ERNDIM
Qualitative Organic acids Urine
Heidelberg ANNUAL REPORT 2019

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1. Introduction

The ERNDIM Qualitative Organic Acids in urine scheme offers urine samples obtained from confirmed patients with confirmed diagnoses to enable laboratories to gain or maintain experience to identify organic acid disorders. The scheme is organised by Dr Claus-Dieter Langhans (metabolic center Heidelberg) in conjunction with CSCQ, the Swiss organisation for quality assurance in medical laboratories.

As in previous years, samples were sent out to cover the spectrum of what is typically observed in the metabolic laboratory. A mix of clearly diagnostic profiles and some more challenging profiles were provided. As in previous years normal profiles were also sent out. The requirement to interpret a normal profile, as such, is as important as correctly identifying abnormal profiles. Correctly identifying a profile as normal can avoid unnecessary further investigation and distress to the patient and family.

2. Participants

In 2019 seventy-two laboratories from many different countries participated in the QLOU Heidelberg scheme. There were no educational participants in 2019 (none in 2018). They take part in all aspects of the scheme and receive interim reports with scores, but performance is not indicated on the ERNDIM certificate of performance.

One participant withdrew from the scheme.

Participants and new applicants will be distributed between the Barcelona, Heidelberg and Sheffield qualitative urinary organic acid schemes which are run separately. The three organising laboratories each participate in the other's scheme by rotation.

Table 1: Geographical distribution of participants

Country	*Number of laboratories*		*Country*	*Number of laboratories*
Austria	3		Lithuania	1
Bulgaria	1		Luxembourg	1
Canada	11		Mexico	1
China	3		Netherlands	9
Croatia	1		Slovenia	1
Czech Republic	2		Sri Lanka	1
Denmark	1		Switzerland	3
Estonia	2		Thailand	1
Germany	17		Turkey	10

Version Number (& Date)	Amendments
[1] version 2 (02 March 2020)	• Page 21: scores for Lab no 55 revised

Table 1: Geographical distribution of participants				
Country	*Number of laboratories*		*Country*	*Number of laboratories*
India	1		UK	1
Latvia	1			

3. Design of the scheme and logistics

As usual, the samples used in 2019 were authentic human urine samples, six from affected patients and three from healthy individuals.
All samples selected by the Scientific Advisor have been heat-treated and were tested for suitability in the Scientific Advisor's laboratory.
In 2019 CSCQ dispatched the QLOU EQA samples to the scheme participants and provides a website for on-line submission of results and access to scheme reports. Existing QLOU, ACDB, DPT and Urine MPS scheme participants can log on to the CSCQ results submission website at: https://cscq.hcuge.ch/cscq/ERNDIM/Initial/Initial.php
Labelled copies of chromatograms can be uploaded on the CSCQ website.

4. Schedule of the scheme

Table 2: Time schedule in the 2019 ERNDIM QLOU Heidelberg scheme.

	1st Submission Round	**2nd Submission Round**	**3rd Submission Round**
Sample ID's:	QLOU-DH-2019-A QLOU-DH-2019-B QLOU-DH-2019-C	QLOU-DH-2019-D QLOU-DH-2019-E QLOU-DH-2019-F	QLOU-DH-2019-G QLOU-DH-2019-H QLOU-DH-2019-I
Shipment of samples	February 5th, 2019		
Start of analysis (clinical data available)	May 13th, 2019	July 8th, 2019	September 9th, 2019
Reminder for result submission	May 27th, 2019	July 22th, 2019	September 23th, 2019
Results submission deadline:	June 3rd, 2019	July 31st, 2019	September 30th, 2019
Interim reports available on CSCQ website	August 19th, 2019	October 8th, 2019	November 4th, 2019

To be able to continue this scheme we need a steady supply of new patient samples. Several laboratories have donated samples to the Urine QLOU scheme in the past, for which they are gratefully acknowledged. If you have one or more samples available and are willing to donate these to the scheme, please contact us at admin@erndim.org.
Laboratories which donate samples that are used in the scheme are eligible for a 20% discount on their participation in the QLOU scheme in the following year.

Table 3: Samples included in the 2019 ERNDIM QLOU Heidelberg scheme.

Survey	Sample no.	Diagnosis
19-05-OUH	QLOU-DH-2019-A	HMG-CoA lyase deficiency
	QLOU-DH-2019-B	ß-ureidopropionase deficiency
	QLOU-DH-2019-C	normal pattern
19-07-OUH	QLOU-DH-2019-D	combined malonic and methylmalonic aciduria (cMAMMA)
	QLOU-DH-2019-E	2-methylbutyryl-CoA dehydrogenase deficiency
	QLOU-DH-2019-F	normal pattern
19-09-OUH	QLOU-DH-2019-G	normal pattern
	QLOU-DH-2019-H	aminoacylase I deficiency
	QLOU-DH-2019-I	isovaleric aciduria

The scheme format was kept identical to those of previous years. Samples were shipped by regular mail. Details regarding stability of samples are provided in the sample package.

Evaluation of results was performed using Excel with the submitted results extracted from the database by the website manager.

5. Results

Table 4: Receipt of results in the 2019 ERNDIM QLOU Heidelberg scheme.

Survey	In time	Late	Total
19-05-OUH	70	0	70
19-07-OUH	68	0	68
19-09-OUH	69	0	69

Table 5: Returned results in the 2019 ERNDIM QLOU Heidelberg scheme.

Submissions	Number of laboratories	%
3	66	93
2	4	6
1	1	1
0	0	0

6. Website reporting

The website reporting system is compulsory for all centres. Please read carefully the following advice:

- Results
  - Give quantitative data as much as possible.
  - Enter the key metabolites with the evaluation **in the tables** even if you don't give quantitative data.
  - If the profile is normal: enter "Normal profile" in "Key metabolites".
  - **Don't enter results in the "comments" window**, **otherwise your results will not be included in the evaluation program.**
- ***Diagnosis***
  - **Don't enter the diagnosis in the "comments" window**, **otherwise your results will not be included in the evaluation program.**
- Recommendations = **advice for further investigation**.
  - Scored together with the interpretative score.
  - Advice for treatment are not scored.
  - **Don't give advice for further investigation in "Comments on diagnosis"**: it will not be included in the evaluation program.

7. Scoring of results

A scoring system was developed in 2012 and approved by the ERNDIM Scientific Advisory Board. Similar to other qualitative (proficiency testing) ERNDIM schemes, the maximum score for a sample is 4 points.
Qualitative results and diagnostic proficiency of the 2019 samples were scored using the criteria given in Table 6. These criteria have been set by the Scientific Advisor, approved by the Scientific Advisory Board. The final decision about scoring of the scheme is made in the Scientific Advisory Board (SAB) during the Autumn meeting (November 21st, 2019).

Table 6: General criteria used to score results

Satisfactory	4	Helpful but incomplete	3
Not helpful	2	Slightly misleading	1
Misleading	0		

Starting with the 2014 schemes the concept of 'critical error' is introduced to the assessment of the qualitative schemes. Labs failing to make a correct diagnosis of a sample considered eligible for this category will be deemed not to have reached a satisfactory performance even if their total points for the year is sufficient according to the requirement set by the SAB. The classification of samples to be judged for critical error was undertaken at the SAB meeting held on November 21st, 2019.

Table 7: Samples eligible for critical errors in the 2019 ERNDIM QLOU Heidelberg scheme.

Sample	Critical errors
N/A	No

Details are given under item 9 'Results of individual samples and evaluation of reporting'.

We are required to define "Participation" for the purpose of the ERNDIM Annual Certificate which covers all ERNDIM schemes. For this urinary organic acid scheme we have defined "**Participation**" as requiring **at least two returns during the year**. Failure to meet this requirement will result in the certificate of participation showing 'non-submitter' rather than 'satisfactory' or 'unsatisfactory'.

Satisfactory performance is defined as **70% of maximum score** which equates **25/36** points for three returns and **17/24** points for two returns.

8. Proficiency of the 2019 surveys

ERNDIM provides a single certificate for all its schemes with details of participation and performance.

In 2019, 66 participants submitted 3 reports and four participants two reports including 0 educational participants. From the 71 ordinary (non-educational) participants 70 (99%) achieved satisfactory performance (score ≥ *25 / 17*, no critical error). One participant did not accomplish satisfactory performance due to incomplete submission of results (i.e. no report or 1 survey report submitted instead of 2 reports).
Overall proficiencies of each sample are depicted in Table 8.

Table 8: Overall proficiencies of the 2019 surveys.

Sample ID	Sample type	Proficiency (%)
QLOU-DH-2019-A	HMG-CoA lyase deficiency	100
QLOU-DH-2019-B	ß-ureidopropionase deficiency	Educational sample
QLOU-DH-2019-C	normal pattern	93
QLOU-DH-2019-D	combined malonic and methylmalonic aciduria (cMAMMA)	43
QLOU-DH-2019-E	2-methylbutyryl-CoA dehydrogenase deficiency	56
QLOU-DH-2019-F	normal pattern	97
QLOU-DH-2019-G	normal pattern	97
QLOU-DH-2019-H	aminoacylase I deficiency	68
QLOU-DH-2019-I	isovaleric aciduria	100

No Performance Support letters will be sent for the 2019 surveys. Unsatisfactory performance (either due to overall score or due to critical error) within an EQA scheme for at least 2 out of 3 years that the participant has subscribed for will result in a notification letter of unsatisfactory performance to the quality manager or head of department.
For the 2018 scheme seven Performance Support letters were sent.

9. Results of individual samples and evaluation of reporting

Sample QLOU-DH-2019-A:

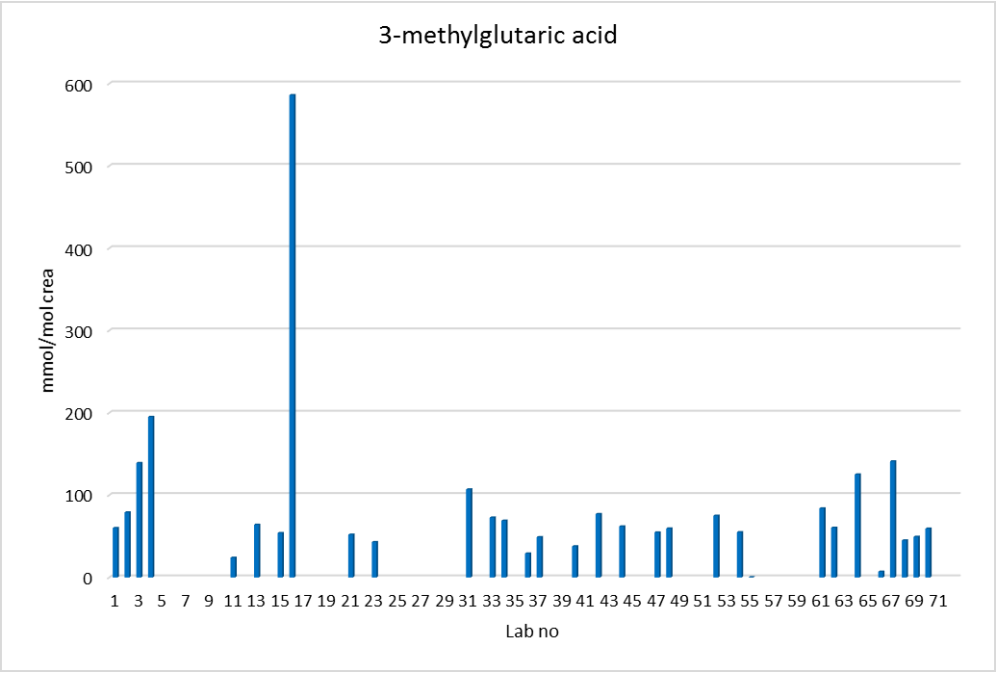
Patient details: 3-year-old boy, hypoglycaemic after episodes of vomiting

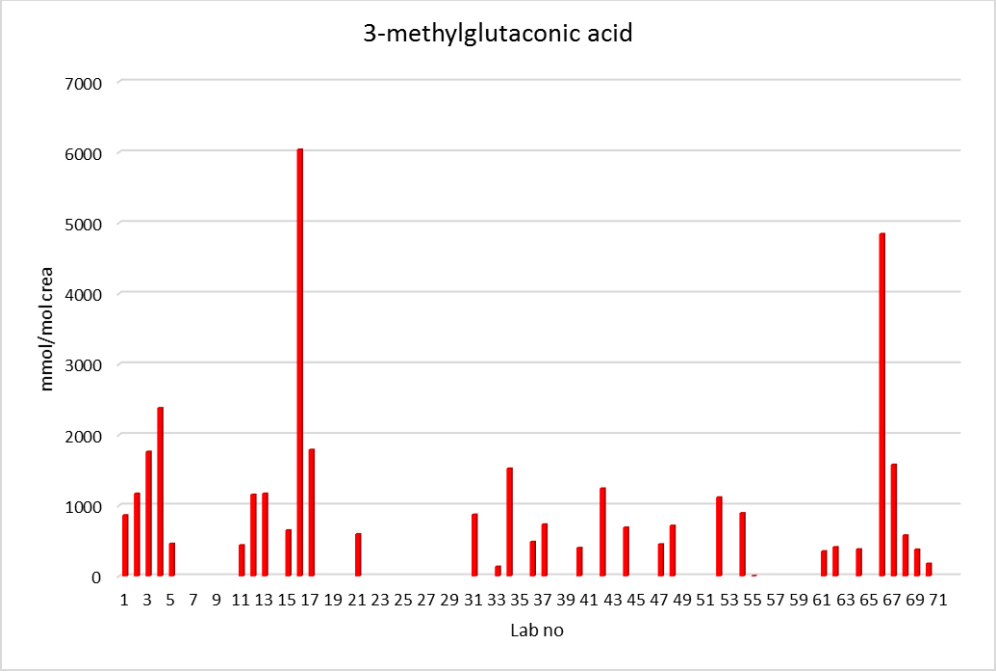
Known diagnosis: HMG-CoA lyase deficiency

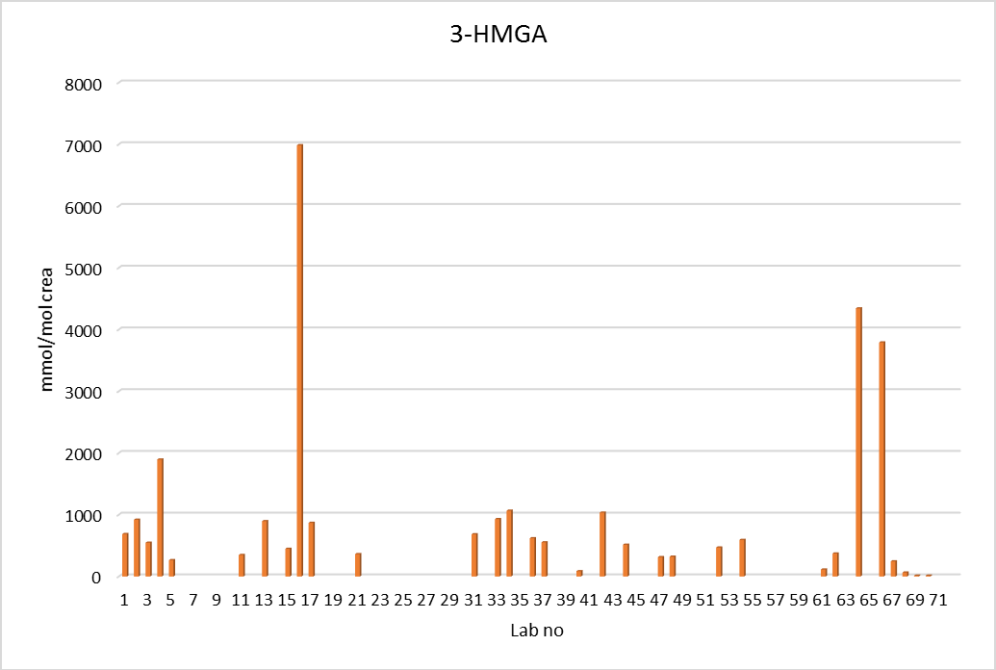
Analytical details: The key metabolites 3-methylglutaric acid, 3-methylglutaconic acid, 3-methylcrotonylglycine and 3-hydroxy-3-methylglutaric acid were clearly elevated in this sample and were reported by all participants in different combinations.
99% of the laboratories (69/70) reported 3-methylglutaconic acid and 3-hydroxy-3-methylglutaric acid.
3-methylglutaric acid was given by 94% of the participant (66/70).
3-methylcrotonylglycine was mentioned only by 46% (32/70). This may reflect the suitability of the used methods to detect glycine derivatives, also often seen in detection of MCAD deficiency.

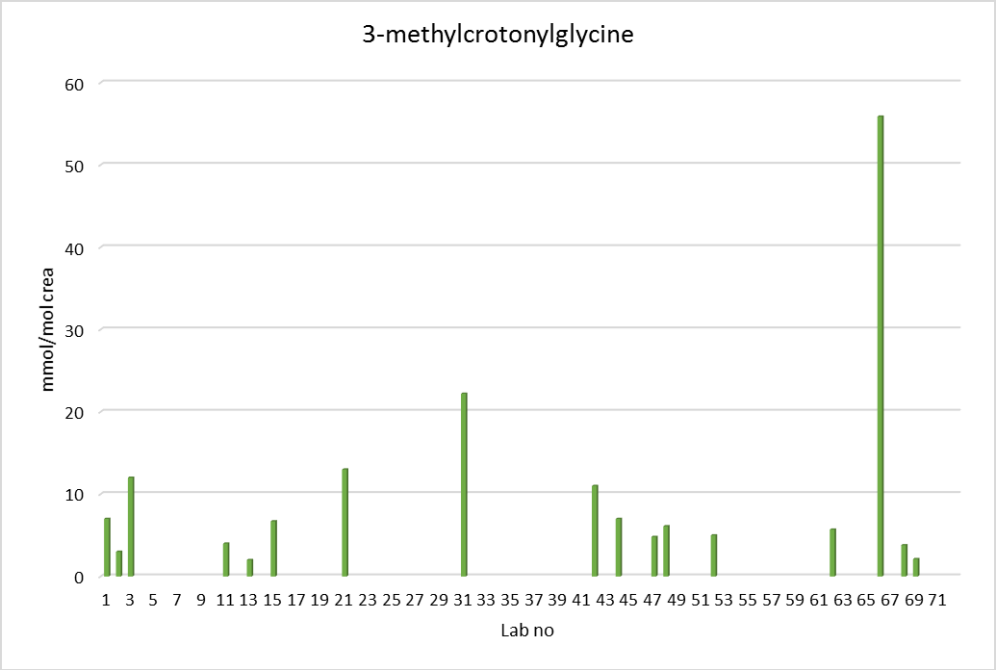
Table 9: Quantitative results of relevant metabolites

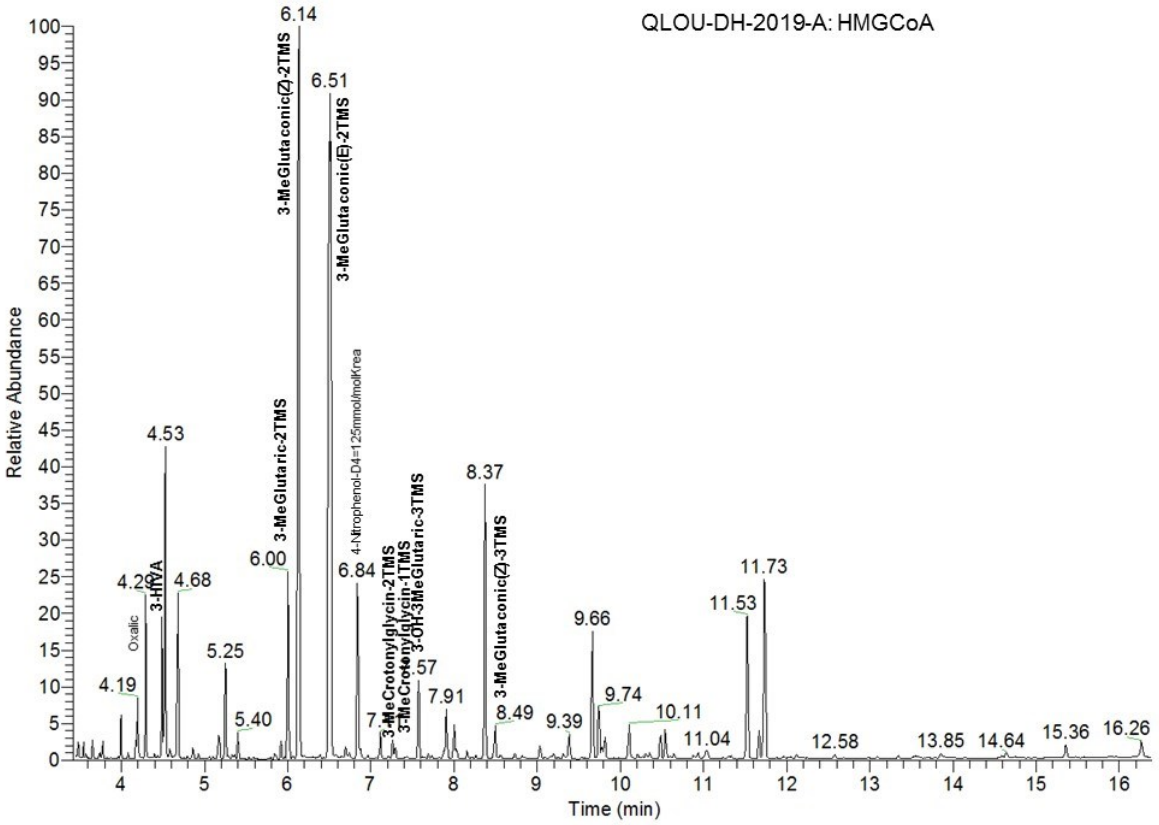
[mmol/mol creatinine]	N	Median	Range
3-hydroxy-3-methylglutaric acid	31	547.0	13.4 – 6985.0
3-methylglutaconic acid	33	716.4	5.0 – 6040.0
3-methylglutaric acid	31	60.0	0.32 – 586.0
3-methylcrotonylglycine	17	6.1	2.0 – 55.9
3-hydroxyisovaleric acid	36	297.0	5.6 – 1450.8






3-HMGA
8000
7000
6000
5000
4000
3000
2000
1000
0
mmol/mol crea
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71
Lab no


3-methylcrotonylglycine
60
50
40
30
20
10
0
mmol/mol crea
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71
Lab no



Interpretation: As expected the overall diagnostic performance was very good (100%).

This was a relatively easy sample to analyse.

Sample QLOU-DH-2019-B:

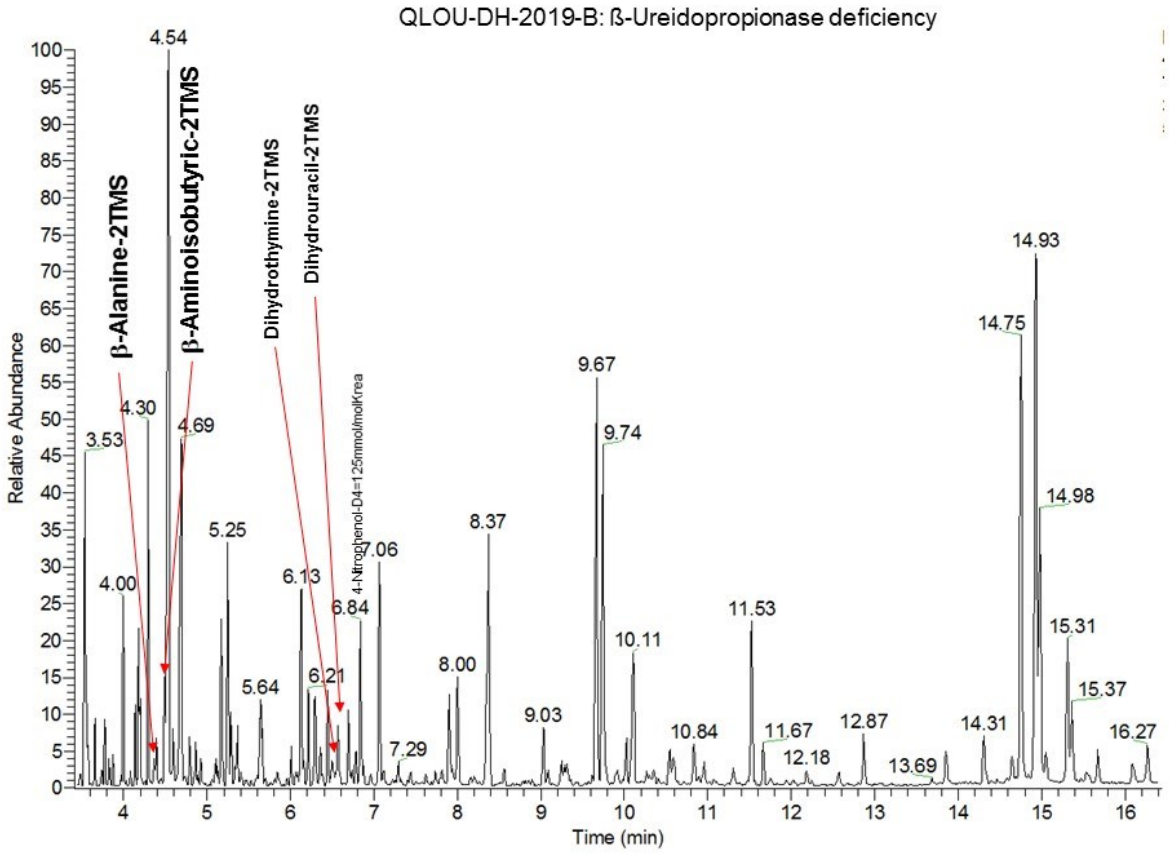
Patient details: 8-month-old girl with severe developmental delay and dystonia

Known diagnosis: ß-ureidopropionase deficiency

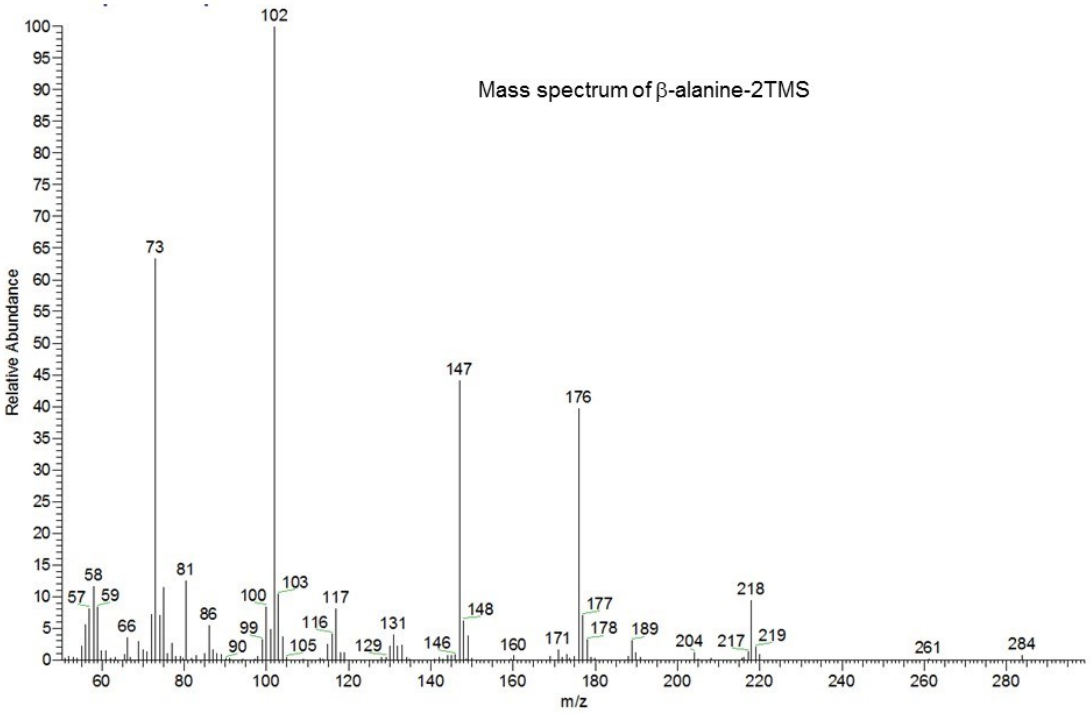
Analytical details: This sample showed elevated amounts of dihydrothymine and dihydrouracil together with detectable amounts of β-alanine and β-aminoisobutyric acid.
In case of ß-ureidopropionase deficiency elevated amounts of β-ureidopropionic acid (N-carbamoyl-β-alanine) and β-ureidoisobutyric acid (N-carbamoyl-β-aminoisobutyric acid) are excreted in urine and can be measured by purine and pyrimidine analysis. We determined, by purine and pyrimidine analysis, 147 mmol β-ureidopropionic acid / mol creatinine and 282 mmol β-ureidoisobutyric acid / mol creatinine.

Extraction efficiency of these metabolites is very low in with organic solvents and the extracted amounts decompose in the hot injector of the gas chromatograph to form β-alanine and β-aminoisobutyric acid.

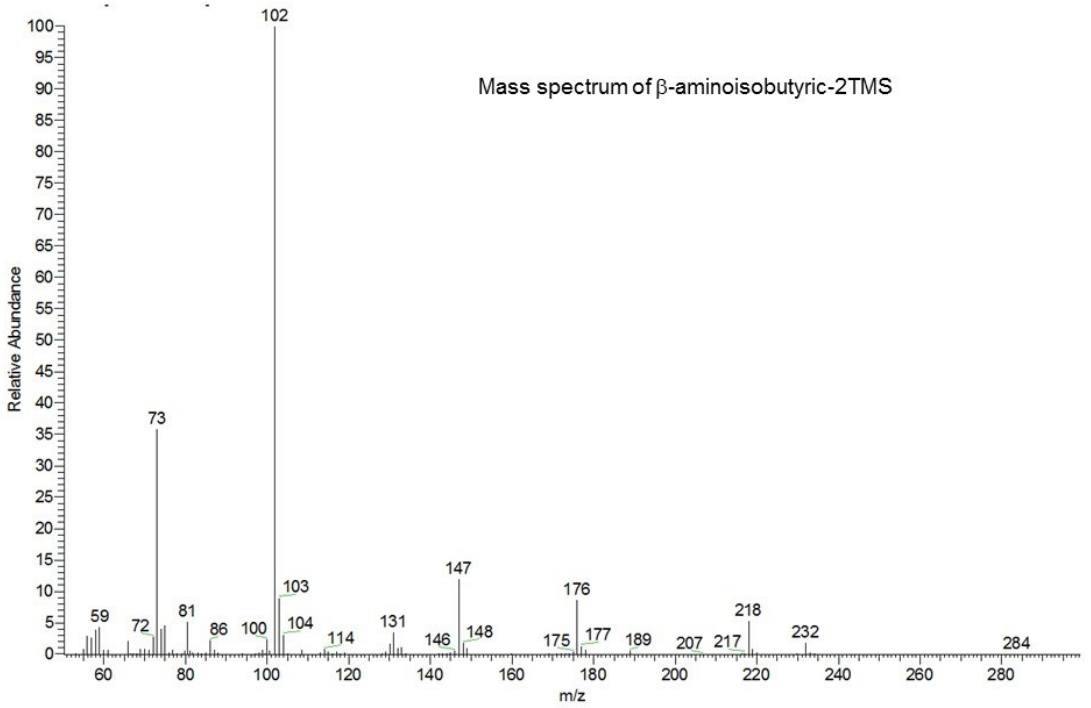
The analysis is further hampered by the fact that β-alanine elutes close to 2-methyl-3-hydroxybutyric acid and the peak of β-aminoisobutyric acid overlaps with that of 3-hydroxyisovaleric acid. Only a thorough inspection of the mass spectra could reveal the presence of these analytes.



QLOU-DH-2019-B: ß-Ureidopropionase deficiency



QLOU-DH-2019-B: ß-Ureidopropionase deficiency



Only three laboratories reported the finding of β-alanine and β-aminoisobutyric acid.
The reason for this may be that the mass spectra of these metabolites are not generally known.
Only 10% of the participants (7/70) reported elevated amounts of dihydrothymine and 6% dihydrouracil (4/70).

Interpretation: ß-ureidopropionase deficiency was diagnosed by 11% of the participants (8/70), dihydropyriminidase deficiency by 7% (5/70) and ß-aminoisobutyrate-pyruvate aminotransferase (BAIBPAT) deficiency by 3% of the participants (2/70). Overall only 21% of the participants (15/70) identified a possible disorder of purine and pyrimidine metabolism.

Overall impression: This was a rather challenging sample, mostly because organic acid analysis is not the method of choice for this kind of disorders. Nevertheless, we have chosen this sample to make laboratories aware of β-alanine and β-aminoisobutyric acid in organic acid analysis.

Furthermore it seems that a large number of labs have problems in detecting elevated amounts of dihydrothymine and dihydrouracil.

We would advise labs to re-evaluate their methods for dihydrothymine and dihydrouracil.

This sample was considered by the SAB to be an educational sample.
Scores are not to be taken into account in evaluating overall performance.

Sample QLOU-DH-2019-C:

Patient details: 7-year-old boy with poor appetite and failure to thrive

Known diagnosis: normal control sample

Analytical details and interpretation: normal pattern for organic acids. This was diagnosed by 93% of the participants (65/70). Five laboratories suggested either liver damage, medication, short/branched-chain acyl Co A dehydrogenase deficiency or vitamin B_{12} deficiency.

Sample QLOU-DH-2019-D:

Patient details: 13-month-old girl hospitalized for diarrhoea, vomiting, and dehydration

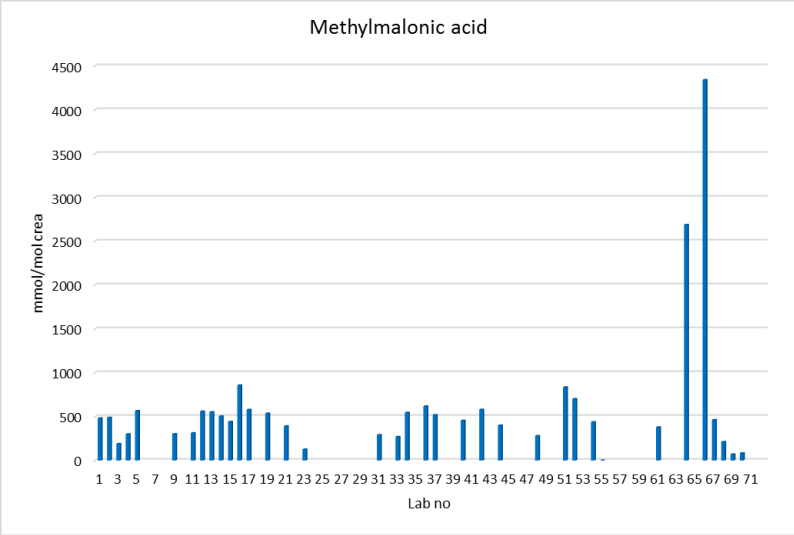
Known diagnosis: combined malonic and methylmalonic aciduria (CMAMMA)

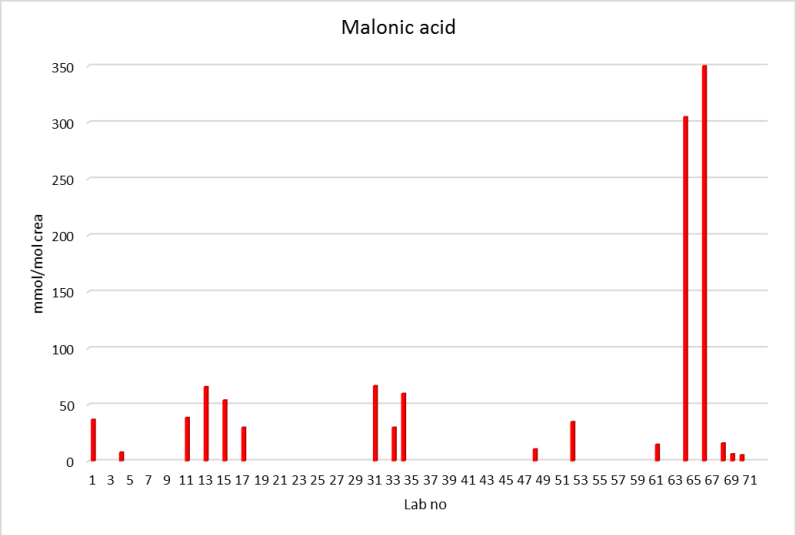
Analytical details: clearly elevated amounts of malonic acid and methylmalonic acid.

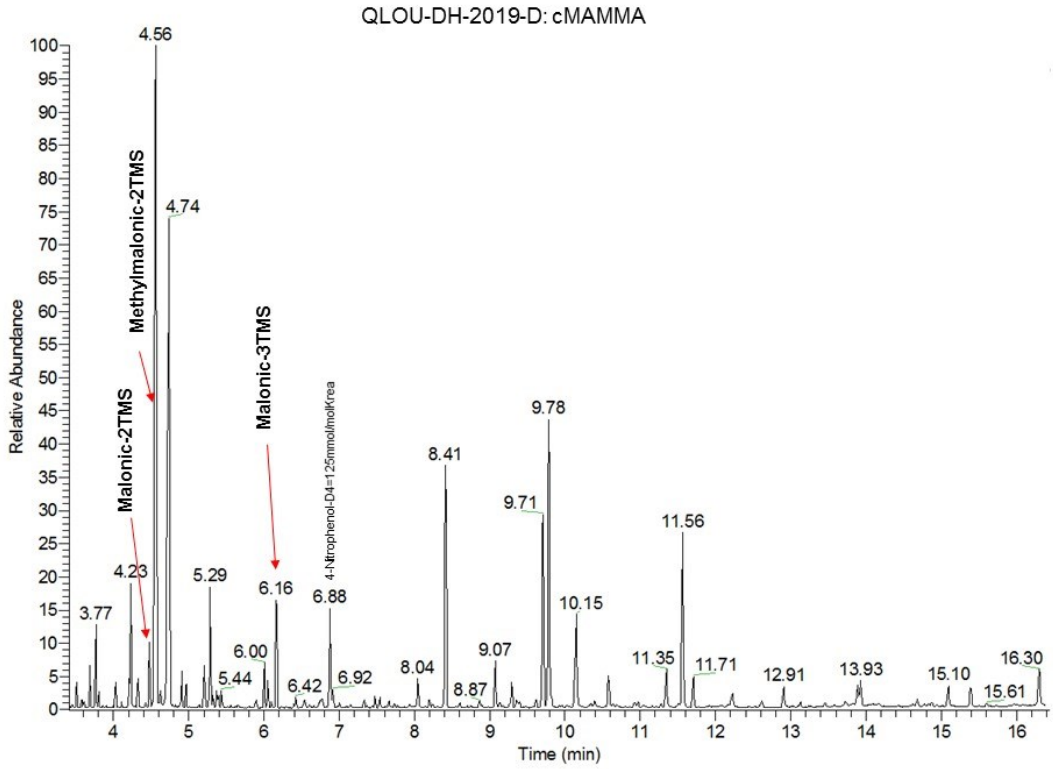
Whereas 99% of the participants (67/68) reported elevated methylmalonic acid only 59% (40/68) found malonic acid to be increased.

Table 10: Quantitative results of relevant metabolites

[mmol/mol creatinine]	N	Median	Range
methylmalonic acid	36	459.9	2.3 – 4341.8
malonic acid	17	35.0	5.6 – 2494.7







Interpretation: 44% of the participants (30/68) diagnosed cMAMMA.

Even though all labs pointed to several types of methylmalonic aciduria the proficiency in diagnosing cMAMMA is rather poor.

In the November meeting the SAB decided that the scoring of this sample had to be changed from the interim report.

New scoring:

Analytical performance:

Elevated methylmalonic acid	1 point
Elevated malonic acid	1 point

Interpretation of results

cMAMMA	2 points
MMA	1 point

Please note that all scores given in the interim reports are always only provisional and have to be verified by the SAB.

Sample QLOU-DH-2019-E:

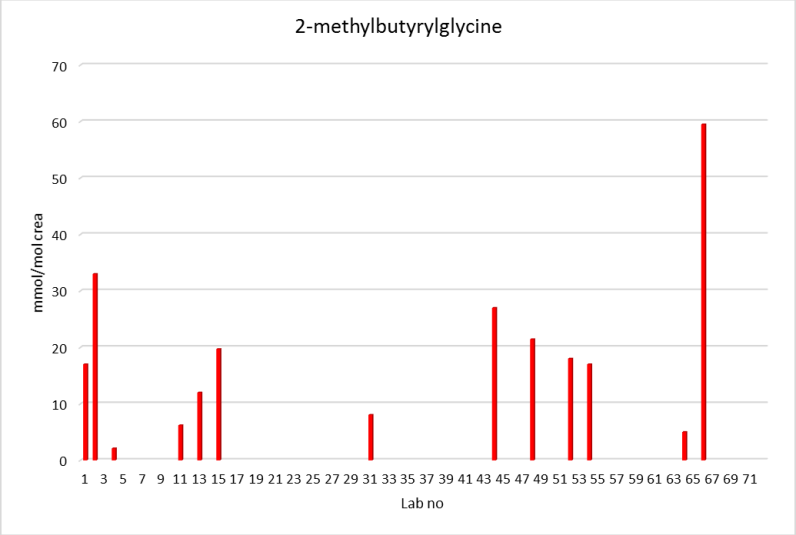
Patient details: 6-year-old mentally retarded boy with autistic features

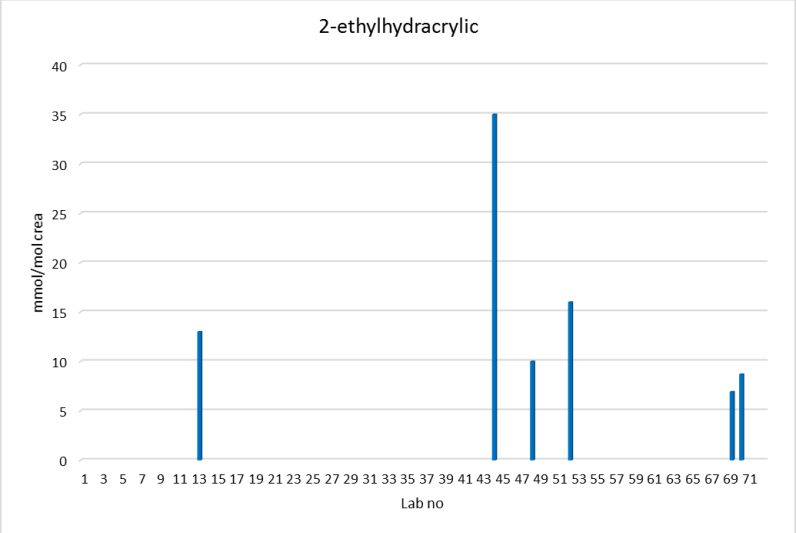
Known diagnosis: 2-methylbutyryl-CoA dehydrogenase deficiency (SBCAD)

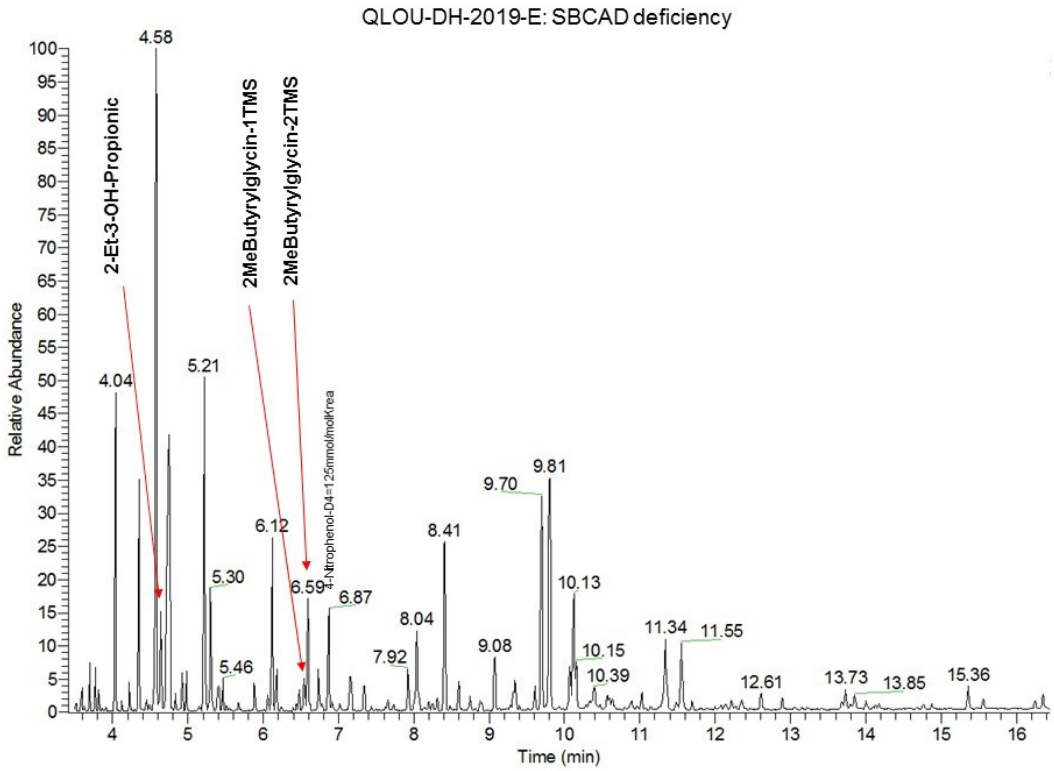
Analytical details: excretion of elevated amounts of 2-methylbutyrylglycine and 2-ethyl-3-hydroxypropionic acid (2-ethylhydracrylic acid).

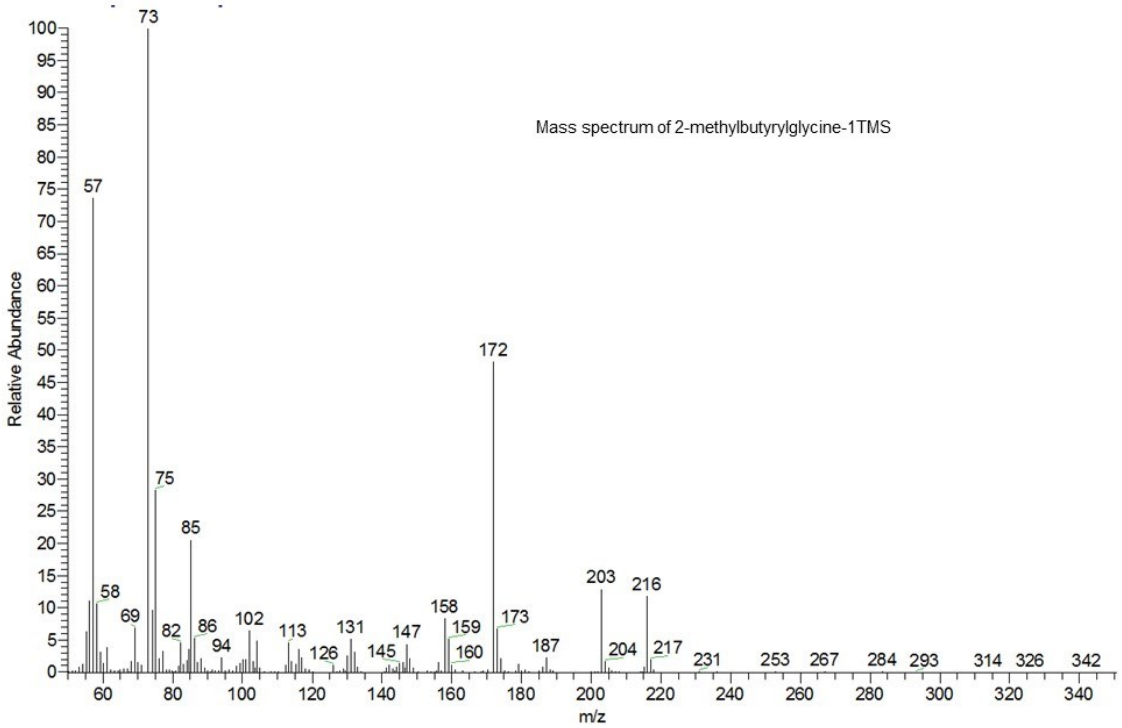
Table 11: Quantitative results of relevant metabolites

[mmol/mol creatinine]	N	Median	Range
2-methylbutyrylglycine	13	17.0	2.1 – 59.5
2-ethyl-3-hydroxypropionic acid (2-ethylhydracrylic acid)	6	11.5	6.9 – 35.0

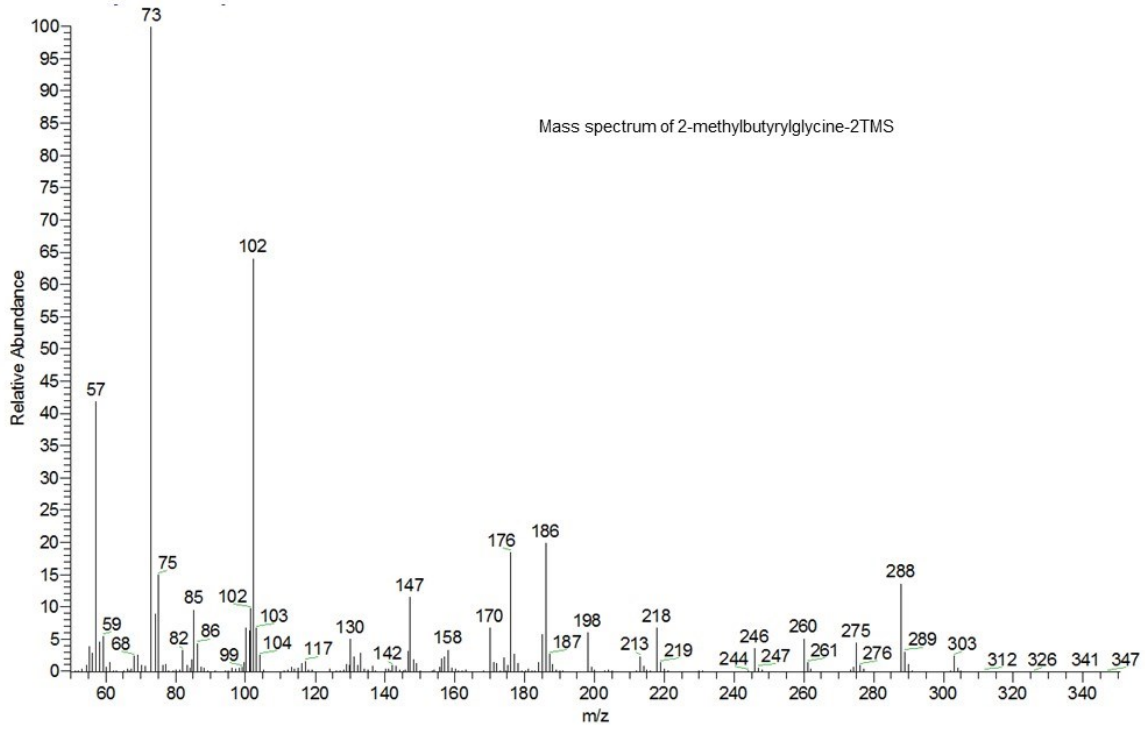




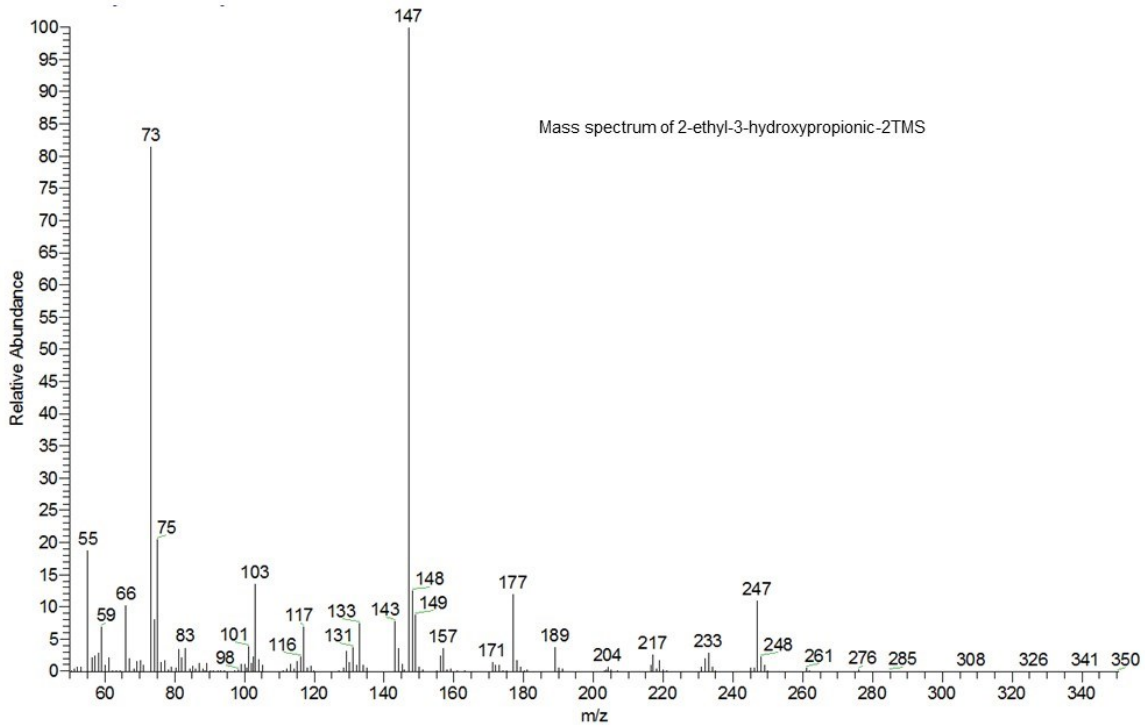

QLOU-DH-2019-E: SBCAD deficiency
2-Et-3-OH-Propionic
2MeButyrylglycin-1TMS
2MeButyrylglycin-2TMS
4-Nitrophenol-D4=125mmol/molKrea
Relative Abundance
Time (min)
4.58
4.04
5.21
5.30
5.46
6.12
6.59
6.87
7.92
8.04
8.41
9.08
9.70
9.81
10.13
10.15
10.39
11.34
11.55
12.61
13.73
13.85
15.36


QLOU-DH-2019-E: SBCAD deficiency
Mass spectrum of 2-methylbutyrylglycine-1TMS
Relative Abundance
m/z
73
57
172
75
85
58
69
82
86
94
102
113
126
131
145
147
158
159
160
173
187
203
204
216
217
231
253
267
284
293
314
326
342

QLOU-DH-2019-E: SBCAD deficiency



QLOU-DH-2019-E: SBCAD deficiency



Analytical performance was low with 59% for 2-methylbutyrylglycine (40/68) and 28% for 2-ethyl-3-hydroxypropionic acid (19/68).

Two points were given for detecting the key metabolite 2-methylbutyrylglycine and one point for elevated 2-ethylhydracrylic acid alone.

Interpretation: 62% of the participants (42/68) correctly diagnosed 2-methylbutyryl-CoA dehydrogenase deficiency whereas 21% gave a normal diagnosis.

Even though the overall performance was only moderate, the SAB considered this sample not to be educational. Thus scores are included in the assessment of the total performance.

Sample QLOU-DH-2019-F:

Patient details: 9-year-old boy with attacks of vertigo and headache

Known diagnosis: normal control sample

Analytical details and interpretation: normal pattern for organic acids which was correctly diagnosed by 93% of the participants. Three participants diagnosed either glutaric aciduria type 1, hyperoxaluria type 1 and benzoate treatment / intake of food additive.

Sample QLOU-DH-2019-G:

Patient details: 2-year-old girl with ataxia and tremor

Known diagnosis: normal control sample

Analytical details and interpretation: 97% of the participants diagnosed a normal sample. Two participants supposed either mevalonate kinase deficiency or succinate dehydrogenase deficiency.

Sample QLOU-DH-2019-H:

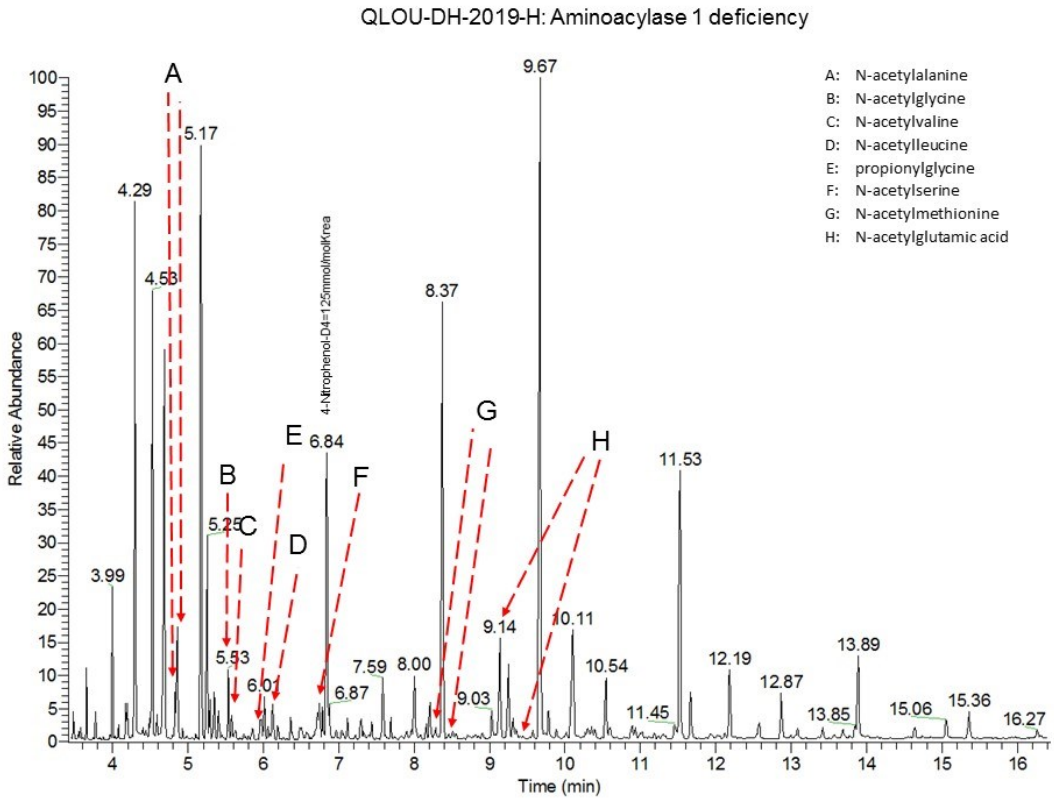
Patient details: 3-year-old girl presented with febrile seizures

Known diagnosis: aminoacylase I (ACY I) deficiency

Analytical details: several N-acetylated amino acids were detectable in this urine. N-acetyl-alanine, N-acetyl-glycine, N-acetyl-valine, N-acetyl-leucine, N-acetyl-serine, N-acetyl-methionine, and N-acetyl-glutamic acid could be identified by their mass spectra and their respective retention times.

GERLO et al decribed mass spectra of trimethylsilylated N-acetylated amino acids in Anal. Chim. Acta 2006; 571(2): 191-9.

Interpretation: 68% of the participants (47/69) reported the correct diagnosis whereas 19% (13/69) found that sample normal.



Review of performance in recent years

Samples from patients with ACY I deficiency were distributed several times over the past ten years (2016, 2012, and 2009) in the QLOU Heidelberg scheme.

Fifty-five participants were registered to QLOU Heidelberg in both 2019 and 2016. Less than fifty percent performed well in both years and 13% missed the diagnosis in both years.

Table 12: Performance in 2016 and 2019

	Number of participants
correct diagnosis in 2019 and 2016	23 (42%)
wrong diagnosis in both years	7 (13%)
Improved performance from 2016 to 2019	13 (24%)
declined performance from 2016 to 2019	8 (15%)
new participants in 2019 with correct diagnosis	9/18

Eighteen labs were registered in 2019 for the first time to the QLOU Heidelberg scheme. Fifty percent of them diagnosed correctly.

The overall performance of diagnosing ACY I deficiency improved from 42 % in 2009 to around 70% (73% in 2012, 65% in 2016, and 68% in 2019).

Thirty-five labs were registered to QLOU Heidelberg in the all the years 2009 to 2019.

The performance of diagnosing ACY I deficiency is shown in table 13

Table 13: Performance of individual labs from 2009 to 2019

lab no (see table 15)	2019	2016	2012	2009
5	+	+	+	+
7	+	+	+	+
10	+	+	+	+
12	+	+	+	+
15	+	+	+	+
17	+	+	+	+
19	+	+	+	+
20	+	+	+	+
23	+	+	+	+
27	+	+	+	+
31	+	+	+	+
33	+	+	+	+
37	+	+	+	+
26	+	-	-	-
38	+	-	-	-
42	-	-	-	-

+: correct diagnosis -: wrong diagnosis

From the data given in table 13 one can see that around 40% of these participants (13/37%) show a consistent good performance over the whole years. One lab did not improve over these years at all. The reason for missing this diagnosis may be poor analytical efficiency. Another cause could be that N-acetylated amino acids are not implemented as a standard feature in the organic acid methods of some laboratories.

Sample QLOU-DH-2019-I:

Patient details: 11-year-old boy, severe metabolic acidosis after gastrointestinal infection

Known diagnosis: isovaleric aciduria / isovaleryl-CoA dehydrogenase deficiency

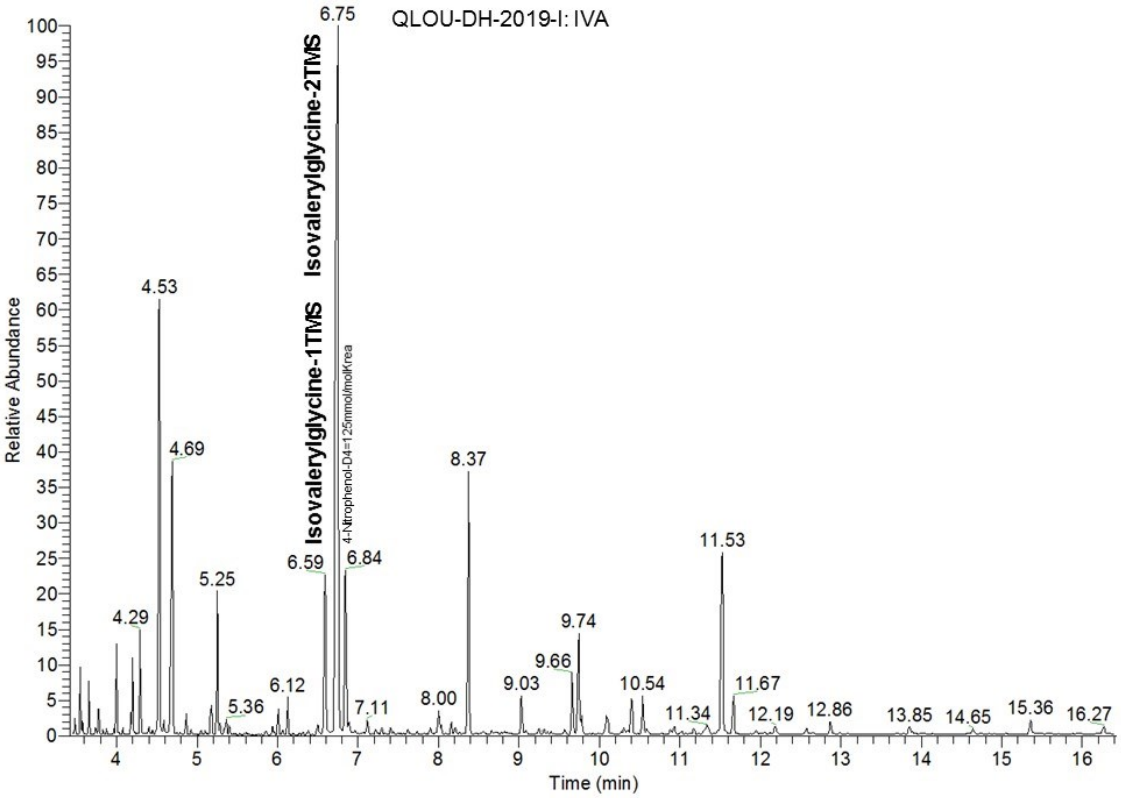
Analytical details: isovalerylglycine is clearly elevated in this sample. This was reported by all participants (100%).

Table 14: Quantitative results of relevant metabolites

[mmol/mol creatinine]	N	Median	Range
isovalerylglycine	12	1881.5	552.7 – 3267.0
3-hydroxyisovaleric acid	7	4.0	2.0 – 24.9

Analytical details and interpretation: This was an easy sample to analyse. Isovalerylglycine was clearly detected by all participants.

The overall performance for isovaleric aciduria was 100%.



10. Scores of participants

Table 15 presents detailed scores and performance data for all participants.

Scores and performance data were confirmed by the Scientific Advisory Board meeting in November 2019.

The anonymous data are accessible to all participants. Individual data are only visible to your laboratory.

Lab no	A	B*)	C	sum	D	E	F	sum	G	H	I	sum	Total score	Performance
1	4		4	8	4	4	4	12	4	4	4	12	32	
2	4		4	8	2	4	4	10	4	4	4	12	30	
3	4		4	8	2	1	4	7	4	4	4	12	27	
4	4		4	8	4	4	4	12	4	4	4	12	32	
5	4		4	8	2	4	4	10	4	4	4	12	30	
6	4		4	8	2	4	4	10	4	1	4	9	27	
7	4		4	8	4	4	4	12	4	4	4	12	32	

Lab no	A	B*)	C	sum	D	E	F	sum	G	H	I	sum	Total score	Performance
8	4		4	8	2	1	4	7	4	3	4	11	26	
9	4		4	8	4	4	4	12	4	0	4	8	28	
10	4		4	8	4	4	4	12	4	4	4	12	32	
11	4		4	8	4	4	4	12	4	4	4	12	32	
12	4		4	8	4	4	4	12	4	4	4	12	32	
13	4		4	8	4	4	4	12	4	4	4	12	32	
14	4		4	8	2	4	4	10	4	4	4	12	30	
15	4		4	8	4	4	4	12	4	4	4	12	32	
16	4		4	8	2	1	3	6					14	2 returns
17	4		4	8	4	0	4	8	4	4	4	12	28	
18	4		4	8	3	1	4	8	4	2	4	10	26	
19	4		4	8	4	4	4	12	4	4	4	12	32	
20	4		4	8	4	1	4	9	4	4	4	12	29	
21	4		4	8	4	0	4	8	4	0	4	8	24	
22	4		4	8	2	0	4	6	4	2	4	10	24	
23	4		4	8	4	3	4	11	4	4	4	12	31	
24	4		4	8	2	0	4	6	4	4	4	12	26	
25	4		4	8	4	4	4	12	4	4	4	12	32	
26	4		4	8	2	4	4	10	4	4	4	12	30	
27	4		4	8	2	1	4	7	4	4	4	12	27	
28	4		4	8	4	4	4	12	4	4	4	12	32	
29	4		4	8	2	4	4	10	4	0	4	8	26	
30	4		4	8	2	3	4	9	4	4	4	12	29	
31	4		4	8	4	4	4	12	4	4	4	12	32	
32	4		4	8	2	0	4	6	4	0	4	8	22	

Lab no	A	B*)	C	sum	D	E	F	sum	G	H	I	sum	Total score	Performance
33	4		0	4	4	4	4	12	4	4	4	12	28	
34	4		4	8	4	4	4	12	4	4	4	12	32	
35	4		4	8	2	4	4	10	4	0	4	8	26	
36	4		4	8	2	4	4	10	4	4	4	12	30	
37	4		4	8	4	4	4	12	4	4	4	12	32	
38	4		4	8	2	0	4	6	4	4	4	12	26	
39					2	4	4	10	4	0	4	8	18	2 returns
40	4		4	8	2	3	4	9	4	0	4	8	25	
41	4		4	8	2	1	4	7	4	0	4	8	23	
42	4		4	8	2	1	4	7	4	2	4	10	25	
43	4		3	7	4	4	4	12	4	4	4	12	31	
44	4		4	8	2	4	4	10	4	4	4	12	30	
45	4		4	8					4	4	4	12	20	2 returns
46	4		4	8	2	0	4	6	4	4	4	12	26	
47	4		4	8					4	4	4	12	20	2 returns
48	4		4	8	3	4	4	11	4	4	4	12	31	
49	4		4	8	4	4	4	12	4	4	4	12	32	
50	4		4	8	2	3	4	9	4	4	4	12	29	
51	4		4	8	4	0	4	8	4	4	4	12	28	
52	4		4	8	4	4	4	12	4	4	4	12	32	
53	4		4	8	3	4	4	11	4	4	4	12	31	
54	4		4	8	2	0	4	6	4	0	4	8	22	
55	4		4	8	2	4	4	10	4	0	4	8	26	
56	4		4	8	4	0	4	8	2	4	4	10	26	
57	4		4	8	2	4	4	10	4	0	4	8	26	

Lab no	A	B*)	C	sum	D	E	F	sum	G	H	I	sum	Total score	Performance
58	4		4	8	2	4	4	10	4	0	4	8	26	
59	4		4	8	4	4	4	12	4	4	4	12	32	
60	4		4	8	2	0	4	6	4	4	4	12	26	
61	4		4	8									8	1 return
62	4		4	8	4	3	4	11	4	4	4	12	31	
63	4		3	7	3	4	4	11	4	2	4	10	28	
64	4		4	8	2	4	4	10	4	4	4	12	30	
65	4		3	7	3	2	3	8	1	2	4	7	22	
66	4		4	8	2	4	4	10	4	4	4	12	30	
67	4		4	8	4	1	4	9	4	4	4	12	29	
68	4		4	8	2	1	4	7	4	2	4	10	25	
69	4		4	8	3	1	4	8	4	2	4	10	26	
70	4		3	7	4	4	4	12	4	4	4	12	31	
71	4		4	8	3	1	4	8	4	0	4	8	24	

*) Educational sample
CE: Critical error
PP: Poor performance (on score)

Your laboratory scores for 2019:

ERNDIM Number:

Lab number in table 15:

Total score 2019:

11. Preview of the scheme in 2020

The format of the QLOU 2020 scheme will be similar to that of previous years.

Changes planned for 2020:
Interim reports are intended to be produced automatically by a software developed by CSCQ.

This is already working in the proficiency testing schemes and has to be adopted to the QLOU requirements.

02 March 2020

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Please note:
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