ESVE Veterinary Endocrinology External Quality Assessment Scheme
ESVE REPORT

Release Month:	**Nov-15**
Release Number:	**007**

Overall Commentary

General

This is the report of the seventh release of the ESVE EQA scheme. The efforts made by the participants to report their results were much appreciated. We had participation from 41 separate physical locations providing 252 analytical results. Unfortunately, a small number of labs did not receive their samples or declined to process them due to postal delays around the Christmas period. We hope there will be less issues with the next release. The strength of a scheme such as this can only improve as more participants are recruited. If you are in contact with other laboratories that are generating veterinary endocrine analytical results that are not participants in the scheme, please encourage them to participate.

Although the the numbers of participants within individual methodologies is still limted, we are already seeing patterns of performance that should allow participants to get a feel for how their methods compare and in some cases that are raising questions that would be best followed up by internal QC, reference range review and validation checks etc

We continue to be cautious with the public release of method names because of the limitations of so-far having only a small participant number but as was the case on previous releases we have highlighted a small number where it seems most relevant to do so.

This Release

This was a canine serum pool.

As was the case for 006, this release again saw only 1 result excluded from statistical analyses, our lowest exclusion rates since 003. Those of you familiar with other EQA schemes will recognise that the overall CV's we are seeing are high. On this release, Cortisol, Free T4, TSH and Creatinine CV's are below 20%. A wide CV% makes more sense for our peptide representative (insulin) but it is concerning that we are seeing a high CV for Fructosamine. On a positive note, this release saw the lowest CV's for Cortisol, Progesterone, Free T4, Oestradiol and Testosterone since the inception of the scheme.

For those of you that are clinicians or that work closely with clinicians, these reports serve as a reminder to exercise caution in making significant clinical management decisions based on relatively modest differences in results and particulary when basing advice to third parties on laboratory results generated at locations or by equipment over which you have no control. Theoretically at least, we should feel relatively comfortable using literature reference ranges for steroids and non-species-specific analytes but these results indicate that we should be more cautious than we might expect to need to be. In this release a cortisol of 77 or 179 nmol/L could be obtained from the same sample depending on where the result originated.

As was the case in the previous releases and as has been the experience of the Michigan State University SCE EQUAS scheme, the range of results obtained for Oestradiol is tremendous. This is a notoriously difficult hormone to measure well which presents interpretative challenges.

Caution

It should be remembered that assays that are more commonly used may not turn out to be the ones that yield the most accurate results so at least for now, we may have to recognise that some of the methods with the most "outlying" results may not be the methods that are "wrong".

Please note that the Method numbers bear no relationship to one another across analytes. That is, for example, Immulite 1000, may be Method 1 for one analyte but Method 7 for another.

A simplistic way to check for the accuracy of your reconstitution of the freeze dried sample is to check if all your "SD Multiples" are consistently positive or consistently negative.

Analytes

Cortisol

As was the case for previous releases, the range of results generated for cortisol continues to surprise; especially taking into account that this is not a species specific hormone and the general consensus among endocrinologists in the interpretation of cortisol results in suppression and stimulation tests. However, this is our best cortisol CV yet at 16.5%. It would be nice to believe we are successfully working towards a closer agreement among labs for this analyte - time will tell. In large human EQA schemes, CV for cortisol is 7-8%.

Fructosamine

The range of fructosamine results is wide, the overall CV is high and reference to the literature for diabetes diagnosis or monitoring cannot be recommended. That said, there is no relationship between the result reported and the upper limit of the reference ranges used for either dogs (R-sq 0.000) or cats (R-sq 0.02) suggesting comparison to local ranges and cut-off's may be equally problematic. Although there are small numbers of participants per method, one method (Method 6; Cobas) again showed a good method CV on this occasion. One possiblity is that we are not capturing methodologic differences well and I had planned to work on this for the current release - the conversion to web-reporting took longer than expected and so the Fructosamine method capture will be an improvement for release 008.

Insulin

As a peptide with some species differences, it is not too great a surprise to see variation in this analyte as different methods have different degrees of cross-reactivity between canine insulin and the method standards. This is an analyte where we should expect to see variation also in the reference ranges used by labs and clinicians should avoid textbook ranges (for insulin but also where appropriate insulin:glucose ratios) in reaching a diagnostic interpretation. As has been the case in previous releases, the Immulite methods (n=4; Methods 6 and 7) yielded much lower results than other methods (all less than 3uU/ml including 1 below detection limit 2 uU/ml).

Progesterone

Most (33 of 35) result were above the common "luteal cut-off" of 3 nmol/L. The results re-iterate the need for caution in over-interpreting results close to a "diagnostic cut-off". This was our best Progesterone all-method CV so far. Method 3 (Tosoh AIA) and Method 8 (Immulite 2000) gave the lowest method CV's

Thyroxine

The all-method CV% achieved on this release was close to 20% but not as low as we have achieved previously for this method. Methods 1 (Tosoh AIA), 5, 6 and 7 (Immulite Canine TT4) yeilded the lowest method CV's.

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Free T4 On a theoretical basis, the methods using dialysis or 2-step immunoseparation should yield the Free T4 results closest to the true value. Unfortunately, we have only one participant using such a method in this release (Method 1; 11.4 pmol/l). However, on this occasion, the all-method CV is yet a further improvement over previous releases.

Oestradiol The variation in results obtained for Oestradiol is a well known phenomenon to anyone participating in the MSU/SCE EQUAS scheme. Methodologic and calibration differences along with poor low-end sensitivity have been considered to play their part. Some laboratories are using extraction procedures to improve their analyses. There should be considerable caution in interpreting oestradiol results against literature ranges particularly where oestradiol is being used in isolation to support diagnoses of adrenal dysfunction. No labs used the same methodology on this occasion.

Testosterone The sample contained a low but detectable concentration of testosterone. This was our best all-method CV% so far which is encouraging at a low concentration.

TSH The 3 Immulite methods yielded close agreement across laboratories with an all-Immulite CV of 7.3%. Only 1 non-Immulite result was reported which was excluded from the analysis (0.83ng/ml)

Creatinine This is our first release to include creatinine. I was interested because a similar scheme in in-clinic analysers yeilds very large variation. Thankfully, this laboartory-based scheme has performed much better than the in-clinic scheme for creatinine. The lower all-method CV% for this analyte is expected in chemical versus immunoassay based methods. It is interesting that 1 common method (Method 3) yielded such a wide range of results - this may be due to differences in reaction protocols between labs which we may be able to capture in the future. As was the case for fructosamine, there was not a relationship between the creatinine result and the upper limit of the canine (R-sq 0.001) or feline (R-sq= 0.14) reference interval.

Peter Graham, Program Coordinator, February 2016

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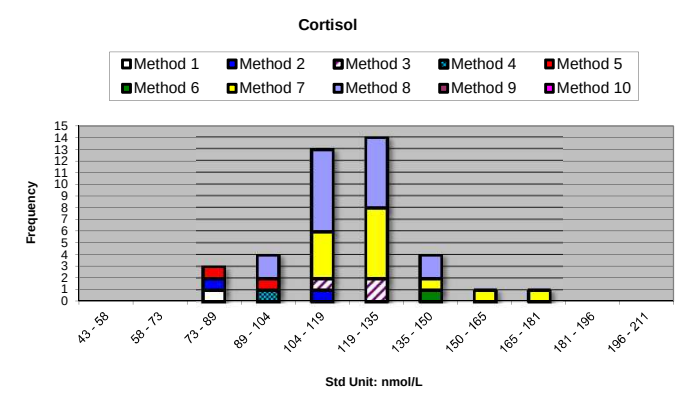
Cortisol

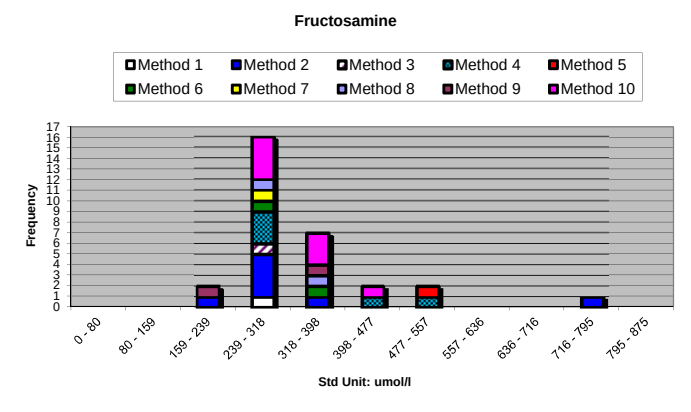
	n	Mean	StDev	%CV
Method 1	1	88.3		
Method 2	2	94.1	23.86	25.4
Method 3	3	124.3	6.61	5.3
Method 4	1	92.0		
Method 5	2	87.2	9.29	10.7
Method 6	1	140.0		
Method 7	13	130.6	18.04	13.8
Method 8	16	118.4	13.53	11.4
Method 9	0			
Method 10	0			
All Methods	**39**	**119.0**	**19.60**	**16.5**



Note: Reported results ranged from 77 to 179 nmol/l.

Fructosamine

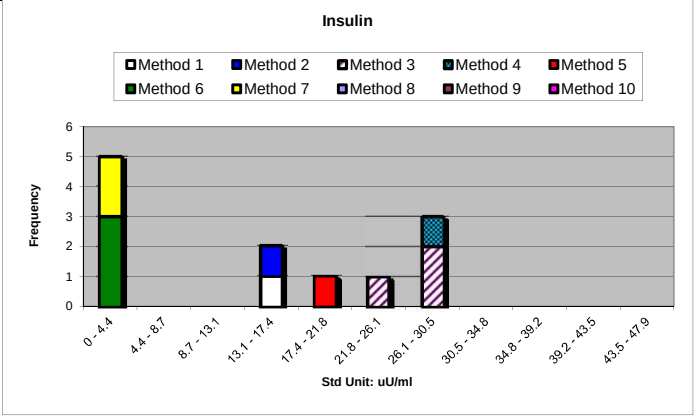
	n	Mean	StDev	%CV
Method 1	1	275		
Method 2	6	276	40.0	14.5
Method 3	1	244		
Method 4	5	351	104.2	29.7
Method 5	1	489		
Method 6	3	318	24.5	7.7
Method 7	1	251		
Method 8	2	344	57.3	16.7
Method 9	2	291	78.5	27.0
Method 10	8	327	65.8	20.1
All Methods	**30**	**317**	**72.6**	**22.9**



Note: Reported results ranged from 205 to 735 umol/L

Insulin

	n	Mean	StDev	%CV
Method 1	1	16.9		
Method 2	1	14.6		
Method 3	3	28.6	2.2	7.8
Method 4	1	29.0		
Method 5	1	18.1		
Method 6	3	2.1	1.0	48.8
Method 7	1	1.9		
Method 8	0			
Method 9	0			
Method 10	0			
All Methods	**11**	**15.7**	**12.01**	**76.5**



Note: Reported results ranged from <2 to 30 uU/ml
One result (Method 6) was below the assay detection limt (<2) and is repoted as 1 uU/ml)

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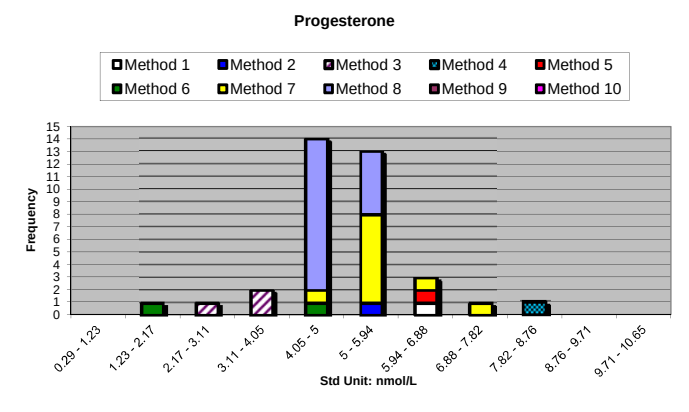
Progesterone

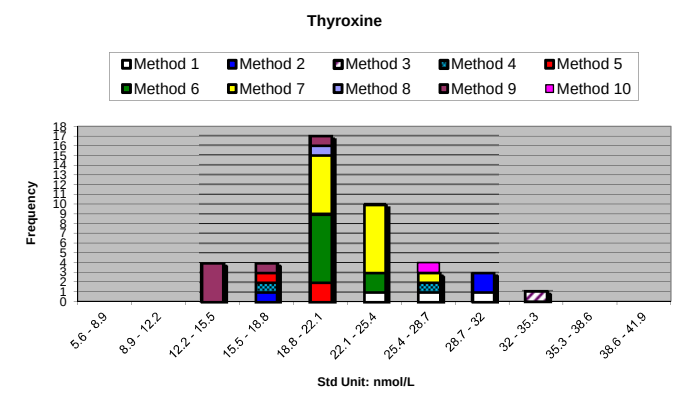
	n	Mean	StDev	%CV
Method 1	1	6.77		
Method 2	1	5.50		
Method 3	3	3.14	0.4	11.5
Method 4	1	7.90		
Method 5	1	6.00		
Method 6	2	3.05	2.0	66.3
Method 7	10	5.66	0.9	15.1
Method 8	16	4.79	0.5	9.8
Method 9	0			
Method 10	0			
All Methods	**35**	**5.00**	**1.21**	**24.3**



Note: Reported results ranged from 1.6 to 7.9 nmol/L

Thyroxine

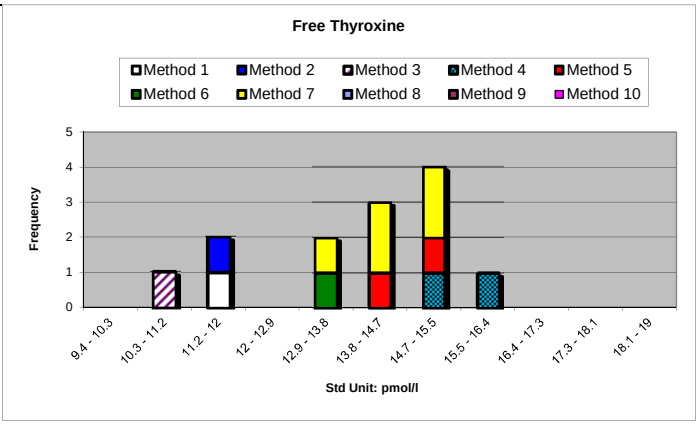
	n	Mean	StDev	%CV
Method 1	3	27.20	1.952	7.2
Method 2	3	26.26	8.251	31.4
Method 3	1	35.00		
Method 4	2	22.18	6.760	30.5
Method 5	3	19.74	1.270	6.4
Method 6	9	21.14	1.299	6.1
Method 7	14	22.72	1.563	6.9
Method 8	1	19.31		
Method 9	5	16.56	3.414	20.6
Method 10	1	27.68		
All Methods	**42**	**22.30**	**4.420**	**19.8**



Note: Reported results ranged from 13 to 35.0 nmol/L.
Methods 5, 6 and 7 were "canine" methods. Method 4 is a homologous assay.

Free T4

	n	Mean	StDev	%CV
Method 1	1	11.4		
Method 2	1	11.3		
Method 3	1	10.5		
Method 4	2	15.9	0.61	3.8
Method 5	2	14.6	0.42	2.9
Method 6	1	13.3		
Method 7	5	14.3	0.78	5.5
Method 8	0			
Method 9	0			
Method 10	0			
All Methods	**13**	**13.8**	**1.76**	**12.8**



Note: Reported results ranged from 10.5 to 16.3 pmol/L.
A FT4 result by equilibrium dialysis was reported by one laboratory (Method 1; 11.4 pmol/l)
Methods 6 and 7 were "veterinary" methods

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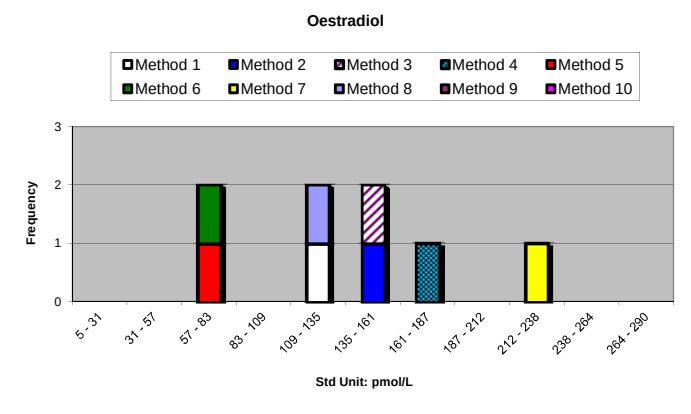
Oestradiol

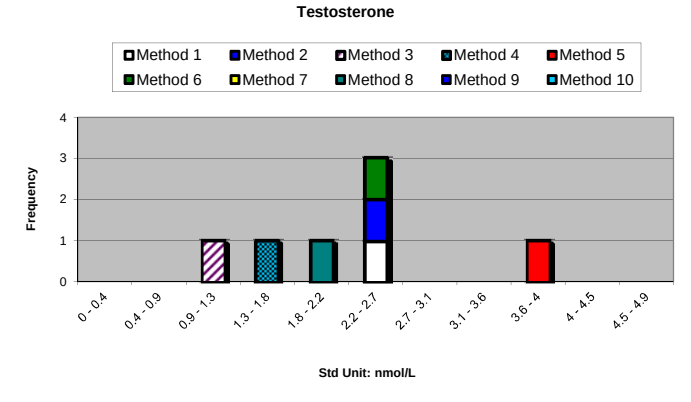
	n	Mean	StDev	%CV
Method 1	1	128.5		
Method 2	1	143.0		
Method 3	1	153.9		
Method 4	1	171.4		
Method 5	1	72.3		
Method 6	1	57.0		
Method 7	1	229.7		
Method 8	1	121.9		
Method 9	0			
Method 10	0			
All Methods	**8**	**135**	**54.7**	**40.5**



Note: Reported results ranged from 57 to 230 pmol/L.

Testosterone

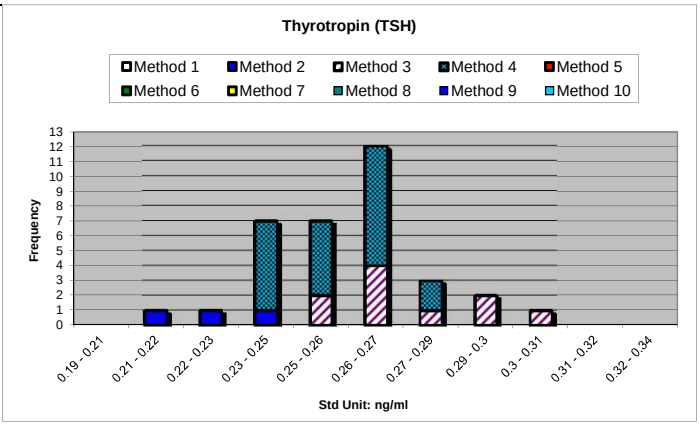
	n	Mean	StDev	%CV
Method 1	1	2.3		
Method 2	1	2.4		
Method 3	1	1.0		
Method 4	1	1.5		
Method 5	1	4.0		
Method 6	1	2.4		
Method 7	1	2.1		
Method 8	1	2.2		
Method 9	0			
Method 10	0			
All Methods	**8**	**2.2**	**0.87**	**39.5**



Note: Reported results ranged from 0.97 to 3.96 nmol/L

TSH

	n	Mean	StDev	%CV
Method 1	0			
Method 2	3	0.23	0.01	4.4
Method 3	10	0.27	0.02	6.7
Method 4	20	0.26	0.01	5.5
Method 5	0			
Method 6	0			
Method 7	0			
Method 8	0			
Method 9	0			
Method 10	0			
All Methods	**33**	**0.26**	**0.019**	**7.3**



Note: Reported results ranged from 0.22 to 0.36 ng/ml. One result (Method 1) was excluded 0.83ng/ml.
Methods 2, 3 and 4 represent the same manufacturer's chemiluminescent assay on 3 platforms

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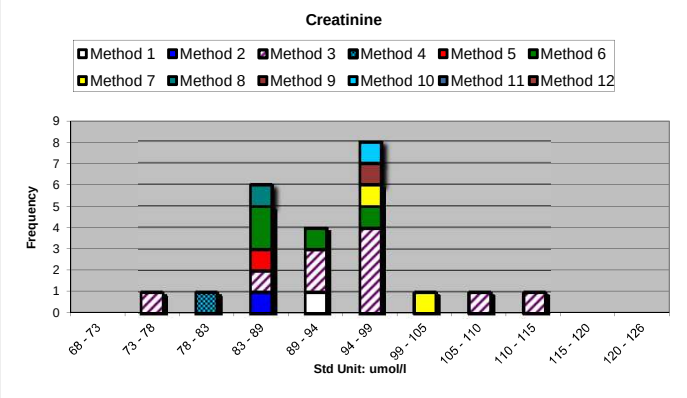
Creatinine

	n	Mean	StDev	%CV
Method 1	1	89		
Method 2	1	88		
Method 3	10	96	10.03	10.5
Method 4	1	80		
Method 5	1	85		
Method 6	4	89	3.98	4.5
Method 7	2	99	6.19	6.3
Method 8	1	88		
Method 9	1	96		
Method 10	1	95		
Method 11	2	103	11.31	11.0
Method 12	0			
All Methods	**25**	**94**	**8.7**	**9.3**



Note: Reported results ranged from 77 to 112 umol/l
Methods 2, and 8 were known "enzymatic methods". We will improve method detail in future but most if not all the other methods were Jaffe

For statistical purposes, results lower than reportable limit have been converted to a value 0.5 x lowest reportable limit