ERNDIM

QUALITY ASSURANCE IN LABORATORY TESTING FOR IEM

2019 Participant Survey Report:

[2018 scheme year]

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1. Introduction

- Participants (443 contacts from 401 centres) were sent the link to the ERNDIM Participant Survey on the Survey Monkey website (www.surveymonkey.com) on 23rd January 2019. We asked participants to answer questions relating to the 2018 EQA schemes. The closing date for the survey was 4th March 2019.

2. Summary

- Thank you to everyone who took the time to complete this survey. This report is a summary of all the responses we received. The results from the survey will help us to continue to improve the quality and efficiency of the ERNDIM EQA schemes.
- 52.9% of the laboratories that participated in the 2018 schemes responded to the survey, with the response rate for each of the schemes being between 40.7% - 77.4%.
- The survey has again highlighted areas where we need to improve, such as low sample volume for some of the qualitative schemes. Some participants are also unhappy with the analyte concentrations in some schemes and specific comments from ERNDIM for the relevant schemes can be found in the summary of 'Remarks, comments or suggestions for improvements' on page 12.
- However, it is gratifying to see that 94% of respondents rate the quality of products and services we provide as 'excellent' or 'good' and that 72% of respondents believe that the quality of service we offer is getting better. We will continue to make further improvements to the service that we offer as we work towards applying for accreditation.
- In 2018 we were still working towards moving all of the qualitative schemes to website reporting, with website reporting for the Qualitative Organic Acids and Acylcarnitines in DBS schemes being launched in 2018.
- The issue of sample volume is more difficult. The schemes that use real clinical samples as the EQA materials are dependent on the Scientific Advisors sourcing suitable clinical samples of sufficient volume either by direct contact with clinicians or via donations from participating laboratories. However we are investigating alternative routes for sample donation. Information on the types of samples that would be useful to ERNDIM can be found on the website (www.erndim.org) under EQA schemes\sample donations. Discounts on scheme fees are also available for some schemes if a donated sample is used as an EQA material. If you would be interested in donating a sample please contact admin@erndim.org for more information.
- We are especially pleased that so many of you took the time to complete the survey and to send comments on the schemes. We hope you find the summary where we answer some of your comments, interesting (see page 12) and we would welcome any other comments or suggestions for improvements.

3. Survey Responses

- 212/443 contacts from 212/401 centres in 50 countries responded to the survey. The response rate by centre was 53% (compared to 48% in the last survey) and the individual response rate was 47.9% (compared to 25% in the last survey).

3.1. Please rate the following aspects for each of the ERNDIM quality assurance schemes that you subscribe to (Q.1)

- Number of centre responses = 205 centres (= 97% of all responses).
- The response rate for each EQA scheme is shown in Figure 1 and Table 2. For the individual schemes the highest response rate was for Neurotransmitters in CSF (77.4% of 2018 scheme participants) and the lowest was for Pterins in urine (40.7% of 2018 scheme participants).
- The response rate was higher for all schemes than in 2018 except Purines and Pyrimidines (59.3% from 67.6%) and Pterins in Urine (40.7% from 68.8%).

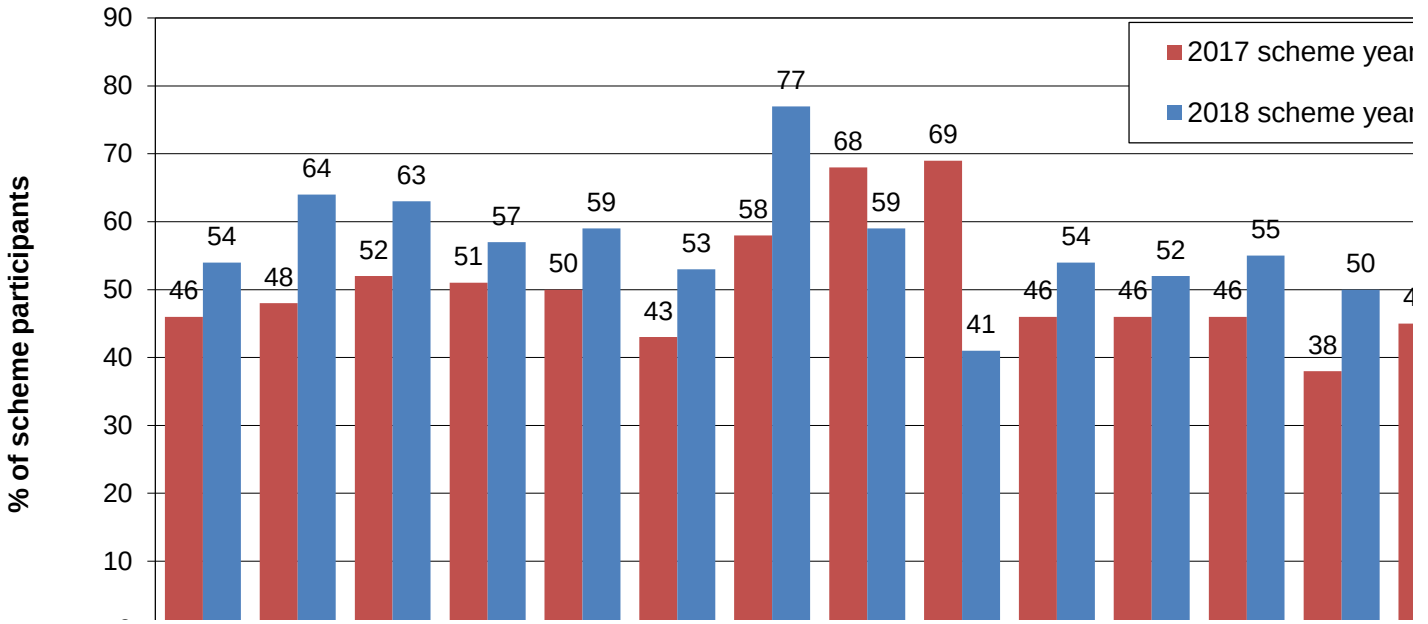


Figure 1. Survey responses per EQA scheme (Question 1) as a percentage of the EQA scheme participants

Key

EQA Scheme	Code	EQA Scheme	Code
Acylcarnitines in DBS	ACDB	Pterins in urine	PTU
Acylcarnitines in serum	ACS	Qualitative organic acids (urine)	QLOU
Congenital disorders of glycosylation	CDG	Quantitative amino acids (serum)	QTAS
Cystine in white blood cells	CWBC	Quantitative organic acids (urine)	QTOU
Diagnostic Proficiency Testing (urine)	DPT	Special assays - serum	SAS
Lysosomal storage enzymes (fibroblasts)	LEFB	Special assays - urine	SAU
Neurotransmitters in CSF	NCSF	Urine Mucopolysaccharides	UMPS
Purines & pyrimidines (urine)	PPU		

- Participants were asked to rate the following aspects of each scheme:
  - Frequency of samples
  - Appropriateness of analyte concentration
  - Website display
  - Value for money
  - Sample volume
  - Adequacy of the report
  - Usefulness of the annual report
  - Billing arrangements
- Each of the aspects of individual EQA schemes was rated according to the following scoring system:
  1 = Excellent 2 = Good 3 = Poor 4 = Very poor
- The average scores per scheme since 2001 are shown in Table 1 and Figure 2 and scores ≤ 1.5 are highlighted in blue and scores ≥ 2.0 are highlighted in red.
- The overall score for all aspects of all schemes was 1.8, which is slightly worse than in 2018 (1.8). Nine of the EQA schemes had the same score as last year, 6 schemes had a worse score than last year (ACS, CDG, DPT, LEFB, QTOU and UMPS) and 2 schemes had better scores (NCSF and PTU).
- The best scoring schemes were CWBC, PPU, QLOU, QTAS, SAS and SAU which all scored 1.7. The worst scoring scheme was the CDG scheme which scored 1.9.
- The scores for each scheme in each of the individual aspects are given in Table 2. The score for 6 out of the 8 of the individual aspects have stayed the same since the 2018 survey, while 'Sample volume' received a slightly worse score than the 2018 survey.
- The worst scoring aspect was 'Sample volume' which scored 1.9; with the best scoring aspects being 'Frequency of samples', 'Adequacy of the report' and 'Usefulness of the annual report' which scored 1.7.
- The score for 'Frequency of samples' is slightly worse than in 2018 (1.7 compared to 1.6) with DPT and ACDB scoring 1.8. The score for 'Appropriateness of sample concentration' was also slightly worse than in 2018 (1.8 compared to 1.7), only PTU and QTAS scored better than 1.8 (both 1.7).

Table 1. Average scores per scheme (Question 1) *[See Figure 1 for key to scheme codes]*

	Average Scores											
EQA Scheme	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**	**2011**	**2007**	**2004**	**2001**
All schemes	**1.8**	**1.7**	**1.7**	**1.7**	**1.8**	**1.7**	**1.7**	**1.7**	**1.8**	**1.7**	**2.0**	**2.0**
ACDB	1.8	1.8	1.8	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.3	-
ACS	1.7	1.6	-	-	-	-	-	-	-	-	-	-
CDG	1.9	1.8	1.9	1.9	2.0	2.0	1.9	1.8	1.9	-	-	-
CWBC	1.7	1.7	1.7	1.7	1.8	1.8	1.6	1.7	1.6	1.4	-	-
DPT	1.8	1.6	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.7	2.0	2.0
LEFB	1.8	1.7	1.8	1.9	1.9	2.0	1.9	2.0	2.1	-	-	-
NCSF	1.8	1.9	1.7	-	-	-	-	-	-	-	-	-
PPU	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.9	1.6	1.8	2.1
PTU	1.8	1.9	-	-	-	-	-	-	-	-	-	-
QLOU	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	2.0	1.9
QTAS	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.9	2.0
QTOU	1.8	1.7	1.7	1.7	1.8	1.7	1.7	1.7	1.9	1.7	1.9	2.1
SAS	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.7	1.8	1.7	1.8	2.0
SAU	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.9	2.1
UMPS	1.8	1.7	1.8	1.7	1.8	1.8	1.8	1.8	-	-	-	-

- There were a total of 4 scores of 2.0 or more in this survey: CDG ('Sample volume' = 2.4), CWBC ('Sample volume' = 2.0), PTU ('Sample volume' = 2.0), DPT ('Website display' = 2.0).
- The 'Sample volume' score for CDG was again the worst score in the survey although it scored slightly better in 2019 compared to the previous year (2.4 in 2019 compared to 2.6 in 2018,).
- The best scores of the whole survey (all 1.5) were for 'Frequency of samples' (CWBC) and 'Usefulness of the annual report' (DPT and QLOU).

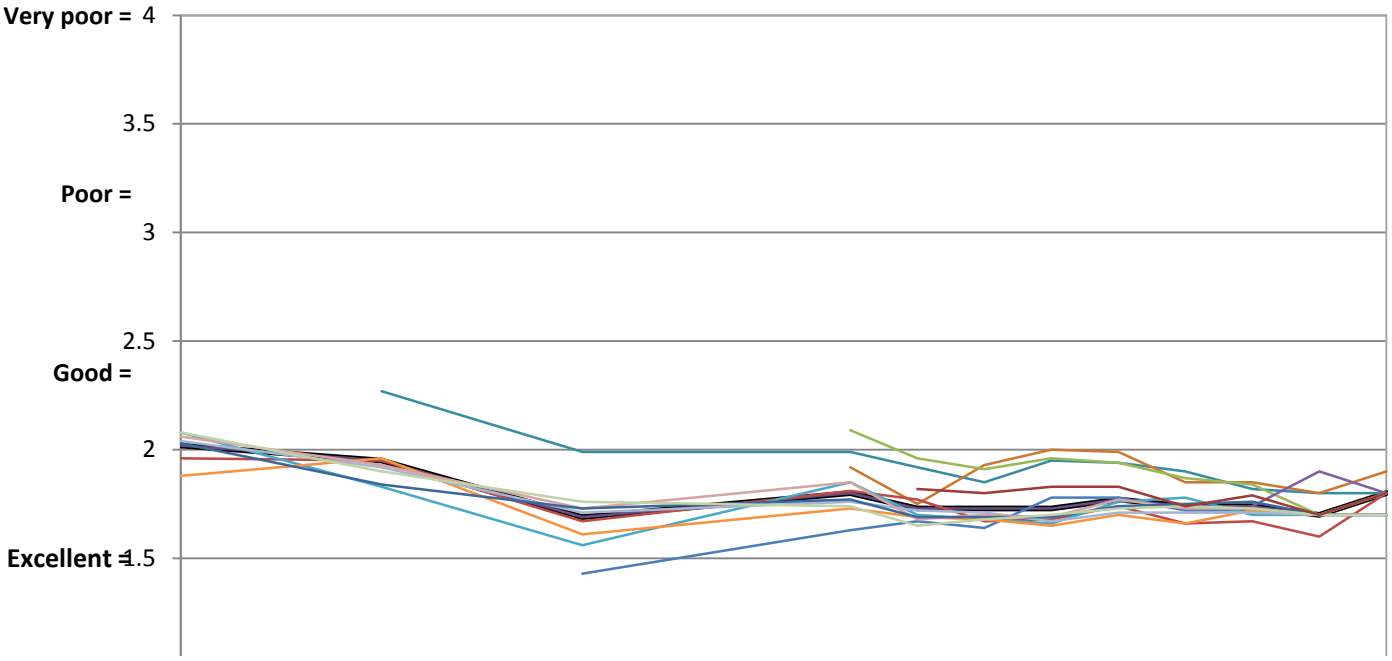


Figure 2. Average score per EQA scheme (Question 1) *[See Figure 1 for key to scheme codes]*

Table 2: Average scores per aspect of each scheme (Question 1) *[See Figure 1 for key to scheme codes]*

Scheme Aspects / EQA Schemes	Frequency of samples	Sample volume	Appropriateness of analyte concentration	Adequacy of the report	Website display	Usefulness of the annual report	Value for money	Billing arrangements	Average per scheme	No. of responses (% of scheme participants)
ACDB	1.8	1.9	-	1.7	1.9	1.7	1.8	1.7	1.8	68 (54.0%)
ACS	1.7	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.7	65 (63.7%)
CDG	1.7	2.4	-	1.7	1.9	1.7	1.8	1.8	1.9	42 (62.7%)
CWBC	1.5	2.0	-	1.7	1.7	1.7	1.7	1.8	1.7	20 (54.1%)
DPT	1.8	1.9	-	1.6	2.0	1.5	1.7	1.8	1.8	65 (59.1%)
LEFB	1.7	1.9	1.8	1.8	1.8	1.8	1.8	1.7	1.8	39 (53.4%)
NCSF	1.7	1.9	1.8	1.8	1.8	1.7	1.8	1.9	1.8	24 (77.4%)
PPU	1.7	1.6	1.8	1.7	1.7	1.8	1.8	1.8	1.7	32 (59.3%)
PTU	1.6	2.0	1.7	1.8	1.8	1.7	1.7	1.9	1.8	22 (68.8%)
QLOU	1.6	1.9	-	1.6	1.9	1.5	1.8	1.7	1.7	119 (54.1%)
QTAS	1.6	1.7	1.7	1.7	1.8	1.7	1.8	1.8	1.7	137 (51.9%)
QTOU	1.7	1.7	1.8	1.7	1.7	1.7	1.8	1.7	1.8	69 (54.8%)
SAS	1.7	1.7	1.8	1.7	1.7	1.7	1.8	1.8	1.7	116 (49.8%)
SAU	1.7	1.7	1.8	1.7	1.7	1.7	1.9	1.7	1.7	91 (51.4%)
UMPS	1.6	1.9	-	1.7	1.9	1.6	1.8	1.7	1.8	58 (58.0%)
Average for all schemes	**1.7**	**1.9**	**1.8**	**1.7**	**1.8**	**1.7**	**1.8**	**1.8**	**1.8**	**212 (52.9%)**

3.2. Analytes in Quantitative Schemes (Q3 – Q.20)

- A total of 86 individuals (41%) made suggestions for analytes to be added to or removed from the Quantitative schemes.
- Where possible we do try to incorporate suggestions for additional analytes but unfortunately this is not always possible. A summary of the suggestions for analytes to added or removed, with some responses from ERNDIM, is below (pages 5 to 8).

Q.3: Acylcarnitines – Serum (8 responses, 9.3% of all respondents)

Suggested Analytes to be added

Total suggested = 8

Analytes with >1 response

C10:1 n = 3

C6-DC n = 2

Suggested Analytes to be removed

Total suggested = 0

All Analytes suggested

ERNDIM Response:

- Neither analytes were requested by a large number of participants. At this time neither will be added as it was agreed by the ERNDIM Scientific Advisory Board (SAB) that it is important to manage the addition of analytes carefully as new additions may affect the stability of the samples due to possible cross reactions.

Q.5: Lysosomal Enzymes (23 responses, 26.7% of all respondents)

Suggested Analytes to be added

Total suggested = 12

Analytes with >1 response

Beta-Hexosaminidase A	n = 6
Beta-Hexosaminidase A+B	n = 6
Sphingomyelinase	n = 5
alpha-iduronidase	n = 4
chitriosidase	n = 2
beta-manosidase	n = 2
alpha-manosidase	n = 2
Heparan sulphatase	n = 2
Arylsulphatase	n = 2

Suggested Analytes to be removed

Total suggested = 3

All Analytes suggested

Palmitoyl protein thioesterase	n = 4
Lysosomal acid lipase (LAL/ acid esterase)	n = 4
Tripeptidyl peptidase I	n = 3

ERNDIM Response:

- The 2019 LEFB scheme has seen the first change to the enzymes included in several years. It is the intention of the Scientific Advisor for this scheme to review the performance and requests of participants each year and adjust the scheme to address enzymes which cause difficulty or are of interest to our participants. It is hoped that a wider selection of enzymes will be included in this scheme by rotating the enzymes each year.

Q.6: Neurotransmitters – CSF (8 responses, 9.3% of all respondents)

Suggested Analytes to be added

Total suggested = 6

Analytes with >1 response

5-MTHF	n = 7
pterins in CSF	n = 2

Suggested Analytes to be removed

Total suggested = 0

All Analytes suggested

ERNDIM Response:

- 5-MTFH may be considered for inclusion in the scheme in the future however this cannot be added for the 2020 scheme due to the time required to prepare and validate the addition of a new analyte to this scheme.

Q.8: Purines & pyrimidines (9 responses, 10.5% of all respondents)

Suggested Analytes to be added

Total suggested = 8

Analytes with >1 response

SAICAR	n = 5
Succinyladenosine	n = 4
SAdo	n = 3
Ureidopropionate	n = 2
Ureidobutyrate	n = 2
Dihydroxyadenine	n = 2

Suggested Analytes to be removed

Total suggested = 2

All Analytes suggested

Pseudo-uridine	n = 1
Orotidine	n = 1

ERNDIM Response:

- SAICAR is very costly, however this will be reviewed periodically as other changes to the scheme may make this a viable addition in the future.
- Succinyladenosine will be included at two levels in the 2020 scheme.
- Analytes only requested by two participants are not yet in demand enough to be added.

Q.10: Pterins – Urine (1 responses, 1.2% of all respondents)

Suggested Analytes to be added		Suggested Analytes to be removed
Total suggested = 2		Total suggested = 0
All analytes suggested		**All Analytes suggested**
Monapterin	n = 1	
Isoxanthopterin	n = 1	

ERNDIM Response:

- No responses were received from enough participants to warrant adding new analytes to the scheme at this time.

Q.12: Quantitative amino acids (17 responses, 19.8% of all respondents)

Suggested Analytes to be added		Suggested Analytes to be removed	
Total suggested = 27		Total suggested = 12	
Analytes with >1 response		**Analytes with >1 response**	
Homocystine	n = 4	Pipecolic acid	n = 7
Phosphoethanolamine	n = 4	Aspartyl glucosamine	n = 7
Histidine 1-Methyl	n = 3	Sarcosine	n = 3
Glycine-Proline dipeptide	n = 2	Histidine 3-methyl	n = 3
Homocysteine	n = 2	Tryptophan	n = 3
		Arginin-succinic acid	n = 2
		2-Aminobutyric acid	n = 2
		Homocitrulline	n = 2
		Saccharopine	n = 2

ERNDIM Response:

- The addition of phosphoethanolamine was tested in 2016 but it was not stable enough to include.
- Addition of other analytes may be considered subject to the cost of inclusion. This includes consideration of inclusion of analytes usually included on rotation to be included in every scheme year.

Q.14: Quantitative organic acids (10 responses, 11.6% of all respondents)

Suggested Analytes to be added		Suggested Analytes to be removed	
Total suggested = 14		Total suggested = 3	
Analytes with >1 response		**All Analytes suggested**	
orotic acid	n = 5	keto-glutaric	n = 1
3-hydroxypropionic acid	n = 3	glycolic	n = 1
succinylacetone	n = 2	Vanillactic acid	n = 1
suberylglycine	n = 2		
lactic acid	n = 2		

ERNDIM Response:

- Orotic acid, succinylacetone and lactic acid are included in the Special Assays in urine scheme.
- There were not enough requests for removal of any analyte to justify their removal at this time.

Q.6: Special assays – Dried Blood Spots (16 responses, 18.6% of all respondents)

Suggested Analytes to be added		Suggested Analytes to be removed	
Total suggested = 28		Total suggested = 3	
Analytes with >1 response		**All Analytes suggested**	
alpha-glucosidase	n = 6	C0	n = 1
alpha-galactosidase	n = 6	SA	n = 1
methylmalonic acid	n = 5	NTBC	n = 1
acid lipase	n = 5		
beta-glucosidase	n = 5		
GALT enzyme	n = 4		
Methylcitric acid	n = 3		
C18	n = 2		
Homocysteine	n = 2		
C8	n = 2		

ERNDIM Response:

- This scheme is currently very new and while changes may be made in the future it is not yet the right time to expand the analytes to be included.
- There were not enough requests for removal of any analytes to justify their removal at this time.

Q.18: Special assays – serum (19 responses, 22.1% of all respondents)

Suggested Analytes to be added		Suggested Analytes to be removed	
Total suggested = 32		Total suggested = 4	
Analytes with >1 response		**All Analytes suggested**	
Acetoacetate	n = 4	NEFA	n = 3
Biotinidase	n = 3	carnitine free	n = 2
Campesterol	n = 3	3-OH butyrate	n = 1
Desmosterol	n = 3	lactic acid	n = 1
Lathosterol	n = 3		
Sitosterol	n = 3		

ERNDIM Response:

Suggested additions

- Biotinidase - Enzyme activity, there is no commercially available analyte so it cannot be added. EQA for Biotinidase in dried blood spots is available in Newborn Screening Quality Assurance Program, Atlanta (www.cdc.gov/nsqap).
- Desmosterol – This was considered by the SAB in 2016 and rejected as it was not commercially feasible.
- Sitosterol, lathosterol, camposterol – These were considered by the SAB in 2018 and rejected
- Over several years the inclusion of Coenzyme Q10 has been requested. The potential to include measurement of this is being investigated by the Scientific Advisor for this scheme.

Suggested removals

- There were not enough requests for removal of any analytes to justify their removal at this time.

Q.20: Special assays – urine (19 responses, 22.1% of all respondents)

Suggested Analytes to be added		Suggested Analytes to be removed	
Total suggested = 20		Total suggested = 10	
Analytes with >1 response		**All Analytes suggested**	
Gb3	n = 3	Glycolic Acid	n = 3
		Glyceric acid	n = 2
		Pipecolic acid	n = 2

ERNDIM Response:

- No changes were requested by a large enough number of participants to lead to any changes.

3.3. Do you have any other remarks, comments or suggestions for any of the schemes you subscribed to? (Q.22)

- Number of individual responses = 30 (= 14.2% of all responses).
- These comments are summarised under 3.8 (page 12) with the comments made in response to Q.43 (see 3.7).

3.4. Would your laboratory accept an increase in scheme costs if it allowed additional analytes to be included in the scheme? *[relating to ACS, NCSF, PPU, PTU, QTAS, QTOU, SADB, SAS and SAU]* (Q.4, 7, 9, 11, 13, 15, 17, 19 and 21):

- A total of 156/212 respondents (73.6%) answered the question for one or more schemes in this section.
- We also asked if participants had any other comments related to this question and a total of 28/156 participants responding in this section (17.9%) also included a comment relating to the question.

Table 3: Responses to questions on possible changes to scheme costs related to analyte content.

Scheme	No. of responses	% of scheme participants†	Respondents answering "yes"	Respondents answering "no"	No. of comments
ACS	76	74.5%*	50 (65.8%)	26 (34.2%)	8
NCSF	32	103.2%*	17 (53.1%)	15 (46.9%)	2
PPU	42	77.8%*	24 (57.1%)	18 (42.9%)	0
PTU	32	100.0%*	13 (40.6%)	19 (59.4%)	0
QTAS	117	44.3%*	61 (52.1%)	56 (47.9%)	15
QTOU	68	54.0%*	38 (54.0%)	30 (44.1%)	5
SADB	52	59.8%*	32 (61.5%)	20 (38.5%)	0
SAS	83	61.5%*	44 (53.0%)	39 (47.0%)	3
SAU	84	38.5%*	48 (57.1%)	36 (42.9%)	4
Total	**586**	**-**	**327 (55.8%)**	**259 (44.2%)**	**37**

† Total responses as a % of number of participants in the 2018 scheme

** Responses from laboratories not participating in the scheme were not excluded from the figures as these may represent potential future participants in the scheme.*

- Comments (n = 28)
  - Not willing to accept costs because do not believe the scheme requires any additional analytes (n = 12: ACS = 4, NCSF = 1, QTAS = 5, QTOU = 1, SAS = 1).
  - Acceptance of cost increases would depend upon the analytes to be added or how many analytes were to be added (n = 10: ACS = 2, QTAS = 3, QTOU = 1, SAS = 2, SAU = 2).
  - Increased costs would only be accepted if the costs were reasonable (n = 7: ACS = 2, QTAS = 3, SAS = 2, SAU = 2).
  - Do not have control over lab budget for EQA, that is decided by their organisation (n = 2: QTAS = 1, QTOU = 1).
  - Costs are already high (n = 3: QTAS = 2, SAU = 1).
  - Reduce the number of samples rather than increasing costs (n =1: QTAS)
  - Moving an analyte from one scheme to another should not mean an increase in cost (n = 1: QTOU)
  - Thanks for the addition of a previously requested analyte without a cost increase (n = 1: QTAS)

3.5. Would you accept a smaller sample for this scheme & what is the minimum sample size you require for this scheme? *[asked for all schemes]* (Question 23 to 38)

- Background: We are aware that the increasing costs of EQA participation is an issue for some of our participants. So we are looking at ways to decrease the scheme costs without affecting the quality of the schemes. We are also aware that some laboratories would like extra analytes to be included in the Quantitative EQA schemes. However the addition of some of the requested analytes would increase the EQA scheme prices which, we appreciate, may be unacceptable to some laboratories.
- For this section only responses from participants in each of the schemes have been included as they are best able to assess the minimum volume size they can accept.
- A total of 182/212 respondents (89.2%) answered the question for one or more schemes in this section.
- Full details of the responses are in Table 4 on page 10.
- The average response rate for each scheme was 50.3% of 2018 scheme participants.
- Of the 16 schemes surveyed only 5 (ACS, PPU, QTAS, QTOU, SAS) had a majority of responders accepting smaller sample sizes/volumes. For QTAS and SAS the margin in favour of smaller sample volume was very small (QTAS Yes = 51.8% and SAS Yes = 50.5%). ACS, PPU and QTOU, however, had larger majorities of

responders accepting smaller sample sizes although all 3 of these schemes had a response rate of less than 50% of scheme participants.

- We also asked if participants had any other comments related to this question and total of 70 comments, from 40/182 respondents, were received relating to these questions.
- Comments (n = 70)
  - Prefer samples to remain the same or to receive larger samples than currently provided (n = 56: ACDB = 2, LEFB = 3, NCSF = 1, PPU = 1, PTU = 3, QTAS = 8, QTOU = 2, SADB = 2, SAS = 4, SAU = 3, ACDB = 5, CDG = 6, DPT = 4, QLOU = 9, UMPS = 3).
  - Required sample volume is dependent upon the creatinine concentration (n = 8: QTOU = 1, DPT = 3, QLOU = 2, UMPS = 2).
  - Reduce the number of circulations rather than reducing volume of sample (n = 2: ACDB = 1, PPU = 1).
  - Would a smaller sample volume mean a reduction in scheme price (n = 2: SADB = 1, SAS = 1).

Table 4: Responses to questions on possible sample volume changes.

Scheme (current sample size)	No. of responses from scheme participants / Total No. of scheme participants	Average no. of analytes that submit results for (range)	Would you accept a smaller sample volume?[1]		What is the min. sample size you could accept?[2]	
			Yes	No	n[3]	No of responses per option
ACDB (35-50µl)	58/126 (46.0%)	n/a	12/56 (21.4%)	44/56 (78.6%)	31	10-20µl = 1 (3.2%)
						20-30µl = 7 (22.6%)
						30-40µl = 23 (74.2%)
ACS (1ml)	50/102 (49.0%)	18 (5-21) *21 analytes in scheme*	30/48 (62.5%)	18/48 (37.5%)	41	0.25ml = 12 (29.3%)
						0.5ml = 17 (41.5%)
						0.75ml = 12 (29.3%)
CDG (25µl)	41/67 (61.2%)	n/a	4/41 (9.8%)	37/41 (90.2%)	12	10µl = 1 (8.3%)
						20µl = 11 (91.7%)
CWBC (5ml, whole blood equivalent)	20/37 (54.1%)	n/a	4/20 (20.0%)	16/20 (80.0%)	12	1ml = 1 (8.3%)
						2ml = 1 (8.3%)
						3ml = 1 (8.3%)
						4ml = 9 (75.0%)
DPT (10ml)	61/110 (55.5%)	n/a	13/59 (22.0%)	46/59 (78.0%)	23	2.5ml = 2 (8.7%)
						5.0ml = 8 (34.8%)
						7.5ml = 13 (56.5%)
LEFB (0.5mg)	40/73 (54.8%)	9 (1-11) *11 analytes in scheme*	2/38 (5.3%)	36/38 (94.7%)	9	0.25mg = 9 (*only one option given)*
NCSF (0.5ml)	20/31 (64.5%)	3 (1-4) *4 analytes in scheme*	5/19 (26.3%)	14/19 (73.7%)	10	0.1ml = 0 (0.0%)
						0.2ml = 2/ (20.0%)
						0.3ml = 1 (10.0%)
						0.4ml = 7 (70.0%)
PPU (5ml)	26/54 (48.1%)	15 (3-23) *23 analytes in scheme*	19/24 (79.2%)	5/24 (20.8%)	21	1ml = 5 (23.8%)
						2ml = 8 (38.1%)
						3ml = 5 (23.8%)
						4ml = 3 (14.3%)
PTU (1ml)	19/32 (59.4%)	3 (2-4) *4 analytes in scheme*	6/19 (31.6%)	13/19 (68.4%)	12	0.25ml = 1 (8.3%)
						0.5ml = 1 (8.3%)
						0.75ml = 10 (83.3%)
QLOU (2-3ml)	103/220 (46.8%)	n/a	19/102 (18.6%)	83/102 (81.4%)	54	1ml = 9 (16.7%)
						2ml = 45 (83.3%)
QTAS (1ml)	118/264 (44.7%)	25 (1-35) *35 analytes in scheme*	59/114 (51.8%	55/114 (48.2%)	90	0.25ml = 11 (12.2%)
						0.5ml = 40 (44.4%)
						0.75ml = 39 (43.3%)
QTOU (10ml)	54/126 (42.9%)	18 (1-26) *26 analytes in scheme*	36/52 (69.2%)	16/52 (30.8%)	44	2.5ml = 10 (22.7%)
						5.0ml = 22 (50.0%)
						7.5ml = 12 (27.3%)
SADB (75µl)	31/87 (35.6%)	6 (1-11) *11 analytes in scheme*	5/30 (16.7%)	25/30 (83.3%)	11	25µl = 3 (27.3%)
						50µl = 8 (72.7%)
SAS (5ml)	100/233 (42.9%)	7 (1-23) *23 analytes in scheme*	48/95 (50.5%)	48/95 (49.5%)	69	1ml = 11 (15.9%)
						2ml = 15 (21.7%)
						3ml = 18 (26.1%)
						4ml = 25 (36.2%)

Scheme (current sample size)	No. of responses from scheme participants / Total No. of scheme participants	Average no. of analytes that submit results for (range)	Would you accept a smaller sample volume?[1]		What is the min. sample size you could accept?[2]	
			Yes	No	n[3]	No of responses per option
SAU (5ml)	78/177 (44.1%)	8 (1-11) *21 analytes in scheme*	27/77 (35.1%)	50/77 (64.9%)	40	1ml = 5 (12.5%)
						2ml = 7 (17.5%)
						3ml = 7 (17.5%)
						4ml = 21 (52.5%)
UMPS (5ml)	56/100 (56.0%)	n/a	12/56 (21.4%)	44/56 (78.6%)	25	1ml = 3 (12.0%)
						2ml = 2 (8.0%)
						3ml = 5 (20.0%)
						4ml = 15 (60.0%)

[1]*Only responses from participants in this scheme were included in the data; the percentages refer to the number of responses Yes or No in relation to the total number of responses to this question.*

[2]*Some participants answering 'no' to 'would you accept a smaller sample" also responded to the question asking them to select a minimum sample size.*

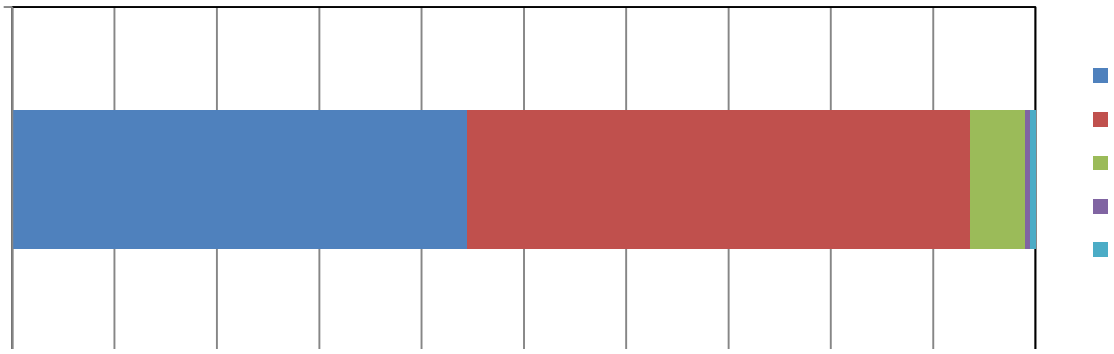
[3]*n = number of responses from scheme participants per question*

3.6. Comments on the overall performance of ERNDIM (Q.39 – 42)

- The aim of this section is to assess participants' perception of the overall performance of ERNDIM.
- In summary:
  - 94% of respondents rated the quality of services provided by ERNDIM as 'excellent' or 'good'; with 97% of respondents having 'complete' or 'a lot' of confidence that ERNDIM can deliver the service required by participants.
  - 72% of respondents agreed that overall ERNDIM's performance is 'getting better' or 'getting much better'; with 97% of respondents stating that it was 'certain' or 'very likely' that they would use ERNDIM services in the future.

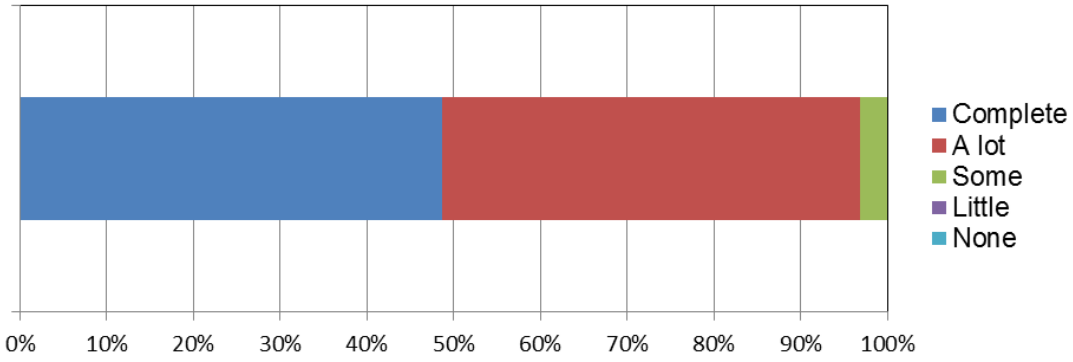
Q.39: Overall, how do you rate the quality of products and services we provide?

(189 individual responses, 89% of all responses for this section)



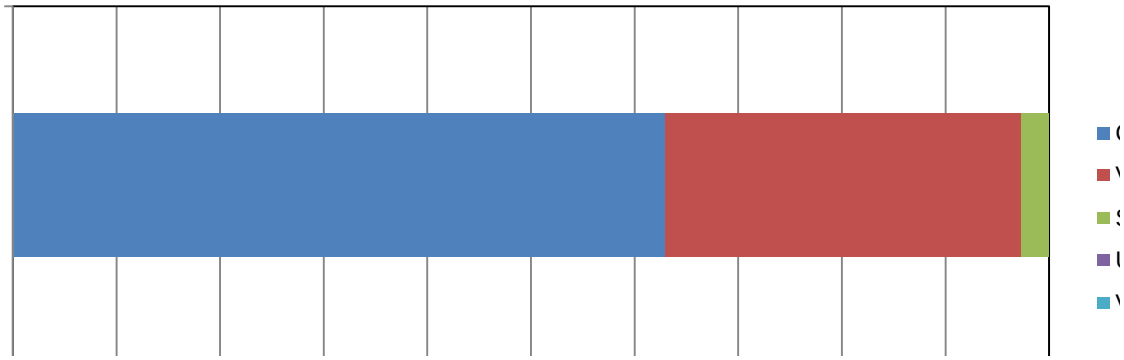
Q.40: What level of confidence do you have in us to deliver the products and services that you require?

(187 individual responses, 88% of all responses for this section)



Q.41: Overall, is our performance...
(187 individual responses, 88% of all responses for this section)

Q.42: Based on our performance, how likely is it that you will use us in the future?
(189 individual responses, 89% of all responses)



3.7. Do you have any other remarks, comments or suggestions for how we could improve the services we provide? (Q.43)

- Number of individual responses = 44 (= 21% of all responses).
- These comments are summarised below with the comments made in response to Q22.

3.8. Summary of Remarks, comments or suggestions for improvements (Q.22 & Q.43)

- Total number of responses was 72 from 56 individuals (= 34% of all responses).
- There were a large number of comments and suggestions for improvement. Below is a summary of some of the most frequent comments with responses from ERNDIM.

Participant Comment	ERNDIM Response
1. Administration	
• Unnecessary length of survey with a lot of questions which answers you could extract from your own database.	• As part of the progress towards accreditation to ISO 17043 ERNDIM is required to collect feedback from participants. This is also part of our aim to continue developing our services to meet the needs of our participants. Although the length of the survey may seem excessive we aim to be thorough in our consultations with our participants. While a large proportion of participants do choose to provide their ERNDIM code we allow anonymous completion of the survey, this means that it is not possible for us to extract data from our database as we cannot match all responses to specific participants.
• About invoices, an e-mail notifying they are already available in the web would be advisable. It seems we were waiting for this e-mail for several months without knowing the invoices were already available in the web.	• Emails are automatically sent from our website via the admin@erndim.org email address when invoices are first issued. While a small proportion of participants apparently did not receive this notification the majority did receive the notification. Reminders are then sent on a monthly basis from the erndim@mft.nhs.uk email address to ensure participants are aware of the invoice.

Participant Comment	ERNDIM Response
• There continues to be a difficulty updating the laboratory contact information across all schemes. It appears that we need to contact each scheme separately when a change is made. It would be easier to be able to just contact the ERNDIM office once.	• During the registration period Primary Contacts are able to make changes to their institutes contact information via the registration website. At all other times contact changes should be made by contacting the administration office directly, admin@erndim.org or erndim@mft.nhs.uk. Changes are then disseminated to all scheme organisers but please allow up to 2 weeks for these changes to be made.
• The accreditation of ERNDIM is taking too long, it should be accomplished quickly.	• Accreditation is a high priority for ERNDIM and progress is being made in order to apply for accreditation as soon as possible.
• Payment option using credit card would be helpful.	• ERNDIM is currently reviewing options for changes to our registration website and will investigate the possibility of accepting credit card payments as part of this process.

2. EQA Schemes

2.1. General

• The main problem is the long interval between the last scheme sample (October) and the new scheme (March or April) that leaves the laboratories without external controls during almost 6 months. Why not make a pause during summer and a shorter pause during winter?	• For the quantitative schemes, the gap in EQA (November – March) relates to organisation issues. This cannot be changed easily however, we are working on a modified scheme calendar which will partially address this. • For the qualitative schemes, sample availability is the main reason for the gaps between the end one scheme year and the beginning of the next. We are looking to address this over the coming years.
• I would prefer samples which only include cases of inborn errors of metabolism with minimum samples of 'normal'. Please avoid non IEM samples in the scheme such as what we had in one of the urine qualitative organic acid scheme in 2018.	• The disorders included in ERNDIM Qualitative schemes are limited by the availability of samples, we welcome sample donations for these schemes. Please visit https://erndim.org/home/qascheme.asp for further information. • The inclusion of 'normal' samples is also a key part of EQA assessment as it is equally important to ensure over-diagnosis is avoided as correct diagnosis of affected patients.

2.2. Sample Volume

• Our lab also often use residual ERDNIM material (from previous years) for validation of new method; target concentrations used for a marker corresponding to the consensus mean concentrations of all participating laboratories. So ERNDIM could prepare larger volumes for each quantitative QCE scheme, that in order to keep residual material to sell to labs that want to validate a new method.	• ERNDIM EQA samples are not designed for the purpose of validation. While we understand that participants may use additional material for these purposes ERNDIM cannot produce larger sample sizes for that purpose as this would require additional charges to scheme participants. During registration however, labs can purchase additional sets of samples for the majority of our schemes if a greater sample volume is required. Additionally where a sample is required for re-testing, for instance in the case of a poor EQA performance, participants can contact the administration office to enquire whether any material is available at the end of the scheme year.

2.3. Website reporting

• New design for web submission report in Qualitative Organic Acids and Acylcarnitines is a bit confusing, let´s see in 2019 if we fill it better avoiding mistakes.	• 2018 was the first year online reporting was introduced for these two schemes. We hope that as participants adjust to the website it will become easier to use. Please be aware that user guides are available and the administration office (admin@erndim.org) can be contacted for assistance whenever required.
• Evaluation of lab results by the organiser must be faster.	• Evaluation of Qualitative schemes is very labour intensive and as such takes some time. With online result submission now available for our EQA schemes we hope to move towards improved assessment tools for our Scientific Advisors to use which will hopefully speed up evaluation.

2.4. Acylcarnitines in DBS

• Results on BS Acylcarnitine are not received in timely manner.	• Result submissions are currently assessed manually by our Scientific Advisors, this is a very labour intensive task and our Scientific Advisors have full time posts in diagnostic roles in addition to their ERNDIM contributions. We hope that the introduction of online reporting and subsequently assessment will reduce this workload and allow for a quicker publishing of results.

Participant Comment	ERNDIM Response
2.5. CDG scheme	
• It is really good to have the 'diagnoses' quickly for the qualitative schemes as done by CDG and MPS schemes. It would be particularly helpful to have this for organic acid, acyl carnitine and DPT schemes.	• We appreciate this feedback and the possibility of doing this for other Qualitative schemes will be discussed at the November 2019 ERNDIM Scientific Advisory Board meeting.
2.6. DPT scheme	
• The marking of results for the DPT schemes needs to reflect that not all testing to reach a diagnosis is available in all centres. eg oligosaccharide testing is not available in all labs.	• When a lab does not provide all the testing required to reach a diagnosis the submitted report should include any suggestions or recommendations for further testing as would be done for a clinical sample
2.7. Neurotransmitters in CSF	
• Reference values should be given based on the CSF fraction taken, since not all labs use the same fraction and can therefore have different reference values and a different interpretation of the results.	• Scoring of interpretation is being piloted during 2019 and the provision of reference range is one of the factor being investigated
2.8. Qualitative Organic Acids	
• In organic acid qualitative scheme it would be good to get a spiked sample with unusual compounds that can prove difficult to detect rather than solely depending on patient samples	• The Quantitative Organic Acids in urine scheme may be of interest in this case.
2.9. Special Assays in DBS	
• The amount of sample provided for the DBS scheme is really minimal for our needs. There's no room for error and would be impossible to repeat anything. Two spots, or a larger spot, per sample would better.	• The volume of sample provided will be reviewed given the survey findings (see page 9).
2.10. Special Assays in serum	
• Based on the concentrations ranges for Methylmalonic acid (MMA) and Homocysteine (tHCY) from last years (2018) report, approximately 6/8 of the ERNDIM lyophilized samples will be far beyond the clinically meaningful range typically observed for these biomakers. Is it possible for ERNDIM to provide specimens with concentrations closer to what is typically measured in human plasma/serum samples? Concentrations around <0.26 umol/L and 5-15 umol/L for MMA and tHCY, respectively.	• The levels of Methylmalonic acid and Homocysteine are being reviewed by the Scientific Advisor for this scheme prior to production of the 2020 scheme samples.
3. Suggestions for future schemes	We do welcome suggestions for future schemes but unfortunately it is not possible to cater for every request.
• Lysosomal Enzymes in DBS pilot scheme.	• This is something ERNDIM is looking into for the future. However, the ability to plan a future pilot scheme is dependent on sample availability. Please visit https://erndim.org/home/qascheme.asp for further information about donating samples.
• A pterins in CSF scheme would be very helpful.	• Thank you for your suggestion, this will be considered for the future.
• Metabolomics scheme.	• This something that ERNDIM is considering for the future but at this stage there are too few laboratories in a position to participate in this type of scheme for it to be viable.

3.9. Please complete your name and institute address details (Q.45)

- Number of individual responses = 161 (= 76% of all responses).