how to reach a stated objective.

Food and Veterinary Office defined effectiveness as “The extent to which official controls produce an intended effect and/or achieve an objective” (EU Member States Network on National Audit System, 2014). This objective aims at safe food through official control that detects non-compliances.

This project showed that findings of non-compliances at food business establishments, as found by official inspectors compared with those found by supervisors, could be used as an indicator for the effectiveness of official controls.

26 slaughterhouses subjected to planned official control with no non-compliances found, were reinspected by trained supervisors according to a predetermined checklist. The supervisors revealed a number of non-compliances in some areas not previously detected. In other areas only a few non-compliances were detected by supervisors. The result indicated that effectiveness was higher when controlling larger slaughterhouses.
EFSA activities on animal welfare at slaughter

Denise Candiani, Scientific Officer,
Animal and Plant Health Unit, European Food Safety Authority (EFSA)

The European Food Safety Authority (EFSA) is an agency established in 2002 by the EU under the General Food Law (EC Reg 178/2002). It provides the European Commission (EC), Parliament and Member States (MS) with independent scientific advice and communication on risks associated with the food chain. Animal welfare is part of EFSA’s remit, including welfare at slaughter. EFSA’s activities in this field are carried out by the Panel of experts on animal health and welfare (AHAW). The EC has mandated the AHAW Panel to provide scientific advice on several welfare aspects related to the slaughter process. In particular, recent scientific production relates to:

- four opinions on monitoring procedures for cattle, pigs, sheep, goats and poultry at slaughter (2013): toolboxes of welfare indicators are proposed for developing monitoring procedures at slaughterhouses. Welfare indicators and their corresponding outcomes of consciousness, unconsciousness or death are suggested to assess consciousness in animals after stunning. The frequency of checking is also proposed;

- guidance on criteria to assess studies evaluating the efficacy of new or modified stunning methods (2013 and ongoing revision): following the receipt of applications for new or modified stunning methods (e.g. Low Atmospheric Pressure System for poultry), the AHAW Panel defined process and methodological criteria to evaluate the submitted studies and to assess if the methods ensure a level of welfare at least equivalent to that of currently approved methods;

- opinion on welfare aspects of slaughter of pregnant animals in EU following a mandate from 4 Member States (2017) - This scientific opinion presents new insights on how many pregnant animals are slaughtered in the EU, the reasons why they are slaughtered and whether livestock fetuses can experience pain. Experts propose practical measures for reducing the number of pregnant animals slaughtered and actions to be undertaken at slaughter.

Finally, EFSA coordinates the Network of National Contact Points appointed by each MS to provide scientific support to their national competent authorities in line with Article 20 of EC REg 1099/2009.
Data-driven surveillance: Automated extraction of information to support decision making in animal health

Fernanda C. Dórea
Department of Disease Control and Epidemiology, National Veterinary Institute (SVA), Sweden

A great variety of animal health data are available electronically. However, their systematic use for disease control faces a number of obstacles, from data ownership to technical barriers. At SVA we conduct research to develop effective methods to combine evidence from multiple data sources, while respecting data privacy issues.

A system is currently in place for automated analysis of all data from laboratory test submissions received at SVA daily, generating reports for decision makers. The main goal of the system is early detection of unexpected disease trends, but we believe that the system can be improved to provide true situational awareness about the health of the livestock population. Ongoing research aims at improving the sources of data analysed, and overcoming technical barriers to allow computers to do most of the data processing, so that we can focus epidemiological expertise where it is needed – on decision making.

In this presentation we will demonstrate how various types of data – including for instance laboratorial, clinical, animal movement, production data, and potentially even slaughter inspection – can be used to produce actionable information for disease surveillance.
New legal framework, visual meat inspection in bovines, UECBV perspective

Annette Dresling
Danish Agriculture and Food Council, Denmark

The new EU control regulation No 625/2017 (OCR) pushes like domino pieces for alteration of other EU meat production legislation. Consequently, the work converting Regulation No 854/2004 on official control into Implementing and Delegated Acts has begun and will be finished by summer 2018 and followed by the EU legal procedure before entering into force in December 2019. This has brought about the possibility to alter the text regarding meat inspection in bovines and move forward towards a more risk based approach and the implementation of visual meat inspection in this species.

The EFSA opinion on the public health hazards to be covered by inspection of meat (bovine animals) from 2013 highlights *Salmonella* spp. and pathogenic verocytotoxin-producing *E. Coli* as important pathogenic organism not covered by the traditional meat inspection. On the other hand, visual meat inspection will according to the opinion reduce the detection of bovine tuberculosis and cysticercosis. This discrepancy has resulted in a reluctance to introduce visual meat inspection in bovines in the EU.

The UECBV is the European Livestock and Meat Trades Union. It represents at the EU level the national federations of the livestock traders, livestock markets, meat industry (slaughterhouses, cutting and meat preparation plants), wholesale meat traders and international meat traders. The focus is cattle (beef), horses (horsemeat), small ruminants (sheep and goat meat) and pigs (pork). UECBV has been working with the OCR and the legal text replacing Regulation No 854/2004 in close contact with stakeholders in the different Member States and in a positive dialog with the EU Commission and the national authorities.

Scientific based work provided by academia and published in peer-reviewed journals form the basis for an UECBV proposal to include animals younger than 20 months raised entirely indoors in officially tuberculosis free countries in the group of young animals presented for meat inspection. In this group of animals incisions of the masseters for detection of cysticercosis are not relevant and lymph nodes are palpated but not incised to check e.g. for tuberculosis. Furthermore, and based on the same scientific evidence showing a minimal risk in this age group, UECBV pushed to raise the age limit for young animals from the present Commission proposal for 8 months to a limit of 12 months. These discussions are still ongoing.

In conclusion, the above mentioned scientific evidence published support the implementation of visual meat inspection for a certain group of bovines. The proper use of the food chain information
(FCI) as well as epidemiological or other data from the holding and any findings from the meat inspection are of importance, when choosing whether to perform a more traditionally meat inspection or not.

Key words for the future meat inspection are the use of risk based approaches based on new knowledge and technology to maintain the high food safety in the EU. The possibility of making use of new future developments is already in the new OCR, where it’s stated that “while complying with the objectives of this Regulation and in particular as regards food safety requirements, the Member States may adopt national measures implementing pilot projects limited in time and extent, to evaluate alternative practical arrangements for the performance of official controls on the production of meat.” Furthermore, an open interdisciplinary discussion between the authorities and relevant stakeholders has several times proven its worth as a way for exchange of knowledge, knowhow and mutual understanding and hence problem solving.
Improved Food Chain Information (FCI) as control tool for pork-related zoonoses

Felin Elina¹, Hälli Outi², Heinonen Mari², Jukola Elias³, and Fredriksson-Ahomaa Maria¹

¹Department of Food Hygiene and Environmental Health, Faculty of Veterinary Medicine, University of Helsinki, P.O Box 66, 00014 University of Helsinki, Finland;
²Department of Production Animal Medicine, Faculty of Veterinary Medicine, University of Helsinki, Paroninkuja 20, 04920 SAARENTAUS, Finland
³Helsinki, Finland;

Introduction
Food chain information (FCI) should provide information related to food safety from farm to slaughterhouse. *Salmonella* spp., *Yersinia enterocolitica* and *Toxoplasma gondii* are important biological hazards in the context of meat inspection of pig. However, these infections usually are asymptomatic in pigs at farm and show no direct pathological lesions detectable in current meat inspection.

Methods
Blood samples from 653 fattening pigs in 34 farms in Southern Finland were collected at the beginning and at the end of the fattening and analyzed with commercial ELISA kits. Associations were assessed by logistic regression.

Results
*Yersinia* and *Salmonella* seroprevalences rose significantly during the fattening period: *Yersinia* from 30.3% to 72.3% and *Salmonella* from 8.1% to 17.2%, while the seroprevalence of *Toxoplasma* stayed low (<1%). The higher the *Yersinia* seroprevalence at the farm at the beginning of the fattening was, the higher was the risk for pig to be *Yersinia* seropositive at the end of the fattening (OR 28.8, p=0.003). However, the *Salmonella* seroprevalence at the farm at the beginning of the fattening was not associated with the pig’s *Salmonella* seropositivity at the end of the fattening (p=0.49). There were clear differences between farms in seroprevalences of these pathogens.

Conclusions
Serological monitoring as part of the comprehensive pork carcass safety assurance system could be used to target control measures of these pathogens and thus improve food safety. The control of *Yersinia* would require the possibility to buy piglets from *Yersinia* -negative farms, while for *Salmonella* the environmental infections during fattening seems to have larger impact. Serological
profiles could be used as part of the food chain information (FCI) in risk-based meat inspection to make decisions regarding additional inspections, carcass processing or sampling at the slaughterhouse.

Kontrollappen – a mobile tool at meat inspection

Maria Hall, Veterinary Inspector
National Food Agency, Sweden

There have been two major problems with documentation of ante and post mortem inspection, 1) inefficiency and 2) lack of quality of registered information. The National Food Agency, Sweden, came to the conclusion in 2015 that the solution to address these problems was a mobile tool in the form of an application for smart phones/pads - an application for on-site documentation at slaughterhouses that works off line as well as on line so it can be used also at abattoirs with poor or non-existing internet connection. A project with the mission to develop such an application was started in 2016 and the result is “Kontrollappen” - the tool which make every day easier before, during and after ante and post mortem inspection. “Kontrollappen” has just recently been put into use with the expectation that it shortly will release time that can be used for other tasks. Registered data will also become more quality-proof, which provides a better basis for monitoring and planning of inspection activities.
On-farm slaughter of cattle – prospects for efficient veterinary inspection and good animal welfare

Jan Hultgren1*, Charlotte Berg1, Katrin J. Schiffer2 and Bo Algers1

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* Presenting author

Extensively reared cattle may be less tolerant to handling at the time of slaughter. The high line speed in large-scale abattoirs results in demanding working conditions, making it difficult for stockpersons to deal with hassle and balking. For logistic reasons, a considerable proportion of the animals transported to slaughter spend one night at the abattoir before being slaughtered, which may increase stress levels if lairage conditions are poor. There is an interest among consumers and artisan food producers for locally produced meat from animals with good animal welfare. These are issues that contribute to an interest in small-scale on-farm slaughter. On-farm slaughter may be conducted at an on-farm stationary plant or in a mobile unit temporarily placed at or near the farm. It may also be done by stunning and bleeding on farm followed by carcass transport to a nearby plant for further processing, although current legislation only allows this for fenced game whereas domestic animals have to be brought alive into slaughterhouses. On-farm slaughter has the potential to reduce pre-slaughter animal stress by shorter or eliminated transports, minimised exposure to unfamiliar environments, animals and persons, minimal time in lairage and a reduced slaughter line speed. However, rigid regulations and comparatively high costs per kg carcass for official meat control impede the development of on-farm slaughter. The objective of this paper is to discuss methodological and practical concerns, as well as perspectives on the development of legislation, guidelines and practices, in relation to on-farm slaughter and efficient veterinary inspection.
The monitoring of campylobacter in poultry

Helena Höök
National Veterinary Institute (SVA), Sweden

Poultry meat is considered the most common infection source for human campylobacteriosis. In Sweden, a Campylobacter surveillance programme has been operated by the industry since 1991. Each broiler flock from breeders included in the programme is sampled at slaughter. Ten caeca are pooled to one sample and analysed at the National Veterinary Institute (SVA) for detection of Campylobacter spp. The overall flock prevalence has declined from around 20% in 2000 to 10.7% in 2017. However, there is a large variation between different slaughterhouses and breeders, where a substantial proportion of breeders never or hardly never produce Campylobacter positive flocks, while Campylobacter are much more commonly found in flocks from other breeders. There is also a marked seasonal variation where most positive broiler flocks are found during July to September.

During late autumn and winter 2014, 2015 and 2016 for the season unusually high flock prevalences were noticed. Each of these deviations from the until then quite stable seasonal pattern were linked to a likewise higher occurrence of domestic human campylobacteriosis cases. The largest winter outbreak started in autumn 2016, when the summer peak was unusually high and the flock prevalence did not show the normal lowering numbers during later autumn and winter. Most Campylobacter positive samples were from farms delivering birds to the same slaughterhouse, where an erroneously installed washing device for transport crates was found, with the consequence that contaminated washing water was recirculated. In combination with thinning of broiler houses, this opened the opportunity for spread of campylobacters to many different breeders via the transport crates and vehicles. Whole genome sequencing of all Campylobacter isolates from the programme during a two and a half-week period in February and March 2017 confirmed a common origin for most of the isolates, as 44 of the 48 isolates were genetically very similar or even indistinguishable. Only after implementation of further measures in the broiler production chain the overall prevalence started to decline. From August 2017 until January 2018 the overall Campylobacter flock prevalence has been lower than ever before.

Since 1st January 2018 a new process hygiene criterion for Campylobacter is applied. According to Commission regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs, broiler slaughterhouses are obligated to take five samples per week from broiler carcasses after chilling for quantitative analysis of Campylobacter spp., and to take actions in case of unsatisfactory results. Possible actions include improvements in slaughter hygiene as well as review of animals’ origin and of the biosecurity measures in the farms. The sampling and measures according to demand in the Campylobacter programme are focused on the primary production stage, but also
comprise a possibility for the slaughterhouse to control the incoming raw materials and its *Campylobacter* status.

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**Monitoring of visible carcass contamination**

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**Background:** European Commission project "Share of Best Practices in Slaughter Hygiene" aiming to assist the development of effective systems by competent authorities for control and monitoring of slaughter hygiene started in 2014. As a result of the Commission project, Finnish Food Safety Authority Evira developed first a guideline 16050/1 for monitoring cattle cleanliness in slaughterhouses published in 2016. As a second step in improving slaughter hygiene, Evira started a year-long project for monitoring slaughter hygiene in cattle and pig slaughterhouses to unify the monitoring and control procedures by official veterinarians and to collect data on the carcass contamination during slaughter.

**Slaughter hygiene control project:** The Evira slaughter hygiene project was based on the Swedish control system for monitoring visible carcass contamination (Lindblad & Berking, Food Control, 2013, 30: 101–105). The project started in May 2017 and ends in April 2018. Official veterinarians from seven cattle slaughterhouses and five pig slaughterhouses volunteered in the project and the number of carcasses monitored monthly is assigned based on the slaughterhouse capacity. Official veterinarians monitor daily all visible carcass contamination at the end of the slaughter line or in the carcass cooler and register the site of the contamination in the carcass and type of the contamination on each monitored carcass. A limit of contamination derived from gastrointestinal tract is set in the project and official veterinarian should use administrative enforcement measures when the limit is exceeded. After the project, the results will be analyzed and the effectiveness of the monitoring procedure evaluated.
Official control in slaughterhouses comprises meat inspection and food safety inspections (verification of food business operators’ (FBO) compliance with food safety legislation). Meat is a worldwide trade item, an important source of outbreaks and the most common foodstuff linked to food frauds in the European Union, thus advocating the presence of official control in slaughterhouses. Consequently, official control is generally accepted as necessary to ensure that hygiene rules are met, meat is fit for consumption and the consumers are not misled by adulterated meat. However, debate is ongoing concerning costs and task distribution between the authority and FBOs. Regardless of the organizational model, official control should be of high quality and contribute to meat safety. Carrying out high-quality official control requires adequate prerequisites, which were studied in a three-year project funded by the Ministry of Agriculture and Forestry in Finland 4/2013-3/2016. We focused on prerequisites related to task distribution, and the sufficiency, skills and independence of the official control personnel. Furthermore, need for guidance and efficacy of control methods were studied. The study included official veterinarians’ (OVs), official auxiliaries’ (OAs), control department officials’ and slaughterhouse (SH) representatives’ views to attain a comprehensive understanding of the field. The results indicated that there are no urgent needs to make major changes in the task distribution because the parties involved were mostly satisfied with the functionality of the task distribution. However, the pressure to decrease costs seemed to be the most important factor for willingness to redistribute tasks. Nevertheless, whole-carcass condemnation in red meat SHs was strongly seen as the tasks of the OV, also by all SH representatives, who stressed the importance of maintaining confidence in meat inspection. Ante mortem inspection, however, could be carried out by OAs or SH employees according to 40% of the SH representatives, but all OVs and all poultry SH representatives highlighted the importance of OV performing ante mortem inspection, as did 96% and 86% of poultry and red meat OAs, respectively. The respondents emphasized the importance of ante mortem inspection and the required knowledge in carrying out a proper inspection.

Shortage of OVs was experienced in over half of the slaughterhouses and in two (14%) constantly. The shortage resulted in less attention to food safety inspections, further training and guidance to OAs. The control methods used by OVs varied between SHs. In those SHs where written time limits for correction of non-compliances were used more often, also non-compliance was less frequent. Many OVs urged for more guidance, especially when dealing with difficult decisions such as enforcement measures. Interestingly, some of the OAs, especially in poultry SHs, did not consider it entirely clear that they perform meat inspection independently from the SH. This can be due to the fact that the poultry OAs are employed by the SH. However, there should be no doubt or misunderstanding concerning the responsibilities of personnel carrying out meat inspection.
Ante-mortem meat inspection of cattle using a video recorded on farm

– A pilot study

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Annually, 27000 cattle are slaughtered for private consumption (without meat inspection) or euthanized on farms in Finland. Although rarely used, emergency slaughter is possible, when an otherwise healthy animal has suffered an accident preventing its transport to the slaughterhouse for welfare reasons ((EC) No 853/2004). Currently, the official veterinarian travels to the farm to ante-mortem inspect the animal. Cattle farmers have expressed a need for a more flexible meat inspection, so that injured animals could be slaughtered for public consumption.

The aim of this pilot study was to test whether cattle can be ante-mortem inspected from a video recorded on farm. A guideline for the study was formed with instructions for the cattle farmers, slaughterhouse operators and official veterinarians. Farmers were recruited for the study between May 2016 and May 2017. Because emergency slaughtered cattle were difficult to obtain, also healthy cattle destined for normal slaughter were included.

Altogether 27 cattle entered the study. All animals were recorded on farm by the farmer or slaughterer, ante-mortem inspected on farm (emergency slaughter, N=4) or in the slaughterhouse (normal slaughter, N=23) and post-mortem inspected in the slaughterhouse. The official veterinarian in the slaughterhouse performed the ante-mortem inspection to the animal from the video and compared the result of video-ante-mortem inspection with the live ante-mortem inspection. 26/27 of the videos were deemed adequate and one insufficient for ante-mortem inspection. However, on six (22%) videos the ear tag was not fully readable making the identification of the animal uncertain. Three emergency slaughtered animals were injured already weeks before slaughter, and one did not present clear injury but was otherwise sick.

Based on the pilot, cattle can be ante-mortem inspected from a video recording. However, clear instructions are needed on what should be visible on the video. The preconditions on emergency slaughter have to be clarified.
The EU slaughter hygiene project

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An overview report is currently being drafted by DG SANTE, providing a summary of competent authorities’ working practices which have been highlighted as having a positive impact in slaughter hygiene, and thus on consumer protection. These were identified during the course of DG Health and Food Safety (DG SANTE) study visits to various EU member states and Norway and a series of workshops attended by EU member states plus Switzerland, Norway, Iceland and the European Free Trade Association Surveillance Authority (ESA). This is part of the EU Commission’s initiative to achieve ever greater levels of compliance in the implementation of EU legislation dealing with food safety at slaughterhouses.

Effective and efficient competent authorities’ working practices support compliance by slaughterhouse operators, who are ultimately responsible for the production of safe food. The world in which competent authorities operate continues to evolve and change, thus inflexible or inefficient official controls in monitoring food business operators compliance, results in a reduction of the benefits that EU legislation aims to bring.

The countries’ national experts, who attended the study visits and workshops, were presented with a series of working practices in place at the countries that had been visited, providing solutions to the very similar issues being faced by all. The experts found that a lot of these practices were good, some excellent and others innovative, resulting in a number of them being highlighted for their positive impact and for their added value if transferred into their national working practices. Some countries have already begun to do so.

The main identified shared arrangements and working practices that supported competent authorities’ verification and control systems included: clean livestock policy, on-line clipping of livestock, carcass contamination recording system, official verification procedures for carcass contamination, pool of official experts with technical and managerial responsibility, sampling and analysis performed by competent authority on microbiological criteria, risk profiling of slaughterhouses and publication of official control results.
Tools in modernization of poultry meat inspection – short and long perspectives

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The primary aim of meat inspection is to ensure proper food safety, but also animal health and welfare as given in the recently released EU 625/2017 (OCR) – for which implementing and delegating acts and annexes are still in the pipeline. The new meat inspection should be designed in accordance to that the prevalence of zoonotic and animal diseases as well as welfare aspects, differs between countries. The new meat inspection should, however, be designed in a risk based way as described in the “Scientific Opinion on the public health hazards to be covered by inspection of meat (poultry)” (SOPHHP).

Regarding poultry meat, Campylobacter, Salmonella spp. and ESBL/AmpC gene-carrying bacteria were identified as the most relevant meat borne public health biological hazards in SOPHHP. The existing visual ante mortem and post mortem inspection does not enable detection of these and hence EFSA concluded that visual inspection could be replaced with an inspection focusing on microbiology through improved food chain information (FCI) and risk-based interventions. This includes thorough surveillance and inspection on zoonotic diseases on farms and implementation of process hygiene criteria mirroring the hygiene in slaughter houses as well as giving the opportunity to apply interventions pre-harvest. OCR also describe that there should be a feedback system in place to report animal disease findings in meat inspection to the producer. FCI, is implemented through the Quality Assurance System in Danish Chicken Production called “KIK” and the Campylobacter and Salmonella spp. national surveillance systems are adjusted to fit the process hygiene criteria.

Post-mortem inspection of birds is currently, in EU, a two-step inspection. First the birds are inspected after plucking and secondly immediately after evisceration where both the carcasses and viscera are visually inspected under the responsibility of an official veterinarian. Alterations detected during the visual inspection(s) (e.g., small size, ascites, cellulitis, abnormal colour, bone fractures, hepatitis or peritonitis) will result in partial or total condemnation of the bird – given in the Danish Circular Letter on Meat Inspection (9611/2011) (DCLMI). The existing DCLMI contains 13 different pathological alterations which will result in condemnation of the whole carcass and one code where the results are condemnation of organs/parts of the carcass. As a part of implementing the OCR a new DCLMI, however now as a Meat Inspection Guideline (MIG), will be made. As a part of the work with the MIG an evaluation of whether acute or chronic hepatitis should result in condemnation of the whole carcass, or only the liver, was conducted and the results indicate that hepatitis is a chicken disease concern and not a food safety matter. Hence livers with hepatitis alterations could be discarded as part of the Food Business Operators meat quality assurance system. Similar evaluations could be conducted for the other codes (verifying potential changes as scientifically based).
Introducing camera based inspection equipment would allow inspection of every carcass (as today), however also at higher slaughter speeds, and with an improved precision (standardized classification within and between slaughter houses). A pilot of the camera based system (ClassifEYE VetInspector) for inspection of the outside and inside of the carcass and viscera for pathological alterations was implemented in one of the two larger poultry slaughterhouses in Denmark. The performance (to detect disease) based on registration of alterations on the carcass or organs could be improved with ClassifEYE VetInspector. It requires however an evaluation of ClassifEYE Vetinspectors performance vs. visual inspection conducted by a human being. For further improvement of the accuracy (towards a gold standard), an in depth scientific evaluation of the pathological changes and consensus regarding causality of chicken diseases is needed (only partly conducted in the existing version of ClassifEYE VetInspector). A pilot camera based system for detecting the welfare parameter foot-pad lesions (system from Meyn) has been a part of a project but performance evaluation is not completed (implemented in the Netherlands). The ClassifEYE VetInspector project will end in 2018, however, at that time probably not yet containing all specifications from a MIG or specifications for feedback to the producers about animal diseases and welfare issues. Implementation of camera based inspection in Danish slaughter houses might be legally possible by Article 18 (9) in the new OCR which states that: food safety requirements could nationally be evaluated in pilot project for practices of official control of meat production.
Fecal contamination: how to handle cattle and pig manure on carcasses at slaughter

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The most important hazards in fresh meat and products derived from fresh meat are Salmonella spp., Campylobacter spp., Yersinia enterocolitica and shigellatoxin-producing E. Coli. These hazards are spread to carcasses mainly via contamination with feces and ingesta. Such contamination on carcasses at slaughter is therefore a question of major concern for the official control and public health.

The food business operator (FBO) is responsible for ensuring that food satisfies the requirements of food law and for the procedures necessary to achieve the objectives in the requirements for food hygiene. The requirement for slaughter hygiene in Regulation (EC) nr 853/2004 is “carcasses must not contain visible fecal contamination” and “any visible contamination must be removed without delay”. Traditionally the post-mortem-inspection (PM) performed by official veterinarians (OV) and official auxillaries (OA) addressed visible fecal contamination at the position in the slaughter process where the PM-inspection concerning pathophysiological abnormalities or changes is detected by pointing out the contamination to the food business operator. Those procedures turned, from that point on in the process, over the responsibility to the official control from the FBO despite the fact that the slaughter process was not yet finished. Therefore the National Food Agency changed the procedures a decade ago and now focus the official controls of fecal and ingesta contamination to the end of the slaughter process where all the FBO:s procedures for slaughter hygiene and HACCP have had the opportunity to achieve the requirements. The most important parts of the new procedures are planned unannounced inspections of a specified number of carcasses based on the number of slaughtered animals per month and a pre-defined level for sanctions (civil penalty, or consideration of civil penalty).
Realization of animal welfare goals in Norway’s food sector

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The presentation includes a description of and preliminary findings from, the project ANIWEL ("Realization of animal welfare goals in Norway’s food sector"). The primary objective of ANIWEL is to provide knowledge on how public instruments can be formulated and used in such a way that they effectively pursue the aims of the Norwegian Animal Welfare Act, including Norway’s commitments under the EEA agreement with the EU. The Animal Welfare Act establishes one goal regarding animals ("good animal welfare") and one goal regarding humans’ attitudes to animals ("respect for animals"). Because legislation can promote animal welfare only by regulating human behaviour, we believe that social science is required to understand how the abovementioned goals can be reached. At the core of the project is the relationship between the Norwegian Food Safety Authority and food producers. The project is designed to provide knowledge about the factors that affect this relationship and thus seeks to explain the effectiveness (or lack of effectiveness) of implementation and enforcement of animal welfare regulations. The project aims to contribute to improved management strategies for food inspection authorities and food producers in the area of animal welfare. The project consists of three main parts: 1) a study of how food producers respond to public instruments, and how public authorities can apply the instruments effectively to improve animal welfare in primary industries; 2) how the implementation strategies specific to animal welfare in slaughterhouses promote or undermine the implementation of the Animal Welfare Act, and how these strategies affect the inspectors’ priorities, communication/enforcement styles and discretion; 3) how coordination (structure of control relations) and specialization (structure of activities and responsibilities) in the animal welfare management system affect implementation’s effectiveness.

In this presentation, focus is on 2), i.e. management, inspection and control of animal welfare in slaughterhouses. Data for this part of the project have been collected from several sources: (a) public and legal documents + literature; (b) interviews with animal welfare inspectors, employees at slaughterhouses, and animal transporters; (c) field work at two slaughterhouses, including participation in daily routines relevant for the management of animal welfare; and (d) a survey among employees of the Norwegian Food Safety Authority, which is responsible for animal welfare inspections. Preliminary findings show that in order to achieve effective management of animal welfare concerns it is important to take into consideration a number of different factors, of which three key categories are highlighted here: 1) The availability and design of effective legal instruments to be used by animal welfare inspectors – compliance with animal welfare regulations is enhanced by knowledge among food producers about these instruments; 2) The importance of how legal rules and instruments are interpreted and applied in concrete situations – too early escalation from “soft instruments” to “hard instruments” may in effect lead to unnecessary conflict escalation; and 3) Good communication and a high level of trust among inspectors and food producers enhance effective management of and compliance with animal welfare concerns – breakdowns in interpersonal relationships, on the other side, may create “deadlocks”, where problems of managing animal welfare concerns at slaughterhouses persist.

Our findings show that management strategies should take into account the accumulated effect of these three categories of factors: legal instruments, interpretation/application, and social interaction/“the human factor”.
Risks and benefits of meat inspection – an incomplete presentation

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Yesterday the treasure to be found was gold, today treasure is we look for is oil and gas while in the future treasures will be derived from will mining big data to produce knowledge and insights. The proposition is that to unlock the benefits from meat inspection we need to have a new approach on how organize the data collection, analysis and sharing of results. What works? What do we know about welfare at farms, transport and lairage, and at slaughter? How is the link between welfare and quality? What are hazards entering the food chain, how to use results to monitor animal or environmental health status in primary production (Sweden free of TB?). Could the level of parasite infestation say something about the environment of pasturing animals e.g., global warming? Are the results from meat inspection independent of whom is inspecting and where the inspection is done?

No one has the overview today, and the different data are owned and used by different stakeholders, in a highly compartmentalized fashion. For example the results from meat inspection of bovines and swine are analysed by the farmers’ association for many years. In developing such an information ecosystem there are several challenges both of practical, technical, administrative and legal nature. Who owns the data? Can the different databases communicate? What about privacy, commercial secrets, data protection refer new EU regulation? To whom are the results made available?

Meat inspection was initiated to control risks by inspecting the individual animals and certifying it was safe by stamping the carcass. Today meat inspection has several purposes control food safety, animal welfare, but also monitoring of the food chain including hazards entering the food chain but also the health and welfare situation in primary production as well as transport and lairage. For example the incision of lymph nodes in cattle has been the main surveillance tool for bovine TB even in countries where the compulsory tuberculin testing of cattle have been permitted to cease.

In addition data are collected on the weight, meat and fat percentages, and other quality attributes indicators (e.g., hygiene) to classify the carcass and determine the price paid to the farmers. The grading of carcass quality is done according to official guidelines. In addition the data on hygiene of slaughter such testing of broiler neck skins for salmonella, safety of by-products and offal, the specified risk materials are collected. Furthermore, 3rd party auditors are also collecting data on the operations to certify with private standards such as BRC (British Retail Consortium) but also organic farming (KRAV).

It is suggested we in the Nordic countries start thinking about how to unlock the benefits of all data collected at slaughter.
Nordic Meeting on the Modernisation of Meat Control and Animal Welfare Inspection at Slaughterhouses

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