Ministry for Primary Industries
Manatū Ahu Matua

Discussion Paper: Review of the Poultry NMD Programme's *E. coli* testing and *Campylobacter* Performance Target (CPT) Limits

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by the *Campylobacter* Risk Management Strategy Working Group

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Growing and Protecting New Zealand

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1 Executive Summary

The Ministry for Primary Industries (MPI) has a current *E.coli* and *Campylobacter* testing programme for meat chickens which provides information to:

- Verify the effectiveness of the industry's control measures for these organisms during slaughter and dressing,
- Enable MPI to explore whether these control measures impact on human food-borne illness rates, and
- Identify and review risk management options under MPI's relevant pathogen strategies.

This review has considered the need for and the effectiveness of the current:

- *E. coli* testing requirements and
- limits and failure responses for the *Campylobacter* performance targets

The review considered the programme in the light of the use made of the available data, and the need to maintain existing standards and promote further improvement in *Campylobacter* control.

MPI has reviewed the results and presented them to the Poultry Industry Association of New Zealand (PIANZ) and industry representatives. MPI has met with PIANZ and industry to discuss these results and obtain feedback on possible changes to the testing programme, the targets and the responses to failures. MPI has used this feedback to develop Options for changes to the programme. These Options are presented in this paper for external consultation. MPI's preferred position is to:

- Remove the requirement for *E. coli* testing.
- Remove the High Count Limit.
- Remove the Quarterly Limit.
- Keep the current Moving Window Limit and introduce a Moving Window Detection Limit.
- Remove the Campylobacter Management Plan Failure.
- Introduce flexibility for responses.

2 Background

2.1 LEGAL REQUIREMENTS:

The current legal requirements for poultry testing are found in the Animal Products (National Microbiological Database Specifications) Notice 2011 and its associated Schedule. Refer to http://www.foodsafety.govt.nz/elibrary/industry/animal-products-national-nmd/schedule-2011.pdf

2.2 PURPOSE OF THE CPT:

The *Campylobacter* performance target (CPT) was introduced by MPI (then NZFSA) to verify the effectiveness of control measures in reducing levels of *Campylobacter* contamination during the slaughter and dressing of broiler chickens.

2.3 MPI'S POSITION:

An unacceptably-high rate of food-borne campylobacteriosis was seen in New Zealand in 2006. Attribution studies estimated that more than 50% of human cases were attributed to the consumption of poultry meat. This led to the implementation of a risk management strategy for *Campylobacter* in broiler chicken meat. Control measures were applied by the poultry industry from primary production to consumption.

The results of NMD testing show that the industry has made significant improvements in control of *Campylobacter* since the programme began. Trend analysis of the broiler chicken carcass rinsate results and human cases show a strong association between the introduction of the CPT (2008) and the reduction in human food-borne campylobacteriosis in New Zealand. Recent results are starting to trend upward again. Updated attribution studies show that poultry is still the major contributor to food-borne campylobacteriosis. MPI therefore needs to ensure that the *Campylobacter* levels do not increase, and if practical, decrease further.

2.4 NZ POULTRY INDUSTRY'S POSITION:

The industry has indicated at joint MPI/industry meetings that it is committed to controlling *Campylobacter* during slaughter and dressing. They have accepted that they need to monitor contamination levels and keep levels to a minimum. They also have indicated that they would like to see any regulatory tightening to focus on the poorer industry performers.

3 Review of Data

3.1 REVIEW PROCESS

3.1.1 Data analysis

MPI's Science and Risk Assessment Group have reviewed the scientific information relating to the current *Campylobacter* performance target with a particular focus on the broiler rinsate sampling data. Evaluation of microbiological data was combined with evaluation of human illness notification data. The findings were discussed at two joint meetings of the MPI and the poultry industry.

3.1.2 Risk management questions

The questions to be answered by the scientific evaluation were:

- What trends in microbiological control are evident from the rinsate data?
- Is the High Count *Campylobacter* Target contributing to assurance of the required level of microbiological control as determined by the *Campylobacter* strategy?
- Is the Median Count *Campylobacter* Target contributing to assurance of the required level of microbiological control as determined by the *Campylobacter* Strategy?
- Is the Moving Window *Campylobacter* Target contributing to assurance of the required level of microbiological control as determined by the *Campylobacter* Strategy?
- Would the Strategy benefit from changes to the current Target?
- Is sampling for *E. coli* required for the Campylobacter Strategy?

3.2 CURRENT SITUATION

3.2.1 Rinsate samples

Currently the National Microbiological Database (NMD) specifies that rinsate samples shall be tested for *Campylobacter* and *E. coli* as detailed in Schedule 1. Refer to http://www.foodsafety.govt.nz/elibrary/industry/animal-products-national-nmd/schedule-2011.pdf. For Standard throughput premises, three *Campylobacter* samples and two *E. coli* samples are collected randomly every processing day. For Very Low Throughput premises, three *Campylobacter* samples are taken every week or part week of processing. In addition sampling for *Salmonella* takes place (not under review).

3.2.2 Regulatory use of data

Currently MPI only uses the *Campylobacter* results as a regulatory tool. If any of the *Campylobacter* Performance Target (CPT) limits as specified in the NMD are exceeded, escalating corrective actions are taken to bring process control back into compliance.

3.2.3 Other use of data

Operators and MPI can use sampling data to inform application of control measures in addition to the CPT e.g.

- **Biosecurity** at the farm – so that fewer flocks are infected
- **Hygienic dressing** – so that fewer organisms get onto the carcass
- **Decontamination** – to effectively remove or inactivate organisms by physical or chemical means

3.3 TRENDS IN HUMAN NOTIFICATIONS AND CARCASS RINSATE DATA

3.3.1 Human notifications and associations with NMD carcass rinsate data

The following graphs show the relationship between carcass sampling data and New Zealand's human health notification rates for campylobacteriosis. There has been a considerable improvement after the start of the NMD and during the period when the CPT was set (Figure 1). However no further improvement has occurred with regard to the number of human notifications in recent years.

The annual New Zealand notification rate for 2011 was 151.9/100,000 (http://www.surv.esr.cri.nz/PDF_surveillance/AnnualRpt/AnnualSurv/2011/2011AnnualSurvTables.pdf). Although comparisons with other countries need to be carried out with caution due to different notification systems, this figure remains high relative to levels reported internationally.

Figure 1: Human cases of campylobacteriosis in New Zealand (all sources)

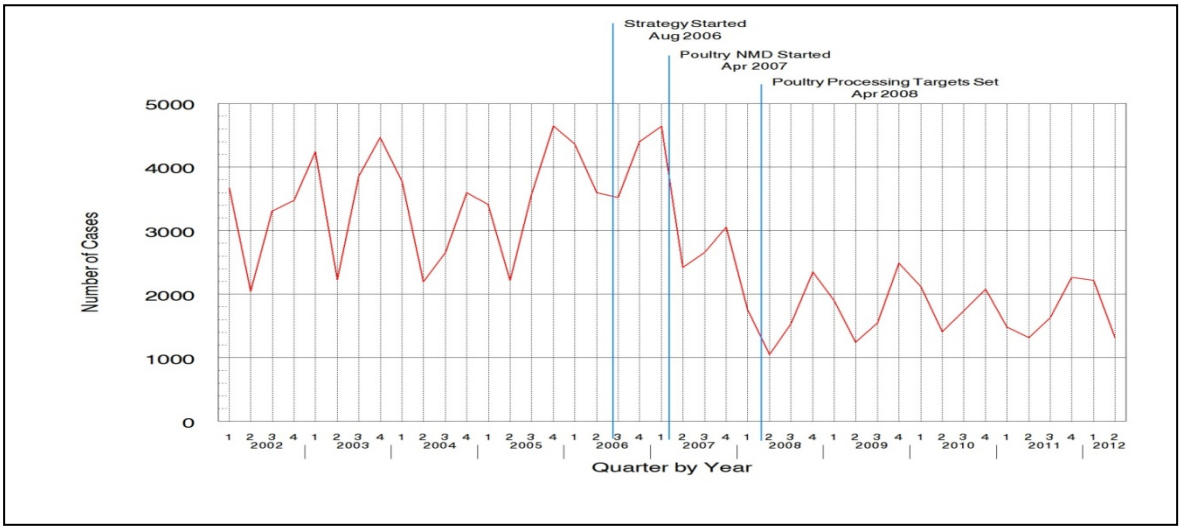
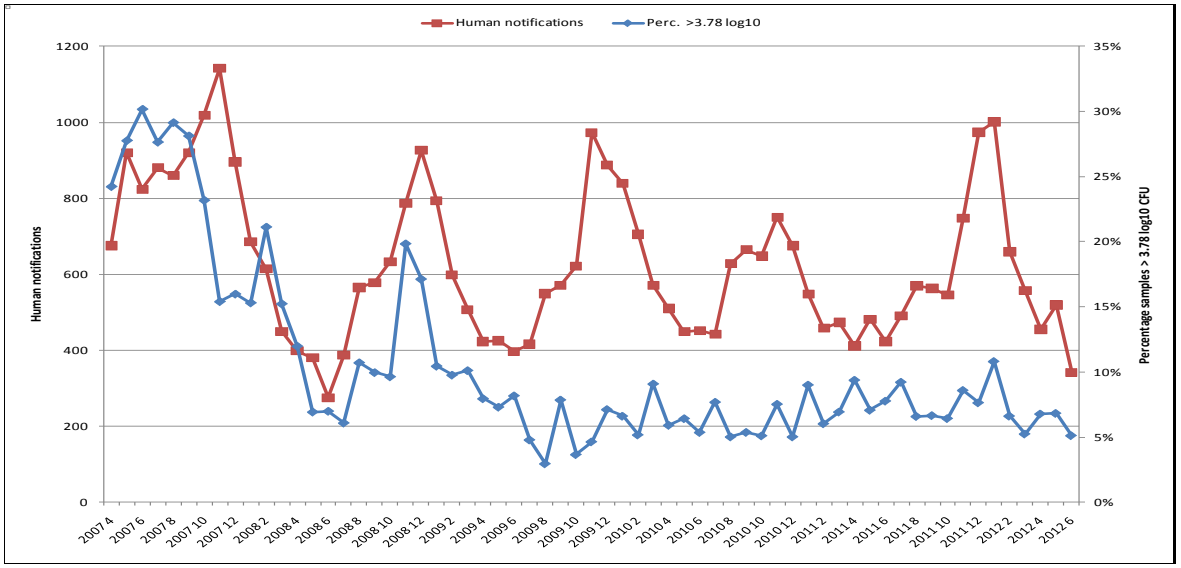


Figure 2 shows monthly human notification rates (in red) and the percentage of NMD samples with counts that exceed 3.78 log10 CFU / per carcass rinsate (in blue).

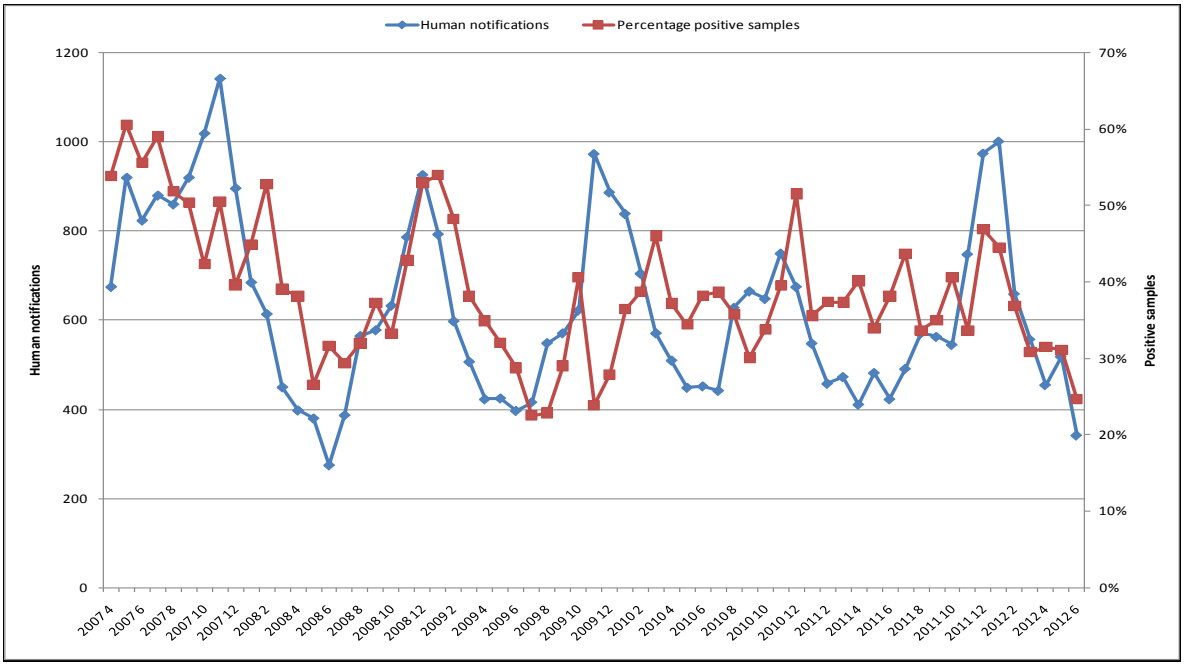
Figure 2: Human notifications and percentage >3.78 log_{10}CFU/carcass



While there was a marked initial decline in the percentage of samples that exceeded the limit of 3.78 log_{10} CFU/rinsate, this has plateaued in subsequent years.

A similar pattern is seen with positive samples, as shown in Figure 3 which shows monthly human notification rates (in blue) and the percentage of positive NMD samples (in red).

Figure 3: Human notifications and percentage positive samples



It is clear from Figure 1 above that a significant improvement in poultry contamination rates does result in reduced human illnesses. The impact of any such improvement can however only be determined by actual results once such changes are made. However, models have been developed that estimate the number of human notifications if the industry as a whole performed to a certain level.

Table 1 estimates the number of human notifications associated with different percentages of positive rinsate samples from broilers. For example, if 30% samples were positive, the annual notification rate is estimated to be 141/100,000. It should be noted that poultry meat is not the only source of human campylobacteriosis and that these estimates include human illness due to other sources. In addition a considerable proportion of the 'negative' rinsate samples in reality contain *Campylobacter*.

Table 1: Number of human notifications associated with different percentages of positive rinsate samples

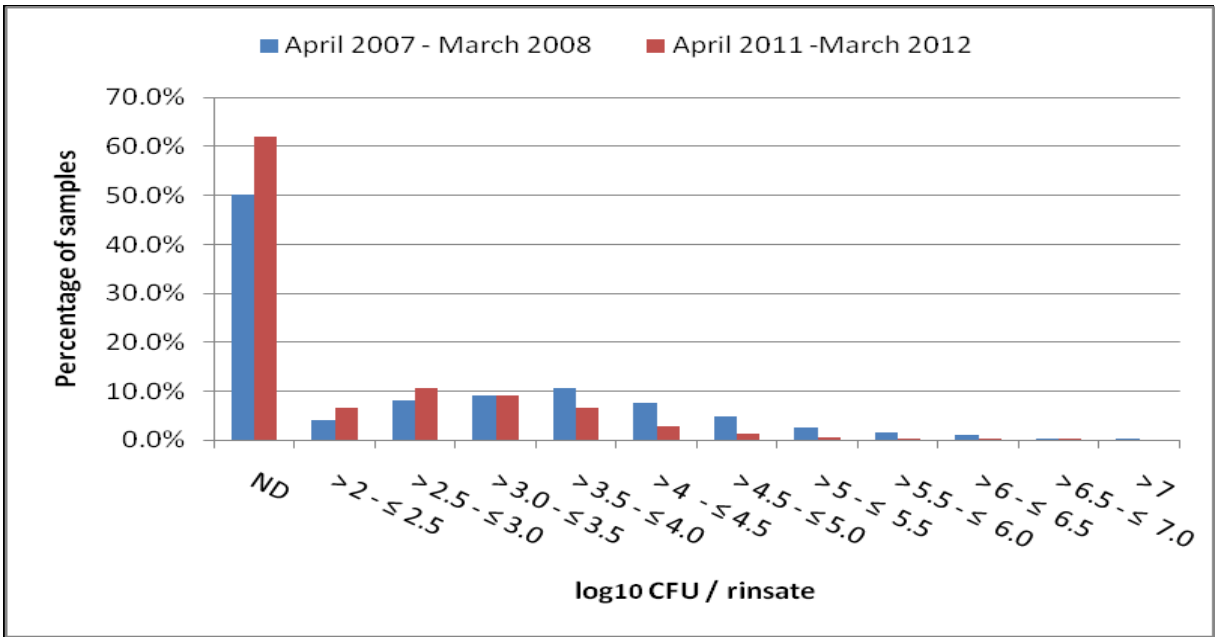
Percentage positive samples	Estimated campylobacteriosis notification rate per 100,000 population
50%	204
45%	188
40%	173
35%	157
30%	141
25%	125
20%	109

It must be emphasised that modelling such as this is not modelling the CPT itself, but industry performance as a whole. However, a more stringent CPT would be expected to result in a lesser public health burden. The actual extent of this improvement would only be measurable over time.

3.4 EVALUATION OF CARCASS RINSATE DATA

The overall improvement of the counts of *Campylobacter* on broiler carcasses from the beginning of the *Campylobacter* NMD (April 2007 – March 2008) to the equivalent last period (April 2011 – March 2012) is shown in Figure 4.

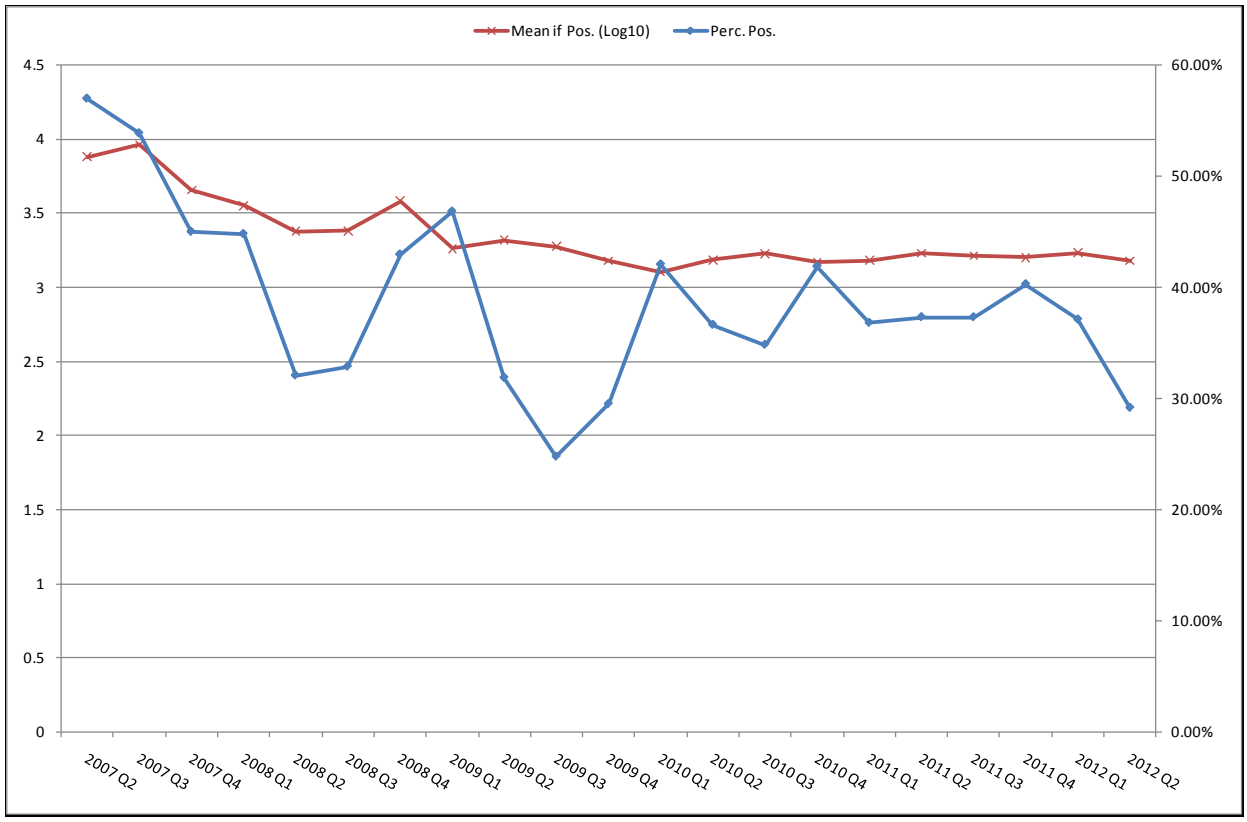
Figure 4: Comparison of the *Campylobacter* counts in NMD samples over a five year period*



* ND denotes Not Detected
This Figure shows that there has been a significant shift in the percentage of samples with low numbers of *Campylobacter* and a decrease in the samples with high counts. There are still considerable percentages of samples in the categories > 2.5 - ≤ 4.0 $\log_{10}$ CFU.
It needs to be kept in mind that ND (*Campylobacter* Not Detected) does not necessarily mean the carcass was truly free of *Campylobacter*. The organisms adhere strongly to the carcass and not all are removed by rinsing. Also, the plating method only uses 2 ml out of a total of 400 ml of rinsate.

Figure 5 shows that there has been considerable variation in the quarterly percentage of positive samples. The cause of this is unknown. Weather conditions are currently under investigation to establish their effect on broiler infection/ carcass contamination rates.

Figure 5: Quarterly percentage positive samples and the mean (log10 CFU) of these positive samples



Note that the above Figures 4 and 5 describe the results of all samples taken from all processors of broiler chickens.

3.4.1 Variation between premises

There is a considerable difference in the level of performance between different premises, as shown in the examples in the following Figures 6 and 7. This suggests that there is room for improvement, especially for poorer performers.

Figure 6: Example of variation in percentage positive *Campylobacter* samples from February 2011 – January 2012 for seven premises

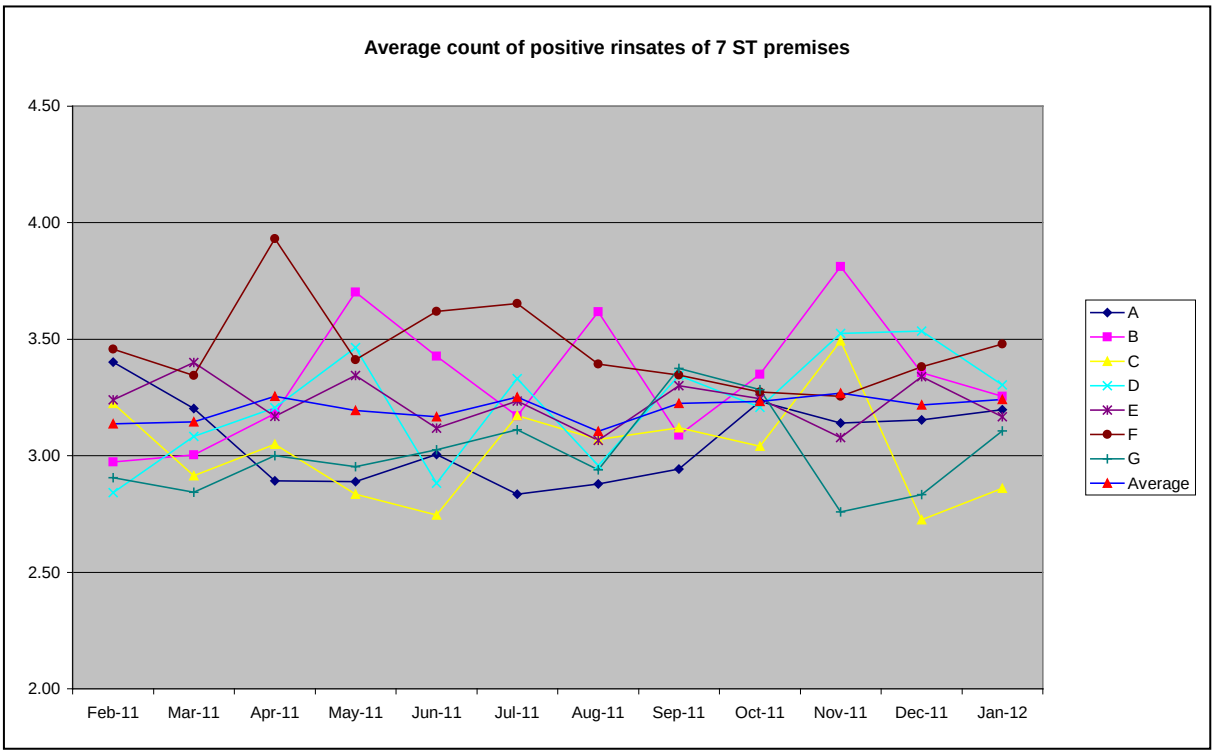
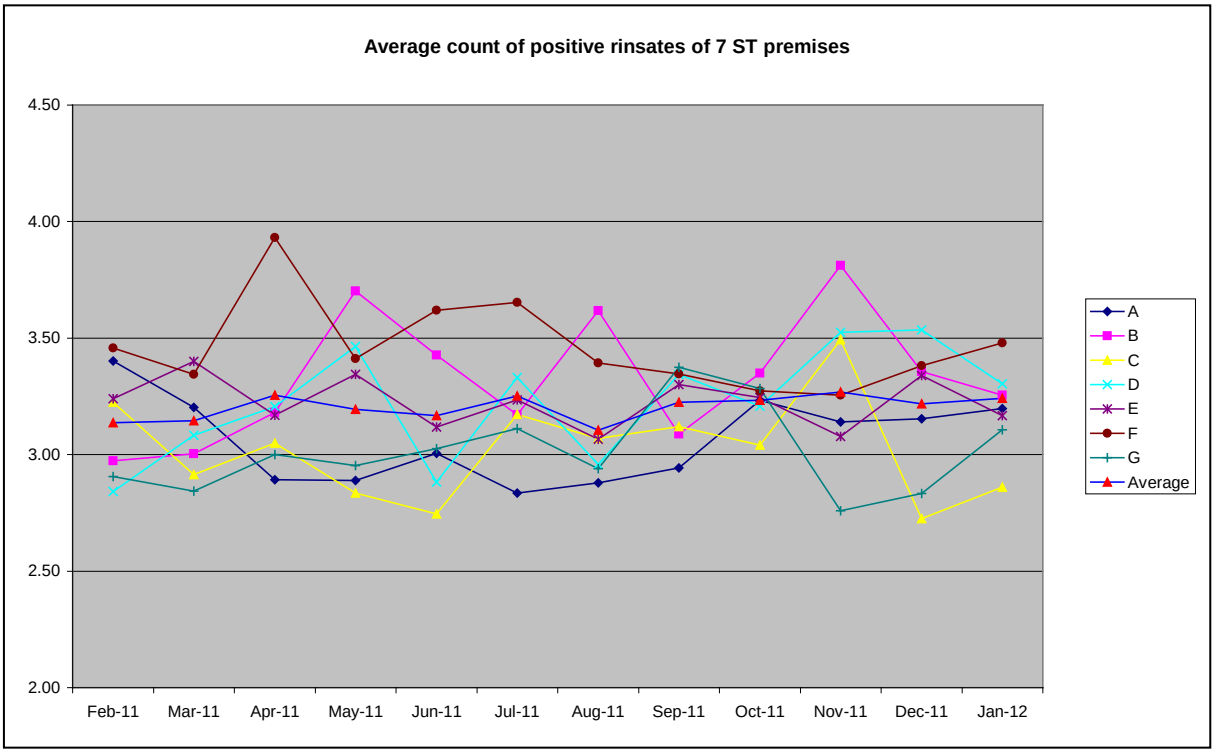


Figure 7: Example of variation in average count of positive *Campylobacter* samples from February 2011 – January 2012 for seven premises



3.5 *CAMPYLOBACTER* PERFORMANCE TARGET

3.5.1 Evaluation of the three targets

The three components of the CPT were all designed to alert the processors and the regulator of an insufficient level of process control at the premises level. Like any sampling plan of this nature, false positive alerts can occur as well as non-detection of inadequate process control. CPT data from 2008 to 2011 was evaluated.

3.5.1.1 High count limit

The high count limit is based on samples exceeding 5.88 $\log_{10}$ CFU / rinsate. Only one premises incurred an alert based on this component of the CPT. Given the total number of CPT alerts over the evaluation period, this limit clearly has no value as a measure of process control.

3.5.1.2 Quarterly median

The quarterly limit is based on the median value of the samples of a given quarter exceeding 4.16 $\log_{10}$ CFU/rinsate. Only one premises incurred an alert based on this component of the CPT. Given the total number of CPT alerts over the evaluation period, this limit clearly has no value as a measure of process control.

3.5.1.3 Moving window

For standard throughput premises, moving window alerts were given when more than six out of 45 samples over a three week processing period exceeded 3.78 $\log_{10}$ CFU/carcass. Alerts often occurred as a series over a short time period in individual premises. It is clear this component of the CPT has value in detecting inadequate process control. This has been corroborated by Industry and *Campylobacter* Review Team findings which showed poor processor Good Operating Practice (GOP) when alerts occurred.

An example of moving window results is shown in Table 2. Where some processors such as at Premises G perform well, other ones such as Processor A performed at a considerably lesser level.

Table 2: Number of weeks with moving window alerts in different premises

Period	Premises						
	A	B	C	D	E	F	G
April 2008 - Sept 2008	5		1			1	2
Oct 2008 - Sept 2009	12	3	3	3	3	7	
Oct 2009 - Sept 2010	14	1	1	1			
Oct 2010 - Sept 2011	6	13	11				2
Oct 2011 - Mid Jan 2012		4	3	5	5		
Total weeks with alerts	37	21	19	9	8	8	4

3.5.2 Using the CPT to monitor an improved level of process control

Data for tables within this section is from standard throughput premises. Very low throughput (VLT) premises data was not able to be used due to sampling changes during the course of the time period under study. However, the principles still apply to VLT premises.

3.5.3 Alerts based on moving windows of samples > 3.78 log10

One option to drive an improvement in the current level of process control would be to tighten the acceptance number of samples in the CPT moving window with campylobacter counts exceeding 3.78 $\log_{10}$. An example of the effect of different acceptance numbers for samples >3.78 $\log_{10}$ on the number of alerts using actual data for an NMD year (1 October 2010 – 30 September 2011) is shown in Table 3 for the seven largest processors. The current acceptance number for samples >3.78 $\log_{10}$ for standard throughput premises is 6/45 samples which resulted in 33 alerts (i.e. non-complying weeks). A tightening of the limit from 6 to 5 would have resulted in 48 alerts (a 45% increase).

Table 3: Number of alerts with different acceptance numbers for samples > 3.78 $\log_{10}$ in the moving window of 45 samples

Acceptance number of samples >3.78 $\log_{10}$	Number of alerts over period 2010Q4 – 2011Q3
5	48
6	33
7	21
8	12

Current situation has 33 alerts in period under review.

3.5.4 Alerts based on moving windows of positive samples

There is currently no target or acceptance number for positive samples. Table 4 shows the number of alerts that would have been generated with various acceptance numbers for positive rinsates. An acceptance number of 25 per 45 samples would have resulted in 35 alerts, a slightly higher number of alerts than that produced by the current system. In contrast, further tightening the acceptance number to 24 would have resulted in a much greater number of alerts than are produced currently.

Table 4: Number of alerts with different acceptance numbers for positive samples

Positive rinsate acceptance number	Number of alerts over period 2010Q4 – 2011Q3
24	48
25	35
26	29
27	23
30	16

3.5.5 Alerts based on moving windows with two acceptance numbers (one for positive samples and one for samples > 3.78 log_{10})

A combination of the approaches used in 3.5.3 and 3.5.4 provides a different pattern of alerts, as shown in Table 5. If the acceptance number for samples >3.78 log_{10} remains constant at the current level of 6, we can then adjust the number of positive samples accepted to fine tune the CPT. This allows a target to be set that would drive an incremental improvement.

Table 5: Number of alerts with combined approach

Ac Samples > 3.78	Ac Positive samples	Number of alerts
6	24	60
6	26	48
6	28	45
6	30	44
6	32	42
6	34	37
6	36	35

Option proposed in section 4.5.2

3.6 *E. coli* enumeration

The NMD system has included the enumeration of *E. coli* since 2005 so as to monitor for GOP. The enumeration of *Campylobacter* was included at a later stage, in 2007, as part of the *Campylobacter* Risk Management Strategy.
Analysis of results showed that there may be some association between the average *Campylobacter* and *E. coli* counts on a premises basis.
E. coli testing has never been used for regulatory purposes and further *E. coli* testing at slaughter is not required for scientific purposes.

3.7 Summary of scientific review

3.7.1 Use of data

This scientific evaluation demonstrates that a strong correlation exists between the level of process control for *Campylobacter* on broiler carcasses and the rate of human cases of campylobacteriosis, notwithstanding the attribution of human cases to other sources.

The CPT is generally indicative of a level of process control that has “plateaued” over the last few years. NMD data also show that different processors have very different levels of performance, both in longitudinal sampling results and in alerts as generated by the CPT.

Risk assessment modelling demonstrates that a further reduction in the level of contamination of broiler carcasses is likely to result in measurable improvements in human cases of campylobacteriosis. Improved GOP can be monitored by compliance with a more stringent CPT.

In considering options for a more stringent CPT, it is clear that current CPT components based on high counts and quarterly median values are of no value and should be discontinued. Further, enumeration of *E. coli* has no benefit in regard to the implementation of the *Campylobacter* Strategy.

The current laboratory system provides a good platform for a more stringent CPT. Industry now has a wealth of experience with this system and reducing the level of the cut-off (3.78 $\log_{10}$) would be problematic for statistical/laboratory reasons (i.e. the accuracy of enumeration).

High variability in performance as shown by alerts to the current CPT illustrates that a higher level of average performance for all processors is a reasonable goal. A CPT that uses a combination of acceptance numbers for positive samples and samples > 3.78 $\log_{10}$ in moving windows provides the greatest opportunity to "fine tune" expectations of improved microbiological process control against practical issues associated with responding to the number of alerts triggered (Section 3.5.5).

4 Option assessment

4.1 *E. COLI* TESTING

4.1.1 Option 1 = Status Quo

4.1.1.1 Description

Standard throughput premises: 2 carcasses must be analysed for *E. coli* per processing day.
Very Low Throughput (VLT) premises: 1 carcass must be analysed for *E. coli* from one processing day per week.[1]

4.1.1.2 Pros

- Gives information on the hygienic dressing of the birds for process control by premises.
- Based on USA requirements, so may be useful for some market access purposes.
- Premises are likely to continue to use this type of data to inform performance of their good hygienic practices

4.1.1.3 Cons

- Costly.
- Information is not used by MPI

4.1.2 Option 2 = Removal of Requirement for *E. coli* testing

4.1.2.1 Description

The requirement for *E. coli* testing will be removed from NMD Notice.
The NMD database will be left as is, so premises can submit data on a voluntary basis if desired.

4.1.2.2 Pros

- Reduces testing costs.
- Could be re-introduced if data seen to be of value to MPI in future

4.1.2.3 Cons

- Information not available to MPI should *E. coli* become more topical in immediate future.

MPI's preferred option is Option 2 = Removal of Requirement for *E. coli* testing, as the cost of collecting the information is not justifiable given that MPI does not routinely use the data.

[1] Under schedule 1 of the Animal Products (National Microbiological Database Specifications) Notice 2011, VLT for poultry processors is defined as those that slaughter product from one million (1,000,000) birds or fewer per annum. 33% of processing premises required to participate in NMD are defined as VLT.

4.2 HIGH COUNT LIMIT

4.2.1 Option 1 = Status Quo

4.2.1.1 Description

A High count failure (HCF) is generated upon detection of a value greater than 5.88 log10CFU/carcass in:

- Standard throughput premises: four (4) or more individual carcass samples in a 15 sample, single processing period.
- VLT premises: two (2) or more individual carcass samples in a 3 sample, single processing period.

4.2.1.2 Pros

- Identifies premises that have too many results at the high end of the distribution curve. It was thought that a reduction in these results would reduce the amount of poultry with an infectious dose of *Campylobacter*.

4.2.1.3 Cons

- Superfluous to requirements as a High Count Limit failure has only occurred when the premises also had a moving window failure.
- Adds complexity to CPT without adding value to the *Campylobacter* testing programme.

4.2.2 Option 2 = Removal of Requirement for High Count Limit

4.2.2.1 Description

The High count failure (HCF) will be removed from the requirements.

4.2.2.2 Pros

- Will simplify the *Campylobacter* testing programme without compromising any other *Camyplobacter* performance target.
- Industry has agreed in principle with removal of this requirement.

4.2.2.3 Cons

- None.

MPI's preferred option is Option 2 = Removal of Requirement for High Count Limit, as this limit is not contributing additional value and is adding complexity to the *Campylobacter* testing programme requirements.

4.3 QUARTERLY LIMIT

4.3.1 Option 1 = Status Quo

4.3.1.1 Description

A Quarterly Failure (QF) is where the median of the premises data for the quarter exceeds 4.16 log10CFU/carcass.

4.3.1.2 Pros

- This limit identifies premises that manage to stay below the other limits but are allowing themselves to get close to the Moving Window limit too often over a quarterly period.
- Discourages premises from staying close to the limit.

4.3.1.3 Cons

- A Quarterly limit failure has only occurred once when the premises has also had a moving window failure.
- Adds complexity to the CPT without adding value

4.3.2 Option 2 = Removal of Requirement for Quarterly Limit

4.3.2.1 Description

The Quarterly failure (QF) will be removed from the requirements.

4.3.2.2 Pros

- This will simplify the *Campylobacter* testing programme without compromising any other *Camyplobacter* performance target.
- Industry has agreed in principle with removal of this requirement.

4.3.2.3 Cons

- None

MPI's preferred option is Option 2 = Removal of Requirement for Quarterly Limit, as this limit is not contributing additional value and is adding complexity to the *Campylobacter* testing programme requirements.

4.4 *CAMPYLOBACTER* MANAGEMENT PLAN FAILURE

4.4.1 Option 1 = Status Quo

4.4.1.1 Description

A *Campylobacter* Management Plan Failure (MPF) is where the operator fails to comply with the requirements of the *Campylobacter* Management Plan, or the *Campylobacter* Management Plan is not yet effective as shown by continuous failures in other categories.

4.4.1.2 Pros

- This allows MPI to apply sanctions where corrective actions are not effective

4.4.1.3 Cons

- This requirement is actually a response and so is in the wrong place.
- Adds complexity to CPT requirements.

4.4.2 Option 2 = Removal of *Campylobacter* Management Plan Failure

4.4.2.1 Description

The *Campylobacter* Management Plan Failure (MPF) will be removed from the requirements. Equivalent oversight requirements will be added into the proposed failure response system.

4.4.2.2 Pros

- This will simplify the responses required without compromising the outcome.
- Industry has agreed in principle with removal of this requirement.

4.4.2.3 Cons

- None.

MPI's preferred option is Option 2 = Removal of the *Campylobacter* Management Plan Failure so long as equivalent responses are included in the proposed failure responses.

4.5 MOVING WINDOW

4.5.1 Option 1 = Status Quo

4.5.1.1 Description

A Moving Window Failure (MWF) is generated upon detection of a value greater than 6000 CFU per carcass (3.78 $\log_{10}$CFU/carcass) in:

- Standard throughput premises: seven (7) or more individual carcass samples in a 45 sample, 3 successive processing periods, moving window; OR
- VLT premises: two (2) or more individual carcass samples in a 9 sample, 3 successive processing periods, moving window.

4.5.1.2 Pros

- This limit has been effective at identifying failures in control measures and contributing to the control of campylobacter levels in premises.

4.5.1.3 Cons

- Despite this limit, results are starting to trend upwards.

4.5.2 Option 2 = Status Quo + Introduction of Detection Limit

4.5.2.1 Description

The Moving Window Failure (MWF) described in Option 1 above is retained but renamed as an **Enumeration failure.**

An **Enumeration failure (EF)** is generated upon detection of a value greater than 6000 CFU per carcass (3.78 $\log_{10}$CFU/carcass) in:

- Standard throughput premises: seven (7) or more individual carcass samples in a 45 sample, 3 successive processing periods, moving window; OR
- VLT premises: two (2) or more individual carcass samples in a 9 sample, 3 successive processing periods, moving window.

AND

A **Detection failure (DF)** will be generated upon a result of 2.30 $\log_{10}$CFU/carcass or greater in:

- Standard throughput premises: thirty (30) or more individual carcass samples in a 45 sample, 3 successive processing periods, moving window; OR
- VLT premises: six (6) or more individual carcass samples in a 9 sample, 3 successive processing periods, moving window.

A non-compliant moving window will be recorded if there is an EF, a DF or both for the moving window.

4.5.2.2 Pros

- Tightens requirements without being unachievable (should result in approximately 25% more alerts nationally).
- Will focus on poorer performers
- Industry has agreed in principle to support the introduction of this measure.

4.5.2.3 Cons

- May have some seasonal issues.
- May have issues for free range flocks.
- Adds some complexity.

MPI's preferred option is Option 2 = Status Quo + Introduction of Detection Limit because it will tighten requirements, still be achievable and will focus on the poorer industry performers.

4.6 RESPONSE TO FAILURES

4.6.1 Option 1 = Status Quo

4.6.1.1 Description

There is an escalating series of responses required for non-compliant premises. Responses 1 to 3 have prescriptive requirements for the Operator to follow. At Response 4 a visit by the Campylobacter Response Team (CRT, made up of 4 specified persons) is required and sanctions are optional. At Response 5 sanctions are mandatory.

Response 4 (CRT visit) currently occurs after 6 consecutive non-compliant moving windows.

Response 6 currently occurs after 8 consecutive non-compliant moving windows.

See detail in Appendix 1.

4.6.1.2 Pros

- This system has generally worked well. All premises that have been required to participate in NMD have reached response 1 at some stage. 5 premises have reached response 4 or 5 since 2008 and have required one or more visits from the Campylobacter Response Team. 3 premises have had sanctions applied. All premises became compliant and/or ceased processing.
- Very clear escalation of responses.
- Certainty for operators.
- Operator is given time to become compliant by themselves if possible before regulatory intervention is required.
- Assistance is provided by appropriate experts to achieve improvements.
- Poor performance has been time limited and managed effectively.
- The Notices of Directions given to freeze product have allowed processors to keep operating whilst solutions are found.

4.6.1.3 Cons

- Inflexible. Prescribed responses not always most appropriate corrective action for the problems found.
- Reporting mechanisms and responsibilities for corrective action and monitoring of its appropriateness are unclear.
- Some operators have not realised that they are non-compliant for a significant period of time. The system relies on the NMD Controller and MPI-assigned premises verifier to check results. An independent check by head office staff is done periodically to ensure the responses are occurring.
- Too many people in response team, and not necessarily the correct mix of skills for the likely issue (e.g. processing, reporting or laboratory). Sometimes more CRT members present than processing staff.
- One bad set of samples can result in 3 moving windows being non-compliant and response escalating despite improvements.
- The time frame before MPI response does not allow the premises sufficient time to make improvements before further escalation.
- There is not enough clarity about how long after the CRT visit the Operator has to make improvements before Notices of Direction are applied and how they come to be removed.

4.6.2 Option 2 = Flexible Responses With More Oversight

4.6.2.1 Description

The Operator will be required to take appropriate corrective action in a timely fashion and report to their MPI-verifier on plans and progress. This continues until they reach their 7th consecutive non-compliant moving window (one week later than in the current system). At this stage the MPI-verifier will provide all information received to date to an MPI-nominated *Campylobacter* expert. This expert will recommend to an MPI Director whether or not a Campylobacter Response Team Visit is necessary, and if so, the experts who should be on the team. The Director will decide on whether or not the visit will proceed. If so, sanctions will still be optional as a result of this visit. Sanctions will remain mandatory at non-compliant moving window 8, however Operators will be asked to propose options for product disposition.

The MPI verifier may also raise concerns about the response prior to the 7th non-compliant window and recommend that the Campylobacter Response Team Visit is brought forward.

See Appendix 1 for proposed wording.

4.6.2.2 Pros

- Much clearer responsibilities for NMD Controller, Operator, MPI verifier and MPI management. Clearly places responsibility on Operator to take corrective action.
- Has checks and balances to ensure that problems cannot continue for too long.
- The Operator is given a chance to put forward a proposal for product disposition if this is necessary. This will help to ensure that sanctions are as practical as possible.
- Corrective action is required as soon as a non-compliance is identified but is the responsibility of the Operator until response 7 (when a CRT visit may be required – this is one week later than the current response 4 to give the Operator more time to find and correct issues).
- The make-up of the CRT is flexible depending on the issue.
- The reporting requirements are clearer.
- The overall timeframe to the application of sanctions has not changed in order to maintain the current level of protection for consumers.
- Costs minimised as Response Team visit not always necessary.
- Industry has supported the proposed changes in principle.

4.6.2.3 Cons

- May be less consistency in responses. MPI needs to manage this so that it can justify action / lack of action especially where sanctions are concerned and taking into account the need to protect the consumer.

MPI's preferred option is Option 2 = Flexible responses with more oversight. This option gives the Operator the responsibility, time and flexibility to deal with the issue themselves, but has sufficient checks and balances by MPI to ensure that the issue is managed effectively.

The overall time to application of sanctions has not changed to maintain the current level of protection for consumers.

5 Summary of Preferred Options

MPI's preferred options are listed below with a summary of the reasons.

Area reviewed	MPI's Preferred Option	Reason
4.1: *E. coli* testing	Option 2 = Removal of Requirement for *E. coli* testing.	Cost of testing outweighs benefit provided by information given amount of information currently available.
4.2: High Count Limit	Option 2 = Removal of Requirement for High Count Limit.	A High Count Limit failure has only occurred when the premises has also had a moving window failure. Tightening the limit was considered but ruled out for statistical reasons.
4.3: Quarterly Limit	Option 2 = Removal of Requirement for Quarterly Limit.	A Quarterly Limit failure has only occurred when the premises has also had a moving window failure. The lack of timeliness for making corrective action was also a concern.
4.4: Moving Window	Option 2 = Status Quo + Introduction of Detection Limit.	The moving window limit has been the most effective target in the current programme. Tightening the acceptance number was considered but ruled out as it would have resulted in too many failures. Introduction of a Detection Limit over the same moving window resulted in a tightening of the requirement that MPI feels should be achievable by industry.
4.5: *Campylobacter* Management Plan Failure	Option 2 = Removal of Campylobacter Management Plan Failure.	This is better placed in failure response system.
4.6: Responses to failures	Option 2 = Flexible responses with more oversight.	Both the industry and MPI found the existing responses to failures to be generally effective, but too complicated, too onerous for first failures and too prescriptive. Option 2 provides for more flexibility but tightens the oversight by MPI to ensure that the corrective action that is taken is effective. The overall timeframe to the application of sanctions has not changed in order to maintain the current level of protection for consumers.

6 Proposed Implementation

It is intended that a joint MPI/ PIANZ/poultry industry workshop will be held late November 2012 to discuss the results of the consultation and the analysis of submissions,

It is intended that proposed changes will come into force through the Animal Products (National Microbiological Database Specifications) Notice 2012 on 7 January 2013.

7 Future Direction

MPI may revise its position on the CPT given further scientific knowledge of the effect of these proposed changes. MPI intends to review the data after a 15 month implementation period to evaluate any effect on *Campylobacter* reduction and also on human foodborne campylobacteriosis levels. The poultry industry will be fully consulted in the normal manner when this occurs.

Industry may wish to use the *E.coli* part of the NMD database on a voluntary basis.

Appendix 1: Comparison between current and proposed section 6.8 of Schedule 1

Current ***Campylobacter* Performance Target** and Responses (excerpt from Schedule to NMD Notice 2011).	Proposed ***Campylobacter* Performance Target** and Responses
6.8 Poultry *Campylobacter* Performance Target (CPT) The CPT regulatory limit used to determine compliance is 6000 CFU/carcass, 3.78 $\log_{10}$CFU/carcass. The poultry *Campylobacter* performance target (CPT) is a regulatory limit which requires *Campylobacter* analysis of poultry broiler carcass rinse samples over set processing periods as follows: • Standard processing premises, a total of three samples must be taken per processing day. Each of the three samples must be collected at a separate randomly selected sampling time per processing day. A processing period is five days processing equalling a total of 15 samples. • Very low throughput (VLT) premises, a total of three samples on a single randomly selected day of one processing week must be randomly selected over available processing times. A processing period is one processing week equalling a total of three samples.	**6.8 Poultry *Campylobacter* Performance Target (CPT)** The poultry *Campylobacter* Performance Target (CPT) consists of two regulatory limits requiring Campylobacter analysis of poultry broiler carcass rinse samples over set processing periods as follows: • Standard processing premises, a total of three samples must be taken per processing day. Each of the three samples must be collected at a separate randomly selected sampling time per processing day. A processing period is five days processing equalling a total of 15 samples. • Very low throughput (VLT) premises, a total of three samples on a single randomly selected day of one processing week must be randomly selected over available processing times. A processing period is one processing week equalling a total of three samples.

Current ***Campylobacter*** **Performance Target** and Responses (excerpt from Schedule to NMD Notice 2011).

Table 34: Table of CPT sampling requirements

CPT regulatory limit type	**Standard throughput**	**Very low throughput (VLT)**
High count	***One processing period***	
	15 samples over 5 processing days.	3 samples from 1 processing day per week.
Moving window	***Three processing periods***	
	45 samples over 15 processing days.	9 samples over 3 weeks.
Quarterly	All samples over 13 weeks of the NMD quarterly periods; January – March, April – June, July – September, and October – December.	

The **high count** limit of 5.88 $\log_{10}$CFU/carcass, derived from the 98th percentile of all data to the end of October 2007, applies to each separate processing period.

The **moving window** limit of 3.78 $\log_{10}$CFU/carcass applies to three processing periods. The addition of the samples of the latest processing period displaces the samples of the oldest processing period.

The **quarterly limit** is a median value of 4.16 $\log_{10}$CFU/carcass, derived from the 80th percentile of all data to the end of October 2007.

Proposed ***Campylobacter*** **Performance Target** and Responses

Table 34: Table of CPT sampling requirements

Sampling Period	**Standard throughput**	**Very low throughput (VLT)**
A moving window of three processing periods	45 samples over 15 processing days.	9 samples over 3 weeks.

The **moving window** is defined as three processing periods. The addition of the samples of the latest processing period displaces the samples of the oldest processing period.

Two CPT regulatory limits are used to determine compliance over each moving window:

- Number of samples with a result of greater than 6000 CFU/carcass, 3.78 $\log_{10}$CFU/carcass and
- Number of positive samples; those samples with a result of 2.30 $\log_{10}$CFU/carcass or higher representing *Campylobacter* detection. [2]

[2] A 'not detected' *Campylobacter* result will be recorded as 2.00 $\log_{10}$CFU/carcass on the NMD database.

Current ***Campylobacter*** **Performance Target** and Responses (excerpt from Schedule to NMD Notice 2011).	Proposed ***Campylobacter*** **Performance Target** and Responses
The first processing period commences from the sampling week beginning 7 January 2008 with regulatory response to CPT non-compliances commencing from the processing period beginning Monday 7 April 2008. Thus during the first quarter 2008 the statistics function will be applied to poultry NMD *Campylobacter* data, but regulatory responses to CPT non-compliances will not be applied until the processing period commencing on 7 April 2008.	**Transitional Arrangements:** The new requirements in this Schedule will be implemented from Monday 7 January 2012. The first processing period under the new system will start on the first day of processing on or after that date. All premises will be reset to "compliant" on that date.
6.8.1 CPT non-compliance If less than the required number of samples have been collected during a processing period the NMD website will automatically calculate the missed samples as greater than 3.78 $\log_{10}$ CFU/carcass. If samples have been taken and entered on the NMD website but there has been a technical failure not permitting a result this will not generate an automatic above 3.78 $\log_{10}$ CFU/carcass result. With the exception of too numerous to count (TNTC) results, which must be reported, and will default to greater than the 3.78 $\log_{10}$ CFU/carcass result recorded as 3.79 Log_{10} CFU/carcass on the database.	**6.8.1 Recording of sample descriptors and default results** Each sample must have its sample descriptors recorded on the NMD database; sample time, farm reference number, shed number, cut number and average age of birds in that cut. **Failure to sample** If less than the required number of samples have been collected during a processing period the missed samples will each default to a greater than 3.78 $\log_{10}$ CFU/carcass result recorded as 3.79 Log_{10} CFU/carcass on the database. **Technical Failures** Samples which have been collected, but where a technical failure (TF) has not permitted a result the sample descriptors must be entered as proof of sampling with TF recorded in the result field. Entering the sampling descriptors of samples taken ensures that a 3.79 default result is not generated. **Too numerous to count results** Too numerous to count (TNTC) results must be reported. Each TNTC result will default to a greater than the 3.78 $\log_{10}$

Current ***Campylobacter* Performance Target** and Responses (excerpt from Schedule to NMD Notice 2011).	Proposed ***Campylobacter* Performance Target** and Responses
There are four classes of CPT failure; **(1) High count failure (HCF)** HCF will be generated upon detection of a value greater than 5.88 log_{10}CFU/carcass in • Standard: four (4) or more individual carcass samples in a 15 sample, single processing period. • VLT: two (2) or more individual carcass samples in a 3 sample, single processing period. **(2) Moving window failure (MWF)** MWF CPT non-compliance will be generated upon detection of a value greater than 6000 CFU per carcass (3.78 log10CFU/carcass) in: • Standard: seven (7) or more individual carcass samples in a 45 sample, 3 successive processing periods, moving window; OR • VLT: two (2) or more individual carcass samples in a 9 sample, 3 successive processing periods, moving window. **(3) Quarterly Failure (QF)** Where the median of the premises data for the quarter exceeds 4.16 log10CFU/carcass. **(4) *Campylobacter* Management Plan Failure (*Campylobacter* MPF)** Where the operator fails to comply with the requirements of the *Campylobacter* Management Plan, or the *Campylobacter* Management Plan is not yet effective as shown by continuous failures in other	CFU/carcass result; recorded as 3.79 Log_{10} CFU/carcass on the database. **6.8.2 CPT non-compliance** There are two classes of CPT non-compliance; **(1) Enumeration Failure (EF)** An EF will be generated upon detection of a value greater than 6000 CFU per carcass (3.78 log_{10}CFU/carcass) in: • Standard Throughput premises: seven (7) or more out of 45 individual carcass samples taken from a 3 successive processing period moving window; OR • VLT premises: two (2) or more out of 9 individual carcass samples taken from a 3 successive processing period moving window. **(2) Detection Failure (DF)** A DF will be generated upon a result of 2.30 log_{10}CFU/carcass or greater) in: • Standard throughput premises: thirty (30) or more out of 45 individual carcass samples taken from a 3 successive processing period moving window; OR • VLT premises: six (6) or more out of 9 individual carcass samples taken from a 3 successive processing period moving window. If the premises has an EF, a DF or both for a moving window it is counted as one non-compliant window. Responses to

<table>
<tr>
<td>Current Campylobacter Performance Target and Responses (excerpt from Schedule to NMD Notice 2011).</td>
<td>Proposed Campylobacter Performance Target and Responses</td>
</tr>
<tr>
<td>categories.

CPT non- compliances are rated as follows:

Table 35: CPT ratings
<table>
<tr><th>Failure type</th><th>Non-compliance response number</th><th>Clearance</th></tr>
<tr><td>HCF
Each HCF non-compliance scores 1 and these are cumulative.</td><td rowspan="2">Select the higher value of the HCF or MWF cumulative totals to determine the rating.</td><td>Reset to zero after 3 successive processing periods with no further HCF non-compliances.</td></tr>
<tr><td>MWF
Each MWF non-compliance scores 1 and these are cumulative.</td><td>Reset to zero at the next compliant moving window.</td></tr>
<tr><td>QF</td><td>Assigned as response four if identified as such by the statistical review of the quarter.</td><td>Each quarter is dependant on the application of suitable responses.</td></tr>
<tr><td>Campylobacter MPF</td><td>Assigned as response five by Campylobacter Response Team (CRT).</td><td>Upon application to MAF (NZFSA).</td></tr>
</table>
The response numbers generated from cumulative HCF and MWF</td>
<td>CPT escalate according to the number of consecutive non-compliant moving windows. To clear the non-compliance, a moving window without an EF and without a DF is required. The database then resets to zero to show that the premises is compliant.
Note that a noncompliance will be recorded in the database as soon as the EF or DF becomes evident (which may be before the results from all samples for that moving window have been entered). This enables corrective actions to be initiated at the earliest opportunity.

6.8.3 Required responses to CPT non-compliance

The premises NMD controller must check the NMD results at least once every processing period to determine whether or not the premises is CPT compliant.
The NMD Controller must notify the operator and the MPI-assigned verifier within 24 hours of determining each non-compliant moving window.
Responses escalate with each consecutive non-compliant moving window. With each non-compliant moving window the investigations, corrective actions undertaken and further actions planned to restore control must be recorded by the NMD Controller in the NMD ledger.
The following responses must be undertaken.</td>
</tr>
</table>

Current ***Campylobacter*** **Performance Target** and Responses (excerpt from Schedule to NMD Notice 2011).

failures will be assigned as follows:

Response one: a rating of 1.
Response two: a rating of 2.
Response three: a rating of 4.
Response four: a rating of 6.
Response five: a rating of 8.

Table 36: Examples of CPT ratings

(1) A premises performing within the required target but having one processing period with a few high counts.

Process-ing Period	**HCF**	**HC Rating**	**Moving window**	**MWF**	**MWF Rating**	**Response Number (based on greater of HCF or MWF rating)**
1	1	1		n/a	n/a	Response one
2	0	1		n/a	n/a	Response one
3	0	1	1 – 3	1	1	Response one
4	0	0	2 – 4	0	0	Nil
5	0	0	3 – 5	0	0	Nil
6	0	0	4 – 6	0	0	Nil

NB – Where boxes are grey it denotes a resetting to zero response required.

Proposed ***Campylobacter*** **Performance Target** and Responses

Consecutive non-compliant moving windows	**Response Required**
1	Within 1 week of a noncompliant window being reported in NMD: • the NMD Controller must: o notify the Operator and the , MPI-assigned premises verifier, and o indicate that this has been done in the NMD ledger, and • the Operator must initiate corrective actions to restore control.
2	As soon as a 2nd consecutive noncompliant window is reported in NMD: • the NMD Controller must notify the Operator, and • the Operator must document the investigations done, corrective actions taken to date and further actions planned to restore control, and • the Operator must copy this information to the MPI-assigned premises verifier, and • the NMD Controller must indicate that this has been done in the NMD ledger. As soon as possible the MPI-assigned premises

Current ***Campylobacter*** **Performance Target** and Responses (excerpt from Schedule to NMD Notice 2011).

(2) A premises consistently performing outside of the CPT.

Processing Period	**HCF**	**HC Rating**	**Moving window**	**MWF**	**MWF Rating**	**Response Number (based on greater of HCF or MWF rating)**
1	1	1		n/a	n/a	Response one
2	0	1		n/a	n/a	Response one
3	0	1	1 – 3	1	1	Response one
4	1	2	2 – 4	1	2	Response two
5	0	2	3 – 5	1	3	Response two
6	0	2	4 – 6	1	4	Response three
7	0	0	5 – 7	1	5	Response three
8	0	0	6 – 8	1	6	Response four
9	0	0	7 – 9	1	7	Response four
10	1	1	8 – 9	1	8	Response five

NB – Maximum rating is 8 and maximum response number is 5.

6.8.2 Expected operator response to CPT non-compliance
Responses to CPT non-compliance are according to non-compliance response number:

1. **Response one:** The operator will immediately notify MAF (NZFSA)

Proposed ***Campylobacter*** **Performance Target** and Responses

	verifier must: • review the actions and if necessary visit the premises or ask for additional information to ensure that the actions are appropriate, and • indicate that this has been done in the NMD alert screen, and • report any concerns to nominated MPI managers/technical people. If the MPI-assigned premises verifier or an MPI manager/technical person is not satisfied that the actions are appropriate they may notify this to an appropriate MPI Director who may require an immediate response as per 7 consecutive non-compliant windows.
3	As for non-compliance 2 with information updated on the NMD ledger by both the NMD controller and the MPI-assigned premises verifier.
4	As for non-compliance 3 with information updated on the NMD ledger by both the NMD controller and the MPI-assigned premises verifier.
5	As for non-compliance 4 with information updated on the NMD ledger by both the NMD controller and the MPI-assigned premises verifier.

Current ***Campylobacter* Performance Target** and Responses (excerpt from Schedule to NMD Notice 2011).	Proposed ***Campylobacter* Performance Target** and Responses	
VA of the non-compliance; a HCF or MWF. The operator is required to commence corrective action as documented in their RMP including, but not limited to review of: • sanitation procedures. • GOP against Poultry Processing COP. • HACCP; with focus on *Campylobacter* control measures/interventions. 2. **Response two:** The operator will immediately notify MAF (NZFSA) VA of the non-compliance and continue corrective action as documented in RMP including, but not limited to: • Actions as per response (1). • Internal review of compliance with Broiler Growing Biosecurity Manual. • Equipment warrant of fitness checks by an independent expert. 3. **Response three:** The operator will immediately notify MAF (NZFSA) VA of the non-compliance. As provided for in the Risk Management Programme, the operator shall submit their current *Campylobacter* Management Plan to MAF (NZFSA) within two working days of detecting this non-compliance. The *Campylobacter* Management Plan must specify all measures that will be implemented to manage the risk from *Campylobacter* and target dates for implementation. The *Campylobacter* Management Plan is to include, but is not limited to: • Actions as per responses (1) and (2). • Any further sampling and research initiatives. • Introduction of a further intervention which must be capable of implementation without delay. • Some form of product disposition, considering internal and external capacity constraints; unless the operator can show that a	6	As for non-compliance 5 with information updated on the NMD ledger by both the NMD controller and the MPI-assigned premises verifier. The Operator must document any product disposition options they could implement in order to minimise the amount of contaminated product reaching the consumer. The product disposition options must be provided to the MPI-assigned premises verifier.
	7	As for non-compliance 6 with information updated on the NMD ledger by both the NMD controller and the MPI-assigned premises verifier. The MPI-assigned premises verifier must provide all information received to date to a nominated MPI *Campylobacter* expert. The MPI *Campylobacter* expert must: • review the actions taken and the results to date then recommend to an MPI Director whether or not to initiate a *Campylobacter* Response Team (CRT) visit to the non-compliant premises and which experts should be in the team. The MPI Director must: • sign-off the decision to initiate the CRT visit, and nominate a CRT Leader and any other relevant experts to form the team, or

Current ***Campylobacter* Performance Target** and Responses (excerpt from Schedule to NMD Notice 2011).	Proposed ***Campylobacter* Performance Target** and Responses
particular flock is free of *Campylobacter* in advance of processing. 4. **Response four:** The *Campylobacter* Response Team (CRT) will visit the premises. The CRT includes the following representatives: VA poultry expert, a CIG representative, a MAF (NZFSA) specialist with particular expertise in *Campylobacter* management and an industry nominated Technical expert/advisor. The CRT will consult/liaise with the following persons; an operator's representative(s) with expertise in *Campylobacter* management, the NMD controller and the primary verifier at the premises. The scope of the CRT review will include, but is not limited to: • *Campylobacter* and other microbiological sampling results required by NMD and the corrective actions taken to date by the operator. • Implementation of GOP requirements, including those specified in COP-Processing of Poultry. • Operator systems for ensuring control of on farm management practices, including the implementation of the requirements specified in the Broiler Growing Biosecurity Manual. • Robustness of the controls specified in the RMP, including any interventions, designed to minimise *Campylobacter* contamination of poultry. • Effectiveness of verification activities. • The CRT may recommend the application of sanctions as listed in response five immediately as an outcome of the visit. Compliance with the agreed Management Plan will be monitored by the VA verifier. 5. **Response five:** The CRT will review and where necessary revise the	• sign a statement declining the recommendation with associated justification. If authorised by the MPI Director, the CRT must visit the premises at the first available opportunity to: • review all actions to date and recommend to the Operator other corrective actions likely to bring the premises into compliance, and • where necessary, require corrective actions; • where necessary, recommend the application of sanctions as per non-compliance level 8 under Section 89 of the Animal Products Act 1999 to protect the consumer. The Response Team Leader must: • provide a report to the Operator summarising the visit findings, a required action plan and recommendations. • copy the report to the MPI-assigned premises verifier, and the MPI Director who approved the visit. The Operator must: • comply with the required action plan unless an alternative is agreed and signed off by the Response Team Leader and copied to the premises

<table>
<tr><th>Current Campylobacter Performance Target and Responses (excerpt from Schedule to NMD Notice 2011).</th><th colspan="2">Proposed Campylobacter Performance Target and Responses</th></tr>
<tr><td>agreed Management Plan from response four. MAF (NZFSA) expects the revision will require an escalation of response which may include, but is not limited to:
• Revisit(s) by CRT and further recommendations by CRT.
• Increased verification frequency by the VA.
• Full-time supervision of processing by the VA.
• Introduction of further interventions or some form of product disposition.
• Further sampling and research initiatives.
• Premises closure.</td><td></td><td>verifier and
• consider the recommendations.
The MPI-assigned premises verifier must:
• monitor the actions taken and
• report any concerns to the CRT Leader.
If actions are not taken as agreed then non-compliance 8 response is required.</td></tr>
<tr><td></td><td>8</td><td>MPI must apply sanctions under Section 89 of the Animal Products Act to protect the consumer. The sanctions may include, but are not limited to, one or more of the following:
• Revisit(s) by CRT and further required actions / recommendations by CRT.
• Increased verification.
• Full-time supervision of processing.
• Introduction of further interventions
• Product disposition.
• Further sampling and research initiatives.
• Premises closure.
When any of the above sanctions are applied, they must remain in place until revoked by an Animal Products Officer:
• after the premises has a compliant moving window, or
• at the direction of an MPI Director.</td></tr>
</table>