



A UK WIDE MICROBIOLOGICAL SURVEY OF CAMPYLOBACTER CONTAMINATION IN FRESH WHOLE CHILLED CHICKENS AT RETAIL SALE

PROTOCOL

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ABBREVIATIONS

CCDA-	Charcoal Cefoperazone Deoxycholate Agar
DH -	Department of Health
FSA -	Food Standards Agency
h -	Hour(s)
PHE -	Public Health England
ISO-	International Standards Organisation
LGP-	Laboratory of Gastrointestinal Pathogens
mL -	Millilitres
mm -	Millimetres
s -	Seconds
MS-	Microbiological Services
UKAS-	United Kingdom Accreditation Service

OUTLINE

Background

1. The Food Standards Agency has a key role in preventing foodborne illnesses. The Strategic Plan aims to reduce foodborne disease further and has set a target to reduce *Campylobacter* contamination in raw chicken.
2. *Campylobacter* is the most prominent bacterium associated with foodborne disease within the United Kingdom. In 2012, there were 72,562 laboratory confirmed UK cases of Campylobacteriosis, which due to under-reporting, are estimated to represent a total of around 460,000 actual cases in the community. An estimated 60-80 % of *Campylobacter* infections are attributed to chicken. It is hoped that by reducing the number of positive birds through effective control programmes, the number of human cases will decrease.
3. In 2001 the Food Standards Agency undertook a UK wide survey of *Salmonella* and *Campylobacter* contamination of fresh and frozen chicken on retail sale - in which *Campylobacter* contamination in the UK was found to be between 50-70 %. [The overall frequency of Campylobacter contamination was 50%, which is the same as the preliminary figure announced in August 2001. However, there was a significant difference in the contamination rate when England and Wales were compared to Scotland and Northern Ireland. The latter two countries had a much higher frequency of contamination (76% average compared with a 44% average for England and Wales). This was recognised when the preliminary results were announced in August 2001. Further work has failed to identify a definitive explanation for these differences, although variation between laboratories is likely to be a factor. (Report actually published in 2003; <http://www.food.gov.uk/multimedia/pdfs/campsalmsurvey.pdf>)]
4. A number of rolling surveys were set up after this to monitor the levels of *Campylobacter* and *Salmonella* in chicken on retail sale. One ran in Wales from 2001 and was extended to Northern Ireland in 2004. Results indicate *Campylobacter* spp. contamination levels to be 70 % in Wales and Northern Ireland¹.
5. The LACORS/HPA Coordinated Local Authority Sentinel Surveillance of Pathogens survey which ran between 2004 and 2007 in England isolated *Campylobacter* from 71 % of fresh chickens tested.
6. In 2009 the FSA published results of its UK survey of *Campylobacter* and *Salmonella* contamination of fresh chicken at retail sale², this survey found the prevalence of *Campylobacter* in chicken at retail in the UK was 65.2 % based on the combining of results from the direct plating and enrichment methods. This survey also highlighted the difficulties in isolating the organism and that the presence/absence method had limitations. Literature suggests that using a combination of presence/absence and

enumeration testing provides a more robust measure of *Campylobacter* prevalence. The overall prevalence figure for the survey was therefore determined by combining the *Campylobacter* positive results from the 927 samples tested by both presence/absence and enumeration methods.

7. In December 2010 The Food Standards Agency, the UK poultry industry, and major retailers agreed a new target that will measure efforts to reduce the levels of *Campylobacter* in chickens. There are three categories of contamination levels and, currently, 27 % of birds are in the highest category. The new target is for the industry to reduce the numbers of these most contaminated birds in UK poultry houses from 27 to 10 % by 2015. It is estimated that achievement of this target could mean a reduction in *Campylobacter* food poisoning of up to 30 %; some 90,000 cases per year.
8. The presence of *Campylobacter* spp. on the outer packaging of chicken packs has raised concern as consumers would not expect products to be contaminated on the outside and would consequently do nothing to avoid cross-contamination. Packaging has previously been examined in two small studies a prevalence of contamination of the outer packaging of ~ 6 % was reported. However, there is a complete lack of information on the level of contamination present on outer packaging and such data is needed to be able to assess the risk associated with exposure from such packaging.
9. The new survey will look at the prevalence and levels of *Campylobacter* contamination in fresh whole chilled chickens and on the outside surface of the packaging at retail using the enumeration method, and will provide valuable information on what happens to *Campylobacter* levels post slaughter. Although the survey will take into consideration seasonal fluctuations in *Campylobacter* prevalence in retail chickens it is not intended to provide data on the seasonal pattern of contamination at retail. The survey may also identify any trends as a result of specific retailer initiatives such as the use of new packaging technologies.

Objectives

1. To determine the prevalence and levels of *Campylobacter* spp. contamination on fresh whole chilled chickens produced in the UK and sold at UK retail outlets by sampling over a 12 month period.
2. To determine the prevalence and levels of *Campylobacter* spp. contamination found on the outside packaging of UK produced fresh whole chilled chickens sold at UK retail outlets.
3. To identify *Campylobacter* spp. present and determine susceptibility of isolates to a defined range of antimicrobial agents.

4. To collect information from each sample on a range of factors including bird weight, rearing method and type of packaging and determine any correlation with Campylobacter contamination.

Publication of results

9. The FSA has a policy of openness and releases all details associated with samples analysed in its surveys including brand names, company names and addresses of retail premises. The Agency will not withhold further information collected in association with this survey if, after due consideration, it considers this to be in the public interest.

At the end of the survey, the results and all the information that has been collected about all of the samples taken for the whole survey period will be published on the Agency's website.

In addition, sample data and results will be reported each month in arrears, and each quarter the Agency will publish an interim report.

Timetable

10. The survey will consist of a 12 month sampling period plus one month preceding this preparing and a further 3 months for data analysis and report preparation. The proposed timetable is available in Annex 1.

Survey Design

13. Based on the information available, the UK core sample will be 4000 samples. These samples will be taken evenly over a 12-month period unless agreed otherwise with the FSA to address additional objectives.
14. The contractor will be responsible for ensuring that the appropriate number of samples are collected in accordance with the sampling plan agreed with the FSA. The number of chickens to be sampled from each UK country will be proportional to population figures and, within each country, chickens may be sampled according to retailer market share³ (Annex 2). If any deviations are necessary these will be noted in the final report. The contractor will ensure that sampling is evenly distributed throughout the period of the survey and is responsible for selecting and collecting samples at random. A maximum of 4 different chicken types (e.g. different size, brand or rearing) will be collected from any one store on any one occasion; the number of samples collected should be reduced if the sampler is unable to collect 4 different chicken types. A maximum of 2 samples should be taken from butchers and smaller independent stores/grocers.
15. The aim of this survey is to obtain a total of 4000 samples of whole UK produced raw fresh chilled chicken. Sample numbers should be

reviewed every month to ensure that chickens are being sampled according to the agreed sampling plan.

16. The contractor will provide smaller independent retail outlets with a letter from the Agency informing them that samples have been taken from their premises in order to carry out a survey (Annex 5). For larger retail chains (i.e. Tesco, Asda, Sainsbury's etc.) this is not necessary, as the relevant contact at head office will be sent a list of the premises from which samples have been obtained.

SAMPLING

Sample collection

17. It is essential that cross-contamination be avoided during the collection of chicken samples. Precautions will therefore be taken at all stages to ensure that the equipment used during sampling, transport and storage is not contaminated with the pathogens investigated in the survey.
18. Contractors will aim to collect samples at random from the refrigerator cabinet and not necessarily from the front of the display. The surface temperature of the chicken should be recorded, as should information on whether it was displayed in a temperature-controlled environment e.g. chillers and the overall condition of shelving e.g. was there any visible meat juices on the shelf.
19. Only packaged whole fresh chilled UK produced birds should be purchased. Unwrapped chickens may be bought from butchers but it should be noted on the sampling form and if available, with an indication of how long the chicken has been on display. Samples, which are packaged, must not show evidence of damage. Each sample then should be placed in a separate sampling bag to avoid the risk of cross-contamination during transport and until testing can take place. If the label on the chicken is not clear, does not include the approval number of the slaughterhouse, or is damaged, then the sample should not be purchased.
20. Only unseasoned, fresh whole UK produced chilled whole chickens should be sampled.

Frozen whole chickens, portions (whether fresh or frozen) including legs, breast, thigh and wing portions and processed or chicken preparations including goujons, ready basted, marinated, herbed, stuffed or pre-prepared (including “cook in the bag” or seasoned whole birds) and cooked chickens are not to be included.

21. Standard produced chickens will be sampled as well as a smaller number of free range and organic chickens (sampling of free range and organic chickens is structured to reflect their market share as outlined in Annex 2). A range of chicken weights will be sampled and each sample should, at the point of sampling, be at least 2 days from its Use-by date.
22. When chilled un-packaged chicken is purchased from smaller butchers the sampling officer may need to enquire about the country of origin, if the bird is not UK produced it should not be included in the survey. The sampler should ask the butcher for the approval number which should be present on the packaging.

23. Each sample should be placed in a plastic bag, which is then sealed. Contractors will ensure that samples are kept at between 2 to 8 °C during transportation and kept dry and out of direct sunlight. A data logger should be placed with the samples to monitor compliance with these requirements. Temperature and package integrity will be checked and recorded on arrival at the laboratory.
24. It is essential to identify the approval number (used to be known as the health mark) from each sample so that the origin of chicken can be determined retrospectively. It has been noted that the country of origin of a chicken pack is not always apparent from examining the label. The Agency will seek co-operation from retailers to permit identification of country of production for chicken where the country of origin appears to be uncertain.

Sample information

25. All relevant information available from the sample should be recorded on the sample submission form (Annex 4). As far as possible this information should include the name and postcode of the retailer, date and time of purchase, the approval number, weight, use-by date, price, product name, packaging information and display temperature. Other information, such as sample description, whether the sample was purchased from an in-store butcher, should be included under the comments section of the form. Each sample should be labelled with a unique number by the laboratory which should be used from sampling to testing. The sampling sheet is completed with the addition of the results from the microbiological testing. This data is then entered onto a spreadsheet compatible with Microsoft Excel.
26. Sampling and results should be reviewed every month to ensure that the chickens sampled could generate statistically valid/meaningful results. The samplers should co-ordinate their sampling with the testing laboratory, project manager and the Agency.

TESTING

Receipt of samples

27. On receipt of the samples, laboratories will check the information recorded by the sampler and complete the relevant sections of the laboratory sample submission form. This information is then entered onto a spreadsheet compatible with Microsoft Excel.
28. Digital scans or photographs will be taken of the label of each sample to capture all product information. Photos or scans are to be stored on suitable digital media under the appropriate sample number. The scan/photograph will be of a high resolution so that the labelling details

are clear. Following examination, the product label itself shall be removed, cleaned and stored if intact and readable. The agency must be informed immediately if the approval number of the slaughterhouse cannot be located on the package.

29. All chicken samples should reach the laboratory within 24 hours of sampling. **[In exceptional situations (e.g. long journeys from the Northern Scottish Isles) this period may be extended to within 48 hours]**. Fresh whole chilled chicken samples should be held at 2 to 8°C and the laboratory sampling procedure should begin within 24 hours of arrival at the laboratory. **[If the transport period was 48 hours from sampling, then the sample should be tested on receipt]**. All samples should always be tested before/on their use-by dates.

Examination

30. Samples of chicken will be examined to ensure that the packaging is intact before testing. If packaging has been damaged during transportation this should be noted on the sampling form before testing. The temperature of the samples will also be recorded on receipt; those at temperatures above 8 or below 2°C will not be tested.
31. It is essential that handlers take care to avoid cross contamination between samples and between the chicken and its packaging as well as from the surrounding environment at all stages. Gloves must be worn and changed between each sample of chicken. The work-surface of the bench must be sanitised before unwrapping each chicken. Thorough cleaning of equipment and work surfaces will be undertaken regularly. There must be environmental sampling of the laboratory for test bacteria (*Campylobacter*) during the testing period at regular intervals. The contractor will carry out examinations in areas dedicated to the examination of survey samples and clearly separated from other potentially contaminated materials.

Methodology

32. The microbiological methodology for the testing of each sample (chicken and packaging) for *Campylobacter* is as follows:
The quantitative analysis of *Campylobacter* in the chicken sample will be based on the method described in **EN/ISO/TS 10272-2:2006** 'Microbiology of food and animal feeding stuffs – Horizontal method for detection and enumeration of *Campylobacter* spp Part 2: Colony-count technique' (please see Annex 3 for details of this method).

Data handling and reporting

33. At monthly intervals (in arrears) the contractor will submit to the Agency a progress report that provides details of the samples taken and the campylobacter counts. The data for antimicrobial resistance profiles for strains isolated will be submitted independently.
34. An interim report (electronic and hardcopy) containing a summary of the samples taken and their results to date will also be submitted to the Agency at 3-monthly intervals. The contractor will be expected to incorporate data on species identification and antimicrobial resistance profiles at the Quarter 2 and Quarter 4 reports.
35. The contractor is responsible for collating all results and submitting a final report to the Agency. The report will present summary statistics on the prevalence of *Campylobacter*, together with a breakdown of the species where appropriate. The results should be subjected to detailed statistical analysis by the contractor; these analyses will be agreed with the Agency's Statistics team prior to commencement.
37. All forms, documentation and electronic files must be retained by the contractor until further notice from the Agency in case of issues arising after the completion of the survey. It is not necessary to provide the Agency with hard copies of forms. However, this information must be readily available to the Agency if required.
38. Every month, the sampling numbers will be assessed to ensure that representative samples are being tested to obtain statistically valid/meaningful results. The contractor is responsible for adjusting the sampling plan every month according to any deviations occurring in the previous month(s) while the FSA is responsible for instructing the contractor on any major changes to the sampling strategy e.g. changes in market-share predictions.

Quality Assurance

39. In order to ensure a high level of accuracy in data entry, data checking and backup, the contractor is accredited to the relevant ISO methods by an appropriate organisation (e.g. UKAS). The EN/ISO/TS 10272-2 method is currently being revised to become a full standard and any proposed changes in the final draft may be incorporated providing they are within the scope of the accreditation. As required by 17025, the contractor must also be able demonstrate satisfactory performance in the testing of food for *Campylobacter* spp. through participation in an external proficiency testing scheme, such as a ring trial. All the Laboratories participating in this study will take part in the FSA Campylobacter Proficiency Testing Scheme. This will include the testing of samples by a different project technician throughout the survey. The measurement of uncertainty for enumeration of *Campylobacter* spp. must also be determined and the FSA will visit the

contractors during the course of the survey to assess how the work is being carried out.

ANNEX 1: PROPOSED TIMETABLE FOR SURVEY

January 2014	Protocol finalised
February 2014	Contract signed
17 th February 2014	Sampling starts
16 th June 2014	Quarter 1 Interim report
16 th September 2014	Quarter 2 Interim report
16 th December 2014	Quarter 3 Interim report
16 th February 2015	End of sampling period
16 th March 2015	Final quarter 4 Interim report
30 th April 2015	Final draft report received
30 th June 2015	Final report signed off

*It is expected that monthly datasets are delivered by the 4th of the month following the last sample for that period.

ANNEX 2: SAMPLING PLAN

A UK core sample size of approximately 4000 samples of fresh whole UK produced chilled chicken are needed to achieve the precision required. The sample numbers should be reviewed periodically to ensure that statistically meaningful analyses can be carried out.

While sampling will aim to take place evenly over a 12-month period, the survey will not specifically take into consideration seasonal variation. The sampling plan is based on population attributable proportions, the baseline set by the Agency in 2007 and initially structured to reflect market share data sourced from Kantar (Kantar, 2010). Sampling will be kept under review and can, as agreed with the FSA, be revised to accommodate any further survey objectives e.g. over-sample during certain periods.

Sampling Plans

Numbers of chickens to be sampled throughout the UK

	Total number of chickens	Number of Free range chickens (of total)	Number of Organic chickens (of total)
Total UK	4000	313	21
England	3355	269	18
Scotland	336	22	1
Wales	193	13	1
Northern Ireland	116	9	1

ENGLAND

Retailer groups	Total no. of chickens	No. of Free-range chickens (of total)	No. of Organic chickens (of total)
Total Market	3355	269	18
Tesco	1021	57	6
Asda	541	15	1
Sainsbury's	499	33	5
The Co-operative	307	14	1
Morrisons	286	24	1
Waitrose	105	23	3
M&S	99	2	0
Butchers	120	70	0
Others*	377	30	1

*E.g Lidl, Iceland, Aldi, Budgens, Costcutter, Nisa, independents, farm shops, markets stalls.

WALES

Retailer groups	Total no. of chickens	No. of Free-range chickens (of total)	No. of Organic chickens (of total)
Total Market	193	13	1
Tesco	64	4	1
Asda	34	1	
Sainsbury's	20	1	
The Co-operative	24	0	
Morrisons	19	2	
Waitrose	3	1	
M&S	4	0	
Butchers	5	4	
Others*	20	1	

*E.g Lidl, Iceland, Aldi, Budgens, Costcutter, Nisa, independents, farm shops, markets stalls.

SCOTLAND

Retailer groups	Total no. of chickens	No. of Free-range chickens (of total)	No. of Organic chickens (of total)
Total Market	336	22	1
Tesco	106	7	1
Asda	57	2	
Sainsbury's	22	2	
The Co-operative	54	1	
Morrisons	37	5	
Waitrose	0	0	
M&S	20	1	
Butchers	4	2	
Others*	35	2	

*E.g Lidl, Iceland, Aldi, Budgens, Costcutter, Nisa, independents, farm shops, markets stalls.

NORTHERN IRELAND

Retailer groups	Total no. of chickens	No. of Free-range chickens (of total)	No. of Organic chickens (of total)
Total Market	116	9	1
Tesco	38	3	
Asda	14	1	
Sainsbury's	13	1	
The Co-operative	1		
Morrisons	0		
Waitrose	0		
M&S	9	1	
Butchers and Others*	41	3	1

*E.g Dunnes, Lidl, Iceland, Aldi, Budgens, Costcutter, Nisa, independents, farm shops, markets stalls.

ANNEX 3: LABORATORY METHODOLOGY

Overview

Chicken neck-skin samples and the outside surface of packaging will be analysed for *Campylobacter*. Wear suitable single-use gloves for handling the packaged chicken, changing gloves after each sample.

Outer packaging swab

Place the wrapped chicken, with the outer bag folded away from the pack label onto a clean surface and take a picture (with sample number and pack label clearly visible) and retain label after examination.

Add 10 ml of Minimum Recovery Diluent (MRD) to a SpongeSicle™ swab and ensure the swab is thoroughly wetted.

Remove the outer sample bag and place the wrapped chicken on a previously disinfected dry plastic tray wearing disposable gloves.

Swab the entire outer surface of the chicken packaging using aseptic technique (swab whole pack twice using both side of the swab).

Replace the swab in its bag breaking off the stick and then stomaching the swab for 30 s. Using a sterile pastette remove > 2 ml into a sterile container for enumeration as described below.

Chicken skin

Wearing a fresh pair of disposable gloves, remove the chicken from its wrapping, taking care not to allow contact between the chicken and outer packaging. Using sterile instruments (e.g. scissors and tweezers) aseptically remove skin from the neck area (if < 25 g neck-skin is available top up with breast skin (record weight of this)) to make a 25 g test portion, avoiding fat and place this into a sterile bag.

Add 225 ml BPW and homogenise for one minute. Remove > 3 ml for enumeration as described below.

Enumeration of *Campylobacter* spp.

Enumerate *Campylobacter* spp. by the surface plate method as described in the HPA Methods - Detection and enumeration of *Campylobacter* spp.: F21 (see Appendix I). This method is based ISO/TS 10272-2:2006 Microbiology of food and animal feeding stuffs -- Horizontal method for detection and enumeration of *Campylobacter* spp. -- Part 2: Colony-count technique and entails the following:

Plating of 1 ml of the packaging swab liquid onto three modified cefoperazone, charcoal deoxycholate agars (CCDA plates: e.g. Oxoid CM739 with Oxoid selective supplement SR155).

Plating of 1 ml of the chicken skin homogenate onto three CCDA plates and 100 µl onto duplicate CCDA plates. Prepare two further 10-fold dilutions in MRD and plate 100 µl of each of these in duplicate onto CCDA plates.

Incubate CCDA plates in a microaerophilic atmosphere at $41.5 \pm 1^\circ\text{C}$ for 44 ± 4 hours.

Counting and confirmation of suspect/typical colonies

Count plates from those with less than 150 colonies, where possible. As the bacteria rapidly deteriorate in air progress confirmation of colonies immediately. Pick 5 (or less if less present) colonies (based on typical colony morphology) and sub-culture onto Columbia Blood Agar (containing 5 % (v/v) defibrinated blood). Check that growth is absent after incubation under aerobic conditions after 48 h and check for typical growth in

a microaerophilic atmosphere at 41.5 °C. Confirm oxidase reaction of pure cultures and typical *Campylobacter* cell morphology (small, slim, curved or spiral, Gram-negative rods/motility (wet mount/phase contrast)). Commercially available latex agglutination test kits can be used to identify campylobacters (e.g. Microscreen® campylobacter (Microgen bioproducts) and Dryspot campylobacter test (Oxoid Ltd) consistent with local Standard Operating Procedures.

Isolates of *Campylobacter* spp. will be sent, as soon as possible, to the Gastrointestinal Bacteria Reference Unit (GBRU) CampyLab, PHE London (Hays DX number DX653008) for speciation and antibiotic resistance testing. One isolate from each positive sample will be sent and archived by GBRU. Isolates sent to GBRU must be clearly labelled with their sample number and the name of the referring laboratory.

ANNEX 4: SAMPLING FORM



**Public Health
England**

FOOD, WATER AND ENVIRONMENTAL MICROBIOLOGY LABORATORY,
ADDRESS, xxx
a UKAS Accredited Testing Laboratory No. xxx
Tele: xxx Email: xx@phe.gov.uk



1 Microbiological survey of *Campylobacter* contamination in fresh whole UK produced chilled chickens at retail sale

<p>Q1 Retailer name _____</p> <p>Address _____</p> <p>Postcode: _____</p>	<p style="text-align: center;">PLEASE AFFIX LAB SAMPLE NUMBERS BELOW</p> <div style="border: 1px solid black; height: 50px; margin-bottom: 5px;"></div> <p>LOCAL AUTHORITY (if applicable) _____</p> <p>Post code _____</p> <p>Telephone number _____</p> <p>Purchase order number (if applicable) _____</p>
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DETAILS

Sample collected by: _____	Date collected: _____	Time collected: _____	Temperature at collection: _____ °C
Display unit (describe: e.g. chiller?, visible meat juice?) _____			

LABORATORY USE ONLY

Q2. Full name of product as it appears on label: _____

Q3. Weight of product, as shown on the packaging: _____ Grams

Q4. Price (£): _____ Q5. Approval number: _____

Q6. Chickens shown as (tick all that apply): Free range Organic Halal Cornfed

Q7. Assurance scheme (tick all that apply): Red Tractor other (specify e.g. freedom food _____)

Q8. Use by Date (dd/mm/yy): _____ Q9. Are giblets present? YES NO

Q10. Visible liquid in pack? YES NO Q11. Breast skin in sample? _____ Grams

Q12. Packaging (please tick all that apply): Wrapped tight Tray present Modified atmosphere packed

Date received: / /20	Data logger / probe ID:	Book in for <i>Campylobacter</i> ONLY
Time received:	Temp. on receipt: °C	enumeration cfu/g skin and cfu/swab
Received by:	Sample & Receipt:	Comments (e.g. outer packaging bloody/wet?):
Received from:	<input type="checkbox"/> SATISFACTORY	
	<input type="checkbox"/> UNSATISFACTORY	

ANNEX 5: LETTER TO RETAILERS

Letter to be sent to Retailers during Sampling

Insert Council Logo &/or Name

<Date>

Dear

This letter has been given to you by an Environmental Health Officer (EHO)/ Sampling Officer (SO) from [\[insert name of Contractor\]](#).

The EHO / SO is authorised by the [\[Contractor\]](#) to carry out food sampling work, and has purchased chicken from your premises as a food sample, which is to be used for a food surveillance survey.

The aim of this particular survey is to ascertain the incidence and contamination level of *Campylobacter* in raw UK produced chicken available to consumers at retail in the UK. Whole chickens are being sampled and tested during a 12 month period.

This survey is being funded by the Food Standards Agency which has commissioned [\[name of Contractor\]](#) to carry out the sampling.

Your premise has been visited as one of the retail outlets where people may buy raw chicken - the subject of this survey. The raw chicken purchased from your premises will be taken to [\[insert name of lab\]](#) for testing, and you will be provided with the results of this testing by a letter from the Food Standards Agency. Please note that the survey is not for enforcement purposes.

The results of the samples taken in this survey will be collated and will form part of a report on the incidence and contamination level of the pathogen *Campylobacter* spp. on the surface of the packaging and in fresh whole chilled UK chicken on retail sale within the UK. This report will be published by the Food Standards Agency. At the end of the survey, in line with Food Standards Agency policy on openness and transparency in relation to food safety and matters of interest to consumers relative to food, individual retailers/producers of the chicken sampled will be published on the Agency's website www.food.gov.uk as part of this report.

Should you have any queries, please contact Lorna Rowswell, Hygiene and Microbiology Division on the following telephone number: 020 7276 8138 or send an E-mail to Lorna.Rowswell@foodstandards.gsi.gov.uk

Yours sincerely

REFERENCES

¹ Meldrum, Richard J.1; Wilson, Ian G. 2007. Salmonella and Campylobacter in United Kingdom Retail Raw Chicken in 2005. *Journal of Food Protection*, 70:1937-1939.

² Food Standards Agency.2009. UK-wide survey of Campylobacter and Salmonella contamination of fresh chicken at retail sale
Food Standards Agency, London.
http://www.foodbase.org.uk/admintools/reportdocuments/351-1-676_B18025.pdf

³ Kantar data (2010)