

Monthly Report: Surveillance Project SB4008 IFNg tests for bovine tuberculosis

(TC0651 and TC0751)

Number 79

Report Period 1st - 31st March 2013



AFVLA Weybridge

Issued 10 April 2013

Operational notes on terminology, definitions, re-test and re-samples test outcomes:

- “Samples” refers to an individual tube of blood taken from an individual animal which is subsequently submitted for testing. It is generally assumed that the number of samples and the number of animals are analogous as any duplicate sample blood tube from the same animal will not be tested. However, minor discrepancies may occur where the same animal is tested more than once due to a request for a resample or the animal is tested twice under different categories (for example, as a PAR-RAPID and then as part of a PAR-HERD-S).
- “Submissions” refers to an individual batch or set of samples received for testing. Submissions may comprise 1 or more samples (for example, if an entire herd is being tested it is usually sent as 1 submission). It is generally assumed that the number of submissions and the number of herds are analogous.
- Retests are samples where the first ELISA assay fails and the same sample is retested on a new ELISA plate. Each sample can be retested only once. A retest is not a reportable test outcome.
- Resamples are where a sample has been retested and failed a second time, so that the lab requests a new sample. This is a reportable test outcome.
- Rejects are samples that are not tested by the lab for one of the following reasons: blood collected into wrong type of vacutainer, samples that have not been maintained at the appropriate temperature range ($22\pm5^{\circ}\text{C}$), unlabelled samples, broken or cracked tubes, blood that is extensively clotted (small clots are OK), samples received after 4pm on the day after sample collection. Such samples are reported separately in the tables and in figure 5.
- POS (pokeweed mitogen) is a sample positive control reagent which provides a measure of the quality/viability of the blood sample. A POS fail (< 0.45 optical density reading) may indicate compromised blood quality as a result of collection/transportation conditions or due to the animal having an unusually low/suppressed cellular immune response.
- NEG (no-antigen control) is a sample negative control which provides a measure of the background antigen-independent IFN- responses. A NEG fail (> 0.3 optical density reading) may indicate a laboratory procedures problem (normally resolved during re-test) or that an animal has unusually high background levels of IFN-g.

Test Criteria

Submission Reason	Explanation	Mandatory?
Possible Herd Slaughter	Parallel interferon-gamma blood testing of skin test negative cattle to inform whole or partial herd slaughters decisions	YES, if Animal Health are contemplating a herd slaughter
Persistent Confirmed Incidents 1-2yr	Parallel blood testing of skin test negative cattle in chronically infected herds that have failed to resolve by repeated short-interval skin testing and fulfil a minimum of biosecurity standards	NO (AH's discretion)
Parallel - Low Incidence	Parallel blood testing to maximise the probability of removing all infected cattle in a new herd breakdown in an area of low TB incidence, as soon as possible after confirmation of TB.	YES
Rapid Testing of twice IR's	Parallel blood testing of two-times IRs identified under the severe interpretation of the skin test used in Wales.	YES (Wales only)
Parallel Other	Other parallel blood testing not covered in any of the other scenarios	NO (Animal Health discretion)
'NSR' Herds	Modified serial blood testing of individual skin test reactors and/or IRs in unconfirmed TB breakdown herds in 2-, 3- or 4-yearly areas, to clarify their infection status where there is evidence of non-specific sensitisation to bovine tuberculin (the "non-specific reactor" procedure)	NO (AH's discretion)
Suspected Fraud	Modified serial blood test of suspected fraudulent reactors to the skin test (animals with abnormal skin swellings), in confirmed or unconfirmed TB incidents.	NO (AH's discretion to firm up or rule out any suspicion of fraud and support any investigations)
Serial Other	Other modified serial blood testing	NO (AH's discretion)

Table 1. Monthly Totals for March 2013

		Num samples March 2013	%	Total 2013	%	Total since 23/10/06	%
Submissions		65		274		7723	
Samples	Total (%)	3416	100.00 %	12974	100.00 %	198562	100.00 %
	England	1818	53.22 %	9562	73.70 %	129965	65.15 %
	Scotland					19454	9.80 %
	Wales	1598	46.78 %	3412	26.30 %	49843	25.06 %
Parallel Tests	PAR-HERD-S	59	1.73 %	186	1.43 %	6570	3.31 %
	PAR-LOW-IN	3103	90.84 %	10711	82.56 %	156385	78.76 %
	PAR-OTHER	0	0.00 %			2385	1.20 %
	PAR-P-CONF	157	4.60 %	1616	12.46 %	21294	10.72 %
	PAR-RAPID	97	2.84 %	429	3.31 %	10611	5.34 %
	Total(% of all samples)	3416	100.00 %	12942	99.75 %	197245	99.34 %
Serial Tests	SER-FRAUD	0	0.00 %	32	0.25 %	1027	0.52 %
	SER-NSR	0	0.00 %			213	0.11 %
	SER-OTHER	0	0.00 %			77	0.04 %
	Total(% of all samples)	0	0.00 %	32	0.25 %	1317	0.66 %
	Total	3416	100.00 %	12974	100.00 %	198562	100.00 %
Retests	Total (% of all samples)	214	6.26 %	579	4.46 %	16550	8.33 %
	England	111	3.25 %	426	3.28 %	10288	5.18 %
	Scotland					1949	0.98 %
	Wales	103	3.02 %	153	1.18 %	4313	2.17 %
Resamples	Total (% of all samples)	144	4.22 %	406	3.13 %	11165	5.62 %
	England	77	2.25 %	305	2.35 %	6858	3.45 %
	Scotland					1246	0.63 %
	Wales	67	1.96 %	101	0.78 %	3061	1.54 %
Rejects	Total (% of all samples)	17	0.50 %	144	1.11 %	3567	1.80 %
	England	16	0.47 %	59	0.45 %	1956	0.99 %
	Scotland	0	0.00 %			417	0.21 %
	Wales	1	0.03 %	85	0.66 %	1194	0.60 %

Figure 1. Number of samples submitted in each category during March 2013

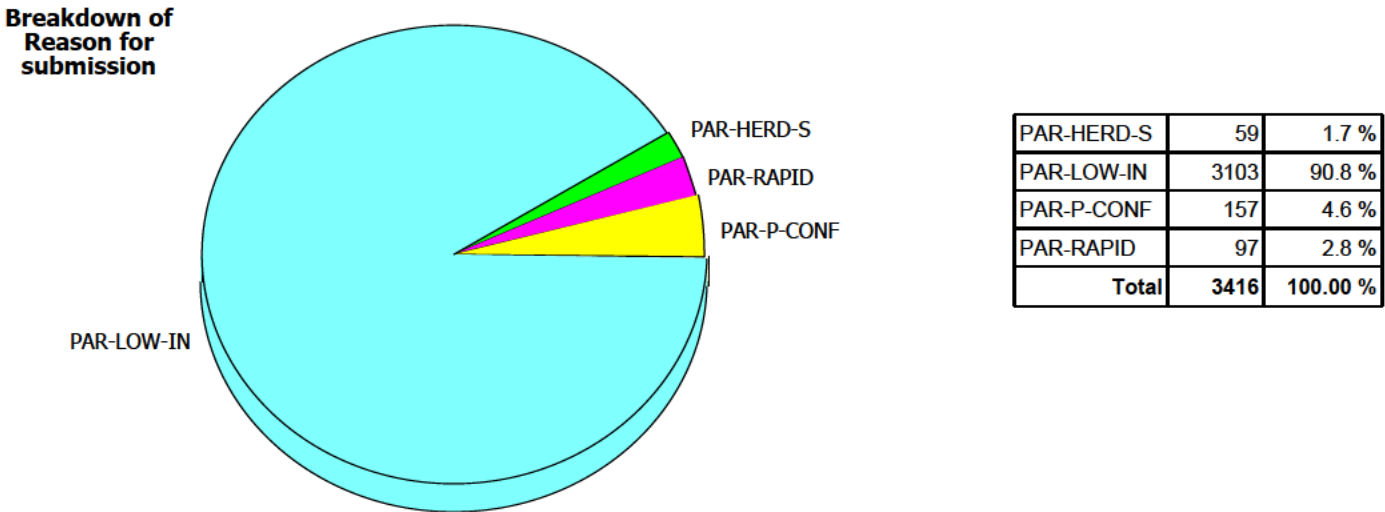


Figure 2. Number of samples submitted in each category by AHDO during March 2013

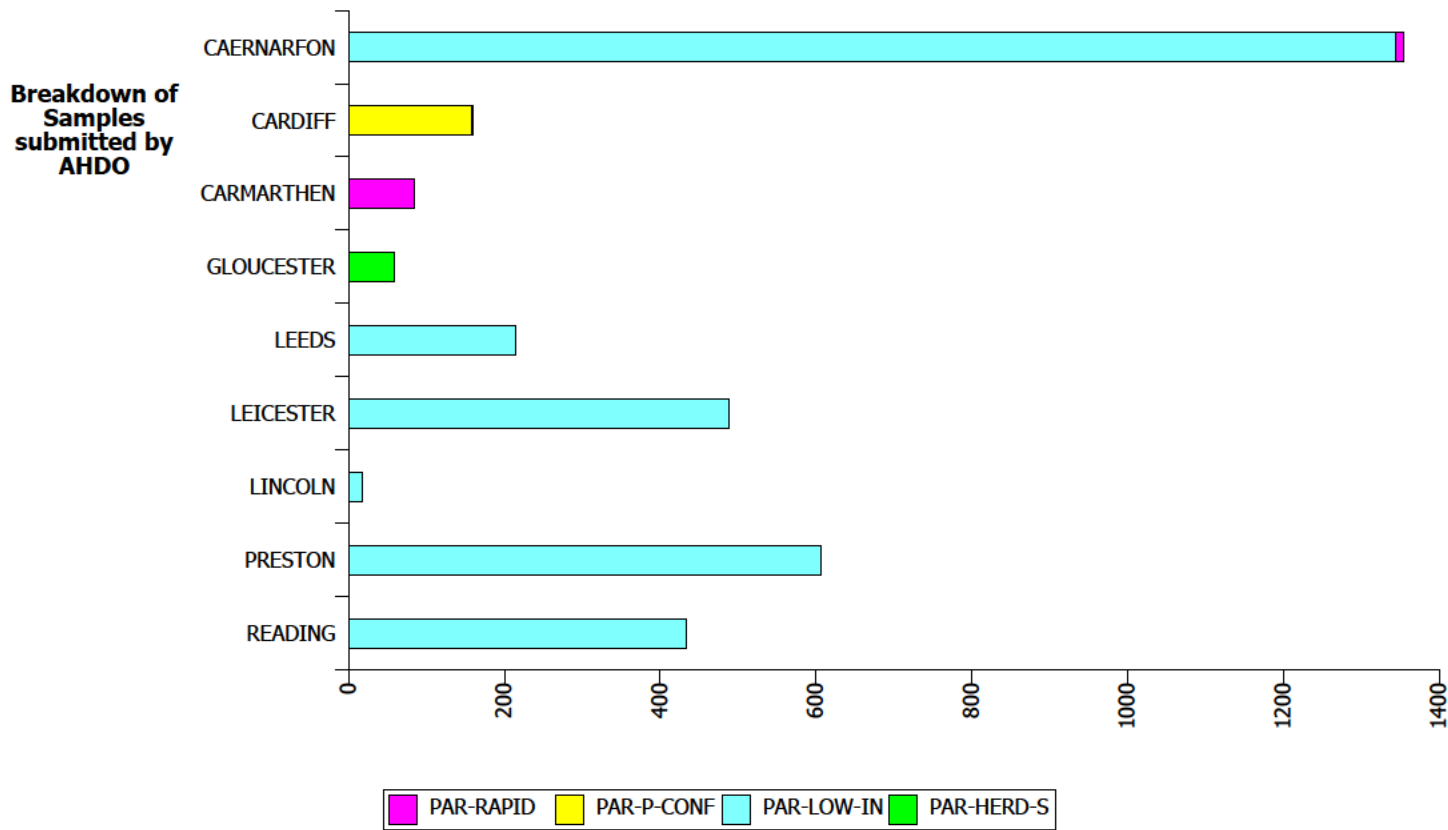


Figure 3. Number of samples submitted in each category by AHDO during 2013

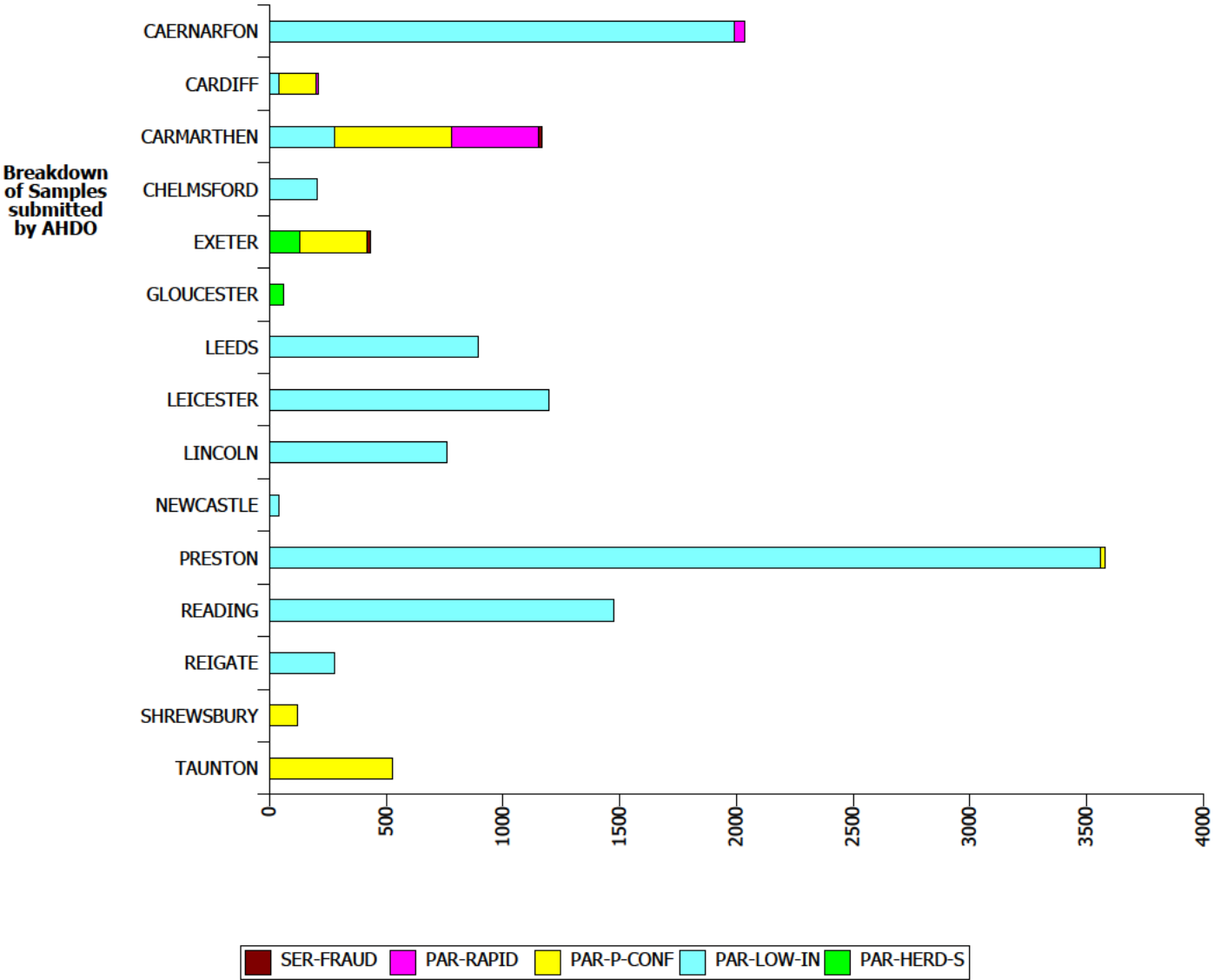


Table 2. Summary by AHDO for March 2013

Country	AHDO	Submission Reasons*	No submissions	Samples		Gamma Positive		Gamma Negatives		Retest*		Resample		Reject	
				n	% of total	n	%	n	%	n	%				
England	GLOUCESTER	PAR-HERD-S	1	59	1.73 %	2	3.39 %	39	66.10 %	5	8.47 %	5	8.47 %	13	22.03 %
	LEEDS	PAR-LOW-IN	4	214	6.26 %	4	1.87 %	205	95.79 %	5	2.34 %	5	2.34 %	0	0.00 %
	LEICESTER	PAR-LOW-IN	3	488	14.29 %	14	2.87 %	462	94.67 %	34	6.97 %	11	2.25 %	1	0.20 %
	LINCOLN	PAR-LOW-IN	1	18	0.53 %	0	0.00 %	17	94.44 %	1	5.56 %	1	5.56 %	0	0.00 %
	PRESTON	PAR-LOW-IN	10	606	17.74 %	22	3.63 %	548	90.43 %	43	7.10 %	35	5.78 %	1	0.17 %
	READING	PAR-LOW-IN	6	433	12.68 %	25	5.77 %	387	89.38 %	23	5.31 %	20	4.62 %	1	0.23 %
Wales	CAERNARFON	PAR-LOW-IN	12	1344	39.34 %	35	2.60 %	1245	92.63 %	95	7.07 %	63	4.69 %	1	0.07 %
		PAR-RAPID	2	10	0.29 %	4	40.00 %	6	60.00 %	1	10.00 %	0	0.00 %	0	0.00 %
	CARDIFF	PAR-P-CONF	1	157	4.60 %	7	4.46 %	146	92.99 %	6	3.82 %	4	2.55 %	0	0.00 %
		PAR-RAPID	3	3	0.09 %	2	66.67 %	1	33.33 %	0	0.00 %	0	0.00 %	0	0.00 %
	CARMARTHEN	PAR-RAPID	22	84	2.46 %	31	36.90 %	53	63.10 %	1	1.19 %	0	0.00 %	0	0.00 %
		Sum:	65	3416		146		3109		214		144		17	

*For test criteria please refer to Operational notes.

* Sufficient plasma supernatant is collected and stored following the overnight culture stage of the assay such that if the sample fails any of the QC criteria, it is possible for the laboratory to 're-test' the original sample. Depending on the outcome of a retest, a resample (if QC criteria fail to be met), a positive or a negative result will be reported. Therefore, the total number of samples = the sum of positive, negative, resample and reject samples only.

Table 3a. Summary of IFN Gamma results by country and protocol March 2013

Country	Protocol	No submissions	Samples		Positive		Negatives		Retest*		Resample		Reject	
			n	% of total	n	%	n	%	n	%	n	%	n	%
England	Parallel	25	1818	100.0%	67	3.7%	1658	91.2%	111	6.1%	77	4.2%	16	0.9%
	Serial	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
	Total	25	1818	100.0%	67	3.7%	1658	91.2%	111	6.1%	77	4.2%	16	0.9%
Scotland	Parallel	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
	Serial	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
	Total	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
Wales	Parallel	40	1598	100.0%	79	4.9%	1451	90.8%	103	6.4%	67	4.2%	1	0.1%
	Serial	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
	Total	40	1598	100.0%	79	4.9%	1451	90.8%	103	6.4%	67	4.2%	1	0.1%
GB	Parallel	65	3416	100.0%	146	4.3%	3109	91.0%	214	6.3%	144	4.2%	17	0.5%
	Serial	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
	Total	65	3416	100.0%	146	4.3%	3109	91.0%	214	6.3%	144	4.2%	17	0.5%

* Sufficient plasma supernatant is collected and stored following the overnight culture stage of the assay such that if the sample fails any of the QC criteria, it is possible for the laboratory to 're-test' the original sample. Depending on the outcome of a retest, a resample (if QC criteria fail to be met), a positive or a negative result will be reported. Therefore, the total number of samples = the sum of positive, negative, resample and reject samples only.

Table 3b. Summary of IFN Gamma results by country and protocol (Total 2013)

Country	Protocol	No submissions	Samples		Positive		Negatives		Retest*		Resample		Reject	
			n	% of total	n	%	n	%	n	%	n	%	n	%
England	Parallel	92	9545	99.8%	583	6.1%	8598	90.1%	426	4.5%	305	3.2%	59	0.6%
	Serial	3	17	0.2%	3	17.6%	14	82.4%	0	0.0 %	0	0.0 %	0	0.0 %
	Total	95	9562	100.0%	586	6.1%	8612	90.1%	426	4.5%	305	3.2%	59	0.6%
Scotland	Parallel	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
	Serial	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
	Total	0	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
Wales	Parallel	175	3397	99.6%	281	8.3%	2931	86.3%	151	4.4%	100	2.9%	85	2.5%
	Serial	4	15	0.4%	0	0.0 %	14	93.3%	2	13.3%	1	6.7%	0	0.0 %
	Total	179	3412	100.0%	281	8.2%	2945	86.3%	153	4.5%	101	3.0%	85	2.5%
GB	Parallel	267	12942	99.8%	864	6.7%	11529	89.1%	577	4.5%	405	3.1%	144	1.1%
	Serial	7	32	0.2%	3	9.4%	28	87.5%	2	6.3%	1	3.1%	0	0.0 %
	Total	274	12974	100.0%	867	6.7%	11557	89.1%	579	4.5%	406	3.1%	144	1.1%

* Sufficient plasma supernatant is collected and stored following the overnight culture stage of the assay such that if the sample fails any of the QC criteria, it is possible for the laboratory to 're-test' the original sample. Depending on the outcome of a retest, a resample (if QC criteria fail to be met), a positive or a negative result will be reported. Therefore, the total number of samples = the sum of positive, negative, resample and reject samples only.

Table 3c. Summary of IFN Gamma results by country and protocol (Total since test roll out)

Country	Protocol	No submissions	Samples		Positive		Negatives		Retest*		Resample		Reject	
			n	% of total	n	%	n	%	n	%	n	%	n	%
England	Parallel	3807	128701	99.5%	9314	7.2%	110638	86.0%	10253	8.0%	6814	5.3%	1943	1.5%
	Serial	56	656	0.5%	18	2.7%	581	88.6%	35	5.3%	44	6.7%	13	2.0%
	Total	3863	129357	100.0%	9332	7.2%	111219	86.0%	10288	8.0%	6858	5.3%	1956	1.5%
Scotland	Parallel	268	19447	100.0%	1077	5.5%	16706	85.9%	1949	10.0%	1246	6.4%	417	2.1%
	Serial	2	7	0.0%	0	0.0 %	7	100.0%	0	0.0 %	0	0.0 %	0	0.0 %
	Total	270	19454	100.0%	1077	5.5%	16713	85.9%	1949	10.0%	1246	6.4%	417	2.1%
Wales	Parallel	3557	49097	98.7%	5600	11.4%	39302	80.0%	4220	8.6%	3012	6.1%	1181	2.4%
	Serial	33	654	1.3%	17	2.6%	575	87.9%	93	14.2%	49	7.5%	13	2.0%
	Total	3590	49751	100.0%	5617	11.3%	39877	80.2%	4313	8.7%	3061	6.2%	1194	2.4%
GB	Parallel	7632	197245	99.3%	15991	8.1%	166646	84.5%	16422	8.3%	11072	5.6%	3541	1.8%
	Serial	91	1317	0.7%	35	2.7%	1163	88.3%	128	9.7%	93	7.1%	26	2.0%
	Total	7723	198562	100.0%	16026	8.1%	167809	84.5%	16550	8.3%	11165	5.6%	3567	1.8%

* Sufficient plasma supernatant is collected and stored following the overnight culture stage of the assay such that if the sample fails any of the QC criteria, it is possible for the laboratory to 're-test' the original sample. Depending on the outcome of a retest, a resample (if QC criteria fail to be met), a positive or a negative result will be reported. Therefore, the total number of samples = the sum of positive, negative, resample and reject samples only.

Table 4a. Summary of IFN Gamma results by submission reason (March 2013)

Submission Reason (full)	No submissions	Samples		Gamma Positive		Gamma Negatives		Retest		Resample		Reject	
		n	% of total	n	%	n	%	n	%	n	%	n	%
Possible Herd Slaughter	1	59	1.7%	2	3.4%	39	66.1%	5	8.5 %	5	8.5 %	13	22.0 %
Persistent Confirmed Incidents 1-2yr	1	157	4.6%	7	4.5%	146	93.0%	6	3.8 %	4	2.5 %	0	
Parallel - Low Incidence	36	3103	90.8%	100	3.2%	2864	92.3%	201	6.5 %	135	4.4 %	4	0.1 %
Rapid Testing of twice IR's	27	97	2.8%	37	38.1%	60	61.9%	2	2.1 %	0		0	
	65	3416	100.0%	146	4.3%	3109	91.0%	214	6.3 %	144	4.2 %	17	0.5 %

Table 4b. Summary of IFN Gamma results by submission reason (Total 2013)

Submission Reason (full)	No submissions	Samples		Gamma Positive		Gamma Negatives		Retest		Resample		Reject	
		n	% of total	n	%	n	%	n	%	n	%	n	%
Possible Herd Slaughter	3	186	1.4%	26	14.0%	141	75.8%	6	3.2 %	6	3.2 %	13	7.0 %
Persistent Confirmed Incidents 1-2yr	10	1616	12.5%	270	16.7%	1305	80.8%	54	3.3 %	40	2.5 %	1	0.1 %
Parallel - Low Incidence	112	10711	82.6%	400	3.7%	9832	91.8%	506	4.7 %	351	3.3 %	128	1.2 %
Rapid Testing of twice IR's	142	429	3.3%	168	39.2%	251	58.5%	11	2.6 %	8	1.9 %	2	0.5 %
Suspected Fraud	7	32	0.2%	3	9.4%	28	87.5%	2	6.3 %	1	3.1 %	0	
	274	12974	100.0%	867	6.7%	11557	89.1%	579	4.5 %	406	3.1 %	144	1.1 %

Table 4c. Summary of IFN Gamma results by submission reason (Total since rollout)

Submission Reason*	No submissions	Samples tested		Gamma Positive		Gamma Negatives		Retest		Resample		Reject	
		n	% of total	n	%	n	%	n	%	n	%	n	%
Possible Herd Slaughter	171	6570	3.3%	873	13.3%	5056	77.0%	579	8.81 %	444	6.76 %	196	2.98 %
Persistent Confirmed Incidents 1-2yr	307	21294	10.7%	2207	10.4%	17631	82.8%	1670	7.84 %	1126	5.29 %	331	1.55 %
Parallel - Low Incidence	1880	156385	78.8%	7900	5.1%	136775	87.5%	13181	8.43 %	8827	5.64 %	2888	1.85 %
Rapid Testing of twice IR's	5195	10611	5.3%	4764	44.9%	5252	49.5%	747	7.04 %	501	4.72 %	94	0.89 %
Parallel Other	79	2385	1.2%	247	10.4%	1932	81.0%	245	10.27 %	174	7.30 %	32	1.34 %
'NSR' Herds	25	213	0.1%	9	4.2%	193	90.6%	12	5.63 %	11	5.16 %	0	0.00 %
Suspected Fraud	58	1027	0.5%	25	2.4%	925	90.1%	114	11.10 %	64	6.23 %	13	1.27 %
Serial Other	8	77	0.0%	1	1.3%	45	58.4%	2	2.60 %	18	23.38 %	13	16.88 %
	7723	198562		16026		167809		16550		11165		3567	

*For test criteria please refer to Operational notes.

Table 5a. Summary of PM and culture results for IFNg positive animals.

Year	Month	Herds sampled	Samples tested	Herds with positives	IFNg+ samples	Wrong Eartags	No PM No Cult	No PM Cult Pend	No PM Cult Neg	No PM Cult Mb	No PM Cult Other	VL No Cult	VL Cult Pend	VL Cult Neg	VL Cult Mb	VL Cult Other	NVL No Cult	NVL Cult Pend	NVL Cult Neg	NVL Cult Mb	NVL Cult Other
2012	April	59	3206	39	170	1	8	0	0	0	1	11	0	0	1	0	126	5	17	0	1
	May	90	5141	56	233	2	1	0	0	0	3	47	0	0	4	0	148	0	27	1	3
	June	75	1425	43	101	1	1	0	0	0	0	1	0	4	5	0	49	0	40	0	0
	July	97	3626	45	112	0	1	0	0	0	1	5	0	0	1	0	67	1	34	0	1
	August	98	4445	53	237	3	15	0	0	0	1	58	0	0	7	0	125	0	26	0	1
	September	103	3815	55	164	3	2	0	0	0	0	12	0	0	1	0	126	0	20	0	0
	October	121	5159	77	248	1	0	0	0	0	1	17	0	1	4	0	150	0	74	0	1
	November	112	4509	59	212	4	3	0	0	0	2	44	0	0	1	0	110	0	38	0	2
	December	62	2844	43	187	2	11	0	0	0	1	5	0	0	5	2	126	7	28	0	1
2013	January	115	4235	66	262	3	11	0	0	0	0	20	4	0	0	0	177	41	3	1	0
	February	94	5323	58	459	47	116	0	0	0	0	102	3	0	0	0	119	31	0	0	0
	March	65	3416	38	146	103		0													
Total since Test Rollout		7723	198562	4625	16026	682	534	0	93	13	0	1133	7	98	576	3	8409	89	4101	67	36

Key: NoPM= no PME performed/recorded on Vet Net.
 No Cult=M. bovis culture not performed, CultPend= M. bovis culture pending, CultNeg= M. bovis culture negative,
 CultMtb= M. bovis culture positive, CultOther= Organism other than M. bovis cultured.

Table 5b. Summary of culture results for IFNg positive animals.

Month	Herds sampled	Samples tested	Herds with positives	IFNg+ samples	VL No Cult	VL Cult Pend	VL Cult Neg	VL Cult Mb	VL Cult Other	NVL No Cult	NVL Cult Pend	NVL Cult Neg	NVL Cult Mb	NVL Cult Other
England	3868	129363	2437	9336	577	7	71	425	3	4444	50	2662	51	27
Scotland	270	19454	164	1077	130	0	4	13	0	734	0	72	1	1
Wales	3585	49745	2024	5613	426	0	23	138	0	3231	39	1367	15	8
Total since Test Rollout	7723	198562	4625	16026	1133	7	98	576	3	8409	89	4101	67	36

Key: NoPM= no PME performed/recorded on Vet Net.
No Cult=M. bovis culture not performed, CultPend= M. bovis culture pending, CultNeg= M. bovis culture negative,
CultMtb= M. bovis culture positive, CultOther= Organism other than M. bovis cultured.

Figure 4a. Number of herds sampled for IFNg and numbers of herds with any positive IFNg results.

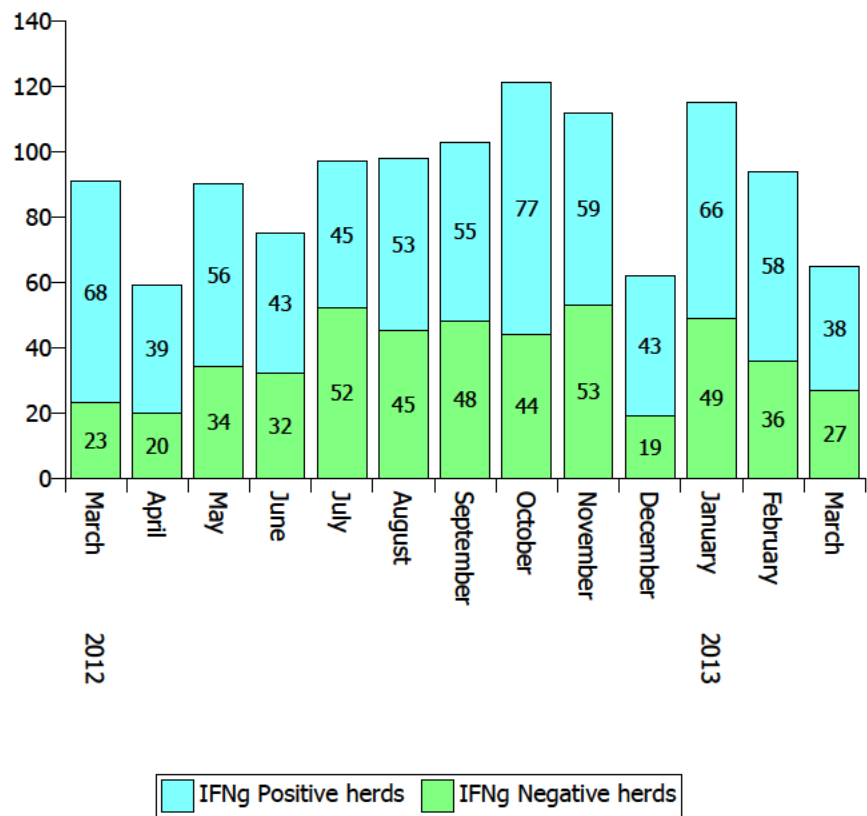
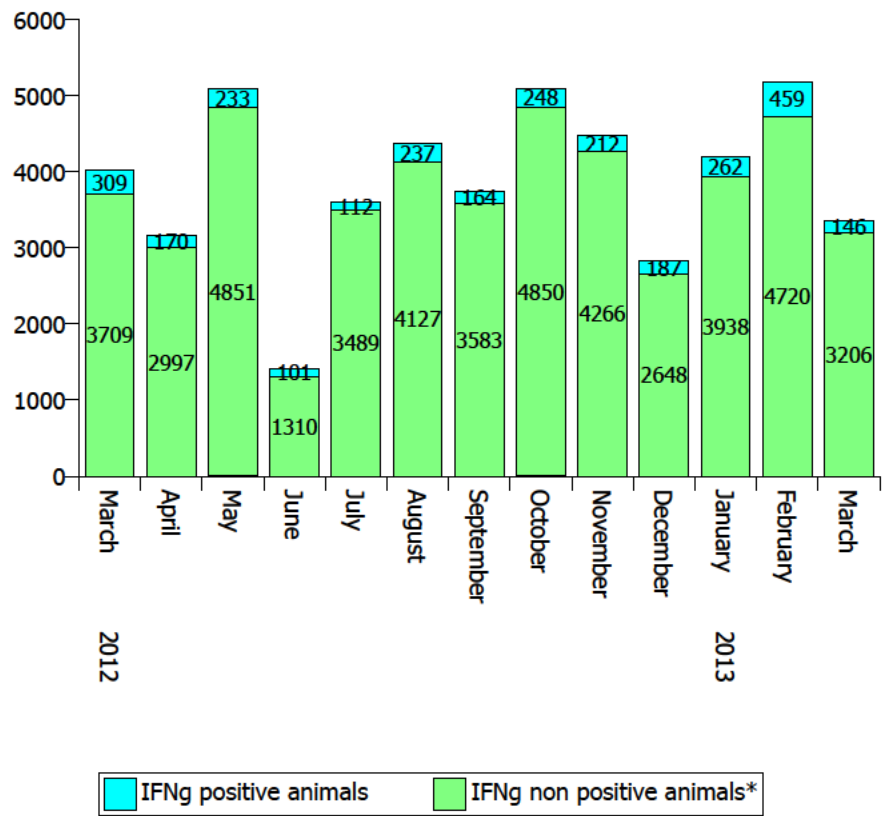
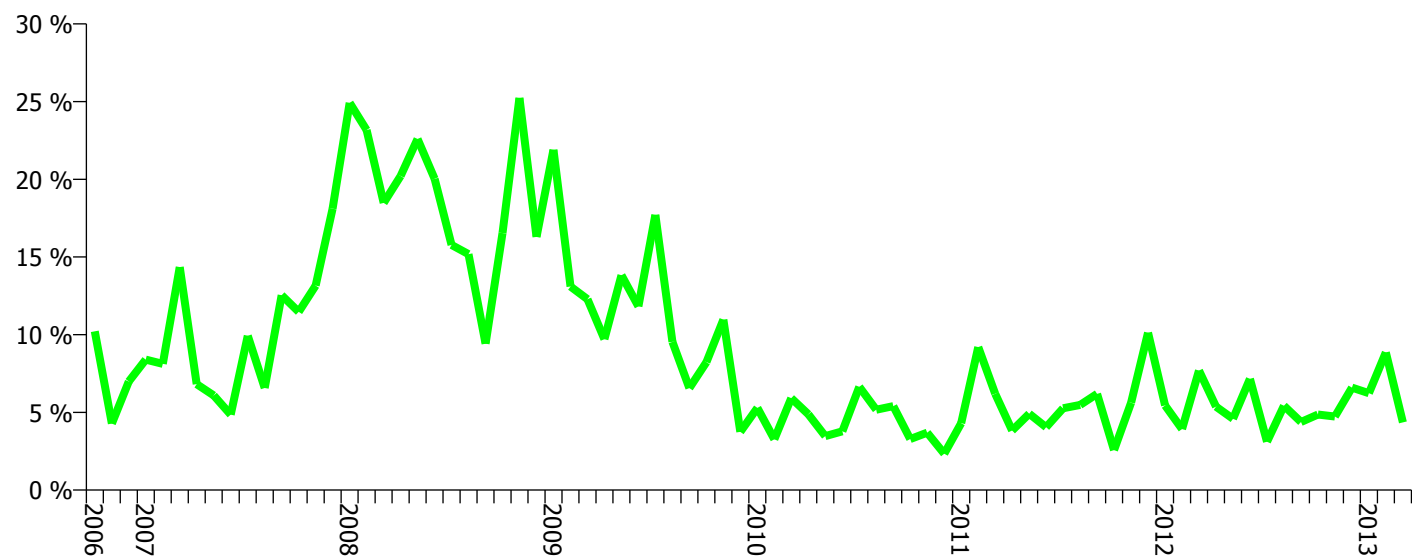


Figure 4b. Number of animals sampled for IFNg and numbers of animals with positive IFNg results.



*Includes all animals with IFNg test negative, resample and reject outcomes

Figure 4c. Percentage of animals tested with IFNg giving a positive response



From Oct 2006

[illegible]

Figure 5. Rates of resamples including the fail rates broken down for positive (POS) and negative (NEG) controls.

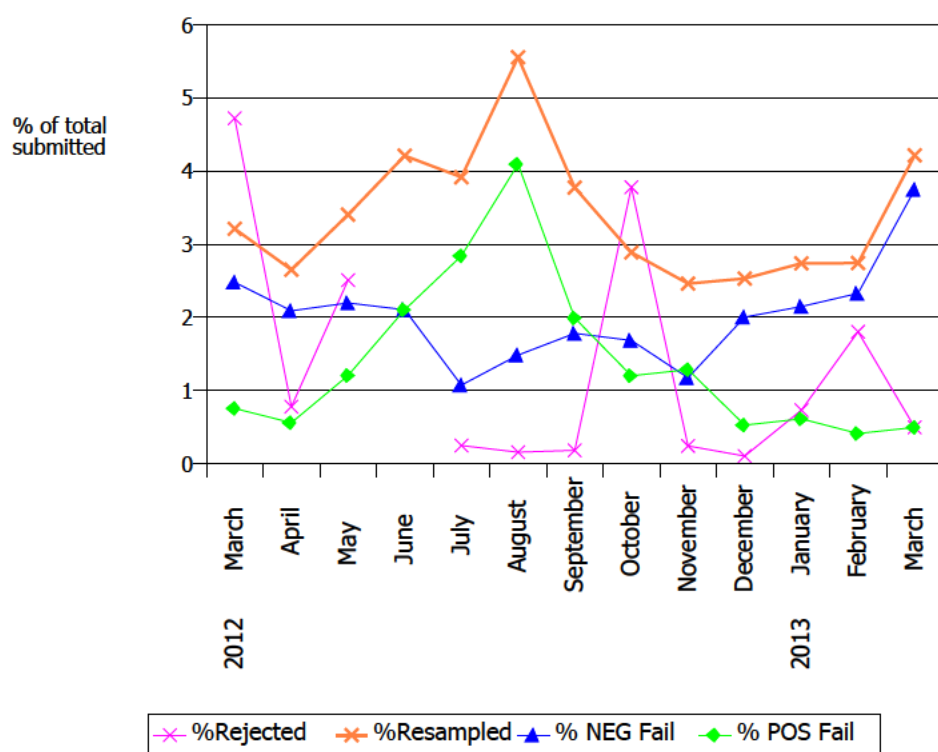


Figure 6. Proportion of samples retested, or requiring a resample, during March 2013 (% submission per AHDO)

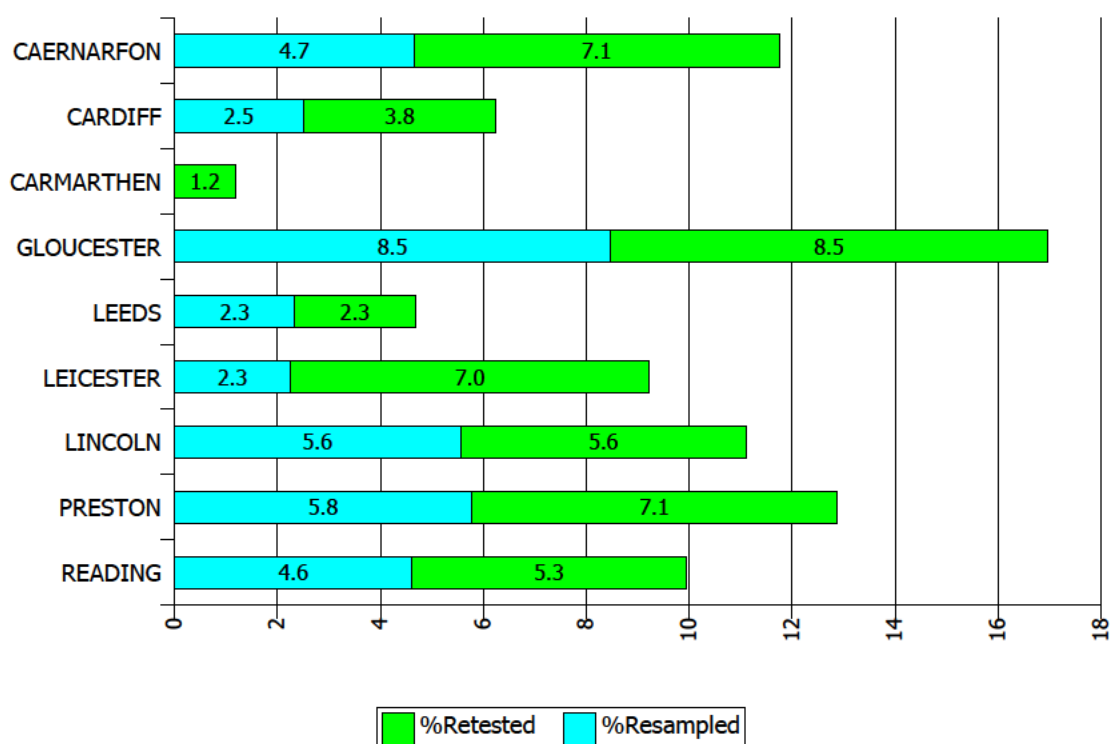


Table 6a: Number of animals and submissions tested in March 2013

Country	No. animals	No of IFHg+ animals	% Positive animals	No. samples	No of IFHg+ samples	% Positive samples
England	1797	67	3.7%	1818	67	3.7%
Wales	1555	79	5.1%	1598	79	4.9%
GB	3352	146	4.4%	3416	146	4.3%

Table 6b: Number of animals and submissions tested in 2013

Country	No. animals	No of IFHg+ animals	% Positive animals	No. samples	No of IFHg+ samples	% Positive samples
England	9397	586	6.2%	9562	586	6.1%
Wales	3240	280	8.6%	3412	281	8.2%
GB	12637	866	6.9%	12974	867	6.7%

Table 6c: Number of animals and submissions tested since test rollout

Country	No. animals	No of IFHg+ animals	% Positive animals	No. samples	No of IFHg+ samples	% Positive samples
England	113530	9327	8.2%	129357	9332	7.2%
Scotland	16652	1077	6.5%	19454	1077	5.5%
Wales	42368	5614	13.3%	49751	5617	11.3%
GB	172468	16018	9.3%	198562	16026	8.1%