Ipsos MORI
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Trialling a modernised poultry inspection system in UK slaughterhouses

Report prepared for the Food Standards Agency

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Glossary

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Ante-mortem inspection	The checks are carried out by the Official Veterinarian (OV) and must take place before an animal can be slaughtered (if an animal is slaughtered without ante-mortem inspection then it must be condemned). The OV checks for any signs of disease, injury, fatigue, stress and mishandling. The animal can then proceed to be slaughtered.
Approved slaughterhouse	FSA conducts an assessment visit which covers all structural, equipment and hygiene requirements. The businesses must meet all the relevant legal requirements of both Regulation (EC) No 852/2004 and Regulation (EC) No 853/2004. A slaughterhouse cannot be considered to be approved until: the approval assessment has taken place; a recommendation is made by the FSA veterinary official; and the approval documentation has been issued to the food business operator.
ATP testing	The ATP test can be used to test the effectiveness of cleaning by detecting the presence of bacteria. The test delivers fast results by testing for the presence of adenosine triphosphate (ATP) which is found in and around living cells.
British Poultry Council (BPC)	The British Poultry Council is the UK's national trade group for the poultry meat industry.
Campylobacter	Campylobacter is the most common cause of food poisoning in the UK and is responsible for an estimated 321,000 cases in England and Wales in 2008, with over 15,000 hospitalisations and 76 deaths. It is found mainly in poultry but also in red meat, unpasteurised milk and untreated water. Although it does not normally grow in or on food, it can transfer easily. Illness can arise from only a few bacteria in undercooked chicken, or in ready-to-eat foods that have been cross contaminated from raw chicken. Campylobacter infections do not usually cause vomiting, but diarrhoea can be severe and bloody, with additional abdominal cramps.
Enforcement action	If meat is not produced in accordance with the relevant regulations, FSA operational staff take proportionate enforcement action, which may include informal action, serving notices, or referrals for investigation or withdrawal or suspension of approval. When carrying out any enforcement activity the FSA acts in accordance with the Manual for Official Controls (MOC) enforcement policy and operational instructions, as well as the Government's Enforcement Concordat.
Food Business Operator (FBO)	The Food Business Operator (FBO) is the natural or legal person/s responsible for ensuring that the requirements of food law are met within the food business under their control.[1] Throughout this report, the FBO refers to the person who self-defined as such during research carried out to examine a modernised inspection system in poultry slaughterhouses.
Food Chain Information (FCI)	Food Chain Information (FCI) refers to the information on the health status of the animal consigned for slaughter and the holding of origin.

[1] Regulation (EC) 178/2002

Food Standards Agency (FSA)	The Agency was created in 2000 as a non-Ministerial government department, governed by a board, and tasked with protecting consumers in relation to food. It is the role of the Agency to help ensure that the meat industry safeguards the health of the public, and the health and welfare of animals at slaughter.
Hazard Analysis and Critical Control Point (HACCP)	HACCP is an internationally recognised way of managing food safety and protecting consumers. All food business operators except farmers and growers are required by EU food hygiene legislation, to implement and maintain hygiene procedures based on HACCP principles, including identifying any hazards that need to be eliminated and implementing appropriate controls.
Lairage	The lairage is the area where animals are held before slaughter. This is usually where the ante-mortem inspection takes place.
Official controls	Official controls are any form of control performed for the verification of compliance with food law. These controls require specified inspections of all animals, carcasses and offal through risk-based audits to verify that approved fresh meat premises comply with EU Food Hygiene Regulations. The official controls in use are inspection, monitoring, sampling for analysis, surveillance and verification.[2]
Official Veterinarian (OV)	Official Veterinarians (OVs) perform a range of official tasks to ensure that the plant is compliant with existing food safety and animal welfare legislation. They also have responsibility for keeping a record of the findings of the inspections, including details of contraventions, actions required and monitoring of these actions.
Poultry Inspection Assistant (PIA)	Poultry Inspection Assistants (PIAs) are employed by the FBO, carrying out a number of official tasks including post-mortem inspection.
Poultry Meat Inspector (PMI)	Poultry Meat Inspectors (PMIs) are FSA officials and carry out a number of official tasks including post-mortem inspections.[3]
Powder Test	The trial required a powder test to be carried out on carcasses after being washed as a way of verifying whether the carcass has been sufficiently washed by the inside/outside washer. Powder would be put on a carcass and the cleaner the carcass, the less powder would stick to the surface.
Post-mortem Inspection (PMI)	Inspection carried out after the animal has been killed and processed through the SH. The inspection is carried out by the Meat Hygiene Inspector (MHI) or Poultry Inspection Assistant (PIA) and involves checking of carcass and offal for signs of disease or meat that is not fit for human consumption. If the carcass is passed fit for human consumption, then it will receive an identification mark; at other times the whole carcass or parts of it will be condemned.
Salmonella	*Salmonella* are a group of bacteria which can cause food poisoning, usually found in animal or human intestines.

[2] Regulation (EC) 882/2004

[3] The OV need not be present during post-mortem inspection if:

- A PMI or PIA carries out post-mortem inspection and puts aside abnormal meat with uncommonly occurring conditions and all other meat from the same animal;
- the PMI or PIA documents their procedures and findings in a manner that allows the OV to be satisfied that standards are being met, and: the OV subsequently inspects all such meat.

Verification Authorised Officer (VAO)	The resident OV in each of the trial plants undertook the function of the VAO for the duration of the trial (8 weeks). During this time an additional visiting OV was deployed in each of the trial plants to undertake the OV tasks to ensure that each plant was regulated in line with existing EU legislation. The VAO role differed from the traditional OV role in a number of different ways. Firstly, the VAO role was not predominantly focused on ante mortem and animal welfare inspection. Instead, the VAO had increased flexibility to focus their verification tasks on where the greatest risks throughout the slaughterhouse environment had been identified. The verification tasks were divided into several categories and had different frequencies depending on the associated risks and possible impact on public health. The verification tasks focused on: 'Process hygiene verification' (including animal welfare and animal health controls); carcass verification; establishment verification and HACCP and microbiological verification. The different elements of the trial are discussed in detail in chapter 2.

Executive Summary

Executive Summary

Background and study approach

The Food Standards Agency's (FSA) 2015-2020 strategic plan[4] makes clear that *Campylobacter* poses an unacceptable level of risk for consumers. As part of its work to tackle this risk[5], FSA wanted to trial a modernised poultry inspection system across eight approved poultry slaughterhouses (hereafter referred to as trial SHs) in the UK. The system required the Verification Authorised Officer (VAO) – i.e. the resident Official Veterinarian (OV) in each respective trial SH – to refocus traditional official controls to new tasks that verify FBO interventions to better control microbial hazards such as *Campylobacter*. The different aspects of the trial included:[6]

- A novel inspection regime for poultry carcasses, moving away from individual carcass inspection by Plant Inspection Assistants (PIAs) to verification by the VAO, by checking a proportion of birds from the day's kill.
- Better targeted and risk-based verification checks to assess FBO compliance with food safety legislation, thus ensuring that trial SHs better prevent contamination throughout the entire slaughtering process.
- Monitoring the results of microbial testing, to assess the effectiveness of these checks.
- Ensuring trial SHs continue to meet their legislative commitments.

Ipsos MORI was commissioned by the Food Standards Agency (FSA) in July 2015 to undertake a mixed method study. The key aims were to ascertain how well these activities worked in practice and if they could contribute to a reduction in levels of contamination and fewer birds infected with a high level[7] of *Campylobacter*[8], thus improving the likelihood that poultry meat produced is safer for human consumption.

The Ipsos MORI project team used a mixed method approach.

- Longitudinal case study visits offered insight into how a modernised inspection system worked in practice, and helped researchers to understand views and expectations of the trial, and its reported impact.
- Analysis of microbial testing conducted for each trial SH helped the FSA to understand the effect of the trial on levels of contamination, pathology and *Campylobacter.*

[4] https://www.food.gov.uk/sites/default/files/FSA%20strategy%20document%202015-2020_April%202015_interactive%20%282%29.pdf

[5] https://www.food.gov.uk/science/microbiology/campylobacterevidenceprogramme

[6] Aims, objectives and design of the modernised poultry inspection system are outlined in Chapter 2.

[7] FSA considers this to be more than 1,000 microorganisms of Campylobacter per gr of skin.

[8] http://www.food.gov.uk/science/microbiology/campylobacterevidenceprogramme/campy-monitoringresults

Summary of key issues identified across trial SHs

The research identified a number of key issues identified across the eight trial SHs, which help to contextualise reported views among those directly affected by the trial, and help explain their expectations of the trial's impact.

- The trial was often seen as one of a number of industry / FSA led initiatives intended to tackle both the prevalence and bacterial load of *Campylobacter*, meaning it was not always valued highly. Across the trial SHs a number of initiatives aimed at tackling this issue have been introduced, including:
    - Developing novel technologies (e.g. cryogenic gas chilling / ultrasound and steam treatments), to reduce levels of *Campylobacter* on poultry carcasses;
    - Creating a "*Campylobacter* Champion"; with responsibility for raising awareness of *Campylobacter* among SH operatives and communicating mitigation measures;
    - Creating a new requirement that line operatives cut off the whole neck flap (an area where *Campylobacter* can accumulate during slaughtering); and
    - Conducting more *Campylobacter* testing to better understand the effect of these activities.

- VAOs were sceptical that the new system would result in significant improvements in contamination and *Campylobacter*. They suggested that trial SH staff are more focussed on production targets than food safety, and are more likely to react to problems as and when they arise, rather than take a proactive approach. They also said trial SH staff are generally satisfied with the controls they have in place or tend to inflate the assessment of standards within the SH environment.

- Assessments of food safety within the SH environment were more positive among trial SH staff than VAOs. Staff described having appropriate systems and processes that enables them to meet their customer requirements and regulatory obligations. This confidence in their ability to deliver a safe end product was a key reason why they felt the trial would not have a significant impact on food safety.

- This difference in perceptions of food safety standards was expected by VAOs to lead to reluctance to rectify issues identified in the trial in a way the VAO would like to see. In addition to their belief that FBO / SH staff did not always fully appreciate risks and their potential impact within the SH environment, it was thought that other factors, such as cost or staffing levels, would reduce the likelihood of the root cause of the problem being addressed during the trial.

- Two of the eight trial SHs processed turkeys. SH staff in both believed the trial would not lead to a significant reduction in levels of Campylobacter. Throughout the trial SH staff repeated the view that Campylobacter bacterial load is often higher in chickens.[9] When combined with the measures they had

[9] Turkeys are slaughtered at a later age (the bird lives longer than a broiler chicken) and have had time to develop an immune response to Campylobacter, reducing the bacterial load.

put in place to lower Campylobacter levels (outlined above), this meant that reading were already close to the FSA's desired target for dressed poultry (1,000cfu/g).

Understanding and views of the trial

VAOs

- Overall VAOs felt pre-trial information received from FSA gave them a good enough understanding to implement the trial. There remained some uncertainty on particular details of the trial, such as frequency of checks, and the level of involvement needed from SH staff. However, these issues were usually resolved following conversations with the FSA poultry trial team.
- There was strong support among VAOs for the new modernised poultry inspection system, despite them viewing this as a pre cursor to withdrawing their permanent presence from poultry SHs in the UK. They strongly felt that even a reduced presence of OVs would have a detrimental effect on food safety.

FBOs and SH managers

- Across several trial SHs, there were a number of reasons why FBOs and SH managers felt obliged to sign-up to the trial. These included being volunteered by senior management; competitors taking part in the trial; and participation allowing them to be seen to do more to tackle *Campylobacter*. As such, there was a lack of buy-in to the trial in some SHs.
- Most FBO and SH managers felt the re-focussed verification checks would allow the VAO to "act as a second pair of eyes", and bring to their attention issues to help them better prepare for external audit / inspection. Others were more cautious, opting instead to wait and see before passing judgement.

PIAs and PMIs

- Only a few PIAs were aware of the trial. While limited understanding did not affect implementation, it was clear they were unaware of potential trial benefits, which helps to explain why the trial did not appear to improve food safety ownership among this group.
- Whereas PIAs generally did not express a strong opinion either way about the new modernised poultry inspection system, PMIs were positive. They believed the new system might encourage poultry SHs to assign the same level of significance to food safety as they assume they do to food quality.

The system in practice

- The trial required SHs to work even more closely with suppliers, encouraging them to conduct on-farm *Campylobacter* testing and make the results available to trial SHs in the FCI document. It was reported

that suppliers did not test their birds for *Campylobacter*. Consequently, trial SHs were not aware of the bacterial load of flocks on arrival.

- There was consensus across staff in all trial SHs that increasing the water temperature in the **scalding tank** by a few degrees could not be achieved without affecting the quality of the product and / or the efficacy of the **plucking machine**. However, the fact that the new system allowed the VAO to focus more on de-feathering and bring issues to the attention of SH staff, meant that corrective action was, at least, a higher priority.

- Full crops[10] remained a problem in **evisceration** throughout the trial. Although this issue was generally seen as supplier one, we did identify cases of better recognition of contamination; however, communication of the risks full crops pose remained very uncommon.

- Despite concern that the required frequency of the **powder test** was above and beyond the frequency recommend by the FSA, the results did lead FBOs and / or managers in some trial SHs to implement a number of improvements to their hygiene and evisceration procedures.

- Although the importance of **establishment verification checks** across all trial SHs was recognised, such checks were thought not to reveal anything that trial SHs did not know already given these checks are already undertaken in line with the SH HACCP. Nevertheless, cleanliness and hygiene related issues were identified as the most common failings across the trial SHs.

- VAOs saw the **ATP test**[11] as a useful tool to justify VAO scoring decisions during the trial. However, SH staff questioned the quality of the reading where they felt that chemicals can "contaminate" the reading. However, it seems in some cases at least the ATP tests encouraged a number of SHs to develop new cleaning practices and procedures.

- FBOs and VAOs felt obtaining a score of compliance for **carcass verification checks** was not achievable despite the improvements that had been made before and during the trial. Some FBOs also questioned the fairness of this check, on the basis of perceived VAO inconsistency in how they undertake those checks.

- VAOs and SH staff were sceptical that the results of additional **microbial testing** would have a significant impact on contamination and / or *Campylobacter* levels. VAOs generally felt that it was

[10] The crop is a part of the oesophagus (food pipe) where the initial stages of digestion can occur. If the supplier does not leave enough time between the last feed and transport to the slaughterhouse, then this increases the likelihood of a bird being slaughtered with a 'full crop' a full crop". This poses a higher chance of cross-contamination as an empty crop is more easily removed during the evisceration process.

[11] The reading from an ATP test can indicate the bacterial load on a surface.

unlikely that the necessary improvements to achieve this would happen, whereas SH staff reported being confident in their ability to control such risks. As such, they did not think action was necessary.

- Staff in some trial SHs questioned the value of the VAO role, with some suggesting a member of the SH technical or quality assurance team could undertake the checks instead. They felt that SH staff are better able to place issues into the context of manufacturing processes. On the other hand, some SHs expressed strong support for the VAO as the best placed person to deliver the new system because the resident OV is seen as having expertise in human and animal health risks.

Impact of the trial

Food safety and microbial risks

Across trial SHs there were conflicting views of the reported impact on food safety. Some – even those who said they were confident in their ability to control risk within the SH environment – suggested the trial may have had a positive effect on food safety. Although there were confident their product had always been safe, they suggested the intervention of the VAO led to more instances of contamination being identified, as compared to the traditional system. In contrast, some FBOs suggested that because the in-take and SH dressing processes had remained the same then it was unlikely that the trial had made any difference.

FBOs in a small number of trial SHs suggested the results of microbial testing had shown lower levels of Campylobacter as a result of the trial. Again, there were conflicting views around the causes. Those who were confident in their controls suggested the lower count was due to chance; others felt the reduction was due to changes they had introduced such as new processes and / or changes to machinery.

Analysis of contamination and pathology data suggests the VAO verification checks had a significant positive effect: leading to a higher number of detections of contamination and pathology. These results must be handled with caution, as without an intervention control we cannot be certain of causality. Even so, they suggest that the VAO verification checks help to better identify the risks that occur in slaughtering and dressing. Despite the data limitations, this does add useful context to the overall evidence base.

Relationships and communication between the VAO and SH staff during the trial

SH staff became increasingly frustrated with the trial, in particular the scoring criteria such as major and critical non-compliance, which staff in most trial SHs were concerned was disproportionate to risk and did not reflect the audit rating of their establishment.

There was also tension and disagreement around the way in which certain issues were interpreted and subsequently scored by the VAO. Even in SHs identified as having courteous and professional relationships, such relationships were said to have suffered because of these issues. As these issues continued during the trial, SH staff began to disengage, and, in some SHs, there was a reluctance to take corrective action, particularly if it was felt to have significant resource implications. In these SHs, the trial became a burden that

interfered with the SH operations. In a few trial SHs, the trial increased communication between VAOs and line operatives, with reports of SH staff receiving first-hand information about issues detected by the VAO, and in some cases, advice on how to resolve them. It is important to note however that such instances were uncommon and were more likely to occur in the earlier stages of the trial before SH staff had begun to disengage due to concerns with the scoring criteria.

Introduction

1 Introduction

Ipsos MORI was commissioned by the Food Standards Agency (FSA) in July 2015 to undertake a mixed method study to examine a modernised poultry inspection system trialled across eight approved poultry slaughterhouses (hereafter referred to as SHs) in the UK. The system required the Official Veterinarian (OV) in trial SHs to refocus traditional official controls to new tasks that verify Food Business Officer (FBO) interventions to better control microbial hazards such as *Campylobacter*.

The aim of the research was to ascertain how well these activities worked in practice and if they could contribute to a reduction in levels of contamination and fewer birds infected with a high level (i.e. more than 1,000 microorganisms per gram of skin) of *Campylobacter*, thus improving the likelihood that poultry meat produced is safer for human consumption.

The Ipsos MORI project team used a mixed method approach. Longitudinal case study visits offered insight into how a modernised inspection system worked in practice, and helped researchers to understand views of the trial, and its predicted and reported impact. Analysis of microbial testing conducted for each trial SH allowed the FSA to understand the effect of the trial on levels of contamination, pathology and *Campylobacter* in the plants.

1.1 Background to the modernised poultry inspection system

The FSA's 2015-2020 strategic plan[12] makes clear that *Campylobacter* poses an unacceptable level of risk for consumers. It is the most common cause of human bacterial food poisoning in the UK. Each year it is responsible for around 280,000 cases of food poisoning, and at its worst, *Campylobacter* can kill. Up to 80% of cases can be attributed to raw poultry meat. The FSA has implemented a range of activities to improve this situation: educating consumers about the risk posed by contaminated poultry, communicating in-kitchen behaviours that increase the risk of food poisoning, as well as carrying out a programme of monitoring and research to better understand the prevalence and level of infected *Campylobacter* birds in slaughterhouses and on-farm.

As part of this work, FSA wanted to trial a new approach designed to refocus official controls to new tasks that verify FBO interventions to control microbial hazards. These new tasks were undertaken by a Verification Authorised Officer (VAO) – the resident OV in the respective SH – to complete throughout the trial. These are summarised below.[13]

- A novel inspection regime for poultry carcasses, moving away from individual carcass inspection by Plant Inspection Assistants (PIAs) to verification by the VAO, by checking a proportion of birds from the day's kill.

[12] https://www.food.gov.uk/sites/default/files/FSA%20strategy%20document%202015-2020_April%202015_interactive%20%282%29.pdf

[13] Aims, objectives and design of the modernised poultry inspection system are outlined in Chapter 3.

- Better targeted and risk-based verification checks to assess FBO compliance with food safety legislation, thus ensuring that trial SHs better prevent contamination throughout the entire slaughtering process.
- Monitoring the results of microbial testing, to assess the effectiveness of these checks.
- Ensuring trial SHs continue to meet their legislative commitments.

1.2 Study scope and methodology

1.2.1 Study scope

The key aim of this study was to assess the new modernised poultry system being trialled in a selection of poultry slaughterhouses across the UK. The study used both qualitative and quantitative methodologies to:

- Examine understanding and views of those directly affected by the modernised poultry inspection system, including FBOs and other SH staff, VAOs, PIAs, and Poultry Meat Inspectors (PMIs);
- Establish how the system was implemented in practice, and identify issues raised during the trial period and if and how corrective action was taken;
- Explore the predicted and reported impacts of a modernised poultry inspection system;
- Provide recommendations which may help further reduce the prevalence and levels of *Campylobacter* in poultry;
- Understand the trial effect on contamination, pathology and Campylobacter by running a number of statistical tests of contamination and pathology data and microbial sampling.

1.2.2 Case study selection for qualitative research

There are 87 approved poultry SHs in the UK. The table presented below shows the characteristics of the eight trial SHs which were visited across the three waves of case study visits. Recruitment of the eight trial plants was managed by the British Poultry Council (BPC) and involved inviting members to take part in the trial. The eight trial poultry plants volunteered to be involved in the research.

Table 1.1: The characteristics of the eight trial poultry SHs

	Species	Throughput	Country	Compliance
1	Turkey	Medium	England	Good
2	Turkey	Medium	England	Good
3	Chicken	Large	Wales	Good
4	Chicken	Large	England	Generally Satisfactory
5	Chicken	Large	Scotland	Generally Satisfactory
6	Chicken	Large	Northern Ireland	Generally Satisfactory
7	Chicken	Large	England	Good
8	Chicken	Medium/ large	Wales	Good

Source: FSA

1.2.3 Limitations of this research

There are therefore a number of limitations of this research in terms of the sample of the eight poultry trial SHs. First, there is likely to be a degree of self-selection bias. For example, the decision to participate in the study may reflect some inherent bias in the characteristics or traits of the participants. However, one of the main advantages with a self-selection sample is that participants are likely to be committed to their role in the research, which helps a longitudinal study like this one.

Furthermore, the plants had similar characteristics. The eight trial SHs have high level of throughput; accounting for around 32 per cent of all birds processed in approved SHs in the UK.[14] They all also had an FSA audit outcome of at least generally satisfactory.[15] Although the vast majority of poultry SHs in the UK have been assigned a good or generally satisfactory audit score following their last FSA audit, it is still the case that the trial SHs were already operating at a level which FSA considers to be acceptable. Therefore, while this study suggests that the trial had some benefit the findings cannot be generalised to all poultry SHs in the UK.

1.2.4 Engagement with the British Poultry Council (BPC) and recruitment of trial SHs

The FSA poultry team, who had responsibility for overseeing the trial, introduced its aims to trial a modernised poultry inspection system to members of the BPC, and their feedback was taken before the final design was put in place and trial participation was agreed. Recruitment and liaison with individual SHs was managed by the BPC.

1.2.5 A longitudinal case study approach

A longitudinal case study design was implemented in order to understand views and practices across the trial period and provide a detailed understanding of implementation, and impact. This aspect of the study ran from November 2015 to April 2016 and included three waves of case study visits.

- Eight pre-trial visits carried out from November to December 2015
- Eight during-trial visits carried out from January to February 2016
- Eight subsequent post-trial visits carried out from March to April 2016

Each of the visits consisted of interviews with the VAO (i.e. the resident OV), Poultry Meat Inspectors (PMIs), Plant Inspection Assistants (PIAs), the nominated FBO, as well as production, technical, and quality assurance managers. This offered us a comprehensive view of how the new system was implemented, and ensured we could answer all study objectives. Interviews typically followed a discussion guide, amended for each of the three visits to reflect the changing emphasis, and interviews usually lasted for approximately one hour each. Visits were carried out by paired researchers, with at least one present for all three visits. This was useful to

[14] The trial SHs together slaughter approximately 340,000,000 birds a year. The total number of birds slaughtered in the UK in approved SHs each year is approximately 1,050,000,000.

[15] There are four possible compliance ratings assigned to slaughterhouses following an FSA audit: good, generally satisfactory, improvement necessary or urgent improvement necessary.

build rapport with the research audience, and enabled a detailed understanding of implementation and impact over time.

1.2.6 Data Management and analysis

Researchers took extensive verbatim notes during the interviews, which were also recorded provided consent was given, for researchers to refer back to. The verbatim notes were uploaded onto an excel sheet, and a separate excel sheet was created for each of the three separate visits: pre-trial, during trial, and post-trial. This entailed creating categories loosely based on the topic guides; each containing sub-themes, for example impact on contamination under the broad category of views of impact. Each theme represented a column in the matrix. Themes were initially created after the pre-trial visits and refined after each wave of case study visits. The rows of the framework matrix are the interviewees, therefore each cell contains a summary of what the interview in that row said about the theme in that column. The final analytic stage involved working through the captured data, drawing out the range of experiences and views, identifying themes, looking at similarities and differences, and interrogating the data to explain emergent patterns and findings. The research team also met during and at the end of fieldwork to discuss emerging themes.

1.2.7 Collection and analysis of quantitative data

Quantitative data was made available through the FSA, which offered three separate data sets:

- Counts of contamination and pathology recorded at post mortem inspection under the traditional approach at a number of time periods: baseline, pre-trial, during trial and post-trial[16]. This enabled us to understand the impact of the trial on detection rates over time.
- Counts of contamination and pathology collected under the modernised inspection system. This was used to compare the counts over the same period under the traditional inspection approach.
- *Campylobacter* readings taken by the VAO from the neck (at the start of processing) and intestine (after dressing) of birds, to understand the extent to which the targeted checks reduced levels of *Campylobacter* during the process.

A detailed description of the different datasets, statistical tests used in analysis and findings is provided in Chapter 6.

1.3 Interpreting the findings

The views expressed are those of the trial poultry slaughterhouse staff and officials alone. Moreover, as with any qualitative research, Ipsos MORI is unable to make inferences about whether the views of those sampled are representative of those of the wider population of similar audiences; this is due to the small sample size

[16] The baseline period ran for three weeks Monday 2nd November – 20th November. The pre-trial period ran three weeks from Monday 23rd November to Friday 11th December. The trail period ran eight weeks from Monday 11th January to Friday 4th March. The post-trial period includes the two weeks from Monday 7th March to Friday 19th March.

and the large self-selection element in this research, as explained in 2.2.2 and 2.23. Rather, the qualitative findings provide in depth insights into the views and perceptions of participants to understand the implementation of the new modernised poultry inspection 'on the ground'. Equally, quantitative data (i.e. contamination, pathology, and *Campylobacter* counts) cannot be deemed to be representative of all slaughterhouses, but for only those that took part in the trial.

The remainder of this report is structured as follows:

Chapter 2: Background to the modernised poultry inspection system trial. This chapter describes the rationale and design of the trial, pre-trial activities and FSA expectations for implementation and outcomes.

Chapter 3: Key themes identified across trial SHs. This chapter outlines key themes identified in visits to trial SHs, which help to contextualise views of the trial, and its perceived impact.

Chapter 4: Understanding and views of the modernised poultry inspection system. This chapter looks at how the rationale of the trial was understood, and how it was initially viewed, focusing on perceived pros and cons.

Chapter 5: The trial in practice. This chapter outlines views of the different checks, the issues identified across the trial SHs and if and how corrective action was taken.

Chapter 6: Impacts of the trial. This chapter discusses reported impacts on food safety. It also looks at the effect of the trial on the nature of relationships between SH staff and the resident OV (i.e. VAOs). Findings for this section are informed by both qualitative and quantitative data.

Chapter 7: Results of analysis of trial data collected. This chapter presents the results of statistical tests on contamination, pathology and Campylobacter data collected before, during and after the trial period.

Chapter 8: Conclusion and recommendation. This chapter sets out the study's conclusions and recommendations for further testing of the modernised system and running trials in SHs more generally.

A modernised poultry inspection system

2 A modernised poultry inspection system

This brief chapter sets out the aims of the modernised poultry inspection system, describes the design of the trial, FSA led activities prior to implementation, and FSA expectations for how the trial would work in practice.

2.1 Background to the trial

As indicated in the previous chapter, FSA wanted to trial a refocus of official controls in poultry SHs to new tasks that verify FBO interventions to control microbial hazards. The different elements of the trial are summarised below.

- A novel inspection regime for poultry carcasses, moving away from individual carcass inspection by Plant Inspection Assistants (PIAs) to verification by the VAO, by checking a proportion of birds from the day's kill.
- Better targeted and risk-based verification checks to assess FBO compliance with food safety legislation, thus ensuring that trial SHs better prevent contamination throughout the entire slaughtering process.
- Monitoring the results of microbial testing, to assess the effectiveness of these checks.
- Ensuring trial SHs continue to meet their legislative commitments.

The FSA may use the findings from this study to inform future changes to the legal framework governing poultry inspection

2.2 The key elements of the trial

The trial design was focussed on key known risks in slaughtering and dressing. The FSA poultry team produced a programme of checks and scoring criteria for the VAO to follow to assess how effectively such risks are controlled in each trial SH. These are outlined below.

- Process verification checks at key stages of processing, namely:
    - At intake VAOs were required to verify that all Food Chain Information[17] for each batch of birds complied with trial requirements. The VAO was also required to pay attention to the welfare and the condition of the birds at point of intake.
    - At the scalding tank, VAOs were required to verify it was operating at a temperature of 55 degrees Celsius or more and without surface build-up of matter or foam where *Campylobacter* can grow.
    - At the plucking machine, VAOs were required to verify that carcasses were adequately defeathered, that machinery was adjusted to the size of the processed bird and that birds were not damaged as a result of the plucking operation.

[17]Please see glossary for full definition of Food Chain Information (FCI)

  - At the evisceration (EV) stage, VAOs were required to verify that the EV machinery was correctly adjusted to the size of the processed bird and that the digestive tract was intact when removed from the bird so that the PIA would be able to inspect the accompanying offal for abnormalities. As a general rule, VAOs were required to check 100 carcasses on each occasion they visited.
  - The VAO would also have checks at the carcass washing machine. These included verifying that the FBO was taking adequate steps to ensure that water ran over the whole carcass internally and externally; that the water was the sufficient pressure; that the spray nozzles were clean and unblocked; and that the carcasses were clean after washing. As part of the verification of the efficiency of the carcass washing, the FBO was required to carry out the powder test[18], which the VAO needed to verify and score the outcome.
  - At the end of the process, the VAO would verify that condensation in the chiller is not observed and any water pooling on the floor is removed.
- Carcase verification checks to be carried out every day the plant was visited by the VAO. As a general rule, the VAO was required to inspect at least 240 carcasses each visiting day, recording instances of contamination or abnormalities found on the birds.
- Establishment verification checks – different parts of the establishment, equipment and hygiene arrangements were verified by the VAO on a biweekly or weekly basis. The areas of establishment verification included:
  - Pre-operational checks to verify that certain parts of the slaughterhouse were sufficiently cleaned following the previous day's operations;
  - Daily operational checks, carried out every visiting day, to check the compliancy of general hygiene practices, crate and vehicle washing and animal by-products;
  - Weekly operational checks in areas of the establishment and processes that required lower verification frequencies, as the public health risk is smaller. These included checking the hygiene and maintenance of the lairage and intake area; the chillers; the packing area; the packing storage area and the dispatch area.
- Verification of the implementation and adherence of each SH's HACCP plan – including monitoring critical control points (CCPs) and taking corrective actions where necessary[19].
- Verification of microbial testing arrangements. A *Campylobacter* sampling regime was established to be followed by both the VAO and the FBO throughout the pre-trial and the trial period. The VAO was also required to test surfaces for microbiological hazards after cleaning by using ATP testing[20].

[18] Please see the glossary for full description of the powder test.

[19] Please see glossary for full description of HACCP plans

[20] The ATP test is a process of rapidly measuring actively growing microorganisms through detection of adenosine triphosphate (ATP)

Table 2.1: The required frequency of the VAO verification checks

Area of verification	Minimum frequency
Process hygiene verification	
1. Intake / Food Chain Information	Each visiting day
2. Welfare	Each visiting day
3. Scalding	Each visiting day
4. Plucking	Each visiting day
5. Evisceration	Each visiting day
6. Inside/Outside carcass washers	Each visiting day
7. Chilling	Each visiting day
Carcase verification	
1. Contamination	Each visiting day
2. Pathology	Each visiting day
3. Rejected carcasses	Once a week
Establishment verification	
1. Pre-operational checks[21]	Twice a week
2. Operational checks[22]	Each visiting day
3. Weekly operational checks[23]	Once a week
HACCP based principles in place	
1. Monitoring of Critical Control Points (CCPs)	Once a week
2. Corrective actions	Once a week
FBO microbial testing arrangement	
1. Statutory testing of *Salmonella*	Once a week
2. *Campylobacter* testing	Once a week
3. ATP testing	Once a week

Source: FSA

The VAO would score each of the verification areas with one of the following levels of compliance:

- Compliant – the food business has met the trial requirements.
- Minor non-compliance – a non-compliance that is not likely to compromise public health (including food safety), animal health or animal welfare or lead to the handling of unsafe or unsuitable food. A minor non-compliance would be an isolated low-risk situation and overall the food safety program is still effective in controlling the food safety hazards. A number of related minor non-compliances could represent a major non-compliance.
- Major non-compliance – a non-compliance that is likely to compromise public health (including food safety), animal health or animal welfare or lead to the production and handling of unsafe or unsuitable food if no remedial action is taken. A number of related major non-compliances could represent a critical non-compliance.
- Critical non-compliance – a non-compliance where the contravention poses an imminent and serious risk to public health (including food safety), animal health or animal welfare.[24]

[21] Bleeding area, scalding tank, plucking machine, whole birds point, EV room

[22] Crate/vehicle washing, general hygiene, animal by-products

[23] Lairage/Intake area, chillers, packing area, packaging storage area, dispatch

The VAO was given a Poultry Process Verification form (PPV-1), designed for the trial. The scores awarded in every verification area were recorded in the relevant box in the PPV-1 and the overall performance would be based on the aggregated scores after five visiting days to the trial SH., reflecting one of four Process Standard indicator categories (based on the traditional FSA audit system): Good, Generally Satisfactory, Improvement necessary, Urgent Improvement necessary.

2.3 Pre-trial activities

The trial was structured in to three components, comprising a baseline period, a pre-trial period, and a trial period. The baseline period consisted of three weeks of sampling, which provided a baseline of typical *Campylobacter* levels within each trial SH. This was followed by a pre-trial period of three weeks, where the VAO verification checks were tested, but a compliance rating was not assigned. This period helped the resident OV become acquainted with the Verification Authorised Officer (VAO) role, and allowed the SH to test trial processes. The full trial ran for a period of 8 weeks, implementing all aspects of the trial design.

The aim of the FSA led pre-trial activities was to help VAOs and SHs prepare for trial implementation. FSA produced a guidance document containing relevant information about the modernised system, including its rationale, design and the outcomes expected by the FSA. The FSA poultry team also ran a training session in York, attended by 27 stakeholders, including VAOs and FBOs / SH managers from most trial SHs. Training consisted of two days of seminars delivered by the FSA poultry team, focussing on giving participants background information and FSA expectations for implementation. Consistency exercises were run so that trial knowledge and implementation would be consistent across all trial SHs.

2.4 FSA expectations for trial implementation

In order for SHs to remain compliant with existing legislation, the trial ran alongside the existing traditional inspection system. This presented the need for SHs to have two active OVs during the trial period, one to carry out the OV role in the traditional system, and one to carry out the VAO role. As already mentioned, the resident OVs were given the task of fulfilling the VAO role, as FSA felt they would be most familiar with trial SHs and find it easier to implement the modernised system. Locum OVs were deployed to run the traditional system while the trial was in place.

The trial brought in a re-focus of official controls, from traditional in-line monitoring of the poultry slaughtering line, to a more flexible and targeted model of controls. The traditional OV role under current legislation must sign off all batches of birds that are received in each SH. This means they spend most of their time in the lairage. The VAO role, however, offered more flexibility to focus on different points along the line and other areas of the SH environment e.g. packing and dispatch.

[24] What constituted compliance or the different levels of non-compliance for each verification check was included in the detailed instructions set out in the official Instructions for FSA Officials taking part in the pilot to assist them in their verification tasks. Please see the appendices for this guidance.

The VAO was required to verify the FBO food safety management system based on HACCP principles, paying attention to key points in the process, including incoming birds, scalding, plucking, washing and chilling. The controls were ad-hoc and unannounced, and included a final monitoring of defect and contamination levels on carcasses at the end of the line order to check the effectiveness of controls within each SH. The results of the verification checks allowed the VAO to make an informed decision about the intensity of future controls, which could change at the VAOs discretion.

Key themes identified across trial slaughterhouses

3 Key themes identified across trial slaughterhouses

This chapter considers key themes identified across the eight trial SHs. They help to contextualise views of the trial, its predicted and reported impact on food safety within the SH environment, but also FBO willingness to recognise and act upon issues identified by the VAO.

Commercial issues often top-of-mind, food safety still seen as important

Commercial issues were identified as top-of-mind for SH staff. The retention of customer contracts was so important that achieving at least a satisfactory rating from a customer inspection or audit was considered to be more important than responding to issues raised by the resident OV before the trial, and by the VAO during the trial. Customer inspections or audits are often unannounced. SH staff suggested this meant their slaughtering and dressing system were already carried out to a high standard both in terms of food safety and food quality. This meant the SHs did not see much room for the trial to have a significant effect on food safety.

"So we don't have the luxury of stage managing – supermarket auditors just turn up at the door and expect to be in the factory within 30 minutes of arrival"

Technical manager

In general, VAOs felt that trial SHs did not take ownership of food safety even though SHs felt that they did. It was thought that the new system would therefore not result in significant improvements in levels of contamination and *Campylobacter*

VAOs also felt that staff in trial SHs are generally more focussed on production targets than food safety. They suggested if food safety was a higher priority then SHs would run a slower line speed, thereby reducing the potential for bunching of carcasses and / or evisceration errors. This point was also made by managers in a couple of trial SHs.

"They want to get the birds from one end to the other in the quickest time. I think it's better if the OV is on site all the time…. The cleaning people cut corners. We have to intervene a lot more in the afternoon shifts than we do in the day because they know there will be no auditors from supermarkets".

VAO

Furthermore, VAOs would often describe SH staff reacting to problems as and when they arise, which was felt to be caused by SH staff being satisfied with the controls they have in place or because SH staff do not appreciate the risks within the SH environment.

"I feel like I'm a policeman, I have to be everywhere and check and double check and check again and chase the managers and tell them to do something – so it's not proactive, it's very reactive".

VAO

As such, VAOs felt that trial SHs tend to inflate the assessment of standards within the SH environment; and although they acknowledged that technical and quality assurance teams add value, standards are only as ever good as the practices of the line operative and the level of oversight they are subject to. As they believed that SH staff did not take ownership of food safety, VAOs said they have a critical role in the context of maintaining current levels of food safety.

Assessments of food safety within the SH environment were more positive among SH staff. They described having appropriate systems and processes that enables them to meet their customer requirements and regulatory obligations. This confidence in their ability to deliver a safe end product meant that SH staff generally felt that the trial would not have a significant impact on food safety.

When asked by researchers whether there was scope for improving standards within the SH environment, middle management e.g. production managers were more likely than senior managers (e.g. FBO) to say there is a need for better hygiene as well as improving the knowledge of staff of invisible risks and control measures. A few even said that the only way in which to significantly reduce levels of contamination and Campylobacter was a permanent reduction in line speed however none thought this would happen.

"I don't think the guy that sets up the plucking machine understands we need to get feathers out because customers don't want feathers or that this can cause contamination and campylobacter. I don't think there is a connective understanding. Everyone is doing a role but they don't have a full understanding".

Technical manager

The trial seen as one of a number of industry / FSA led initiatives to reduce *Campylobacter*, therefore its significance did not always resonate with SH staff

The trial was often seen as one of a number of industry or FSA led initiatives intended to tackle both the prevalence and bacterial load of *Campylobacter*, which meant it was not always valued as highly as it might otherwise have been. SHs explained that for a number of years *Campylobacter* has increasingly become a priority for the poultry industry, mainly due to pressure from customers, but also from the FSA and the Government. SHs involved in the trial mentioned a number of initiatives aimed at tackling this issue they had already introduced, namely:

- Developing novel technologies (e.g. nitrogen chilling / sound and steam treatments), to reduce levels of *Campylobacte*r on poultry carcasses;

- Creating a "*Campylobacter* Champion" with responsibility for raising awareness of *Campylobacter* among SH operatives and mitigation measures;
- Creating a new requirement that line operatives cut off the whole neck flap (an area where *Campylobacter* can accumulate during slaughtering); and
- Conducting more *Campylobacter* testing than they ever done, to better understand the effect of these activities.

While most trial SHs said it was too early to say if these measures had had a significant effect on *Campylobacter* levels, a few suggested they had begun to show lower readings. The actions taken by trial SHs was identified as another reason why there was doubt that the new system would significantly lower levels of *Campylobacter.*

Turkey SHs in general felt that Campylobacter is a far bigger issue for chicken SHs, so in general it was felt the trial would not significantly benefit them

Two of the eight trial SHs processed turkeys. We identified a number of reasons why staff in such plants believed the trial would not lead to a significant reduction in levels of Campylobacter. First, the *Campylobacter* bacterial load usually is higher in chickens, which was a point that staff in turkey SHs repeated throughout the trial. Second, they suggested this lower bacterial load, plus the measures they had put in place to lower *Campylobacter* levels (listed above), had resulted in readings that were already close to the FSA's desired target for dressed poultry (1,000cfu/g).

"Campy is not an issue in turkeys. Before any chicken supplier, we have already met the FSA standard for Campylobacter without changing anything on the process. The very nature of the animal is such that Campylobacter is not so much an issue".

Technical manager

Senior managers in both turkey SHs felt this difference in bacterial load needed to be better recognised by the FSA, consumers and commentators (i.e. the media) and they felt it was potentially detrimental to their commercial operations to see *Campylobacter* as a problem for the entire "poultry sector". It was also mentioned that turkey plants tended to have a manual evisceration process rather than a mechanised one[25], This enabled them to adapt to the variability in size of birds from the same flock, thus reducing the potential for cross contamination.

That said, the spike in production in the pre-Christmas period was considered a riskier period for turkey SHs than at other times of the year. A need to hire agency staff in order to meet higher throughput targets was

[25] Chicken SHs in the trial explained birds are held in a mechanised rotary carousel during evisceration, whereas the process in the trial turkey SHs was done manually.

suggested as a cause for a higher number of errors during the evisceration process despite the fact that all agency staff receive an induction.

SH staff appear to place the opinion of regulatory officials in the context of their perception of risk and other factors like the cost of taking remedial action

There was doubt among VAOs about FBOs willingness to rectify issues identified in the trial. For most, this was based on previous experience of bringing issues to the attention of SH staff that not been addressed weeks, or in some cases, months later. VAOs recognised that remedial action can sometimes be costly, especially structural changes or refurbishing / replacing machinery, but it was felt that FBOs do not always fully appreciate risks within the SH environment and the potential impact of those risks. The pooling of water on the floor and ceiling of the SH environment was identified as one of the most common problems across the trial SHs, both before and during the trial. It was reported (both by SH staff and VAOs) that this is often seen by SH staff as low risk provided the product (i.e. bird) does not come into contact with the water.

Officials often had a different view, suggesting that the pooling of water constitutes ineffective risk management within the SH. They said they have to be satisfied with what they consider to be "short term fixes" such as the mopping of pooled water, but for most this was simply storing up problems for later as they felt the required action that would address the root cause had not been taken e.g. improving air flows across the SH environment. VAOs in general felt this difference in how risk is perceived by SH staff and officials and the factors (e.g. cost) that can influence how risk is responded to would continue into the trial and would be a key factor in whether or not corrective action would be taken.

Understanding and views of the new poultry inspection system

4 Understanding and views of the modernised poultry inspection system

Prior to the trial a key aim for the FSA was that SH staff and the nominated VAO were aware of the detail of the modernised poultry inspection system, and understood it in a way that would facilitate support and implementation. For this to happen, the FSA felt that information it conveyed to the British Poultry Council and to staff and resident OVs who attended the pre-trial training session would be cascaded to others within each trial SH. It was felt this would ensure that staff in each trial SH would understand its rationale, see its benefits, and ultimately buy-in to the spirit and intentions of the new inspection system. This chapter discusses whether this was achieved, by looking at participant's views of, and level of buy-in, as well as their expectations of the modernised inspection system.

4.1 Understanding of the trial: VAOs

VAOs received a guidance document produced by the FSA poultry team, which VAOs said they were largely satisfied with. They said it gave them a solid understanding of the VAO role, the type of checks to be undertaken and how they should be undertaken. There was concern however, that the scoring criteria was unrealistic, in particular the threshold for carcass contamination (see Chapter 6). A few were concerned that enforcement was not permitted as they felt this may have avoided disagreements about their scoring decision and / or increased willingness to take remedial action.

"I found it particularly strange that we were told that it was fine to disagree so long we could justify our decisions, which I did not find helpful. I would have appreciated stricter enforcement around this".

VAO

There were some who questioned the usefulness of illustrations of non-compliance, as the level depicted was felt to be much worse than is seen in each of the trial SHs. VAOs felt that the FSA training course in York, in particular the consistency exercises (see 3.3), gave them a better understanding of FSA expectations for the trial. However, some remained uncertain around the nature and level of involvement of SH staff expected by the FSA.

4.2 Views of the trial: VAOs

There was strong support for the new inspection system among VAOs. In framing this support, the new system was contrasted with the perceived shortcomings of the traditional one. VAOs felt that the traditional system where the resident OV spends most of their time in the lairage conducting ante-mortem checks hinders their ability to verify FBO controls across the SH environment. The traditional inspection approach was also seen as

outdated; that it was not suited to the detection of invisible risks such as pathogens, now seen as the main hazards in slaughtering and dressing.

"The checks under this new system cover everything I would want to know as a VAO, and allow me more time to carry out even more checks".

VAO

The increased flexibility that the new system offered was seen as a significant improvement on the traditional system. VAOs felt it gave them a holistic and better appreciation of food safety risks within the SH environment, as well as create opportunities to communicate their results to SH staff.

"For the first time, I am getting more of a picture of what is happening in this place; benefits are that we can find more problems and we have more time to discuss the problem with the FBO to find a solution".

VAO

However, there was concern among VAOs that the new system was, in part, driven by a desire of the FSA to withdraw the permanent presence of OVs from poultry SHs in order to reduce the cost of regulatory work. Some speculated that FSA wanted ultimately for verification checks to be carried out by third party auditors and / or FSA staff in unannounced visits. They assumed that if the trial was successful and SHs could demonstrate sustained improvement, then FSA would use this evidence to commence this process.

"If the trial shows that after three months, VAO reports for all sections are compliant, then that means vets are unnecessary. I'm concerned that there would be a move back to the system in 1995 when vets were only on site for ante mortem and random checks".

VAO

VAOs were not only concerned that the trial could have implications for their employment but also that the removal of OVs and / or reducing their permanent presence in SHs would have a negative effect on hygiene and food safety within the SH environment.

4.3 Understanding of the trial: FBOs and SH managers

The fact that the pre-trial activities coincided with the pre-Christmas period meant that most FBOs and SH managers were not able to fully engage in the trial until it went live in January 2016. Although this didn't impact trial implementation, there was some confusion about the aims of the trial, the role of SH staff, and how the trial would work in practice. Some thought the aim of the trial was to carry out extra microbial testing as part of FSA's monitoring work, while others did not appreciate that FSA hoped the trial would bring together the resident OV and SH staff in order to better control issues identified in the trial.

Although the training session ran by the FSA in York was viewed positively by the representatives of the seven trial SHs who were able to attend, most SH staff (FBOs, production and technical managers), said their understanding of the trial came from the FSA guidance document. This document was said to provide some clarity on how the trial would run, however there was concern that some aspects of the trial were not well enough explained, in particular the scoring criteria was mentioned. In some SHs, conversations between the resident OVs and SHs helped address this confusion, however in a number of trial SHs, it only became clear how the trial would work in practice once the trial went live. In general, knowledge of the trial was in effect "siloed" among senior managers (e.g. technical and production managers and above) who did not disseminate trial information to their staff. Even after trial implementation individuals with supervisory responsibilities of the slaughtering and dressing process had, at best, a limited understanding of the trial. This is one reason why the trial seemed to have a limited, if any, effect on ownership of food safety among line operatives as well as perceptions of their own role.

4.4 Views of the trial: FBOs and SH managers

Initially, most FBOs and SH managers welcomed the new inspection system. There was recognition that the traditional inspection approach had remained in place for decades and having one which is more focussed on invisible risks was appropriate.

"Poultry inspection has not changed much in the last 20 years, and is in desperate need for modernisation in terms of customer expectations and food safety, especially now that campylobacter has become a big problem".

Production manager

Others who supported the new system did so on the basis that it could bring benefits to the SH itself. They saw the VAO role "as a second pair of eyes and would keep SH staff on their toes", and it was felt this would help them prepare for an external audit / inspection. A couple of SHs said they would use the trial to realise a culture change whereby more line operatives take more ownership for food safety.

Others were more cautious. They felt they would have to wait and see before they would be able to pass judgement. While in theory they suggested the trial was a sensible change given its focus on microbial hazards, there was concern about the assessment process and how individual SHs might be viewed by the FSA and potentially other stakeholders.

There was an initial indifference towards the trial in a number of SHs. This was grounded in the fact that SH staff did not feel like they had a stake in the trial. It was presumed that individual SHs had been opted in by senior management either because their competitors had chosen to take part, or because participating would be seen to look good to the FSA. In these SHs, the trial was typically seen as an inconvenience that would not lead to significant benefit, given the perception of food safety within those SHs.

As FBOs and managers developed a better understanding of the trial after it went live and engaged more with it after being assigned low scores, concerns began to emerge. There was concern that assessment made by a number of VAOs did not reflect the standards within the plant. Another related to whether a VAO had sufficient knowledge of good manufacturing process to be able verify the machinery and equipment used in the dressing process was fit for purpose. Indeed, some SHs said they would have welcomed the opportunity to co-design the verification checks with the FSA, which they felt would have ensured FSA aims were met within the context of individual SH processes.

"The FSA have advised us that temperatures for pluckers would need to be increased to 55 degrees. Currently the SH is running at 52 degrees. This new temperature is likely to be detrimental to the business because at 55 degrees not all the features will be plucked and more time will need to be spent by employees removing what was not removed".

Operations Manager

Across most SHs these concerns increased and crystallised as SHs became increasingly frustrated with the assessment of food safety within the SH environment. This is discussed in detail in Chapter 6.

4.5 Understanding of the trial: PIAs and PMIs

PMIs in general understood the trial was intended to reduce levels of contamination and *Campylobacter* across trial SHs. As was the case with individuals who supervised the line, they explained that until it was implemented they were uncertain how it would work in practice, with most suggesting they had not seen the guidance documents and / or had a conversation with the resident OV and / or SH staff about the trial.

"Communication hasn't been very good. I read the stuff but I don't know if I understood it correctly".

PMI

Only a few PIAs were aware of the trial; those we interviewed had not seen the guidance document. Some had a vague understanding from line supervisors and /or SH managers that the trial was looking at *Campylobacter* but none were aware of the details. Most only became aware after noticing the resident OV had been spending more time in the EV area than they were accustomed to seeing.

This limited understanding did not affect implementation, but it does seem to be one reason why the trial did not prove successful in instilling an increased sense of food safety ownership among PIAs, and SH staff directly involved in dressing.

4.6 Views of the trial: PIAs and PMIs

PIAs generally did not express a strong opinion either way about the new modernised poultry inspection system.

"It's great that we're going to reduce Campylobacter, but to me it's not particularly realistic".

PIA

PMIs were positive about the new modernised poultry inspection system, for them there was an unacceptable risk posed by *Campylobacter* which they believed the poultry sector had been slow to react to. They hoped the new system might push poultry SHs to place an equal importance on food safety and food quality. That said, they too, felt that one aim of the trial was testing the effect of reduced regulatory oversight.

"Not very happy about it, can't trust FBO without no FSA oversight, all they are interested in is the money".

PMI

4.7 Expected impact on food safety

The SH perspective

As discussed, a few trial SHs predicted that a fast line speed was a barrier to the trial having a significant effect on food safety. Most suggested the trial's impact would be limited as food safety was mainly controlled by other internal processes, such as staff induction and on-going training and verification, and quality assurance checks etc. Although some SHs thought the trial may help them to better prepare for a customer audit.

"It [the trial] won't have a significant impact but if the outcome helps us to become better audit ready then that would be a positive".

FBO

In general, PIAs also felt it would at best realise small improvements. While acknowledging that mistakes in EV do happen and that best practice

ood safety behaviours are not always followed, they explained that in general line operatives carry out the task carefully and with the necessary level of attention and flag any issues identified in dressing.

The official's perspective

Officials suggested that the new system could potentially have a positive effect on food safety, however many were uncertain it would. They were concerned that FBOs and SH staff would not take ownership of issues identified in the trial. Their lack of ability to enforce change was seen as a shortcoming. Others were unsure that issues discovered as a result of the new system would be acted upon due to the fact that some trial SHs had not acted on long standing hygiene related issues identified under the traditional system.

"The condensation problem would be easy to solve with a sponge, but has remained poor. I just sent a referral for investigation because of the ventilation probe. Particularly in the wintertime - the condensation is absolutely awful. We cannot accept that".

VAO

Some VAOs however suggested that the new system may encourage trial SHs to make small improvements, which they predicted could contribute to a safer end product.

However, they said that this would depend on whether corrective action was considered to be too costly. They believed that FBOs would be more like to consider short term fixes in order to increase the level of food safety; they were sceptical such action would not address the root causes of issues and therefore concluded the level of food safety would not be maintained.

"To change things and achieve real changes is hard. You put one thing right, and then another thing pops up a week or a month later. When you go to them with problems, they say they are short of staff or money".

OV

4.8 Expected impact on Campylobacter

The SH perspective

There was doubt among SH staff that the new system would have a significant impact on levels of *Campylobacter*. Most trial SHs said they had already taken measures to address this problem such as raising awareness among operatives and increased supervision of operative practices. A couple of SHs appeared to have gone further, having put in place a *Campylobacter* champion who works with the resident OV and other SH staff to identify measures to reduce levels further. To date they described focussing on using novel technologies to reduce the bacterial load and increasing the availability and accessibility of hand washing facilities. In a couple of cases costlier measures such as replacing machinery were planned before the trial.

When SH staff were asked if they could explain the reasons for high levels of *Campylobacter* on birds sold in supermarkets, most blamed suppliers, suggesting that if there were stricter on-farm controls in place then flocks would have lowers levels of *Campylobacter*. Some were more candid; suggesting that *Campylobacter* would remain an issue due to high throughput targets and fast line speeds. Consequently, most felt that the only way to make a significant difference to *Campylobacter* levels while not placing a burden on manufacturing processes would be to subject birds to a very high or low temperature and reducing the on-farm housing density during rearing.

"I don't think you can eliminate it because that needs to be done on the farm. If we have salmonella load from the farm, we can take measures. But with Campylobacter all loads come with it, so there nothing we can do it's already there. We have tested for Campylobacter at the

farm in the past, but I don't know if we are still doing it. With salmonella it's a legal requirement, but not Campylobacter. Essentially we can't eliminate it if we are receiving every load with Campylobacter".

FBO

A few SHs suggested that the new system could have an indirect effect on levels *Campylobacter.*, They thought that if the new system brought more issues to the attention of the SH staff and crucially corrective action is taken then this would lead to a better controlled process for dressing, thus reducing the bacterial load of the end-product.

"It won't directly lower the number of Campylobacter cases but it might highlight some issues that will then lead to reductions. It's not a silver bullet for campy but this can only help it".

FBO

The VAO perspective

VAOs appreciated that measures to improve standards in slaughtering and dressing have the potential to have a significant effect on levels of *Campylobacter.* However, they doubted whether this would be achieved on the basis that FBOs would continue to prioritise food quality, and reducing costs, rather than investing in the measures needed to improve dressing such as supervisors being more proactive and being more willing to address issues identified by the resident OV.

Others were more optimistic, although again, were unsure if the new system would result to significant reduction.

"It will drive it on forward, the way it's moving is positive in that the focus is on things we can't see. Quite hard to say that it will reduce levels of campy because this SH has done an awful lot of work to do so already. So they are already at a good level, don't know how much more this will drive it down".

VAO

The modernised poultry inspection system in practice

5 The modernised poultry inspection system in practice

Throughout the trial, the FSA poultry team received detailed feedback from each VAO via a weekly written report and weekly teleconference, which covered issues identified by the VAO, and any corrective actions taken. This chapter considers the verification checks undertaken by VAOs, focussing on the issues identified, the perceived usefulness of checks and the extent to which the checks led to corrective action. FBOs and slaughterhouse staff did raise some concerns with the individual VAO checks in particular suggesting that same targets were simply unachievable or could not be implemented without a detrimental impact on the final product. As such, some felt the trial may have been more successful and had more buy-in if they have been involved in its design. Despite these reported shortcomings, it was notable that the checks themselves did lead to improvements in a number of trial SHs.

5.1 Process hygiene verification checks

Views of the FCI check

The EU food hygiene legislation requires FBOs to request, receive, check and act upon Food Chain Information (FCI) for all animals sent for slaughter for human consumption. The FCI includes:

- number, species, and production type (free range, housed or organic etc.) of birds;
- contact information for the farm the batch is from; and
- whether any disease has been detected on farm.

In theory, FBOs will already require much of this information from their poultry suppliers as part of their commercial relations with them, and may have had little to do to 'comply' with the trialled assessment criteria. Nevertheless, there was appetite among trial SHs for better information about the condition of the flock and having it in enough time to be able to act appropriately. For example, processing higher risk flocks at the end of the slaughter day just before the daily deep clean, thus reducing the risk of cross contamination. A better understanding of in-take was seen by VAOs and SH staff as an important aspect of the trial, helping the FSA and SHs understand the bacterial load before and after slaughtering and dressing. VAOs were required to assess the quality of FCI, assign major noncompliance for an incomplete FCI document, and critical noncompliance for a missing FCI document.

Response to the FCI check

The trial required SHs to work even more closely with suppliers, encouraging them to conduct on-farm *Campylobacter* testing and make the results available to trial SHs. However, suppliers ultimately did not test their birds for *Campylobacter*, and consequently trial SHs were unable to fulfil this element of the trial.

Views of the scalding tank check

VAOs were required to verify that the scalding tank did not contain a build-up of foam on the surface of the water, as it is thought this increases the risk of cross contamination when birds come into contact with the foam. Participants (both SH staff and VAOs) suggested this was already a known risk, but did not think it could be eradicated without significant investment e.g. replacing or retro-fitting current machinery. Nevertheless, the new system allowed the VAO to bring this issue to the attention of SH staff more often than they would have found possible under the traditional inspection system.

A number of SHs were sceptical about the usefulness of this check, despite recognising the reasons behind it. They felt that because foam builds-up very quickly, it would be impractical to constantly flush out the machine. It was also suggested that any contamination that may occur as result of foam build-up would be removed during the inside/outside wash.

A further trial requirement was for FBOs to ensure the water temperature in the scalding tank was set above 55 Celsius. Again, it was recognised the reason why this requirement was asked for – a higher temperature is more likely to reduce levels of *Campylobacter* – however, there was strong objection to this requirement. These objections were based on concern that a higher water temperature would affect the quality of the end product, leading to discolorations and blemished skin. Moreover, it was explained that water temperature is set to a lower temperate (52 Celsius) to maximise the efficacy of the plucking machine.

"The scald tank temperature is controlled by the finished product you're making and the retailer. If the retailer wants the poultry without scalding - then you cannot hold the temperature above 51 degrees but if you're at 51 degrees, then you're not going to kill any campylobacter. But if you put it up higher, you can only put the birds into frozen and 95% of the market is fresh product"

Group Director

Response to the scalding tank check

Despite concerns around the usefulness of this check, a couple of SHs did take action in terms of adjusting the water supply and pressure in order to "flush-out" the scalding tank. In addition, a few trial SHs did trial a higher temperate but quickly reverted to their pre-trial settings due to quality related issues with the end product.

Views of the evisceration check

Evisceration involves the removal of organs. It is a key critical control point requiring effective management to avoid the risk of cross contamination. Staff appreciated the significance of effective controls, with many pointing out their targets for effectively eviscerated birds but also pointed out that mistakes are unavoidable. In trial SHs using a mechanised evisceration it was explained that the EV machine does not always align to the bird due to variation within the same flock, resulting in viscera left inside the carcass and / or ruptured intestines. In trial SHs where evisceration is done manually, it was explained that line operatives made evisceration errors, thus increasing the risk of cross contamination. This check was usually seen by SH staff as

being more useful for the VAO, rather than SH staff. SH staff felt it illustrated the effectiveness of SH controls in the context of high throughput and fast line speeds.

Birds with full crops and stomachs were identified as the most common problem. It was explained that suppliers are paid on the weight of the birds so they tend not to leave enough time for the food to be digested before arrival at the SH. These issues remained a problem throughout the trial, and although SHs in general felt this was outside of their control, there was in some cases more communication around the associated risks, as compared to the traditional system.

"This week for the first time, the supervisor shouted out to some of the staff to look out for faecal. I've never ever heard that before".

PMI

Corrective action in response to the evisceration check

There was consensus that the trial target for hygienically eviscerated birds was unachievable due to fast line speeds, the variability of bird size, and human mistakes in non-mechanised SHs. Nevertheless, staff across most trial SHs, acknowledged they could reduce the incidence of poorly eviscerated birds, thus get closer to the target set by the FSA. Due to the VAO bringing these issues to the attention of FBOs and SH managers a number of measures were introduced. These included more experienced staff undertaking manual evisceration, more "line spotters" checking both the effectiveness of evisceration machinery as well as the birds themselves, and line supervisors more regularly raising this issue with operatives.

"We have a machine minder now who is making sure the machines are set correctly and another person checking. They are doing what they can".

PIA

Views of the powder test

The powder test can help establish how effective the inside / outside wash is. A number of SHs explained that this is one of a number of internal quality procedures they have, whereas others had used a powder test before. Those less familiar with powder test were more likely to be positive about the test, suggesting the readings provided more accurate, reliable and timely information about their manufacturing processes.

"There was a pipe that burst…normally it would be picked up in the evening, but because of the trial it was picked up earlier".

Operations Manger

Not all OVs were familiar with the powder test, which SH staff in a number of SHs interpreted as further evidence that a VAO may not best equipped to assess the effectiveness of machinery used in dressing, as they explained it was something the industry has been using for many years. VAOs were very positive about the

test, seeing it as incontestable evidence of the controls in this key stage in processing. Those who were unfamiliar with the test called for more detailed guidance and better illustrations, both in terms of how the tests should be carried out and success criteria.

We identified a number of concerns relating to this test. First, the required frequency of this check was believed to be above and beyond the frequency recommended by the FSA. Again this led to conclusions that the trial model was burdensome and disproportionate to risk. The second concern related to a perception of inconsistent scoring based on the results of the residual powder following the wash. In one case, a minor noncompliance rating was assigned and then in a subsequent test, approximately the same amount of powder was rated as a major noncompliance. This instance illustrates that if SH staff were better aware that VAOs were required to recognise repeated contraventions then this may have reduced frustration among FBOs.

Response to the powder test

Despite the perceived shortcoming of the powder test, the results did prompt a number of such SHs to take corrective action such as testing the effect of increased water pressure on the end product, testing the efficiency of the wash through changing the positioning of nozzles as well as replacing ineffective nozzles.

5.2 Establishment verification checks

Views of the establishment verification check

There was recognition of the importance of establishment verification checks across all trial SHs. SH staff, however, felt that cleaning and hygiene related tasks were routinely conducted in accordance with the SH HACCP; so again most suggested these checks did not reveal anything that SH staff did not know already. Despite this confidence in SH systems, food hygiene and cleaning related issues were the most common problems reported by VAOs, particularly poor hygiene practices such as inadequate personal hygiene (e.g. hand washing), inadequate management of equipment (e.g. sterilisation of knives and footwear) and inadequate cleaning within the EV area, and in the chiller where condensation and the pooling of water remained issues in many SHs during the trial.

Response to establishment verification check

Again, despite concerns relating to the usefulness of this check, there was usually a good response to the issues raised by the VAO, with a number of SHs putting in place corrective action including:

- additional and / or re-deployment of cleaning resource to problematic areas e.g. the EV area, new cleaning schedules placed on the wall in the EV area;
- better risk controlled entry and exit routes from the EV area to other areas within the SH;
- supervisors reminding staff not to place equipment (e.g. plastic trays used to store end product) on the floor of the SH.

"We've looked at our own process and we've thought about what the vet would pick up on. We have got to be proactive and find things before the vet comes along. We've blocked drains in the

chiller for years, we've always known it and no-ones dealt with it, we've started to sort these issues".

Production manager

VAOs were genuinely pleased and surprised as they had not seen this level of response in the traditional system. They were satisfied there had been an immediate response to the risk of cross contamination and that it was indicative of SH staff taking food safety more seriously. However, some were not confident that improvements would be maintained beyond the lifetime of the trial. Moreover, there was concern that actions were just a short term fix, with VAOs suggesting the root cause of the problem had not addressed; simply sorting up problems for later. Two of the eight SHs explained they had chosen to modernise the SH chiller, however the driver was reported to have been increased storage capacity, rather than to address the issues identified in the trial.

5.3 ATP tests

Views of the ATP test

The reading from an ATP test indicates the bacterial load on a surface. VAOs were very supportive of this test; suggesting it was a useful tool to justify scoring decisions, and would help point SHs to areas where cleaning should be prioritised as well as overcome any disagreement about what SH staff think constitutes "clean".
There was uncertainty among some VAOs on how to interpret readings from the ATP test. Again, it was felt that guidance could have provided more clarity on what the FSA poultry team considered adequate / sufficient cleaning as well as the circumstances for testing. It was felt this would overcome disagreement on whether to test surfaces which did not come into contact with the product.

"The ATP test tests surfaces that the chickens don't come in to contact with. The ATP test wouldn't make a difference to the outcome".

Production Manager

An issue for some SH staff was that chemicals derived from the protein found in birds may "contaminate" the test reading, thus it was concluded the test was not a reliable indicator of f hygiene practices.

Another concern was how the test was administered, with a couple of SHs unhappy that testing took place during slaughtering as surfaces are more likely to be dirty. Their preference was at the start of each day as they felt this would be a more accurate test of the cleaning carried out after the end of the previous day's slaughter.

Response to the ATP test

Despite these issues and concerns, the ATP tests did encourage a number of SHs to improve their cleaning practices, such as extra cleaning of crates and trailers, as well as changing to a more effective cleaning agent, chosen after trialling a variety of products to see which one had the greatest effect on bacterial load.

5.4 Carcass verification checks

Views of the carcass verification check

Across most SHs there was a number of concerns about the carcasses verification checks. The one mentioned most often was the scoring criteria. The VAO was required to thoroughly inspect at least 240 carcasses per visiting day and record instances of both contamination and pathology detected. In order to score as compliant, the VAO would have to have found 0.2% or under of the 240 birds to have contamination or a defect over a 5-day period. A critical non-compliance score would be given if over 2% of the 240 birds were found to have an instance of pathology or contamination. SH's felt that the scoring to be compliant was not realistic. It was understood this meant that to be compliant across the 5 days the VAO would have to find 1 or less contaminated carcasses from 240 checked, and only identify 5 contaminated carcasses to be assigned a critical non-compliance. Trial SHs own self-imposed targets ranged from 4%-7%. A number of reasons were offered to explain why the FSA threshold was considered unrealistic:

- It was felt that the condition of the flock supplied to the SH was beyond the control of the SHs. As such it was suggested that scoring should differentiate between different types of contamination such as a full crop and faecal contamination as it was perceived each posed a different level of risk.
- Internal factors; mistakes in EV caused by fast line speed, inexperienced agency staff carrying out EV, a failure in mechanised evisceration or an absence of concern for food safety. In addition, discussions with PIAs revealed they are unable to properly inspect every part of each bird due to fast line speeds.
- Some SHs suggested that the checks were not undertaken in a harmonised way across SHs. They felt that checks were more thorough in some SHs, which created the perception that some SHs had received a higher score compared to others.

"It feels like the parameters set up around the carcass verification could be quite strict. If you find one problem in 240 – it's a minor non-compliance, but the SH processes 180 birds a minute. Before carcass verification had been more up to [the PIAs] judgement, but now that there is clearer classification - it's coming in as "not fine". This caused problems when I reported back because they said it was impossible to improve".

VAO

Response to the carcass verification check

The trial did prompt some SHs to implement a number of measures to further reduce their overall proportion of contaminated carcasses. This included: more frequent cleaning to avoid debris build up in the EV area; bringing forward planned machinery checks; and a few SHs even reduced their line speed albeit only temporarily. As Chapter 7 discusses in more detail, more instances of contamination were detected during the trial period, and although we cannot be certain of causality, the introduction of such checks may explain this rise. Ultimately however, none of the trial SHs was close to achieving the compliance target. Their inability to meet the FSA compliance scores became a strong point of frustration and contention among SHs.

"We had "major" non-compliances with the carcass checking - this has improved that week though. We looked at how to improve it - a lot of areas were not cut properly. So we made a list of possible and impossible things. The engineers reviewed the machinery… Also, when I took pictures of birds which were not cut properly and showed them. With a picture, that is one reason why it's getting better".

VAO

5.5 Microbial testing

Views of microbial testing

FBOs in general were fairly indifferent to this aspect of the trial. They explained they carry out microbial testing on a daily basis, and therefore, again, this was given as a reason why this check would not reveal anything which they were not already aware of. VAOs were very positive about extra microbial testing. For the same reasons why some VAOs chose to take photographic evidence, the results of microbial testing were seen as another type of evidence which may prompt SH to improve standards to the level which VAOs would like to see. It was also welcomed as incontestable evidence, helping them to justify their scoring decisions, and therefore avoid any disagreements about corrective action.

Response to microbial testing

There was doubt among participants (VAOs and SH staff) that the microbial checks would have a significant impact on *Campylobacter* levels. A number of reasons were offered to support this claim. First, the lack or absence of *Campylobacter* data received from suppliers meant those involved in the trial would not be able to determine the level of bacterial load on birds before slaughtering and dressing. Second, SH managers having confidence in their ability to control such risks. VAOs explained that SH staff usually did not share *Campylobacter* results with them and significant delays in obtaining VAO test results meant they were of limited use.

Impact of the modernised system

6 Impact of the modernised poultry inspection system

This section looks at the reported impact of the trial on food safety and levels of *Campylobacter*. It also considers the effect of the trial on the nature of relationships during the trial, focussing on engagement and communications between SH staff and the VAO.

6.1 Reported impact on food safety

Across trial SHs there were conflicting views of the reported impact on food safety. Most SHs speculated that the trial had had a positive effect on food safety. Although they were unable to quantify this effect, they felt that issues had been more quickly identified, thus reducing the likelihood of risk. Others described improvements to machinery and EV processes, which they felt contributed to a safer SH environment,

"Since the trial has come into force, more issues have been raised and these are being raised sooner, so we can react sooner- so with this in mind, food safety will be improved. The VAO is now another set of eyes for the team checking the carcasses, so this will only lead to improvements. This also forces people on the team to concentrate more, to avoid problems being raised by the VAO".

FBO

The new system was reported to have resulted in improved practices in areas of the SH which had historically received less attention. Again it was assumed that better recognition of such risks would have contributed to a reduced risk of cross contamination.

"It's improved standards in areas of the SH where the OV did not usually get to. For instance, butchery and packing rooms. It's made sure that staff members don't wash down themselves near the product which reduces the risk of cross contamination - they are now using a different washing point".

VAO

Other SHs, even some who said they were confident in their ability to control risks, believed that the new system had raised standards. While they thought their product had always been safe, they suggested the checks had identified more instances of contamination as compared to the traditional system.

"I think it did improve contamination level. I don't think anything we kill is an immediate food safety risk or I wouldn't be here talking to you but I think you're likely to see an improvement in our microbial testing".

FBO

Some trial SHs felt the trial did not run long enough to realise an increase in food safety and therefore would not pass judgement.

A couple of SHs said in-take and SH dressing processes had not changed as a result of the trial and therefore concluded that the new system had made no difference on food safety.

"Would say no, because the standards we have here are high. Still the same birds and doing everything we used to before the trial".

FBO

6.2 Reported impact on *Campylobacter*

Some SHs suggested that microbial testing had shown lower levels of Campylobacter as a result of the trial. There were conflicting views as to the reasons for this. Again, those who had confidence in their controls, suggested this was due to chance; that the bacterial load had simply been lower in the tested flock. Other plants which had lower readings suggested this was due to measures taken before the trial began.

"We've seen a reduction in Campylobacter levels - but this is a lot to do with independent FBO decisions such as a new scalding tank and, a new machine that removes the whole neck".

VAO

A few suggested that the reduction may have occurred due to small improvements taken during the trial including more frequent maintenance checks, checks to align the EV machines to each flock, and more comprehensive and more frequent cleaning. Some (both VAOs and SH staff) felt these measures would be more impactful if SHs would run slower line speeds.

"We now do adjust the machinery as much as they can. They spend much more time, for every flock, ensuring that the machinery is adjusted properly. The only other extra thing they could do is reduce the speed of the line".

Technical manager

6.3 Suggested measures which could further reduce levels of *Campylobacter*

- Sharing the cost of new technologies which have shown to reduce levels of *Campylobacter*.

A few FBOs repeatedly made the point that industry has invested in novel technologies – exposing the skin of a bird to cryogenic gas chilling and ultrasound and steam – leading to significantly lower Campylobacter levels. It was estimated these technologies increase production costs by 2 pence per birds, which they said they are unable to absorb unless retailers and consumers are willing to share the increased costs of production. They called on the Government or the FSA to apply pressure on retailers to share the burden otherwise it would not be financially viable to use this technology.

- Introduce on-farm measures to reduce the bacterial load of birds sent for slaughter
  Participants felt the new system might help them to make small improvements in their processing but if the FSA wanted to see significant gains then the FSA needed to apply more pressure on suppliers. There was appetite for mandatory on-farm *Campylobacter* testing, better on-farm controls and lower housing density on the assumption this would significantly lower the bacterial load of birds being sent for slaughter.

- Raising awareness of the risk of *Campylobacter* and how it can be transmitted and controlled
  In discussions with SH staff, *Campylobacter* was far from top off mind. Although a few trial SHs have begun to address this low awareness, the evidence suggests that more of this kind of work is needed so that those who are involved in slaughtering and dressing have a better understanding of how it occurs, how it can be transmitted and controlled within the SH environment.

6.4 Relationships and communication before and during the trial period

6.4.1 Pre-trial relationships

In most trial SHs, pre-trial relationships between officials and SH staff were described as respectful, and that SH staff were generally cooperative. In this context, improvements requested recommended by the resident OV were usually actioned. In others, pre-trial relationships were seen as fractious and dysfunctional. From the perspective of SH staff, the frequency in which the resident OV raised issues was felt to border on harassment, while some were frustrated at a perceived unwillingness of resident OVs to justify their regulatory decision or be challenged on food law legislation. The resident OV in such SHs felt that SH staff did not value their role, and that requests for improvements were sometimes ignored or delayed for as long as possible. They also suggested there were occasions when it felt like an "us and them" atmosphere, which they felt was caused by a tension in how risk was perceived and conflicting interpretation of legislation governing poultry SHs.

"Very rude, generally that's the first feedback or reaction: 'what's the problem now? What do you want again?"

VAO

For some (both SH staff and resident OVs), the trial was seen as an opportunity to re-build and or improve relationships. VAOs hoped that by spending more time with SH staff, in particular managers, this would build confidence in VAO decision-making and that this would increase the likelihood of FBOs acting in accordance

with their wishes. SH staff felt that the trial would offer the resident OV a better understanding of SH processing arrangements and they hoped that VAOs would then place problems within this context. As a consequence, they felt this would reduce the likelihood of tension and disagreement, thus enhancing relationships.

6.4.2 Relationships after implementation

A key finding was that SH staff became increasingly frustrated with the trial, in particular when scored repeatedly as non-compliant, with many managers suggesting that scoring was disproportionate to risk and did not reflect the audit rating of the establishment. Linked to this was the frustration among a number of SHs that the VAOs interpretation of the problem was too harsh. Even in SHs identified as having courteous and professional relationships, it was felt that these relationships suffered because of these issues. As the trial continued and SHs received more non-compliant scores, it led to disengagement with the trial, a loss of goodwill and a reluctance to take corrective action, particularly if it was felt to have significant resource implications. In such SHs, the trial became a burden that interfered with the SH operations.

"The vets are doing higher degrees of inspection as part of the pre-trial - that is creating a bigger list of things to fix. You need to spend time fixing all of those things. That is the biggest challenge of having the weekly review. The vet will come with a big list and they will come tomorrow expecting that to be fixed. That's not realistic".

FBO

6.4.3 Pre-trial communication

The nature of pre-trial communication between the resident OV and SH staff in trial SHs ranged from dialogue when it was necessary to use enforcement action, to routine formal catch-ups every month or so, with ad hoc conversations taking place on most days. There was, at best, limited communication between the resident OV (i.e. VAO) and line supervisors and operatives.

6.4.4 Communication during the trial period

To ensure there was a shared understanding of the specifics of the trial, the role of the VAO, and level of involvement expected from SH staff, most SHs held a trial inception meeting. These kick-off meetings typically took place after the Christmas period - when most SHs engaged with the trial. They helped to address pre-trial uncertainty and put in place arrangements for trial related procedures such as carrying out powder tests and mechanisms for VAO giving feedback to SH staff. These meetings however did not go always go well, with a few VAOs suggesting that the tone at these meetings was confrontational and were reflective of the nature of pre-trial relationships.

"The whole group signed up, let's do this together and make improvements, but the first meeting with the FBO was horrible. They attacked me. I had to remind them it's a voluntary project and everybody had signed up for this, and that has been part of the project, to communicate, to

improve together, not necessarily enforcement action. No meetings since. Need communication to the top managers of the SH and signing them up for the project and regular meetings and support from FSA and extra meetings to make sure they do something because otherwise it just doesn't go anywhere".

VAO

In a couple of SHs there was concern that VAO feedback was taking SH staff away from their day-to-day tasks. As such, it was agreed that smaller issues (i.e. minor non-compliance) could be immediately fed back to line supervisors. If the issue was classified as major or critical non-compliance, the VAO would have to engage senior managers e.g. quality or production manager.

In a few trial SHs, the trial did increase communication between VAOs and line operatives, with reports of SH staff receiving first-hand information about the problem, and in some cases, advice on how to resolve it. The verbatim below illustrates that this feedback encouraged different individuals in the SH to work collaboratively to tackle problems raised by the VAO.

"The carcass washing problem is forcing people to work together – technical staff, engineers, operations. It's forcing them to talk about issues that affects all of them. So from that point of view, it's a really positive thing. It's helping everyone get an understanding of why it's critically important. It's no good me looking at those mechanical things in isolation. I don't understand the full capability of those machines so you have to involve the maintenance team in it… we are doing better internally as a team".

Production supervisor

"It's changed the way we see the vet (i.e. the VAO). People higher up might say differently. I think it's built our relationship. I think the trial has helped bring teams together; I've never spoken to night hygiene as much as I have in the last few weeks"

Evisceration supervisor

It is important to note that such instances were uncommon and were more likely to occur in the earlier stages of the trial before SH staff had begun to disengage from the trial and become disinterested in taking corrective action due to concerns such as scoring criteria.

As there was limited trial engagement among line operatives. There was a suggestion to replace the compliance levels of critical, major and minor non-compliance and compliance altogether and present compliance in number e.g. ranging from 1-100 which may be better understood and be a more effective call to action.

"It's easier to mark out of a 100. Even the FBOs would say that... The people who have jobs on the production floor. If you say, you've got an 80 percent, they understand – if you say major or critical they won't know what are you talking about".

OV

6.5 Views of VAO role following trial implementation

The increasing frustration with the trial and the perception that VAO checks duplicated those carried out by SH staff led to some to question the value of the VAO role and also whether the VAO is best suited to the carry out the checks. Among such SHs, it was felt that a member of the SH technical or quality assurance could just as easily carry them out, with some suggesting internal staff members are more equipped to do these checks as they have a better appreciation of the entire SH environment. It was felt that if internal staff members did the VAO checks then issues identified would be seen in the context of the entire process. For example, in one SH, a VAO identified a palate of slaughtered birds in the SH chiller with an unacceptable amount of feathers still intact. The VAO scored this as critical noncompliance whereas the SH argued that was not the end product and required further rectification work. In such SHs, there was appetite for staff members to conduct the VAO checks and although they suggested a need for independent verification they argued for less frequent checks than in the trial.

"It should be one of the QA team here. The vet would then come in and review what they are doing. The vet would also have a responsibility to decide whether there is a need to change the slaughter order of the flocks that come in".

Technical Manager

In a few SHs, even those which shared similar concerns about the trial design, there was strong support for the VAO as the best placed person to deliver the new system. They felt it was important to have independent verification underpinned by regulatory powers in order to retain customer and consumer confidence. They also felt that the VAO knowledge of legislation and risk mitigation added value, raising awareness among staff and helping them to improve processes.

"OV definitely. Independent. People on the inside would be more informal – 'just sort that out'. You get honest appraisal from someone out of the company. You get more knowledge and it's a good way of sharing the right information".

QA manager

As noted, VAOs were extremely positive about the trial as it offered more flexibility which meant they were able to obtain a holistic understanding of the risks across the SH environment. However, there were concerns about the workload associated with the new system, for some it had increased their weekly working hours, while others said the need to randomise their visits had conflicted with the EU working time directive.

"A 6-day week is too long. They said we have to cover 80-85 percent of the production day which works out as 6 days. That's quite intensive".

VAO

A couple of PIAs described similar issues; one described having to arrive on site one hour before the start of their working day to prepare plastic bags for collecting caeca samples. In general, however, there was limited involvement among PIAs in the trial.

Findings from statistical analysis of trial data

7 Findings from statistical analysis of trial data

This chapter presents the results of statistical tests on contamination, pathology and *Campylobacter* data collected before, during and after the trial period.

7.1 Data sets and methodology

Quantitative data was made available through the FSA, which offered three separate data sets, namely:

- Counts of contamination and pathology recorded after post mortem inspection under the traditional approach at a number of time periods: baseline, pre-trial, during trial and post-trial[26]. This enabled us to look at the impact of the trial on rates over time.
- Counts of contamination and pathology collected under the modernised method. This was used to compare to the counts over the same period using the traditional approach.
- *Campylobacter* readings taken by the VAO from the neck (at the start of processing) and intestine (after dressing) of birds, to understand the extent to which the targeted checks reduced levels of *Campylobacter* during the process.

The analysis of contamination and pathology data collected under the traditional inspection approach was conducted using a Poisson random effects model. Poisson models are the best type of modelling approach for data that represent counts of particular traits. We used a version of a Poisson model called a random effects model, which was developed to analyse data that contains repeated observations for individual cases collected at different time points. This model is needed because the patterns and variation seen in the data counts collected over time for an individual case (i.e. SH) are different to the patterns and variation seen in responses collected for different cases (i.e. other trial SHs) at the same time point. This type of model is therefore ideal for the data collected in this study, namely, counts of the number of cases with a particular trait i.e. detection of pathology / contamination that was collected at repeated intervals from each SH.

The model outcomes are the number of contaminations / pathology recorded in the pre, during and post-trial periods. The only characteristics used in the model to predict these two outcomes are time (pre/during/post-trial) and throughput (the overall number of animals entering through the slaughterhouse at each time point). Throughput is included in the model to take account of the level of 'exposure', as it was expected there would be a higher number of contaminations in a slaughterhouse that handles a larger number of birds. The model is

[26] The baseline period ran for three weeks Monday 2nd November – 20th November. The pre-trial period ran three weeks from Monday 23rd November to Friday 11th December. The trail period ran eight weeks from Monday 11th January to Friday 4th March. The post-trial period includes the two weeks from Monday 7th March to Friday 19th March.

used to test whether the time variable is significantly related to the outcome being tested, thus indicating whether there is a significant difference in the number of contaminations / pathology over time.

The same method was used to compare trial data (i.e. new poultry inspection system) and data collected in the traditional inspection approach. The aim was to assess whether the number of contaminations / pathology detected varied according to the method used. The two sets of data were matched using slaughterhouse ID and date of post mortem inspection, meaning the analysis was only carried out on traditional and trial data collected from the same location over the same time period, thus ensuring the two sets of data were comparable. A Poisson random effects model was used to compare the counts recorded under the traditional approach against the numbers recorded in the trial. Here the predictor was a variable that indicated whether the data came from the trial or traditional method. If this variable is significantly related to the outcome then it means there is a significant difference in the number of contaminations / pathology recorded by each method. As before, a measure of throughput was included.

A different method was used to analyse the *Campylobacter*, since these data were not recorded as counts. Instead simple t-tests[27] were used to compare the mean levels of *Campylobacter* data for the baseline and pre-trial periods against the mean levels recorded during the trial.

7.2 Analysis of contamination and pathology data collected through the traditional post mortem inspection

The comparison of contamination and pathology data shows an increase in the number of contamination and pathology detections during the trial and post-trial periods, compared with the pre-trial and baseline periods. The table below shows the mean number of counts recorded in the traditional system at different time periods.

Table 7.1: Mean number of contaminations and pathology recorded by traditional method, by trial period

	Count	Estimate	Std. Err.	[95% Conf.	Interval]
Means					
Contamination					
Baseline / pre-trial	235	1.15	0.16	0.83	1.47
Trial period	263	3.57	0.44	2.70	4.44
Post-trial	85	3.91	0.74	2.46	5.37
Pathology					
Baseline / pre-trial	235	0.047	0.021	0.005	0.088
Trial period	261	0.119	0.030	0.060	0.178

[27] T-tests are used to test whether the means of two samples are statistically different to each other. The *Campylobacter* data was recorded as means, rather than counts, making this an appropriate test. In addition, unlike the other data, the *Campylobacter* data were not provided for weekly intervals and instead as aggregated counts, meaning a random effects modelling approach could not be used.

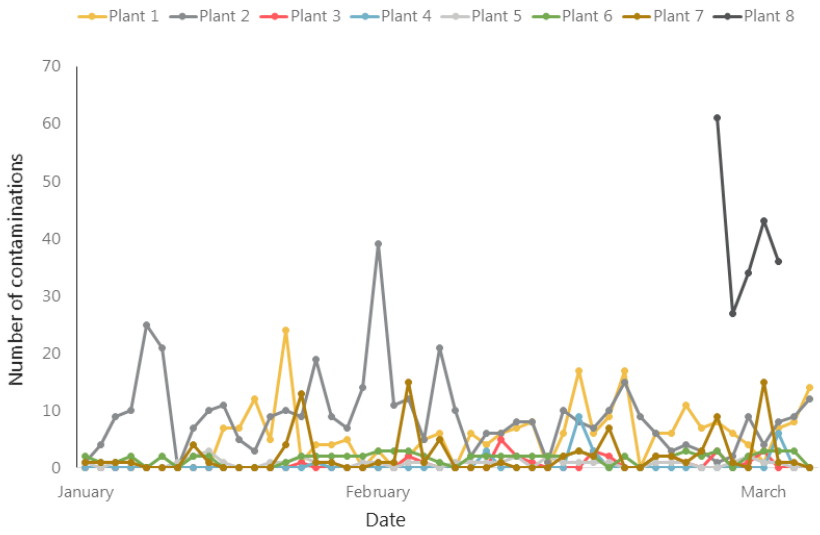
Post-trial	82	0.073	0.029	0.016	0.130
Number of birds inspected					
Baseline / pre-trial	235	554.8	15.2	524.9	584.7
Trial period	263	564.4	13.8	537.3	591.4
Post-trial	85	528.0	22.8	483.2	572.9

Notes: Data are aggregated counts taken for all SHs. 'Count' shows the number of data points (number of readings taken for all SHs at this time point). 'Estimate' shows the mean number of contaminations / pathology at this time point, the table also shows the Standard Error for the mean and a 95% confidence interval.

The table above illustrates that contamination counts for the trial period and post-trial period are higher than baseline/pre-trial. This is reflected in the increasing mean count at each time point; from 1.15 at baseline/pre-trial, to 3.57 during the trial and 3.91 post-trial. The sample size was larger for contamination and pathology, allowing us to run the Poisson model tests, which show this increase to be statistically significant. This suggests the trial had a positive impact on the number of contaminations detected, which seems to have been maintained after the end of the trial.

Looking at the trial SHs individually, the figure below illustrates that, in six of the eight SHs, contamination counts were fairly uniform throughout the trial. In two SHs, there were two quite significant spikes in contaminations. One plant consistently recorded higher contamination counts compared to other trial plants – 61 contamination instances – the highest number recorded throughout the trial period. This may be explained by qualitative data as plant staff within this SH reported consistent non-compliance scores for carcass verification checks. They became increasingly frustrated throughout the trial as they felt the VAO was being far more thorough in their carcass verification checks compared to VAOs in sister SHs participating in the trial, resulting in higher numbers of contamination counts. The figure below also shows that in one plant, there was variation in contamination levels throughout the trial period, including a large spike of 40 contamination counts. During researcher visits to this SH, the VAO explained that high numbers of faecal contamination were regularly recorded due to issues in EV and a high line speed. The VAO reported that the line speed meant that line operatives were not always able to remove faecal contamination during evisceration.

Figure 7.1: Contamination counts within each of the trial SHs



In terms of the pathology count, this increased significantly between the baseline/pre-trial and trial period. However, it then fell again post-trial. This post-trial drop meant the pathology count post-trial was not significantly higher than the pathology count pre-trial. Again, this pattern is reflected in the mean counts at each time period, from 0.047 at baseline/pre-trial, to 0.119 during the trial and 0.073 post-trial. Despite fewer detections after the end of the trial, the analysis suggests the VAO verification checks did increase the number of pathologies detected.

7.3 Data collected in the trial versus data collected in the traditional system

The comparison of trial and traditional data indicates that instances of contamination and pathology are higher for trial data than traditional data. The results of the Poisson modelling show these differences to be statistically significant. Despite the same caveats as noted above (i.e. small sample size / no intervention control), this suggests that the VAO verification checks are better than the traditional approach at detecting contamination and pathology.

Table 7.2: Mean counts of contamination and pathology collected under the new inspection system during the trial period and via traditional inspection approach during the trial period

	Count	Estimate	Std. Err.	[95% Conf.	Interval]
Contamination					
Traditional	580	2.63	0.239	2.16	3.10
Trial	266	4.35	0.442	3.48	5.22
Pathology					
Traditional	578	0.083	0.017	0.050	0.116
Trial	266	0.334	0.190	-0.040	0.710

Notes: Data are aggregated counts taken for all SHs. 'Count' shows the number of data points (number of readings taken for all SHs at this time point). 'Estimate' shows the mean number of contaminations / pathology at this time point, the table also shows the Standard Error for the mean and a 95% confidence interval.

7.4 Analysis of Campylobacter data

Analysis of *Campylobacter* data suggests that the levels found in both the intestine (caeca) and neck fold increased during the trial period. As *Campylobacter* data was collected at less frequent time intervals there are fewer records available for analysis, therefore it is not possible to say whether it is statistically significant because the sample size is too small to run a robust test.[28]

However, the key difference would be whether there was an increased, decreased or similar difference between the *Campylobacter* levels in the caeca sample and the neck sample during the trial period. This would indicate whether the slaughtering process is more effective, less effective or the same as the traditional system at reducing *Campylobacter* levels in the carcass. Therefore, the difference between caeca and neck readings at different time points were also investigated. The analysis compared the ratio of caeca readings to neck readings (calculated for each SH at each time point as the caeca reading divided by the neck reading) at baseline/pre-trial to the ration during the trial period. The results indicated that the difference was not statistically significant, which is possibly due to the small sample size. However, there is a suggestion of a pattern: there was a larger ratio during the trial period than there was pre-trial/baseline. This means that although both neck and caeca *Campylobacter* levels were higher during the trial period, the caeca levels increased by more. This could suggest that the slaughtering process during the trial was less effective at reducing *Campylobacter* levels in the carcass. However, as the results are not significant, this is only a suggested pattern

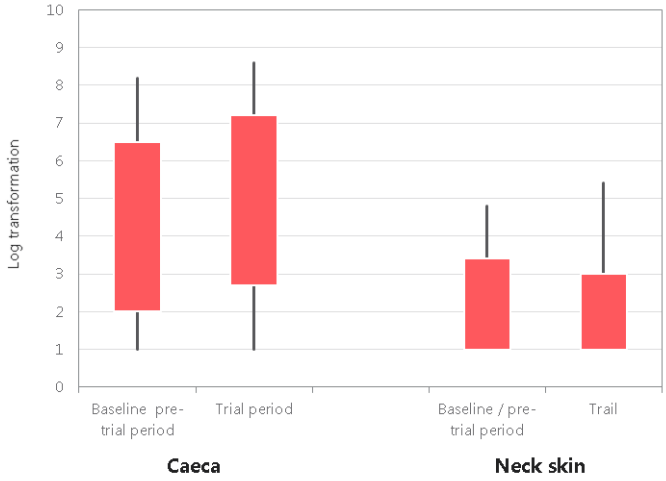
Table 7.3: Mean counts of *Campylobacter* taken before and during the trial period[29]

	Count	Mean	Std. Err.	[95% Conf.	Interval]
Reading taken from caeca					
Baseline / pre-trial	35	7481979	4469515	-1601167	16600000
Trial period	36	30400000	13100000	3782322	57100000
Reading taken from neck					
Baseline / pre-trial	36	3476.9	1684.9	56.4	6897.5
Trial period	36	8927.2	6428.4	-4123.2	21977.6

Figure 7.2: Counts of *Campylobacter* taken before and during the trial period (transformed values)[30]

[28] A small sample contains a lot of variation. The estimates are less stable (for example, if there is a sample size of 36, adding in one case with a higher value will have a big impact on the mean, with a sample of 360, a single case with a high value has far less impact on the overall mean). This means we cannot conclude whether an increase is genuine or due to variation.

[29] Both the mean counts of *Campylobacter* in the caeca and the neck samples were higher in the trial period compared to the baseline/pre-trial period. This difference is not significant due to the small sample size.



7.5 Discussion of quantitative data findings

Analysis of contamination and pathology data suggests the VAO verification checks had a significant positive effect: leading to a higher number of detections of contamination and pathology. This suggests that the VAO verification checks help to better identify the risks that occur in slaughtering and dressing. However, the results of the statistical tests need to be interpreted with caution; and should be seen in the context of the absence of an intervention control, meaning we cannot be certain of causality. We cannot be sure that the significant effect is caused by the trial or by external factors, such as changes in SH procedure, conditions of birds supplied to trial SHs and so on. Despite the data limitations, the findings revealed from analysing contamination and pathology rates does add useful context to the overall evidence base. Moreover, the findings do reflect findings identified in the case study visits and the overall conclusion that there is value in the VAO verification checks. While analysis of *Campylobacter* data has revealed there is a higher prevalence of *Campylobacter* following processing and dressing, this finding is not statistically significant, most likely because there were fewer records for analysis.

[30] This is log-transformed data. Log base 10 has been used. Log transformation are used to make highly skewed data lass skewed. This allows us to make patterns within the data more visible.

Conclusions and recommendations

8 Conclusions and recommendations

Overall conclusions from qualitative and quantitative research	Recommendations for next steps
Attitudes towards the modernised poultry inspection system Participants (both VAOs and SH managers) saw the trial as a much-needed modernisation of the traditional inspection system, focussing on invisible risks, which are seen as the main hazards in the slaughtering and dressing process. VAOs were positive about the increased flexibility the role offered, enabling them to have a "holistic" understanding of the SH environment, and prompt trial SHs to "up their game" through feedback. However, they were concerned about the assumed implications of the trial: the withdrawal and / or reduced presence of OVs in poultry SHs. VAOs were clear that, should this happen, there would be a negative impact on food safety. This was the case across most SHs despite the extensive communication and engagement carried out by the FSA in advance of the trial. Some SH managers shared this assumption, adding that they thought the trial was intended to provide FSA with the evidence needed to reduce regulatory oversight. Nevertheless, SH managers felt that the trial may have benefits, suggesting that the VAO would 'act as a second pair of eyes', helping them better prepare for a customer audit. That said, across most SHs, there was the assumption that they trial would not reveal anything about the SH which they did not already know. They suggested that VAO checks reflect the systems and procedures they carry out currently. Awareness and knowledge of the trial rationale, aims and mechanics were often 'siloed' among senior managers in each SH. Those directly involved on the line (such as supervisors and line operatives) typically only became aware after the trial was live and therefore had, at best, a vague understanding. We	Although FSA communication and engagement work was seen as sufficient and adequate by most, rectifying the break in information flow from SH managers down to those who have oversight of the line could improve engagement and buy-in to the trial. For future trials, FSA may wish to consider running a training session in each trial SHs to be attended by senior managers, as well those who are closer to the line as this may help to achieve a shared understanding and facilitate buy-in. A less costly option would be to provide regulatory officers or SH managers with the necessary information and materials so they are able to run a training session themselves.

suggest that if there had been a shared understanding then this may have increased buy-in with the trial and willingness to engage and act on VAO feedback.	
Practical issues and concerns While SHs could see the thinking that went with the checks carried out by the VAO, there was concern, which increased as the trial progressed, that certain aspects of the trial design were not fit for purpose in the context of food quality and resource constraints. Key points were: • Most trial SHs objected to an increase in scald tank temperature as it was felt this would affect the quality of the end product and the efficacy of the plucking machine. • The scoring parameters of the carcass verification checks were felt not to be realistic. • Turkey plants raised concerns that the trial was designed primarily with chicken SHs in mind, considering the lower levels of *Campylobacter* found in turkeys and the more flexible hand-evisceration processes used in turkey plants. • Eradicating foam build-up on the surface of the scalding tank was not felt to be possible without significant investment. • Eradicating condensation and the pooling of water would also require significant investment, and therefore corrective action taken in the trial was often viewed by VAOs as short-term fixes. There was consensus that significant investment was needed in order to tackle the root causes of most of the common issues identified by VAOs. To have a significant impact on food safety and reduce levels of *Campylobacter*, managers in several SHs suggested that only slower line speeds would realise this. All trial SHs said this would not be possible given the need to fulfil commercial interests and meeting throughput targets. The fact that the new system allowed VAOs to better detect issues in the SH environment and bring them	The trial was intended not only to assess how successfully it was implemented, but also to check how realistic the scoring parameters were. FSA worked hard to re-design the trial based on the feedback from the BPC and others. However, a number of SHs suggested they would have welcomed the opportunity to input into the trial design. It was felt this would have helped with engagement but also provide useful insight into the suitability of the checks in the context of every day manufacturing processes. Clear explanations around the scoring parameters for each verification checks could have avoided some frustrations from the industry. For example, describing the reasoning behind the 0.2% target for carcass verification checks (rather than 1% or 3% and so on).

to the attention of SH staff, meant that corrective action was, at least, a higher priority.	
Impact on relationships within the SH environment In a number of trial SHs, engagement and communication between the resident OV and SH managers was more frequent than it had been under the traditional system. However, SHs became increasingly frustrated as the trial progressed and the nature of relationships ended up reflecting the pre-trial situation. There were a number of factors on which concerns were based: different perceptions of risk and interpretation of the guidance document, concern with the scoring criteria, and perceived inconsistency in scoring. As frustrations increased, some trial SHs disengaged from the trial, seeing it as less of a priority, and a few were less willing to engage with the idea of taking corrective action. Some also suggested that the resident OV may not be the best person to carry out checks of machinery used in dressing. This was based on the belief that a person with a better appreciation of manufacturing processes would be able to place issues within that context, and some issues would then not be considered so risky.	A key aspect of the trial was to see whether the trial facilitated more engagement and more positive relationships between the resident OV and SH staff. While initially this was achieved, it was quickly lost due to concerns about the trial. One of the issues seems to be the timing of the trial, meaning that in most trial SHs, SH managers did not engage with it until after the trial had started. While a number of SHs initiated a trial inception meeting for sharing knowledge about the trial and putting in feedback mechanisms this did not happen across all SHs. The recommendation therefore is that in future trials the FSA recommends that such inception meeting are required, while stating the benefits that such meetings can bring. For instance, having such a meeting may mean that issues are resolved more quickly than escalation through management.
Analysis of trial data and reported impact Statistical analysis of trial data collected before and during the trial suggests that the modernised poultry inspection system trial increased levels of contamination detected across the trial plants. However, this finding should be treated with caution – given the small sample size and length of the trial we cannot be certain of causality. There was also an identified increase in levels of Campylobacter in plants across the trial period, but results are inconclusive due to size of the sample. In terms of reported impact, most trial SHs (both VAOs and SH managers) suggested the trial had resulted in quicker, more frequent identification of some issues. In response, there were a number of	There is scope for a longer trial period to consolidate some of the findings here by increasing the sample size. This will help isolate the impact of the inspection system on levels of *Campylobacter* and contamination. There is also scope to trial this new system in SHs with small and medium levels of throughout; of which some would need to have been assigned a less than satisfactory audit rating.

measures put in place: • Additional and / or re-deployment of cleaning resource to problematic areas e.g. EV area • Extra cleaning of crates and trailers after ATP tests identified problematic areas • Altering and testing water pressure and nozzles in the inside/outside washer in the light of powder test results • Additional maintenance of machines, to ensure they operational effectiveness • Enhanced collaboration between production, technical, quality assurance managers and maintenance and cleaning team in order to tackle such issues While these are notable successes given the trial only ran for 12 weeks, other staff felt the impact could only ever be limited as in-take and line speeds remained unchanged.	

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