INTERLABORATORY COMPARISON PROGRAM
FOR METALS IN BIOLOGICAL MATRICES
(PCI)

REPORT FOR ROUND:	**2014-03**
PTMS SHIPPING DATE:	**2014-04-22**
DATE OF PUBLICATION:	**2014-06-20**

SCC Accredited PTP

PSEA Accrédité CCN ™

Scope of accreditation: The concentration of arsenic in material PC-U-S1407 exceed the level of our scope of accreditation.

Interlaboratory Comparison Program for Metals in Biological Matrices (PCI)

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INTRODUCTION

Dear PCI participants:

This report includes the results and performance evaluations of round 2014-03.

Participating laboratories are identified only by their unique subscription number. Identity of participants will be kept strictly confidential by the PCI organizer.

For this PT exercise, all analytes meet the homogeneity criteria as per ISO/CEI 17043 and 13528 guidelines with the exception of mercury in material PC-U-H1407. A note concerning the homogeneity of PC-U-H1407 has been included in the corresponding section.

A study had been previously performed to demonstrate that all the analytes are stable for the duration of the PT exercise and meet the stability criteria according to ISO/CEI 17043 and 13528 guidelines.

Please note that the appendices containing statistical approaches are no longer included in the reports. You will find them within the "Participant's Guide".

We are available to assist you at any time. If you have any questions or concerns regarding our program, do not hesitate to contact us. Your comments help us enhance the quality of our schemes.

Best regards,

David Bisson, M.Sc. Chemist
Programs Coordinator
External Quality Assessment Schemes and Reference Materials

Centre de toxicologie du Québec / INSPQ
Tel.: (418) 650-5115, extension 4649
E-mail: david.bisson@inspq.qc.ca
Web Site: www.inspq.qc.ca/CTQ/paqe

Centre de toxicologie/INSPQ

945, Ave Wolfe
Quebec, QC
Canada, G1V 5B3

Phone: (418) 650-5115 Ext. 5254
Fax : (418) 654-2148
E-mail : ctq@inspq.qc.ca
http://www.inspq.qc.a/ctq

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Individual results
Blood Cadmium (nmol/L)
Round #2014-03

Participant	PC-B-C1407	z'-score	PC-B-C1408	z'-score	PC-B-C1409	z'-score	Method
176	81.8	-0.35	13.3	-0.94	30.2	-0.62	ICP-MS
194	72.6	-1.63	15.1	-0.14	28.2	-1.22	ND
217	79.7	-0.65	17.5	0.96	36.2	1.10	ICP-MS
323	78.0	-0.89	15.0	-0.18	33.0	0.17	GFAAS
747	84.7	0.04	15.1	-0.14	29.9	-0.72	ICP-MS
1095	95.5	1.54	16.6	0.55	34.5	0.61	ICP-MS (C/R)
1109	88.1	0.51	18.7	1.51	35.1	0.79	ND
1188	89.0	0.63	15.0	-0.17	30.8	-0.46	ICP-MS (C/R)
1418	82.6	-0.24	15.2	-0.09	35.1	0.77	ICP-MS (C/R)
1865	85.4	0.14	17.1	0.77	37.1	1.36	ICP-MS (C/R)
2305	92.8	1.17	14.9	-0.22	31.6	-0.22	ND
2991	104	2.76	20.0	2.12	39.3	2.01	ND
3187	83.2	-0.17	15.0	-0.18	30.5	-0.55	ICP-MS
3211	82.3	-0.29	15.7	0.14	32.3	-0.03	GFAAS
3248	70.6	-1.90	12.9	-1.15	27.3	-1.48	GFAAS
3853	88.4	0.55	20.5	2.34	42.9	3.04	ICP-MS
4708	84.1	-0.04	15.3	-0.05	31.1	-0.38	ICP-MS
4953	88.1	0.51	15.1	-0.13	32.9	0.15	ICP-MS
5591	78.9	-0.76	14.8	-0.28	31.3	-0.32	ICP-MS
5654	93.1	1.20	16.7	0.61	35.0	0.74	ICP-MS (C/R)
5691	84.0	-0.06	15.0	-0.18	32.0	-0.12	ICP-MS
6511	82.7	-0.23	15.1	-0.13	32.0	-0.11	ND
6545	81.4	-0.42	---	---	---	---	ICP-MS
6689	84.0	-0.06	16.9	0.69	32.6	0.05	GFAAS
6794	83.7	-0.10	16.5	0.53	30.4	-0.57	GFAAS
6858	84.8	0.06	12.8	-1.20	30.3	-0.60	ICP-MS
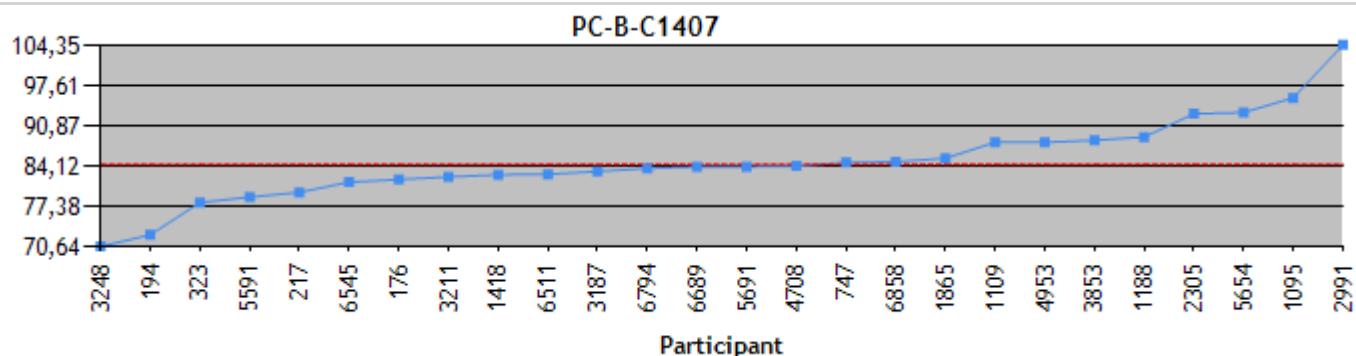
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-B-C1407	84.4	1.24	7.11	70.0 - 98.8	Accepted	---
PC-B-C1408	15.4	0.233	2.17	11.0 - 19.8	Rejected[1]	---
PC-B-C1409	32.4	0.665	3.39	25.5 - 39.3	Accepted	---

Statistics
Blood Cadmium (nmol/L)
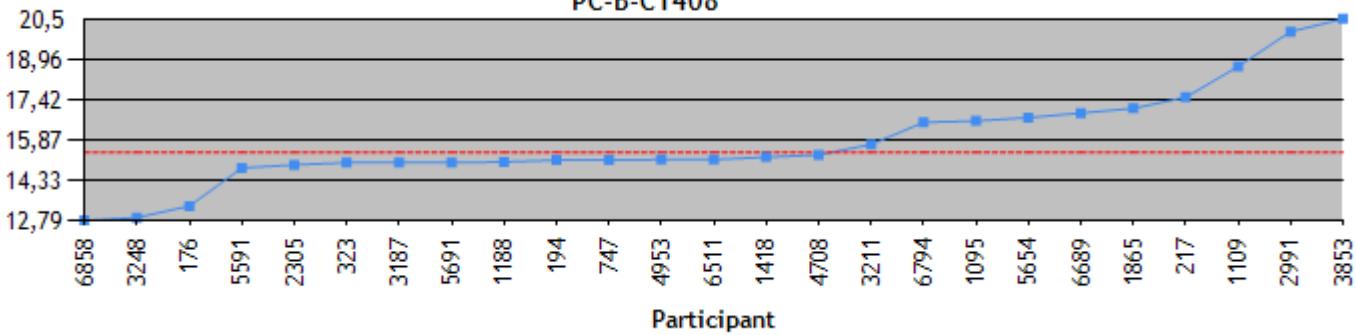
All methods	PC-B-C1407	PC-B-C1408	PC-B-C1409
N	26	25	25
Robust mean Algo A	84.4	15.4	32.4
Robust STDev	5.07	0.932	2.66
Median	84.0	15.1	32.0
STDev from MAD	4.95	0.856	2.49
Arithmetic mean	84.8	15.8	32.9
STDev	6.87	1.90	3.46
CV or Variability	6.0%	6.0%	8.2%

Graphite furnace-AAS	PC-B-C1407	PC-B-C1408	PC-B-C1409
N	5	5	5
Robust mean Algo A	81.4	15.6	31.9
Robust STDev	3.04	1.40	1.20
Median	82.3	15.7	32.3
STDev from MAD	2.49	1.26	1.04
Arithmetic mean	79.7	15.4	31.1
STDev	5.62	1.59	2.35
CV or Variability	3.7%	9.0%	3.8%

ICP-MS	PC-B-C1407	PC-B-C1408	PC-B-C1409
N	11	10	10
Robust mean Algo A	83.6	15.1	31.5
Robust STDev	3.38	0.443	1.45
Median	84.0	15.1	31.2
STDev from MAD	3.20	0.371	1.34
Arithmetic mean	83.6	15.4	32.7
STDev	3.02	2.17	4.02
CV or Variability	4.0%	2.9%	4.6%

ICP-MS (collision/reaction cell)	PC-B-C1407	PC-B-C1408	PC-B-C1409
N	5	5	5
Robust mean Algo A	89.1	16.3	34.9
Robust STDev	6.00	0.814	0.859
Median	89.0	16.6	35.0
STDev from MAD	6.07	0.712	0.684
Arithmetic mean	89.1	16.1	34.5
STDev	5.29	0.939	2.29
CV or Variability	6.7%	5.0%	2.5%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.
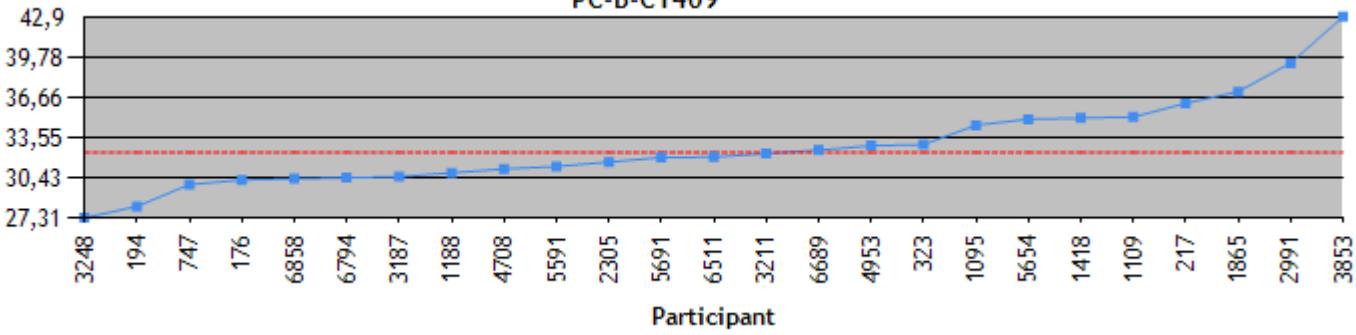
Distribution
Blood Cadmium (nmol/L)

PC-B-C1407

PC-B-C1408

PC-B-C1409

Individual results

Blood Lead (µmol/L)

Round #2014-03

Participant	PC-B-L1407	z'-score	PC-B-L1408	z'-score	PC-B-L1409	z'-score	Method
194	0.144	-0.53	0.392	-1.17	1.50	-1.97	ND
217	0.160	0.32	0.440	0.20	1.78	0.24	ICP-MS
226	0.150	-0.23	0.410	-0.65	1.70	-0.36	ICP-MS
317	0.164	0.53	0.463	0.85	1.80	0.39	GFAAS
323	0.151	-0.16	0.485	1.48	2.02	2.10	GFAAS
387	0.181	1.43	0.428	-0.14	1.80	0.41	GFAAS
636	0.167	0.69	0.453	0.57	1.85	0.76	ICP-MS
744	0.145	-0.47	0.452	0.53	1.82	0.53	ND
747	0.159	0.26	0.431	-0.06	1.79	0.31	ICP-MS
1095	0.150	-0.21	0.420	-0.37	1.79	0.31	GFAAS
1109	0.151	-0.18	0.455	0.62	1.81	0.45	ND
1188	0.163	0.48	0.488	1.57	1.81	0.47	ICP-MS (C/R)
1418	0.146	-0.43	0.420	-0.36	1.69	-0.49	ND
1761	<LQ	---	0.414	-0.55	1.72	-0.21	GFAAS
1855	0.145	-0.49	0.415	-0.51	1.67	-0.63	ICP-MS
1865	0.164	0.53	0.458	0.73	1.71	-0.29	ICP-MS (C/R)
2305	0.150	-0.21	0.460	0.77	1.91	1.26	ND
2397	0.183	1.53	0.425	-0.23	1.69	-0.51	GFAAS
2516	0.173	1.00	0.486	1.51	1.88	0.98	GFAAS
2580	0.110	-2.33	0.420	-0.37	1.79	0.31	GFAAS
2629	0.160	0.32	0.450	0.48	1.89	1.10	ICP-MS (C/R)
2635	0.170	0.85	0.450	0.48	1.79	0.31	GFAAS
2907	0.145	-0.49	0.444	0.31	1.81	0.51	ICP-MS
2937	0.124	-1.59	0.401	-0.91	1.63	-0.93	GFAAS
2982	0.144	-0.55	0.367	-1.89	1.49	-2.06	GFAAS
2991	0.153	-0.03	0.439	0.18	1.45	-2.32	ND
3150	0.160	0.32	0.470	1.05	1.95	1.57	GFAAS
3167	0.150	-0.21	0.440	0.20	1.65	-0.79	GFAAS
3187	0.162	0.42	0.436	0.09	1.85	0.79	ICP-MS
3211	0.160	0.32	0.450	0.48	1.84	0.71	GFAAS
3215	0.140	-0.74	0.380	-1.51	1.70	-0.39	GFAAS
3248	0.140	-0.74	0.430	-0.09	1.69	-0.47	GFAAS
3423	0.139	-0.77	0.391	-1.20	1.65	-0.78	GFAAS
3513	0.150	-0.21	0.430	-0.09	1.86	0.87	ICP-MS
3776	3.70	187.66	5.44	142.73	5.95	33.09	ND
3853	0.180	1.37	0.460	0.77	1.83	0.63	ICP-MS
3970	0.125	-1.51	0.391	-1.20	1.65	-0.78	GFAAS
4082	0.171	0.90	0.440	0.20	1.88	1.02	ICP-MS
4090	0.135	-1.00	0.429	-0.11	1.80	0.37	ICP-MS (C/R)
4708	0.155	0.05	0.420	-0.37	1.73	-0.16	ICP-MS
4953	0.121	-1.76	0.415	-0.51	1.78	0.24	GFAAS
5432	---	---	0.463	0.86	1.47	-2.19	GFAAS
5491	0.164	0.53	0.429	-0.11	1.78	0.25	GFAAS
5591	0.150	-0.21	0.410	-0.65	1.66	-0.71	ICP-MS
5654	0.170	0.87	0.462	0.82	1.99	1.88	ICP-MS (C/R)
5691	0.140	-0.74	0.400	-0.94	1.63	-0.94	ICP-MS

Individual results

Blood Lead (µmol/L)

Round #2014-03

Participant	PC-B-L1407	z′-score	PC-B-L1408	z′-score	PC-B-L1409	z′-score	Method
6200	0.142	-0.61	0.401	-0.92	1.65	-0.82	ICP-MS
6234	0.179	1.32	0.476	1.22	1.81	0.47	GFAAS
6276	0.160	0.30	0.461	0.80	1.79	0.35	ICP-MS
6511	0.170	0.84	0.388	-1.28	1.78	0.27	ND
6545	0.150	-0.21	0.430	-0.09	1.70	-0.39	ICP-MS
6794	0.163	0.48	0.420	-0.36	1.65	-0.80	GFAAS
7111	0.148	-0.32	0.410	-0.65	1.67	-0.67	ICP-MS
7269	0.110	-2.33	0.370	-1.79	1.58	-1.34	GFAAS
7311	0.160	0.32	0.450	0.48	1.80	0.39	ICP-MS
7804	0.152	-0.10	0.516	2.38	1.88	1.04	ND
7932	0.186	1.69	0.471	1.08	1.70	-0.38	GFAAS
8701	0.129	-1.32	0.394	-1.11	1.61	-1.10	ND
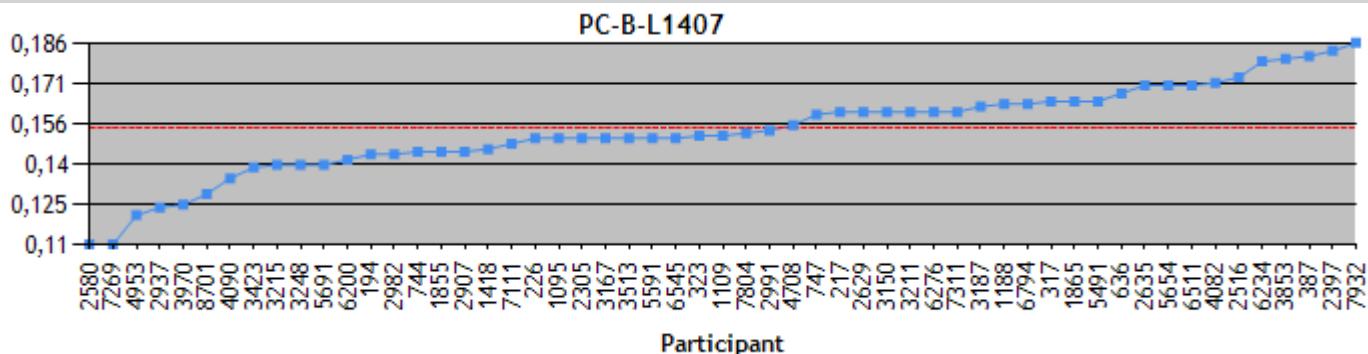
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-B-L1407	0.154	0.00261	0.0187	0.116 - 0.192	Accepted	---
PC-B-L1408	0.433	0.00514	0.0347	0.363 - 0.503	Accepted	---
PC-B-L1409	1.75	0.0182	0.126	1.50 - 2.00	Accepted	---

Statistics
Blood Lead (µmol/L)
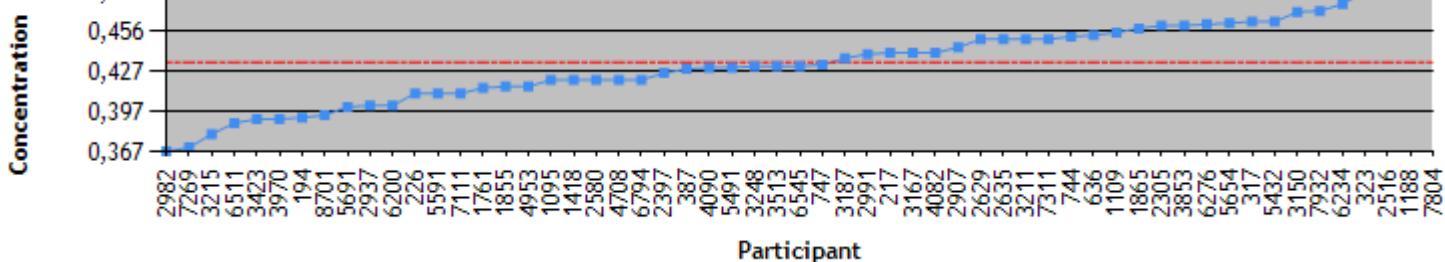
All methods	PC-B-L1407	PC-B-L1408	PC-B-L1409
N	55	57	57
Robust mean Algo A	0.154	0.433	1.75
Robust STDev	0.0155	0.0310	0.110
Median	0.151	0.430	1.78
STDev from MAD	0.0163	0.0297	0.122
Arithmetic mean	0.153	0.433	1.75
STDev	0.0170	0.0314	0.121
CV or Variability	10.1%	7.2%	6.3%

Graphite furnace-AAS	PC-B-L1407	PC-B-L1408	PC-B-L1409
N	23	25	25
Robust mean Algo A	0.152	0.430	1.73
Robust STDev	0.0230	0.0393	0.112
Median	0.151	0.428	1.72
STDev from MAD	0.0193	0.0400	0.108
Arithmetic mean	0.152	0.430	1.73
STDev	0.0229	0.0350	0.127
CV or Variability	15.1%	9.1%	6.5%

ICP-MS	PC-B-L1407	PC-B-L1408	PC-B-L1409
N	18	18	18
Robust mean Algo A	0.154	0.430	1.76
Robust STDev	0.0104	0.0222	0.0939
Median	0.153	0.431	1.79
STDev from MAD	0.0111	0.0259	0.104
Arithmetic mean	0.155	0.430	1.76
STDev	0.0106	0.0196	0.0828
CV or Variability	6.7%	5.2%	5.3%

ICP-MS (collision/reaction cell)	PC-B-L1407	PC-B-L1408	PC-B-L1409
N	5	5	5
Robust mean Algo A	0.163	0.457	1.84
Robust STDev	0.00563	0.0160	0.118
Median	0.163	0.458	1.81
STDev from MAD	0.00445	0.0126	0.119
Arithmetic mean	0.158	0.457	1.84
STDev	0.0137	0.0213	0.104
CV or Variability	3.5%	3.5%	6.4%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.
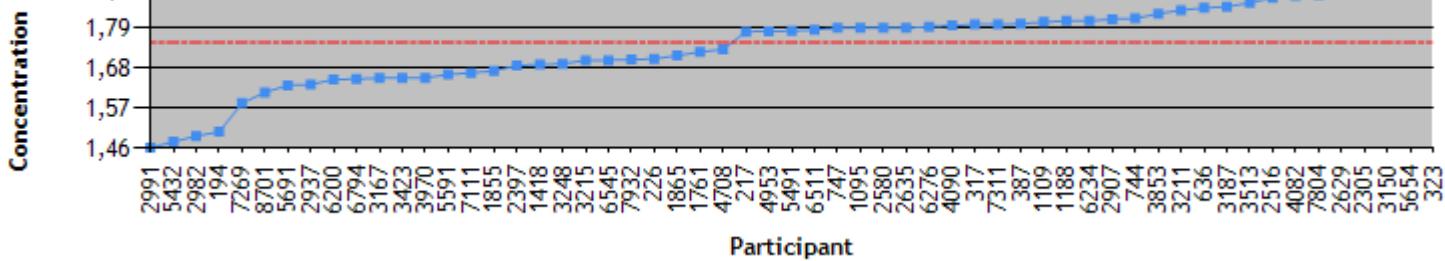
Distribution
Blood Lead (µmol/L)

PC-B-L1407

PC-B-L1408

PC-B-L1409

Individual results
Blood Mercury (nmol/L)
Round #2014-03

Participant	PC-B-M1407	z'-score	PC-B-M1408	z'-score	PC-B-M1409	z'-score	Method
176	174	0.16	<LQ	---	94.7	1.33	ICP-MS
217	102	-3.24	26.0	8.13	52.0	-2.86	ICP-MS
323	153	-0.85	8.00	-2.48	73.0	-0.80	GA-AAS
428	182	0.54	12.9	0.42	122	3.97	ICP-MS
744	178	0.33	14.8	1.54	87.7	0.64	ND
747	175	0.19	10.9	-0.77	82.4	0.12	ICP-MS
1095	178	0.33	13.0	0.47	87.0	0.57	CV
1109	177	0.30	11.5	-0.43	88.7	0.74	ND
1156	202	1.47	11.8	-0.24	80.5	-0.07	ND
1188	187	0.75	10.3	-1.12	86.7	0.54	ICP-MS (C/R)
1418	154	-0.80	12.3	0.07	66.1	-1.48	ND
1865	178	0.35	11.1	-0.67	85.7	0.45	CV
2907	149	-1.06	<LQ	---	70.3	-1.07	ICP-MS
3187	178	0.33	10.2	-1.18	81.4	0.02	ICP-MS
3468	193	1.04	14.3	1.25	88.9	0.76	GA-AAS
3513	166	-0.24	13.0	0.47	80.0	-0.12	ICP-MS
3853	156	-0.71	10.0	-1.30	75.0	-0.61	ICP-MS
4708	176	0.24	11.0	-0.71	82.7	0.15	ICP-MS
4953	185	0.66	12.5	0.16	86.7	0.54	ICP-MS
5029	197	1.21	42.7	17.95	93.6	1.22	ND
5591	175	0.16	14.3	1.24	79.9	-0.13	ICP-MS
5654	186	0.70	9.87	-1.37	85.5	0.42	ICP-MS (C/R)
5691	165	-0.28	12.0	-0.12	80.0	-0.12	ICP-MS
5881	163	-0.40	9.97	-1.31	77.8	-0.34	ICP-MS (C/R)
6511	173	0.12	12.5	0.16	80.3	-0.09	ND
6545	175	0.19	16.3	2.42	86.7	0.54	ICP-MS
6892	179	0.38	14.0	1.06	87.9	0.66	ND
6920	147	-1.13	8.18	-2.37	71.4	-0.96	ND
7263	164	-0.35	97.2	50.11	79.0	-0.22	GA-AAS
7269	21.0	-7.05	12.0	-0.12	11.0	-6.89	CV
9313	>LL	---	>LL	---	>LL	---	ICP-MS
9674	166	-0.23	<LQ	---	81.8	0.05	CV
9759	150	-1.01	<LQ	---	69.8	-1.12	GA-AAS
9777	159	-0.58	9.08	-1.84	73.5	-0.76	GA-AAS
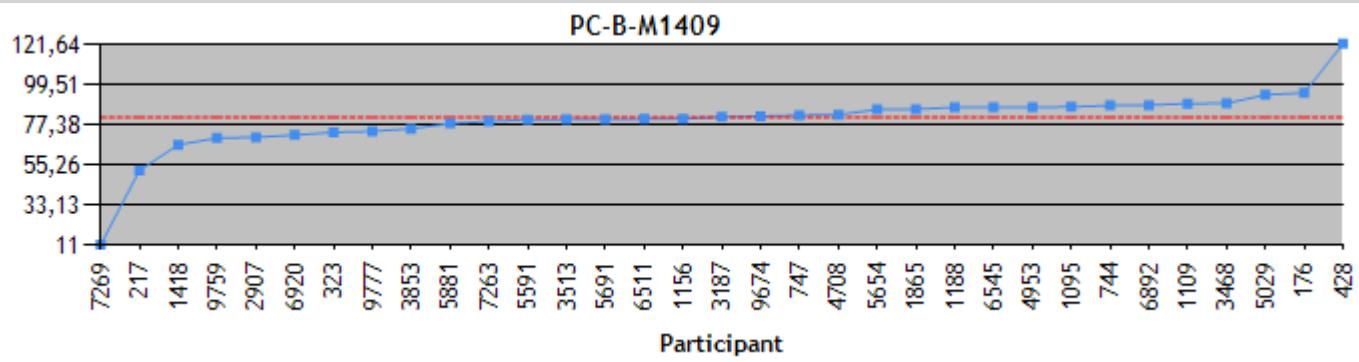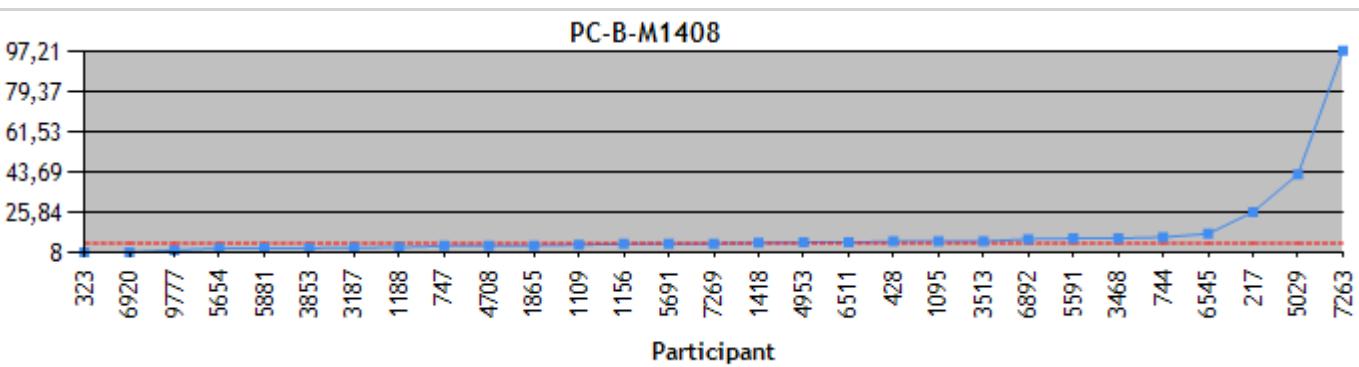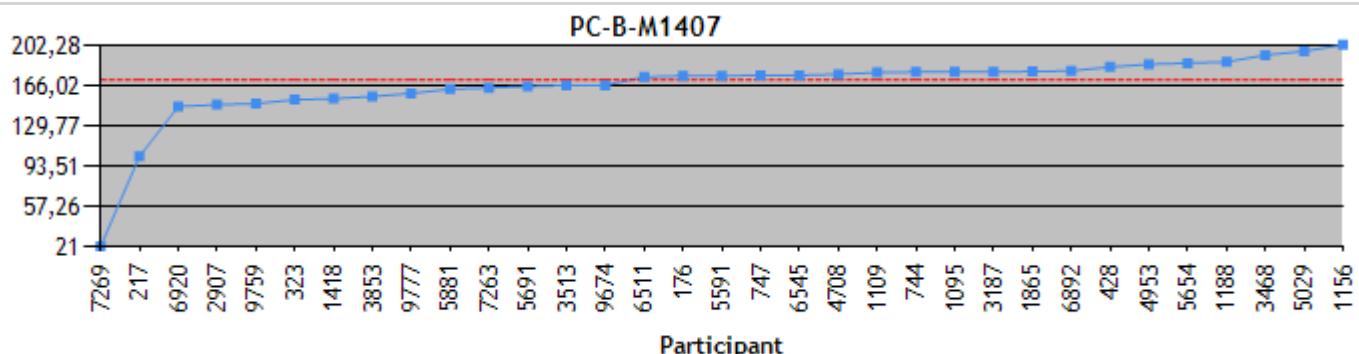
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-B-M1407	171	3.36	21.0	128 - 214	Rejected[1]	Organic
PC-B-M1408	12.2	0.603	1.59	8.81 - 15.6	Rejected[1]	Inorganic
PC-B-M1409	81.2	1.87	10.0	60.8 - 102	Rejected[1]	Organic

Statistics
Blood Mercury (nmol/L)

All methods	PC-B-M1407	PC-B-M1408	PC-B-M1409
N	33	29	33
Robust mean Algo A	171	12.2	81.2
Robust STDev	15.4	2.60	8.57
Median	175	12.0	81.4
STDev from MAD	15.5	2.67	8.30
Arithmetic mean	166	16.3	79.7
STDev	31.8	16.9	16.6
CV or Variability	9.0%	21.3%	10.6%

Cold vapor	PC-B-M1407	PC-B-M1408	PC-B-M1409
N	4	3	4
Robust mean Algo A	170	12.0	83.1
Robust STDev	11.2	1.10	4.67
Median	172	12.0	83.8
STDev from MAD	9.24	1.38	3.89
Arithmetic mean	136	12.0	66.4
STDev	76.8	0.967	37.0
CV or Variability	6.6%	9.1%	5.6%

Gold amalgamation-AAS	PC-B-M1407	PC-B-M1408	PC-B-M1409
N	5	4	5
Robust mean Algo A	159	12.5	75.4
Robust STDev	9.76	5.63	5.49
Median	159	11.7	73.5
STDev from MAD	8.39	4.69	5.50
Arithmetic mean	164	32.2	76.8
STDev	17.4	43.5	7.52
CV or Variability	6.1%	45.0%	7.3%

ICP-MS	PC-B-M1407	PC-B-M1408	PC-B-M1409
N	13	11	13
Robust mean Algo A	171	12.6	81.6
Robust STDev	11.0	2.37	8.32
Median	175	12.5	81.4
STDev from MAD	11.8	2.32	7.86
Arithmetic mean	166	13.6	82.6
STDev	21.8	4.53	15.5
CV or Variability	6.4%	18.8%	10.2%

ICP-MS (collision/reaction cell)	PC-B-M1407	PC-B-M1408	PC-B-M1409
N	3	3	3
Robust mean Algo A	185	10.0	85.0
Robust STDev	2.06	0.187	2.25
Median	186	9.97	85.5
STDev from MAD	1.63	0.148	1.78
Arithmetic mean	178	10.0	83.3
STDev	13.8	0.225	4.85
CV or Variability	1.1%	1.9%	2.6%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Blood Mercury (nmol/L)

PC-B-M1407

PC-B-M1408

PC-B-M1409

Individual results
Serum Aluminium (µmol/L)
Round #2014-03

Participant	PC-S-A1407	z'-score	PC-S-A1408	z'-score	PC-S-A1409	z'-score	Method
217	2.02	-0.15	8.50	0.12	1.01	0.07	ICP-MS
323	1.76	-1.09	7.65	-0.73	0.893	-0.71	GFAAS
387	2.04	-0.07	7.57	-0.80	1.48	3.18	GFAAS
636	2.53	1.72	10.1	1.73	1.19	1.25	ICP-MS
747	2.00	-0.22	8.46	0.08	0.978	-0.15	ICP-MS
1095	2.36	1.11	10.9	2.49	1.10	0.66	GFAAS
1109	1.77	-1.08	7.20	-1.17	0.838	-1.07	ND
1418	2.32	0.97	9.35	0.96	1.05	0.31	ICP-MS (C/R)
1855	1.74	-1.18	>LL	---	0.852	-0.98	ICP-MS
1865	2.16	0.37	8.35	-0.03	1.02	0.10	GFAAS
2305	2.26	0.74	8.64	0.26	1.11	0.73	ND
2516	1.28	-2.89	5.98	-2.37	0.493	-3.36	GFAAS
2580	2.01	-0.20	>LL	---	1.20	1.29	GFAAS
2629	2.09	0.11	6.73	-1.63	0.890	-0.73	GFAAS
2763	2.01	-0.18	8.16	-0.22	1.08	0.53	ICP-MS
3150	2.07	0.04	8.83	0.45	1.01	0.07	GFAAS
3167	2.10	0.15	7.86	-0.51	1.00	0.00	GFAAS
3513	2.01	-0.18	9.06	0.67	0.900	-0.66	ICP-MS (C/R)
3853	2.27	0.78	9.43	1.04	0.870	-0.86	ICP-MS
4090	2.16	0.37	8.47	0.09	0.880	-0.79	ICP-MS (C/R)
4953	1.78	-1.04	7.34	-1.03	0.815	-1.22	GFAAS
5556	1.96	-0.35	6.23	-2.13	1.04	0.25	GFAAS
5654	1.99	-0.24	8.50	0.12	1.30	1.96	ICP-MS (C/R)
5691	1.94	-0.44	8.08	-0.30	0.920	-0.53	ICP-MS
5881	2.02	-0.16	9.14	0.75	0.889	-0.73	ICP-MS (C/R)
5955	2.15	0.33	9.20	0.81	1.03	0.20	ND
6511	2.20	0.52	9.11	0.73	1.03	0.20	ND
6702	2.11	0.18	8.59	0.21	0.974	-0.17	GFAAS
7804	2.39	1.22	9.54	1.15	1.26	1.72	ND
8376	2.20	0.52	8.09	-0.29	1.10	0.64	GFAAS
8454	2.05	-0.04	6.20	-2.16	0.980	-0.13	GFAAS
9759	2.04	-0.08	>LL	---	1.03	0.20	GFAAS
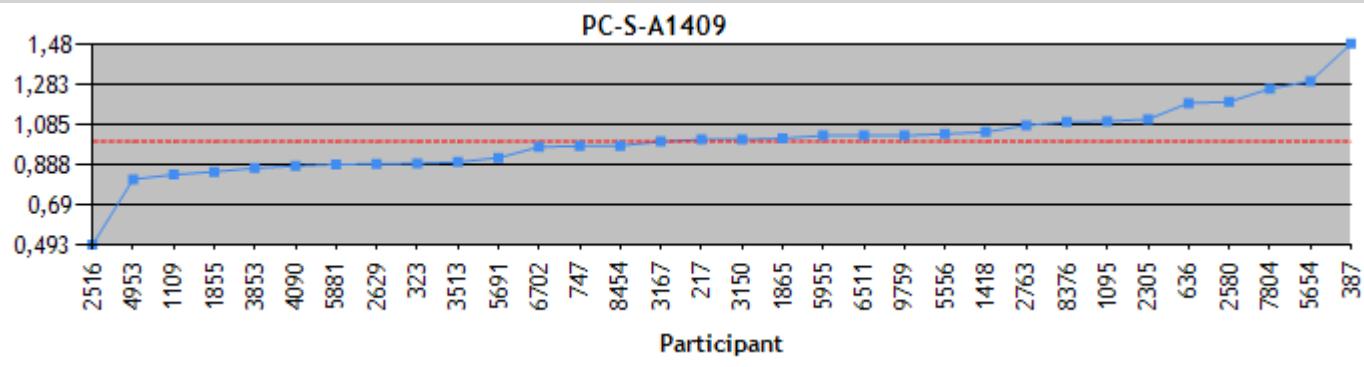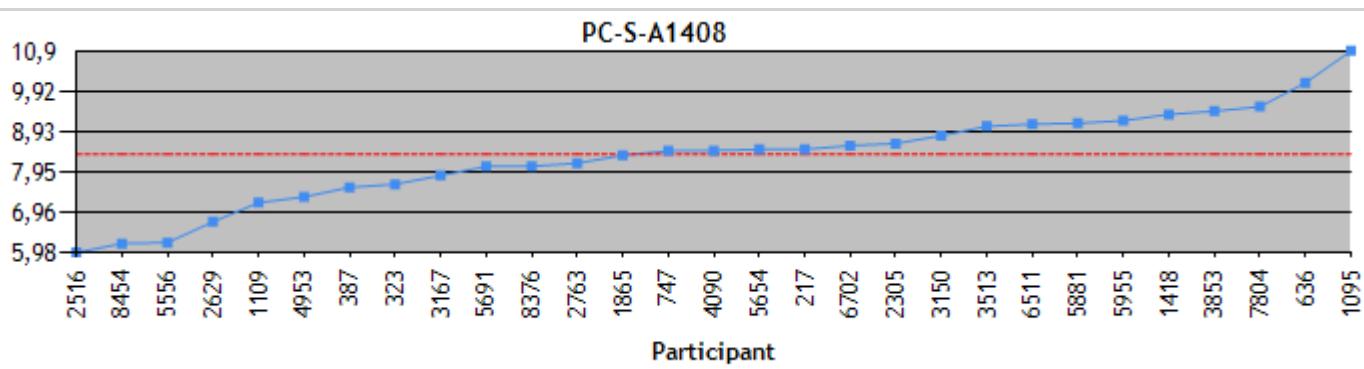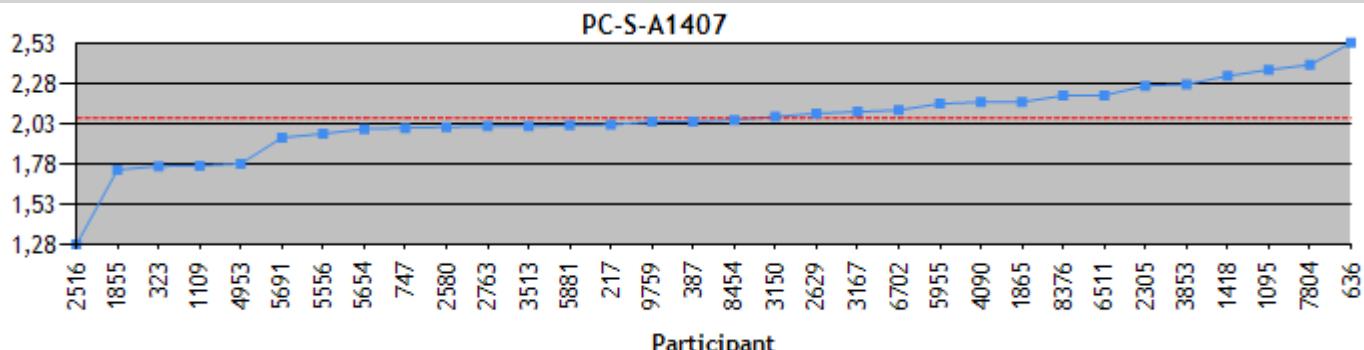
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-A1407	2.06	0.0377	0.268	1.52 - 2.60	Accepted	---
PC-S-A1408	8.38	0.238	0.983	6.36 - 10.4	Accepted	---
PC-S-A1409	1.00	0.0305	0.148	0.697 - 1.30	Accepted	---

Statistics
Serum Aluminium (µmol/L)

All methods	PC-S-A1407	PC-S-A1408	PC-S-A1409
N	32	29	32
Robust mean Algo A	2.06	8.38	1.00
Robust STDev	0.170	1.02	0.138
Median	2.05	8.47	1.01
STDev from MAD	0.156	0.988	0.141
Arithmetic mean	2.06	8.32	1.01
STDev	0.231	1.15	0.173
CV or Variability	8.3%	12.2%	13.8%

Graphite furnace-AAS	PC-S-A1407	PC-S-A1408	PC-S-A1409
N	15	13	15
Robust mean Algo A	2.05	7.61	1.00
Robust STDev	0.105	1.24	0.133
Median	2.05	7.65	1.01
STDev from MAD	0.0890	1.36	0.129
Arithmetic mean	2.00	7.72	1.00
STDev	0.248	1.33	0.208
CV or Variability	5.1%	16.3%	13.2%

ICP-MS	PC-S-A1407	PC-S-A1408	PC-S-A1409
N	7	6	7
Robust mean Algo A	2.02	8.63	0.986
Robust STDev	0.128	0.604	0.136
Median	2.01	8.48	0.978
STDev from MAD	0.104	0.534	0.151
Arithmetic mean	2.07	8.79	0.986
STDev	0.253	0.811	0.120
CV or Variability	6.3%	7.0%	13.8%

ICP-MS (collision/reaction cell)	PC-S-A1407	PC-S-A1408	PC-S-A1409
N	5	5	5
Robust mean Algo A	2.03	8.90	0.912
Robust STDev	0.0378	0.450	0.0349
Median	2.02	9.06	0.900
STDev from MAD	0.0330	0.431	0.0297
Arithmetic mean	2.10	8.90	1.00
STDev	0.141	0.397	0.178
CV or Variability	1.9%	5.1%	3.8%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Serum Aluminium (μmol/L)

PC-S-A1407

PC-S-A1408

PC-S-A1409

Individual results
Serum Copper (µmol/L)
Round #2014-03

Participant	PC-S-E1407	z'-score	PC-S-E1408	z'-score	PC-S-E1409	z'-score	Method
217	9.30	-0.07	13.2	-0.10	27.7	0.00	FAAS
226	9.65	0.35	13.2	-0.07	29.2	0.89	ICP-MS (C/R)
387	9.92	0.69	20.0	6.72	29.3	1.00	GFAAS
428	9.93	0.70	14.3	0.96	28.0	0.19	ICP-MS (C/R)
636	9.05	-0.39	12.9	-0.44	28.0	0.21	ICP-MS
744	8.07	-1.59	11.7	-1.58	24.2	-2.12	ND
747	9.16	-0.25	12.9	-0.40	26.7	-0.61	ICP-MS
1095	9.90	0.67	14.1	0.80	29.7	1.22	FAAS
1109	10.3	1.11	14.2	0.89	29.0	0.80	ND
1188	9.27	-0.11	13.1	-0.20	26.7	-0.61	ICP-MS (C/R)
1300	9.60	0.30	13.1	-0.24	28.0	0.19	FAAS
1855	11.7	2.94	11.6	-1.71	29.7	1.21	ICP-MS
2305	7.92	-1.78	11.5	-1.79	24.2	-2.16	ND
2516	6.37	-3.70	9.11	-4.21	23.0	-2.87	GFAAS
2580	8.70	-0.82	12.4	-0.91	27.6	-0.06	FAAS
2763	9.00	-0.45	12.9	-0.40	27.5	-0.12	ICP-MS (C/R)
2907	9.73	0.45	14.0	0.73	28.0	0.18	ICP-MS
2982	10.3	1.18	14.3	0.98	28.0	0.16	FAAS
3150	9.30	-0.07	13.4	0.10	26.3	-0.86	FAAS
3211	10.1	0.91	15.2	1.91	29.3	0.98	FAAS
3423	10.8	1.77	14.6	1.33	29.7	1.23	FAAS
3513	9.60	0.30	13.7	0.40	28.6	0.55	ICP-MS
3773	9.30	-0.07	13.6	0.29	28.5	0.49	ICP-MS (C/R)
3853	9.26	-0.12	13.4	0.11	29.7	1.23	ICP-MS
4082	8.98	-0.47	12.9	-0.40	2.68	-15.32	ICP-MS
4090	8.89	-0.58	12.4	-0.89	26.6	-0.69	ICP-MS (C/R)
4953	9.36	0.00	13.5	0.19	28.1	0.23	ICP-MS
5556	9.76	0.49	14.0	0.71	27.9	0.09	FAAS
5591	9.00	-0.45	15.5	2.21	29.6	1.16	GFAAS
5596	8.31	-1.30	12.1	-1.22	24.9	-1.73	ICP-MS (C/R)
5654	9.04	-0.40	12.9	-0.43	27.5	-0.15	ICP-MS (C/R)
5691	9.60	0.30	14.1	0.80	29.2	0.92	ICP-MS
5881	8.87	-0.61	12.7	-0.63	25.8	-1.18	ICP-MS (C/R)
5955	9.05	-0.38	13.0	-0.30	26.3	-0.86	ND
6511	8.99	-0.46	12.8	-0.49	27.2	-0.28	ND
6711	9.42	0.07	13.3	0.05	27.5	-0.14	FAAS
7311	9.79	0.53	13.8	0.54	28.3	0.39	ICP-MS
7804	9.45	0.11	12.2	-1.16	30.2	1.51	ND
8376	11.2	2.27	15.5	2.21	27.5	-0.12	FAAS
8454	9.96	0.74	13.6	0.30	27.2	-0.31	FAAS
8981	9.28	-0.10	14.2	0.91	25.5	-1.35	ND
9759	8.12	-1.53	11.9	-1.43	24.6	-1.91	FAAS
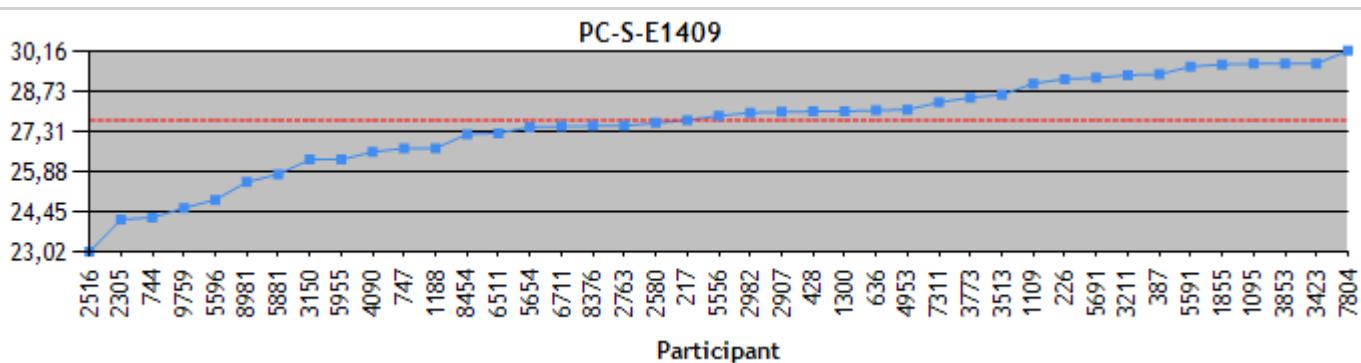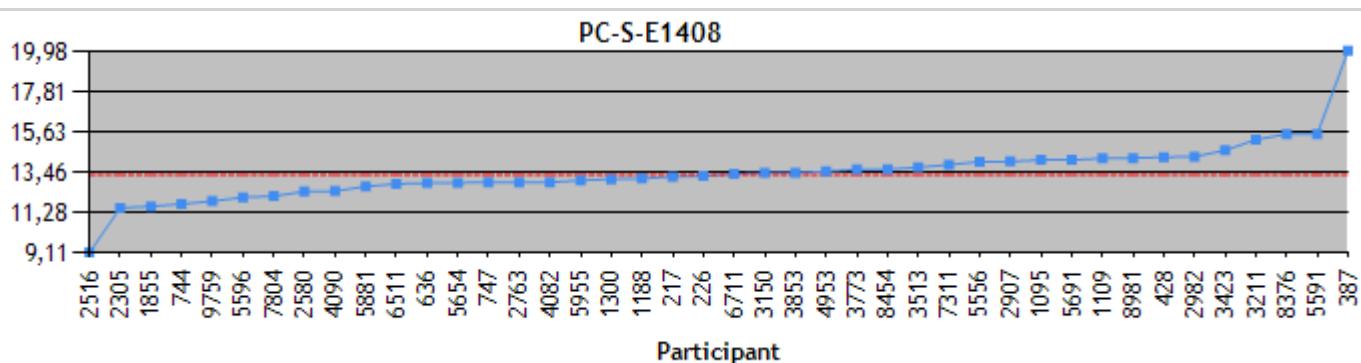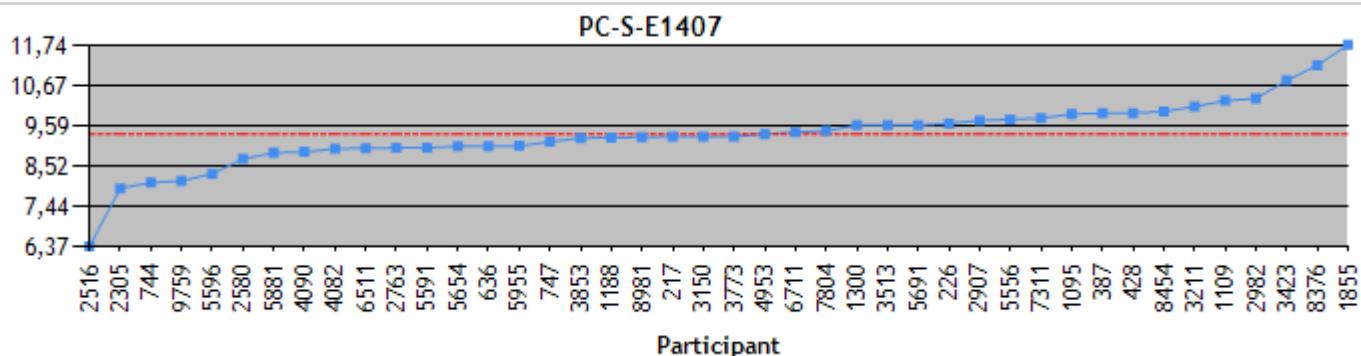
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-E1407	9.36	0.116	0.801	7.74 - 11.0	Accepted	---
PC-S-E1408	13.3	0.207	0.973	11.3 - 15.3	Rejected[1]	---
PC-S-E1409	27.7	0.323	1.60	24.4 - 31.0	Accepted	---

Statistics
Serum Copper (µmol/L)

All methods	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	42	42	41
Robust mean Algo A	9.36	13.3	27.7
Robust STDev	0.601	1.07	1.65
Median	9.30	13.3	27.9
STDev from MAD	0.561	1.07	1.71
Arithmetic mean	9.36	13.4	27.6
STDev	0.890	1.56	1.73
CV or Variability	6.4%	8.1%	6.0%

Flame-AAS	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	13	13	13
Robust mean Algo A	9.74	13.7	27.7
Robust STDev	0.744	0.932	0.560
Median	9.76	13.6	27.7
STDev from MAD	0.677	0.799	0.462
Arithmetic mean	9.73	13.7	27.8
STDev	0.815	1.03	1.38
CV or Variability	7.6%	6.8%	2.0%

Graphite furnace-AAS	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	3	3	3
Robust mean Algo A	8.62	14.9	29.2
Robust STDev	1.72	6.19	0.505
Median	9.00	15.5	29.3
STDev from MAD	1.36	6.64	0.400
Arithmetic mean	8.43	14.9	27.3
STDev	1.84	5.46	3.72
CV or Variability	20.0%	41.7%	1.7%

ICP-MS	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	10	10	9
Robust mean Algo A	9.46	13.4	28.4
Robust STDev	0.403	0.667	0.628
Median	9.48	13.4	28.3
STDev from MAD	0.409	0.813	0.496
Arithmetic mean	9.63	13.3	28.5
STDev	0.794	0.750	0.953
CV or Variability	4.3%	5.0%	2.2%

ICP-MS (collision/reaction cell)	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	9	9	9
Robust mean Algo A	9.11	13.0	27.2
Robust STDev	0.382	0.565	1.38
Median	9.04	12.9	27.5
STDev from MAD	0.342	0.496	1.31
Arithmetic mean	9.14	13.0	27.2
STDev	0.472	0.641	1.34
CV or Variability	4.2%	4.4%	5.1%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Serum Copper (µmol/L)

PC-S-E1407

PC-S-E1408

PC-S-E1409

Participant	PC-S-G1407	z'-score	PC-S-G1408	z'-score	PC-S-G1409	z'-score	Method
217	56.0	3.11	73.0	1.50	102	1.22	ICP-MS
323	32.0	-1.23	45.0	-1.75	65.0	-1.81	GFAAS
747	39.1	0.05	62.5	0.28	93.6	0.53	ICP-MS
1109	53.7	2.70	75.5	1.79	107	1.67	ND
1188	42.6	0.69	68.4	0.96	98.3	0.92	ICP-MS (C/R)
2629	39.7	0.16	51.7	-0.98	78.8	-0.68	GFAAS
2763	32.7	-1.10	51.2	-1.03	74.7	-1.02	ICP-MS (C/R)
4090	28.9	-1.78	53.8	-0.73	77.1	-0.82	ND
6511	38.4	-0.07	64.4	0.50	96.5	0.77	ND
8376	40.6	0.32	60.4	0.04	86.8	-0.02	GFAAS
9759	36.4	-0.43	54.6	-0.64	78.3	-0.72	ICP-MS
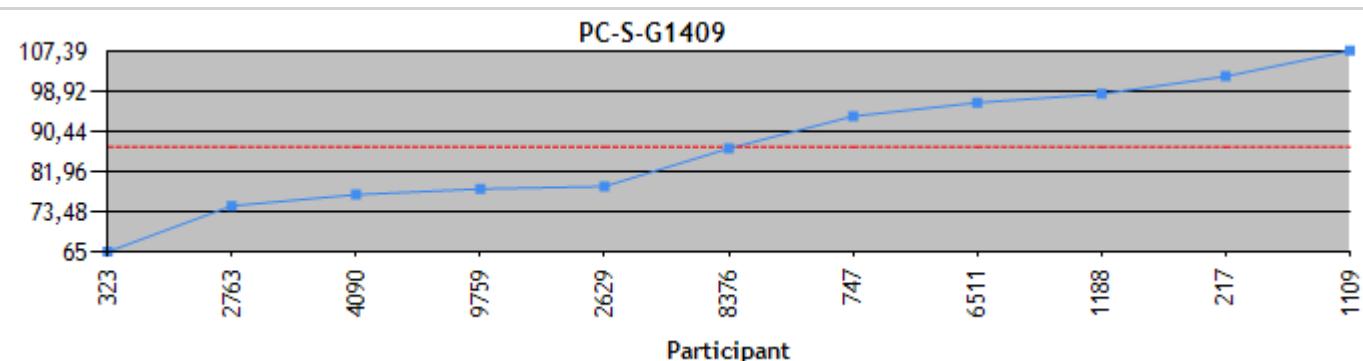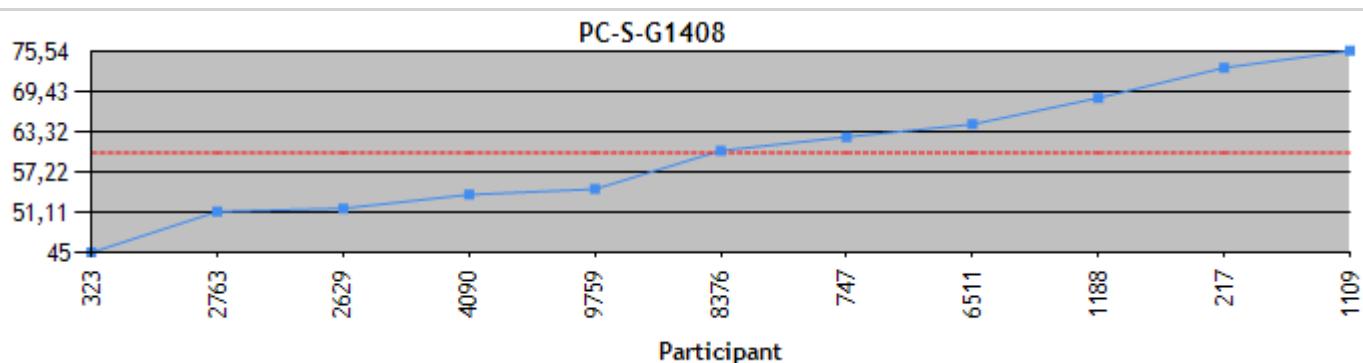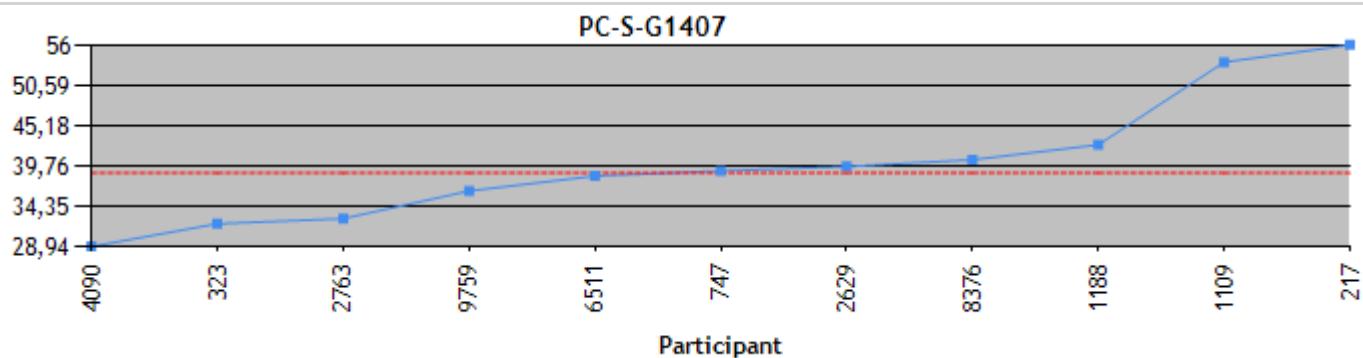
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-G1407	38.8	2.32	5.01	27.8 - 49.8	Accepted	---
PC-S-G1408	60.1	4.16	7.55	42.9 - 77.3	Accepted	---
PC-S-G1409	87.1	5.69	10.8	62.7 - 111	Accepted	---

Statistics
Serum Manganese (nmol/L)

All methods	PC-S-G1407	PC-S-G1408	PC-S-G1409
N	11	11	11
Robust mean Algo A	38.8	60.1	87.1
Robust STDev	6.16	11.0	15.1
Median	39.1	60.4	86.8
STDev from MAD	5.19	11.8	14.5
Arithmetic mean	40.0	60.1	87.1
STDev	8.41	9.73	13.3
CV or Variability	15.9%	18.4%	17.3%

Graphite furnace-AAS	PC-S-G1407	PC-S-G1408	PC-S-G1409
N	3	3	3
Robust mean Algo A	39.3	52.4	76.9
Robust STDev	1.71	8.78	12.5
Median	39.7	51.7	78.8
STDev from MAD	1.35	9.92	11.9
Arithmetic mean	37.4	52.4	76.9
STDev	4.72	7.74	11.0
CV or Variability	4.3%	16.8%	16.3%

ICP-MS	PC-S-G1407	PC-S-G1408	PC-S-G1409
N	3	3	3
Robust mean Algo A	40.2	63.4	91.3
Robust STDev	5.04	10.5	13.6
Median	39.1	62.5	93.6
STDev from MAD	4.00	11.7	12.5
Arithmetic mean	43.8	63.4	91.3
STDev	10.6	9.23	12.0
CV or Variability	12.5%	16.5%	14.9%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Serum Manganese (nmol/L)

PC-S-G1407

PC-S-G1408

PC-S-G1409

Individual results
Serum Selenium (µmol/L)
Round #2014-03

Participant	PC-S-E1407	z'-score	PC-S-E1408	z'-score	PC-S-E1409	z'-score	Method
217	0.930	0.09	1.78	0.99	2.77	0.30	ICP-MS
226	0.903	-0.18	1.56	-0.46	2.77	0.32	ICP-MS (C/R)
428	0.833	-0.89	1.60	-0.23	2.58	-0.49	ICP-MS (C/R)
636	0.916	-0.05	1.63	0.03	2.72	0.10	ICP-MS
747	0.873	-0.49	1.55	-0.53	2.59	-0.47	ICP-MS
1095	1.06	1.42	1.59	-0.26	2.52	-0.76	GFAAS
1109	0.941	0.20	1.69	0.41	2.75	0.21	ND
1188	1.02	1.01	1.83	1.31	3.13	1.82	ICP-MS (C/R)
1300	1.00	0.81	1.73	0.64	3.04	1.43	HG-AAS
2305	1.06	1.42	1.65	0.13	2.66	-0.17	ND
2516	0.960	0.40	1.37	-1.71	2.32	-1.61	GFAAS
2763	0.860	-0.62	1.59	-0.26	2.74	0.17	ICP-MS (C/R)
3150	0.980	0.60	1.56	-0.46	2.57	-0.55	GFAAS
3513	0.860	-0.62	1.65	0.13	2.20	-2.12	ICP-MS (C/R)
3773	0.865	-0.57	1.61	-0.16	2.76	0.27	ICP-MS (C/R)
3853	0.950	0.30	1.71	0.53	3.09	1.65	ICP-MS (C/R)
4082	0.871	-0.51	1.63	0.00	2.68	-0.08	ICP-MS
4590	0.927	0.06	1.59	-0.26	2.76	0.25	GFAAS
4953	0.899	-0.22	1.62	-0.06	2.71	0.04	ICP-MS (C/R)
5556	0.906	-0.16	1.41	-1.47	2.22	-2.05	GFAAS
5596	0.852	-0.71	1.54	-0.62	2.53	-0.73	ICP-MS (C/R)
5654	0.913	-0.08	1.87	1.55	3.00	1.27	ICP-MS (C/R)
5691	0.750	-1.74	1.57	-0.39	2.64	-0.25	ICP-MS
5881	0.864	-0.58	1.57	-0.38	2.63	-0.28	ICP-MS (C/R)
5955	0.886	-0.36	1.63	0.00	2.72	0.08	ND
6511	0.973	0.53	1.68	0.30	2.72	0.07	ND
6545	1.00	0.80	1.78	0.99	2.78	0.34	ICP-MS
6711	0.610	-3.17	1.92	1.91	3.22	2.20	ICP-MS
7311	1.02	1.01	1.87	1.58	2.94	1.02	ICP-MS
7804	1.05	1.31	0.970	-4.34	1.54	-4.91	ND
8376	*62.1*	623.06	*104*	674.58	*182*	756.98	GFAAS
8454	0.610	-3.17	1.61	-0.13	2.72	0.08	GFAAS
9759	0.980	0.60	1.58	-0.36	2.56	-0.60	GFAAS
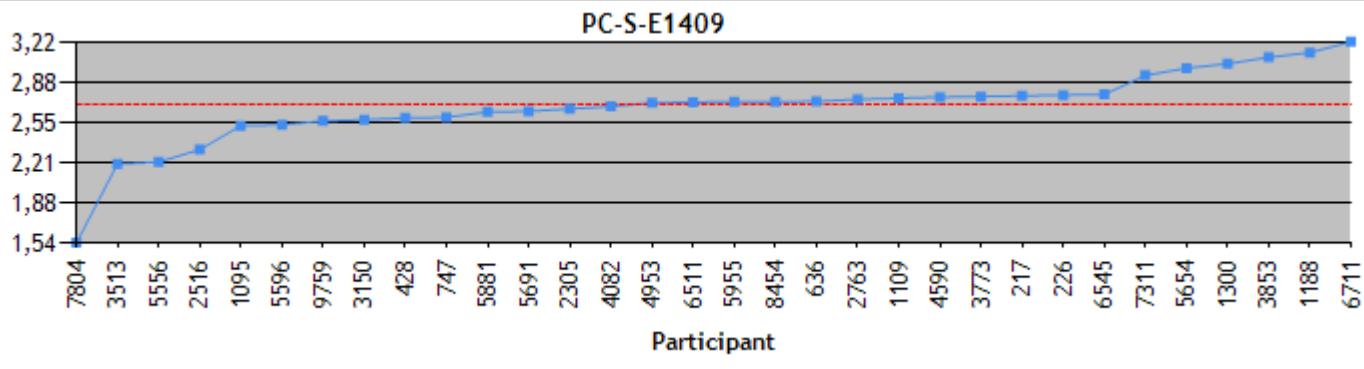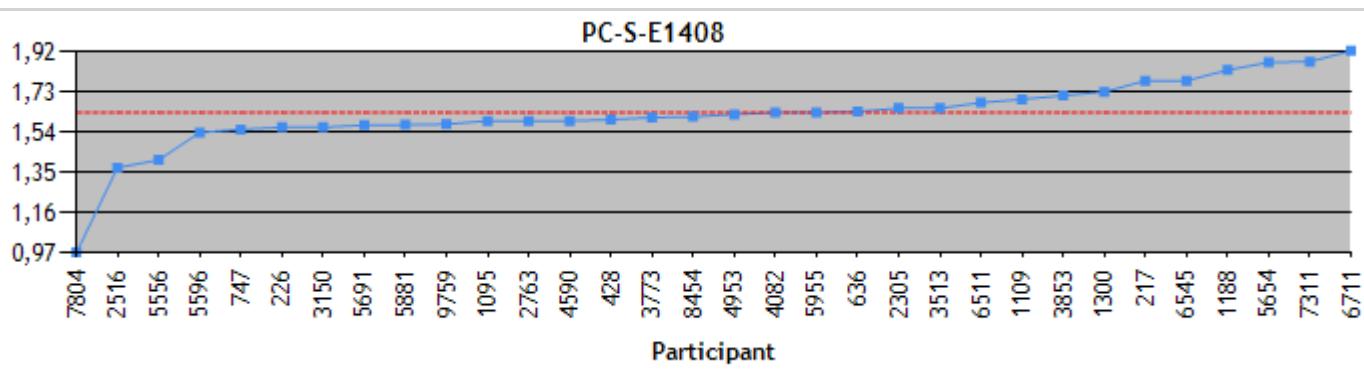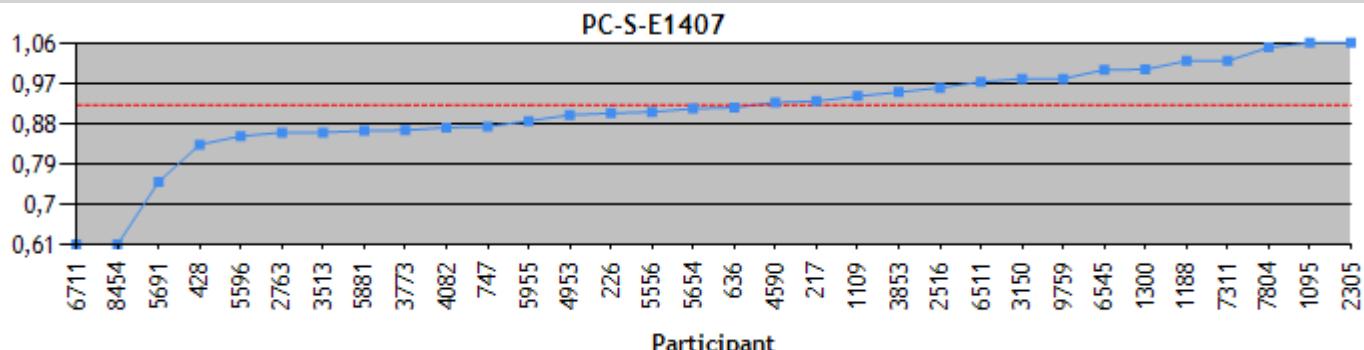
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-E1407	0.921	0.0182	0.0965	0.725 - 1.12	Accepted	---
PC-S-E1408	1.63	0.0197	0.151	1.33 - 1.93	Accepted	---
PC-S-E1409	2.70	0.0386	0.233	2.23 - 3.17	Rejected[1]	---

Statistics
Serum Selenium (µmol/L)

All methods	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	32	32	32
Robust mean Algo A	0.921	1.63	2.70
Robust STDev	0.0824	0.0892	0.175
Median	0.915	1.62	2.72
STDev from MAD	0.0810	0.0822	0.157
Arithmetic mean	0.910	1.62	2.67
STDev	0.107	0.170	0.310
CV or Variability	8.9%	5.5%	6.5%

Graphite furnace-AAS	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	7	7	7
Robust mean Algo A	0.953	1.57	2.52
Robust STDev	0.0573	0.0298	0.223
Median	0.960	1.58	2.56
STDev from MAD	0.0489	0.0230	0.240
Arithmetic mean	0.918	1.53	2.52
STDev	0.144	0.0980	0.197
CV or Variability	6.0%	1.9%	8.9%

ICP-MS	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	8	8	8
Robust mean Algo A	0.887	1.72	2.76
Robust STDev	0.117	0.158	0.146
Median	0.895	1.71	2.75
STDev from MAD	0.105	0.159	0.128
Arithmetic mean	0.871	1.72	2.79
STDev	0.135	0.140	0.202
CV or Variability	13.2%	9.2%	5.3%

ICP-MS (collision/reaction cell)	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	11	11	11
Robust mean Algo A	0.884	1.62	2.75
Robust STDev	0.0397	0.0686	0.256
Median	0.865	1.61	2.74
STDev from MAD	0.0470	0.0654	0.232
Arithmetic mean	0.893	1.65	2.74
STDev	0.0539	0.109	0.268
CV or Variability	4.5%	4.2%	9.3%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Serum Selenium (µmol/L)

Individual results
Serum Zinc (µmol/L)
Round #2014-03

Participant	PC-S-E1407	z'-score	PC-S-E1408	z'-score	PC-S-E1409	z'-score	Method
217	11.8	1.02	17.8	0.88	25.4	0.76	FAAS
226	10.7	0.02	16.8	0.25	24.0	0.17	ICP-MS (C/R)
428	11.6	0.87	17.7	0.81	23.8	0.11	ICP-MS (C/R)
636	11.0	0.25	16.6	0.11	24.1	0.20	ICP-MS
744	9.52	-1.10	15.4	-0.58	22.2	-0.60	ND
747	10.0	-0.65	15.5	-0.55	23.1	-0.21	ICP-MS
1095	10.4	-0.28	15.6	-0.49	22.1	-0.64	FAAS
1109	12.2	1.38	19.5	1.90	26.8	1.38	ND
1188	9.96	-0.69	15.4	-0.61	22.4	-0.51	ICP-MS (C/R)
1300	7.03	-3.42	17.1	0.44	23.4	-0.09	FAAS
1855	13.4	2.54	14.3	-1.28	25.4	0.76	ICP-MS
2305	10.7	0.03	15.4	-0.63	22.0	-0.69	ND
2516	10.5	-0.19	16.4	0.00	23.0	-0.26	FAAS
2580	10.4	-0.28	16.4	0.00	23.6	0.00	FAAS
2763	10.3	-0.37	15.9	-0.31	23.1	-0.21	ICP-MS (C/R)
2907	10.2	-0.44	15.3	-0.70	24.4	0.36	ICP-MS
2982	7.12	-3.34	13.2	-1.96	17.7	-2.49	FAAS
3150	10.9	0.19	16.7	0.18	23.5	-0.04	FAAS
3211	11.1	0.37	17.4	0.61	23.7	0.04	FAAS
3423	10.7	0.01	16.4	-0.01	22.9	-0.30	FAAS
3513	11.5	0.75	17.6	0.73	24.5	0.38	ICP-MS
3773	10.5	-0.15	17.2	0.48	24.7	0.46	ICP-MS (C/R)
3853	11.2	0.42	17.2	0.51	25.5	0.82	ICP-MS
4082	10.2	-0.47	16.2	-0.12	22.8	-0.34	ICP-MS
4090	9.57	-1.06	15.4	-0.60	22.3	-0.57	ICP-MS (C/R)
4953	11.0	0.32	17.2	0.50	24.8	0.51	ICP-MS
5556	10.9	0.14	16.8	0.25	23.2	-0.15	FAAS
5591	11.5	0.75	16.8	0.24	23.9	0.13	FAAS
5596	10.1	-0.59	16.1	-0.18	22.3	-0.55	ICP-MS (C/R)
5654	10.6	-0.09	17.5	0.70	24.4	0.35	ICP-MS (C/R)
5691	11.3	0.56	17.9	0.92	25.3	0.72	ICP-MS
5881	9.95	-0.70	15.7	-0.42	22.1	-0.65	ICP-MS (C/R)
5955	9.93	-0.72	15.7	-0.43	22.2	-0.60	ND
6511	10.7	-0.04	16.4	-0.02	23.2	-0.19	ND
6711	12.0	1.19	17.1	0.45	25.8	0.92	ICP-MS
7311	11.2	0.45	17.2	0.47	24.4	0.33	ICP-MS
7804	<LQ	---	14.7	-1.06	23.3	-0.12	ND
8376	10.8	0.09	16.3	-0.06	23.0	-0.25	FAAS
8454	10.9	0.19	15.3	-0.67	22.6	-0.43	FAAS
8981	8.87	-1.71	14.4	-1.22	22.2	-0.60	ND
9759	11.4	0.63	17.5	0.65	25.3	0.72	FAAS
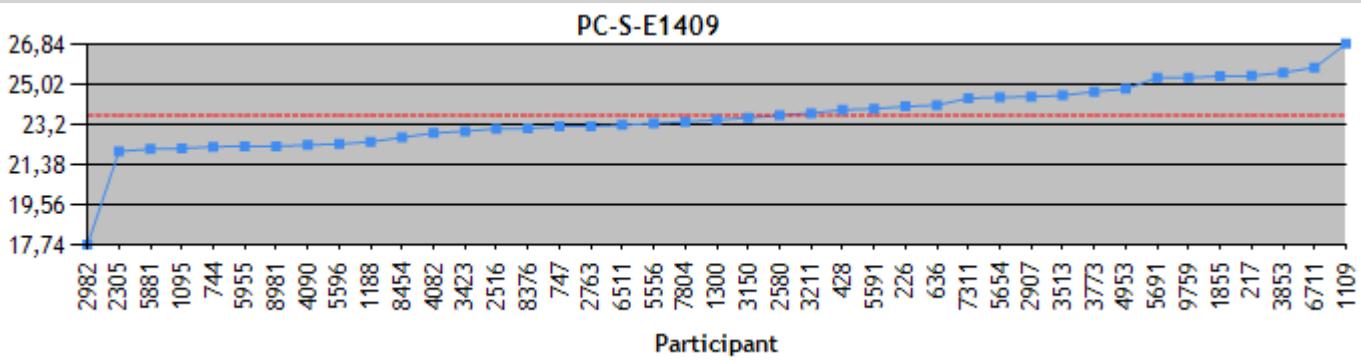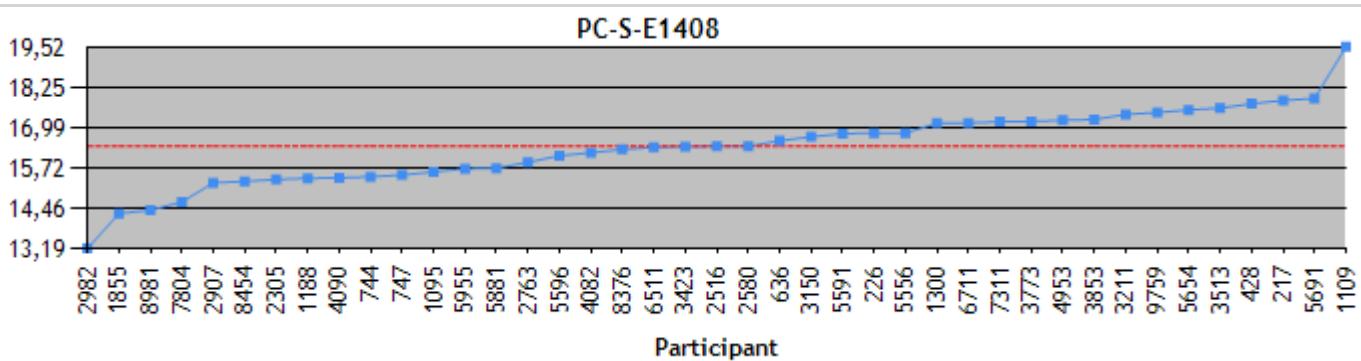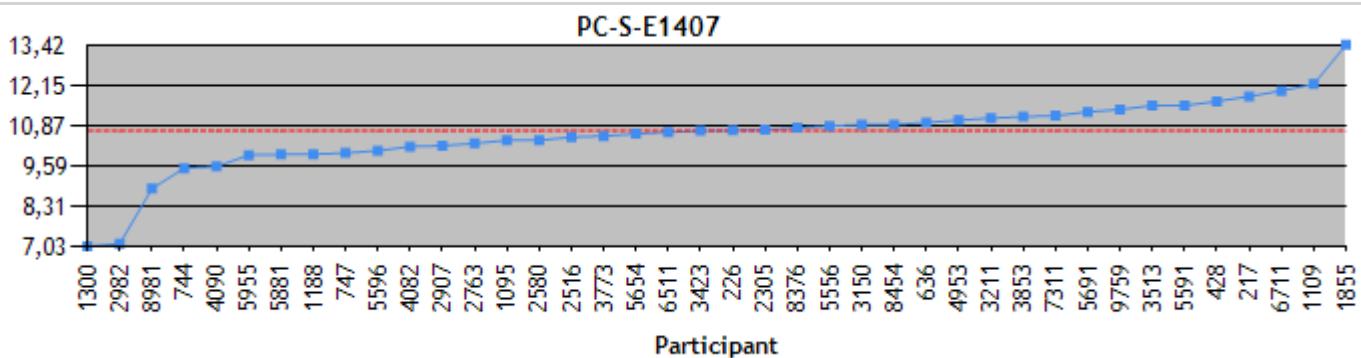
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-E1407	10.7	0.154	1.06	8.56 - 12.8	Accepted	---
PC-S-E1408	16.4	0.218	1.62	13.1 - 19.7	Accepted	---
PC-S-E1409	23.6	0.262	2.34	18.9 - 28.3	Accepted	---

Statistics
Serum Zinc (µmol/L)

All methods	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	40	41	41
Robust mean Algo A	10.7	16.4	23.6
Robust STDev	0.777	1.12	1.34
Median	10.7	16.4	23.4
STDev from MAD	0.739	1.21	1.53
Arithmetic mean	10.6	16.4	23.5
STDev	1.15	1.18	1.53
CV or Variability	7.3%	6.8%	5.7%

Flame-AAS	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	14	14	14
Robust mean Algo A	10.8	16.6	23.3
Robust STDev	0.579	0.748	0.687
Median	10.8	16.6	23.3
STDev from MAD	0.555	0.623	0.603
Arithmetic mean	10.4	16.4	23.1
STDev	1.46	1.15	1.79
CV or Variability	5.4%	4.5%	2.9%

ICP-MS	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	11	11	11
Robust mean Algo A	11.1	16.8	24.6
Robust STDev	0.641	0.829	1.06
Median	11.2	17.1	24.5
STDev from MAD	0.519	0.825	1.19
Arithmetic mean	11.2	16.6	24.6
STDev	0.954	1.12	0.959
CV or Variability	5.8%	4.9%	4.3%

ICP-MS (collision/reaction cell)	PC-S-E1407	PC-S-E1408	PC-S-E1409
N	9	9	9
Robust mean Algo A	10.3	16.4	23.2
Robust STDev	0.525	1.02	1.16
Median	10.3	16.1	23.1
STDev from MAD	0.504	1.04	1.25
Arithmetic mean	10.4	16.4	23.2
STDev	0.600	0.912	1.02
CV or Variability	5.1%	6.2%	5.0%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Serum Zinc (µmol/L)

PC-S-E1407

PC-S-E1408

PC-S-E1409

Individual results
Urine Cadmium (nmol/L)
Round #2014-03

Participant	PC-U-D1407	z'-score	PC-U-D1408	z'-score	PC-U-D1409	z'-score	Method
217	29.5	0.73	80.7	-0.30	11.3	0.36	ICP-MS
744	23.5	-1.48	88.7	0.92	7.95	-1.88	ND
747	23.9	-1.32	80.2	-0.38	9.76	-0.69	ICP-MS
1095	32.9	1.98	97.1	2.20	12.1	0.86	ICP-MS (C/R)
1109	33.8	2.31	92.5	1.50	11.6	0.50	ND
1418	30.0	0.91	93.1	1.60	11.7	0.62	ICP-MS (C/R)
1865	28.7	0.45	82.1	-0.09	10.9	0.09	ICP-MS (C/R)
2937	31.6	1.50	80.9	-0.27	12.0	0.78	ICP-MS
2991	27.4	-0.04	85.1	0.37	13.1	1.50	ND
3187	23.7	-1.39	82.4	-0.05	9.65	-0.76	ICP-MS
3211	25.9	-0.59	86.3	0.55	11.0	0.13	GFAAS
3423	27.4	-0.04	84.7	0.30	10.1	-0.49	GFAAS
3853	27.7	0.07	84.8	0.32	11.6	0.53	ICP-MS
4466	20.6	-2.52	74.5	-1.25	5.43	-3.54	GFAAS
4708	27.4	-0.04	83.8	0.17	10.8	0.00	ICP-MS
4953	30.5	1.11	82.9	0.03	11.0	0.15	ICP-MS
5591	32.7	1.91	95.1	1.90	11.9	0.73	ICP-MS
5654	30.6	1.14	81.2	-0.23	11.5	0.45	ICP-MS (C/R)
5691	24.0	-1.28	78.0	-0.72	9.00	-1.19	ICP-MS
5881	27.5	0.00	81.2	-0.23	10.3	-0.32	ICP-MS (C/R)
6511	28.8	0.49	85.1	0.37	11.1	0.21	ND
6545	26.5	-0.37	69.3	-2.05	---	---	ICP-MS
6689	26.4	-0.40	80.1	-0.40	10.3	-0.32	GFAAS
6794	27.5	0.00	81.2	-0.23	11.5	0.45	GFAAS
6858	26.2	-0.49	77.5	-0.79	9.61	-0.79	ICP-MS
6920	26.8	-0.27	82.8	0.02	10.1	-0.43	ND
8701	26.0	-0.57	79.2	-0.53	10.4	-0.24	ND
9759	25.8	-0.62	81.8	-0.13	10.7	-0.08	GFAAS
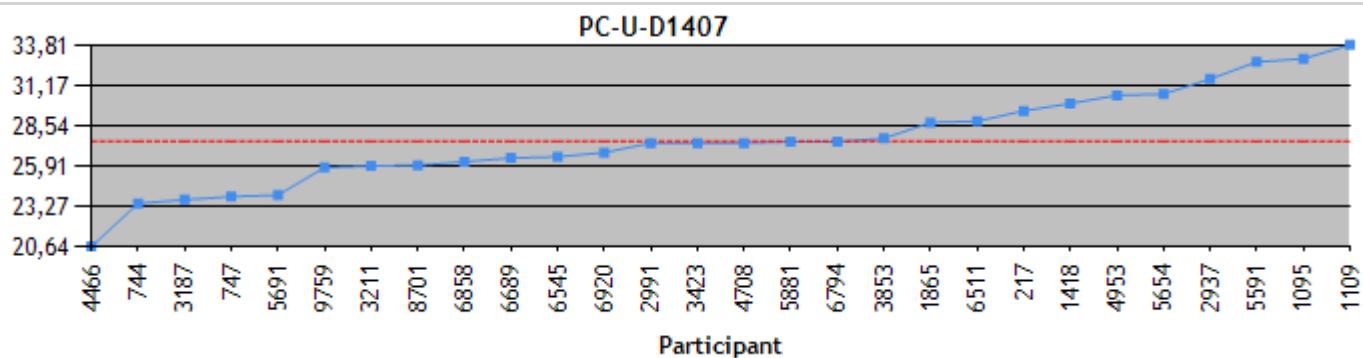
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-D1407	27.5	0.636	2.65	22.0 - 33.0	Accepted	---
PC-U-D1408	82.7	0.927	6.47	69.6 - 95.8	Rejected[1]	---
PC-U-D1409	10.8	0.246	1.50	7.77 - 13.8	Accepted	---

Statistics
Urine Cadmium (nmol/L)
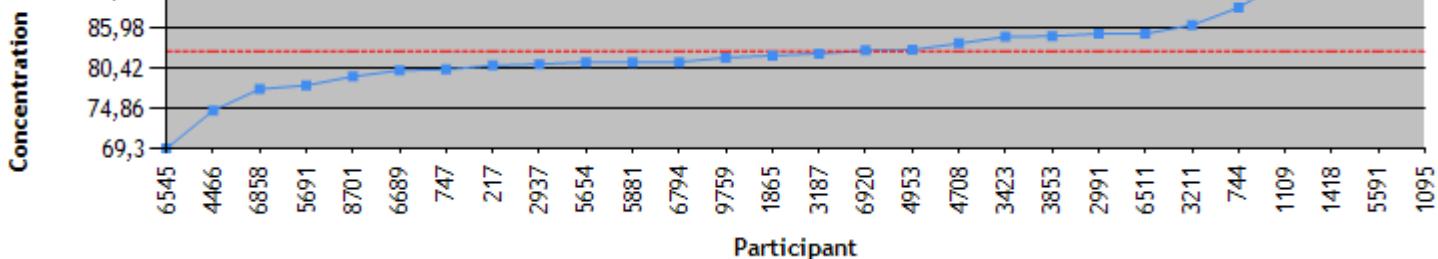
All methods	PC-U-D1407	PC-U-D1408	PC-U-D1409
N	28	28	27
Robust mean Algo A	27.5	82.7	10.8
Robust STDev	2.69	3.92	1.02
Median	27.4	82.3	10.9
STDev from MAD	2.30	3.69	0.976
Arithmetic mean	27.6	83.3	10.6
STDev	3.10	5.97	1.49
CV or Variability	9.8%	4.7%	9.4%

Graphite furnace-AAS	PC-U-D1407	PC-U-D1408	PC-U-D1409
N	6	6	6
Robust mean Algo A	26.2	81.8	10.5
Robust STDev	1.31	3.97	0.815
Median	26.2	81.5	10.5
STDev from MAD	1.19	3.43	0.703
Arithmetic mean	25.6	81.4	9.82
STDev	2.54	4.09	2.21
CV or Variability	5.0%	4.9%	7.8%

ICP-MS	PC-U-D1407	PC-U-D1408	PC-U-D1409
N	11	11	10
Robust mean Algo A	27.6	81.2	10.7
Robust STDev	3.57	4.00	1.22
Median	27.4	80.9	10.9
STDev from MAD	4.62	4.25	1.52
Arithmetic mean	27.6	81.4	10.7
STDev	3.15	6.19	1.08
CV or Variability	12.9%	4.9%	11.5%

ICP-MS (collision/reaction cell)	PC-U-D1407	PC-U-D1408	PC-U-D1409
N	5	5	5
Robust mean Algo A	29.9	82.5	11.3
Robust STDev	2.25	1.65	0.793
Median	30.0	82.1	11.5
STDev from MAD	1.85	1.32	0.792
Arithmetic mean	29.9	87.0	11.3
STDev	2.04	7.59	0.699
CV or Variability	7.5%	2.0%	7.0%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.
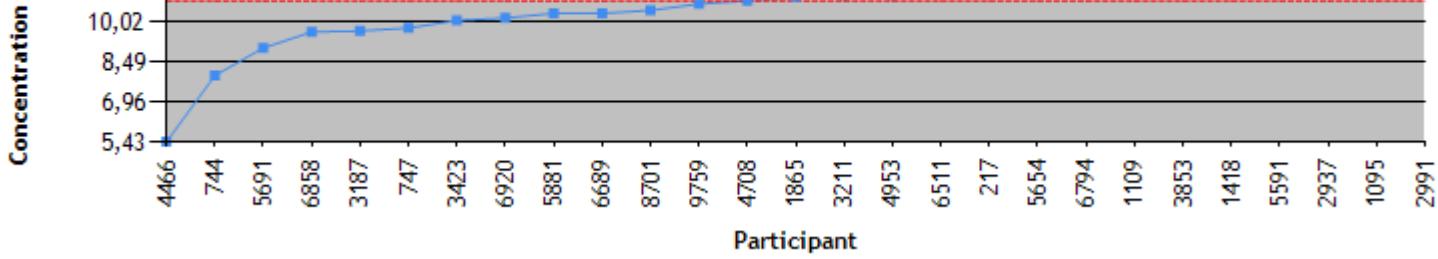
Distribution
Urine Cadmium (nmol/L)

PC-U-D1407

PC-U-D1408

PC-U-D1409

Individual results
Urine Chromium (nmol/L)
Round #2014-03

Participant	PC-U-B1407	z'-score	PC-U-B1408	z'-score	PC-U-B1409	z'-score	Method
176	296	-0.40	28.8	0.15	135	-0.81	ICP-MS (C/R)
744	325	0.65	21.7	-0.99	150	0.20	ND
747	304	-0.11	28.2	0.05	147	0.00	ICP-MS (C/R)
1095	297	-0.37	25.0	-0.47	138	-0.59	GFAAS
1109	338	1.16	28.8	0.15	160	0.83	ND
1418	330	0.83	30.0	0.34	159	0.81	ICP-MS (C/R)
1865	313	0.24	32.3	0.71	153	0.36	ICP-MS (C/R)
2397	283	-0.88	38.0	1.62	143	-0.26	GFAAS
2982	322	0.54	29.8	0.31	149	0.16	GFAAS
3187	290	-0.62	26.8	-0.18	142	-0.33	ICP-MS (C/R)
3853	348	1.51	34.0	0.98	171	1.59	ICP-MS
4604	300	-0.26	25.4	-0.40	136	-0.72	GFAAS
4708	300	-0.26	25.4	-0.40	147	0.00	ICP-MS
4837	334	1.00	30.6	0.43	160	0.86	GFAAS
5491	266	-1.51	19.6	-1.33	122	-1.65	GFAAS
5691	292	-0.55	28.0	0.02	144	-0.20	ICP-MS (C/R)
5881	288	-0.72	27.7	-0.03	140	-0.47	ICP-MS (C/R)
6511	321	0.52	30.0	0.34	158	0.75	ND
6545	369	2.26	30.6	0.43	172	1.63	ICP-MS (C/R)
8701	259	-1.77	17.9	-1.61	120	-1.75	ND
9759	296	-0.40	23.1	-0.77	140	-0.43	GFAAS
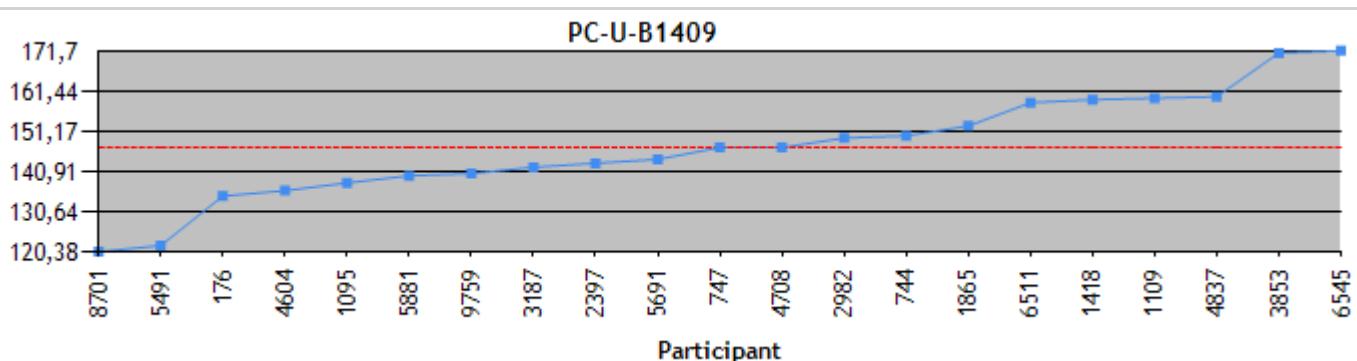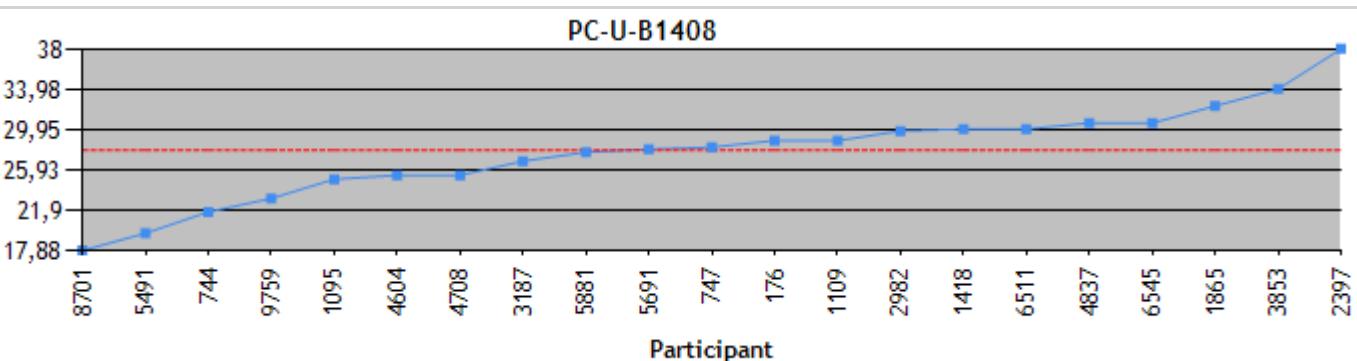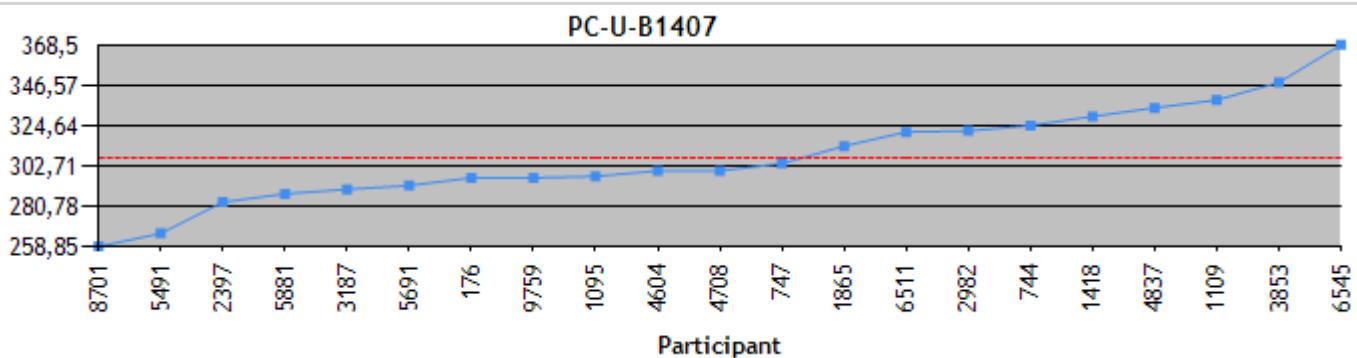
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-B1407	307	6.79	26.3	253 - 361	Accepted	---
PC-U-B1408	27.9	1.06	6.13	15.5 - 40.3	Accepted	---
PC-U-B1409	147	3.63	14.8	117 - 177	Accepted	---

Statistics
Urine Chromium (nmol/L)

All methods	PC-U-B1407	PC-U-B1408	PC-U-B1409
N	21	21	21
Robust mean Algo A	307	27.9	147
Robust STDev	24.9	3.88	13.3
Median	300	28.2	147
STDev from MAD	25.2	3.56	13.3
Arithmetic mean	308	27.7	147
STDev	26.8	4.69	13.6
CV or Variability	8.1%	13.9%	9.1%

Graphite furnace-AAS	PC-U-B1407	PC-U-B1408	PC-U-B1409
N	7	7	7
Robust mean Algo A	299	27.0	141
Robust STDev	24.2	5.95	8.04
Median	297	25.4	140
STDev from MAD	20.8	6.54	6.52
Arithmetic mean	300	27.4	141
STDev	22.8	6.02	11.8
CV or Variability	8.1%	22.1%	5.7%

ICP-MS (collision/reaction cell)	PC-U-B1407	PC-U-B1408	PC-U-B1409
N	8	8	8
Robust mean Algo A	304	28.9	147
Robust STDev	17.5	1.72	10.3
Median	300	28.5	146
STDev from MAD	16.8	1.71	9.41
Arithmetic mean	310	29.1	149
STDev	27.5	1.80	12.0
CV or Variability	5.8%	5.9%	7.0%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Urine Chromium (nmol/L)

PC-U-B1407

PC-U-B1408

PC-U-B1409

Individual results
Urine Copper (µmol/L)
Round #2014-03

Participant	PC-U-R1407	z'-score	PC-U-R1408	z'-score	PC-U-R1409	z'-score	Method
176	0.189	0.63	0.677	-0.12	10.8	-0.56	ICP-MS
387	0.164	-0.59	0.542	-2.27	10.2	-1.26	GFAAS
744	0.166	-0.49	0.597	-1.40	10.9	-0.43	ND
747	0.197	1.03	0.730	0.73	11.5	0.22	ICP-MS
1095	0.170	-0.29	0.800	1.85	*1.18*	-11.27	ICP-MS (C/R)
1109	0.607	21.15	1.17	7.70	12.6	1.47	ND
1188	0.168	-0.39	0.658	-0.42	10.6	-0.78	ICP-MS (C/R)
1418	0.122	-2.64	0.604	-1.27	10.0	-1.44	ICP-MS (C/R)
1855	0.976	39.20	0.614	-1.12	10.8	-0.56	ICP-MS
2629	0.140	-1.76	0.570	-1.82	10.0	-1.42	ICP-OES
2763	0.172	-0.20	0.631	-0.85	11.0	-0.33	ICP-MS (C/R)
3187	0.214	1.86	0.799	1.84	12.8	1.67	ICP-MS
3423	*6.93*	331.11	1.16	7.60	13.4	2.31	FAAS
3513	0.180	0.20	0.680	-0.06	12.0	0.78	ICP-MS
3853	0.280	5.10	0.830	2.33	11.5	0.21	ICP-MS
4090	0.0300	-7.16	0.500	-2.94	10.8	-0.55	ICP-MS (C/R)
4708	0.180	0.20	0.697	0.21	11.1	-0.22	ICP-MS
4953	0.148	-1.38	0.667	-0.27	10.7	-0.65	ICP-MS
5556	0.157	-0.91	0.708	0.39	12.0	0.82	GFAAS
5591	0.220	2.16	0.790	1.69	11.6	0.33	ICP-MS
5654	0.189	0.61	0.714	0.48	11.4	0.11	ICP-MS (C/R)
5691	0.200	1.18	0.700	0.26	10.8	-0.56	ICP-MS
5881	0.153	-1.14	0.658	-0.41	10.9	-0.41	ICP-MS (C/R)
6511	0.173	-0.14	0.721	0.59	11.8	0.51	ND
7804	<LQ	---	0.581	-1.65	14.4	3.50	ND
8376	0.110	-3.24	0.602	-1.31	11.6	0.31	GFAAS
8981	<LD	---	<LD	---	12.6	1.45	ND
9759	0.192	0.78	0.713	0.46	>LL	---	GFAAS
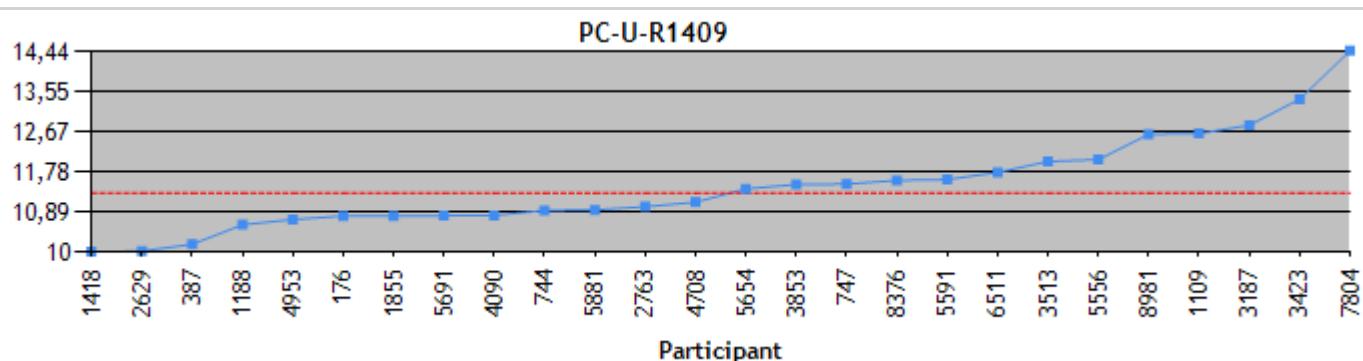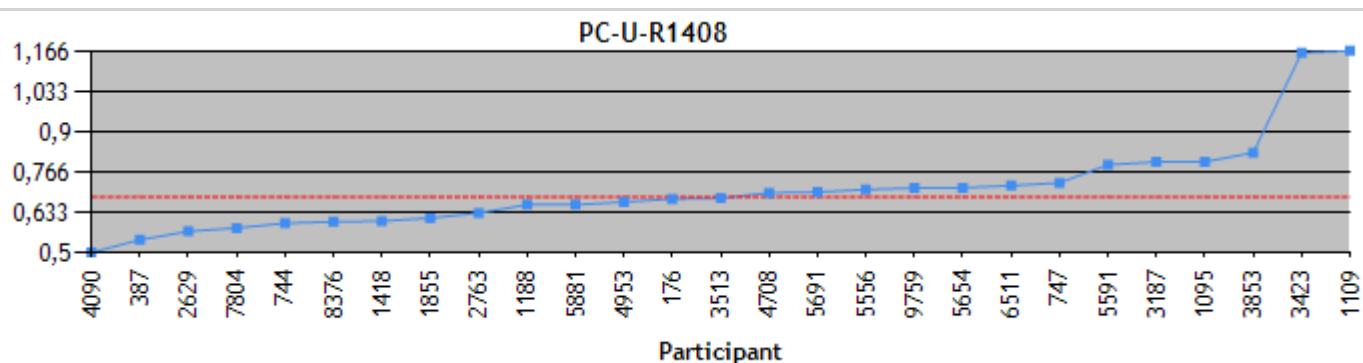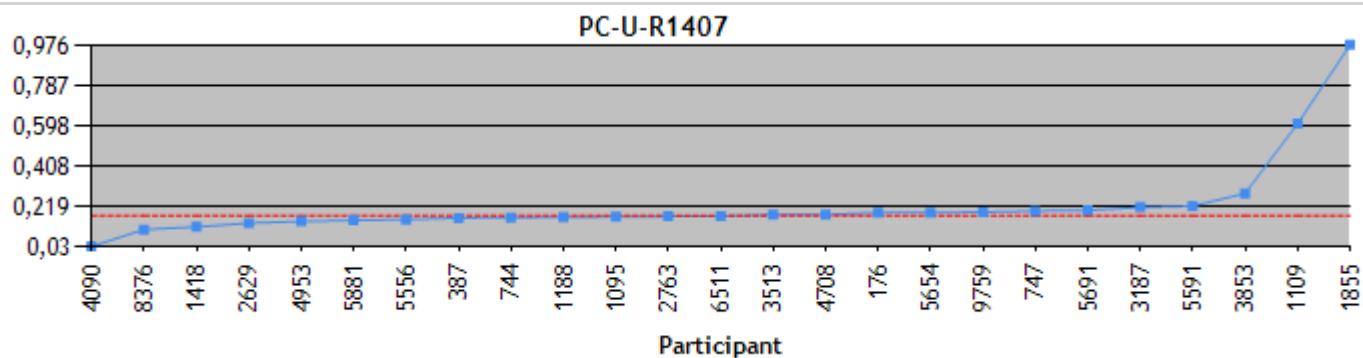
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-R1407	0.176	0.00828	0.0187	0.135 - 0.217	Rejected[1]	---
PC-U-R1408	0.684	0.0241	0.0578	0.559 - 0.809	Rejected[1]	---
PC-U-R1409	11.3	0.198	0.877	9.50 - 13.1	Accepted	---

Statistics
Urine Copper (µmol/L)

All methods	PC-U-R1407	PC-U-R1408	PC-U-R1409
N	25	27	26
Robust mean Algo A	0.176	0.684	11.3
Robust STDev	0.0331	0.100	0.809
Median	0.173	0.680	11.2
STDev from MAD	0.0301	0.0983	0.714
Arithmetic mean	0.220	0.708	11.5
STDev	0.185	0.154	1.05
CV or Variability	18.8%	14.6%	7.2%

Graphite furnace-AAS	PC-U-R1407	PC-U-R1408	PC-U-R1409
N	4	4	3
Robust mean Algo A	0.159	0.641	11.4
Robust STDev	0.0326	0.0948	0.859
Median	0.161	0.655	11.6
STDev from MAD	0.0257	0.0820	0.680
Arithmetic mean	0.156	0.641	11.3
STDev	0.0341	0.0836	0.974
CV or Variability	20.5%	14.8%	7.5%

ICP-MS	PC-U-R1407	PC-U-R1408	PC-U-R1409
N	10	10	10
Robust mean Algo A	0.202	0.708	11.3
Robust STDev	0.0304	0.0552	0.633
Median	0.199	0.699	11.3
STDev from MAD	0.0274	0.0465	0.738
Arithmetic mean	0.278	0.718	11.4
STDev	0.247	0.0681	0.668
CV or Variability	15.1%	7.8%	5.6%

ICP-MS (collision/reaction cell)	PC-U-R1407	PC-U-R1408	PC-U-R1409
N	7	7	6
Robust mean Algo A	0.160	0.655	10.8
Robust STDev	0.0232	0.0869	0.355
Median	0.168	0.658	10.9
STDev from MAD	0.0225	0.0797	0.297
Arithmetic mean	0.143	0.652	10.8
STDev	0.0541	0.0928	0.466
CV or Variability	14.5%	13.3%	3.3%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Urine Copper (µmol/L)

PC-U-R1407

PC-U-R1408

PC-U-R1409

Individual results
Urine Fluoride (μmol/L)
Round #2014-03

Participant	PC-U-F1407	z'-score	PC-U-F1408	z'-score	PC-U-F1409	z'-score	Method
176	208	-0.01	90.5	-0.17	1160	-0.34	FSE
1095	187	-1.63	78.0	-1.99	1180	0.00	FSE
1418	199	-0.66	89.0	-0.40	1210	0.39	FSE
1476	195	-1.01	84.0	-1.12	1080	-1.48	FSE
2629	189	-1.43	89.5	-0.32	1160	-0.34	FSE
4604	211	0.24	92.3	0.09	1190	0.14	FSE
5132	206	-0.16	90.7	-0.14	1130	-0.69	ND
5881	208	0.03	87.0	-0.68	1330	2.25	FSE
6200	212	0.28	93.7	0.29	1240	0.88	FSE
6234	213	0.39	95.2	0.51	1220	0.62	FSE
6545	209	0.09	95.1	0.49	1210	0.46	FSE
6702	214	0.46	91.7	0.00	1140	-0.60	FSE
7269	208	0.00	93.0	0.19	1220	0.59	FSE
8701	218	0.79	95.5	0.54	1240	0.91	ND
9759	208	-0.01	100	1.21	1050	-1.96	FSE
9908	214	0.44	95.3	0.52	1170	-0.08	FSE
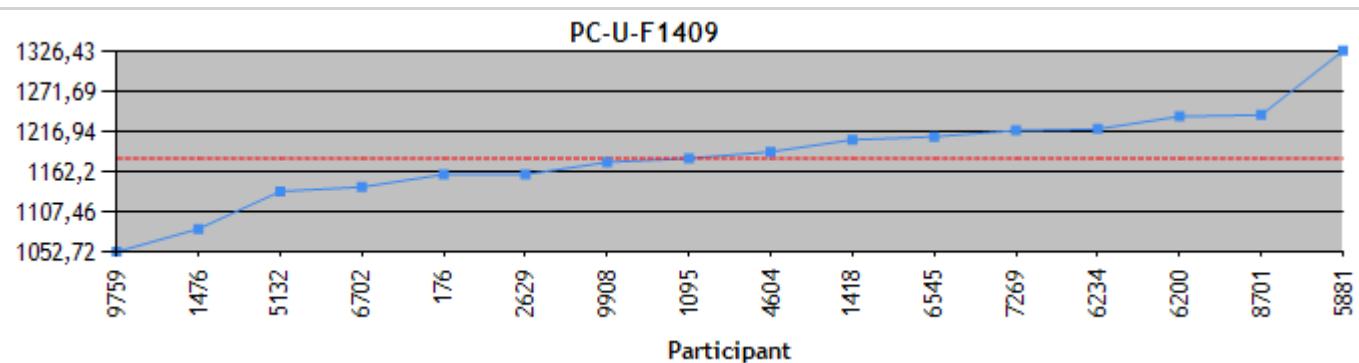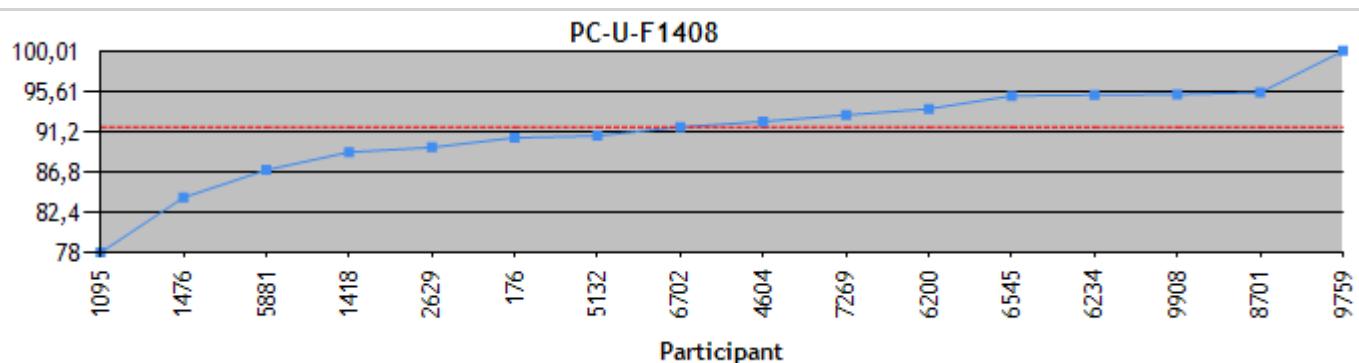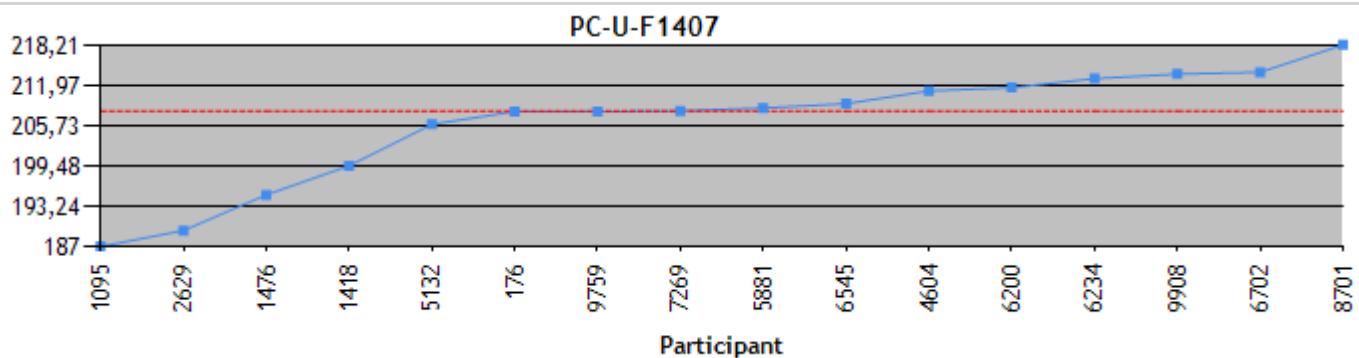
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-F1407	208	2.08	12.7	182 - 234	Accepted	---
PC-U-F1408	91.7	1.36	6.75	77.9 - 105	Accepted	---
PC-U-F1409	1180	16.6	63.0	1050 - 1310	Accepted	---

Statistics
Urine Fluoride (µmol/L)

All methods	PC-U-F1407	PC-U-F1408	PC-U-F1409
N	16	16	16
Robust mean Algo A	208	91.7	1180
Robust STDev	6.65	4.36	53.0
Median	208	92.0	1180
STDev from MAD	6.05	4.56	51.2
Arithmetic mean	206	91.3	1180
STDev	8.95	5.21	64.6
CV or Variability	3.2%	4.8%	4.5%

Fluoride specific electrode	PC-U-F1407	PC-U-F1408	PC-U-F1409
N	14	14	14
Robust mean Algo A	207	91.5	1180
Robust STDev	6.43	4.54	47.7
Median	208	92.0	1180
STDev from MAD	6.05	4.56	44.5
Arithmetic mean	205	91.0	1180
STDev	8.98	5.46	66.3
CV or Variability	3.1%	5.0%	4.0%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Urine Fluoride (µmol/L)

PC-U-F1407

PC-U-F1408

PC-U-F1409

Individual results
Urine Inorganic arsenic (µmol/L)
Round #2014-03

Participant	PC-U-S1407	z'-score	PC-U-S1408	z'-score	PC-U-S1409	z'-score	Method
217	0.380	2.28	1.34	0.00	6.31	0.07	GFAAS
317	0.280	0.00	1.24	-0.71	6.65	0.62	GFAAS
428	0.259	-0.48	1.40	0.44	5.77	-0.82	ICP-MS (C/R)
730	0.302	0.49	1.39	0.34	6.91	1.05	ICP-MS (C/R)
747	0.293	0.30	1.39	0.35	6.48	0.34	ICP-MS (C/R)
1095	0.280	0.00	1.39	0.35	6.78	0.83	GFAAS
1418	0.269	-0.26	1.35	0.10	5.82	-0.74	HG-AAS
1476	0.450	3.87	1.33	-0.07	4.99	-2.09	ICP-MS
1820	0.268	-0.27	1.33	-0.07	7.14	1.42	GFAAS
1827	0.243	-0.84	1.26	-0.57	5.99	-0.46	ICP-MS (C/R)
1865	0.195	-1.94	0.878	-3.27	6.50	0.38	HG-AAS
2580	0.275	-0.11	1.40	0.45	6.86	0.97	GFAAS
2978	0.274	-0.15	1.28	-0.42	5.87	-0.65	ICP-MS
3215	0.330	1.14	1.51	1.20	>LL	---	GFAAS
3423	0.240	-0.91	1.32	-0.13	6.37	0.16	HG-AAS
3853	0.327	1.07	1.37	0.18	6.30	0.04	ICP-MS (C/R)
5375	0.253	-0.61	1.39	0.35	7.22	1.55	ICP-MS
5495	0.315	0.79	1.47	0.89	6.07	-0.32	ICP-MS (C/R)
5691	0.320	0.91	1.17	-1.20	5.89	-0.62	ND
5881	0.237	-0.97	1.17	-1.21	6.10	-0.28	HG-AAS
6511	0.272	-0.18	1.38	0.30	6.27	-0.01	ND
6545	0.290	0.23	1.33	-0.07	5.97	-0.49	ICP-MS (C/R)
7162	0.160	-2.73	1.12	-1.56	5.97	-0.49	GFAAS
8701	0.284	0.09	1.43	0.62	5.96	-0.51	ND

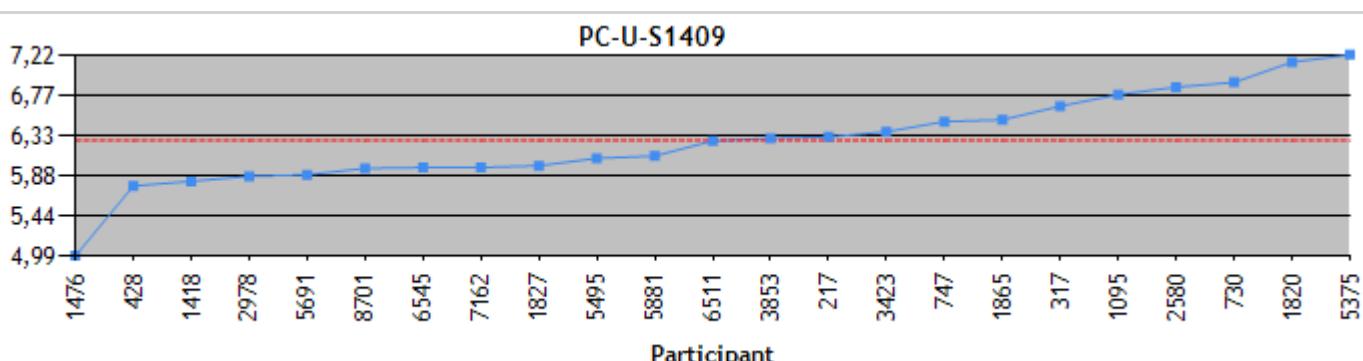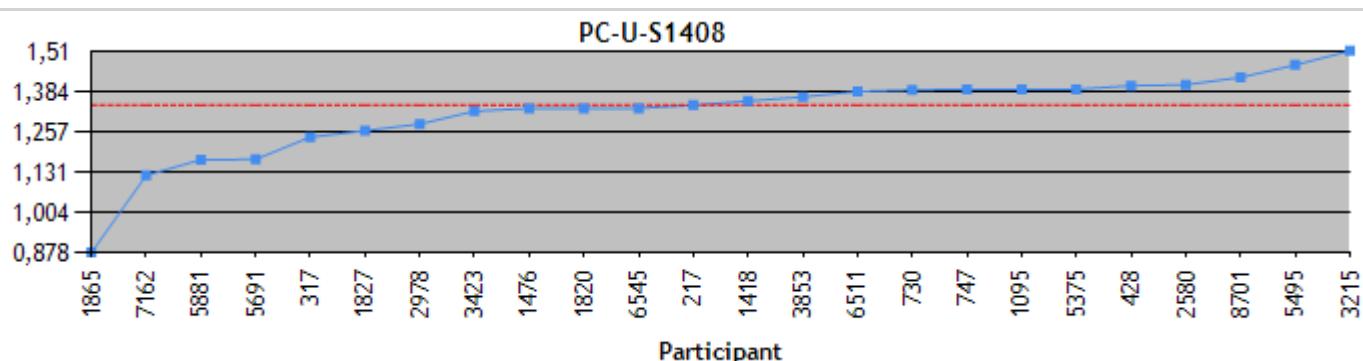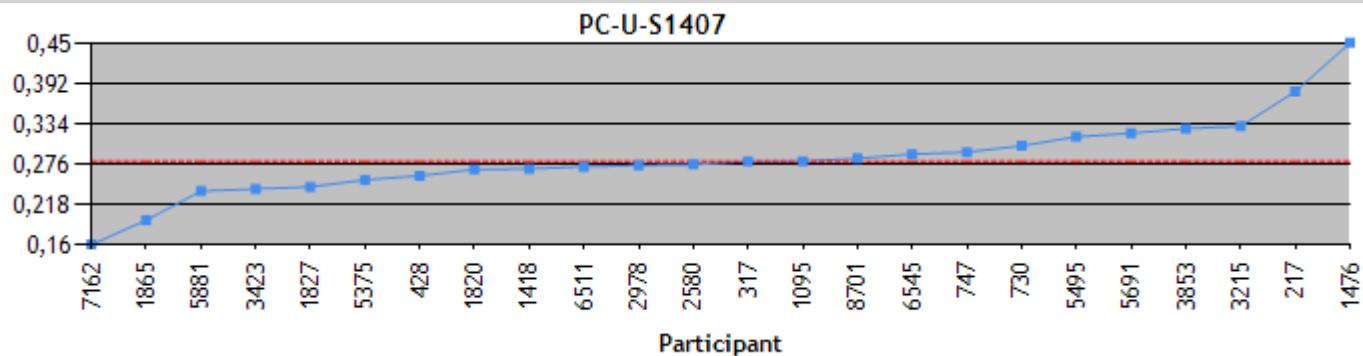|	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-S1407	0.280*	0.00979	0.0409	0.196 - 0.364	Accepted	MAA added
PC-U-S1408	1.34	0.0206	0.140	1.06 - 1.62	Accepted	Workers Profile
PC-U-S1409	6.27	0.123	0.600	5.05 - 7.49	Accepted	As+3 added

*   The assigned value is outside the concentration range of our scope of accreditation.

Statistics
Urine Inorganic arsenic (µmol/L)

All methods	PC-U-S1407	PC-U-S1408	PC-U-S1409
N	24	24	23
Robust mean Algo A	0.280	1.34	6.27
Robust STDev	0.0384	0.0809	0.473
Median	0.278	1.35	6.27
STDev from MAD	0.0361	0.0727	0.451
Arithmetic mean	0.283	1.32	6.27
STDev	0.0571	0.132	0.512
CV or Variability	13.7%	6.0%	7.5%

Graphite furnace-AAS	PC-U-S1407	PC-U-S1408	PC-U-S1409
N	7	7	6
Robust mean Algo A	0.281	1.34	6.64
Robust STDev	0.0222	0.111	0.430
Median	0.280	1.34	6.72
STDev from MAD	0.0178	0.0949	0.409
Arithmetic mean	0.282	1.33	6.62
STDev	0.0671	0.125	0.418
CV or Variability	7.9%	8.3%	6.5%

Hydride generation-AAS	PC-U-S1407	PC-U-S1408	PC-U-S1409
N	4	4	4
Robust mean Algo A	0.238	1.22	6.20
Robust STDev	0.0299	0.164	0.343
Median	0.239	1.25	6.23
STDev from MAD	0.0232	0.136	0.298
Arithmetic mean	0.235	1.18	6.20
STDev	0.0304	0.217	0.302
CV or Variability	12.6%	13.4%	5.5%

ICP-MS	PC-U-S1407	PC-U-S1408	PC-U-S1409
N	3	3	3
Robust mean Algo A	0.282	1.33	6.03
Robust STDev	0.0386	0.0617	1.27
Median	0.274	1.33	5.87
STDev from MAD	0.0306	0.0722	1.31
Arithmetic mean	0.326	1.33	6.03
STDev	0.108	0.0544	1.12
CV or Variability	13.7%	4.6%	21.1%

ICP-MS (collision/reaction cell)	PC-U-S1407	PC-U-S1408	PC-U-S1409
N	7	7	7
Robust mean Algo A	0.290	1.38	6.16
Robust STDev	0.0332	0.0400	0.332
Median	0.293	1.39	6.07
STDev from MAD	0.0322	0.0328	0.331
Arithmetic mean	0.290	1.37	6.21
STDev	0.0297	0.0640	0.387
CV or Variability	11.5%	2.9%	5.4%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Urine Inorganic arsenic (µmol/L)

PC-U-S1407

PC-U-S1408

PC-U-S1409

Participant	PC-U-I1407	z′-score	PC-U-I1408	z′-score	PC-U-I1409	z′-score	Method
217	1.53	0.46	0.900	0.20	2.73	0.36	ICP-MS
428	1.47	0.09	0.898	0.18	2.74	0.41	ICP-MS (C/R)
747	1.39	-0.46	0.841	-0.45	2.54	-0.33	ICP-MS
1095	1.75	1.90	0.923	0.45	3.07	1.60	ICP-MS (C/R)
1855	1.65	1.28	0.953	0.79	3.01	1.38	ICP-MS
2629	1340	8783.51	788	8733.80	2530	9206.59	ND
2763	1.45	-0.07	0.875	-0.08	2.59	-0.15	ICP-MS
2951	1.38	-0.53	0.900	0.20	2.38	-0.91	COLOR
3187	1.36	-0.66	0.809	-0.81	2.56	-0.26	ICP-MS
3513	1.27	-1.25	0.770	-1.24	2.29	-1.24	ICP-MS
4708	1.49	0.20	0.895	0.14	2.73	0.36	ICP-MS
5881	1.84	2.53	1.05	1.87	3.28	2.36	ICP-MS (C/R)
6200	1.51	0.35	0.932	0.55	2.75	0.43	ICP-MS
6511	1.36	-0.64	0.872	-0.11	2.58	-0.19	ND
6545	1.46	0.00	0.840	-0.47	2.58	-0.18	ICP-MS
8981	1.24	-1.44	0.760	-1.35	2.25	-1.38	ND
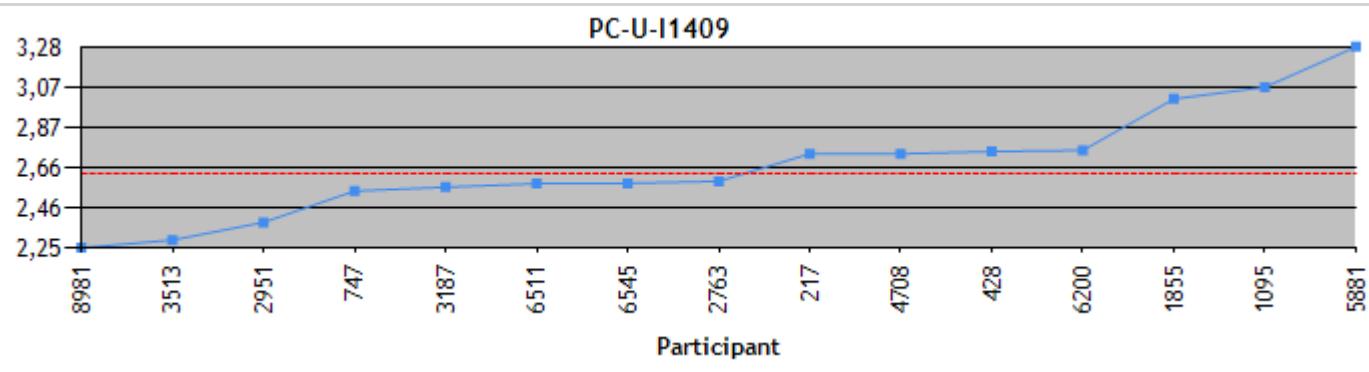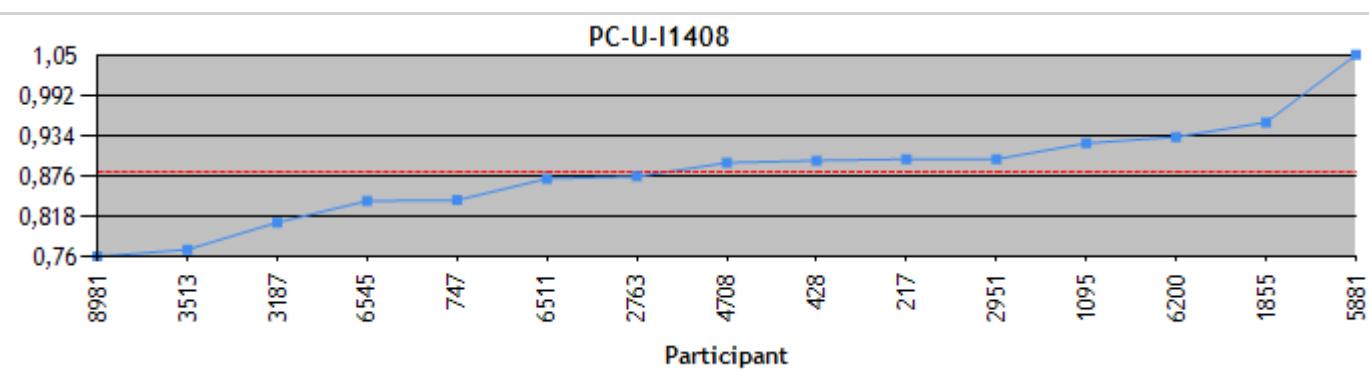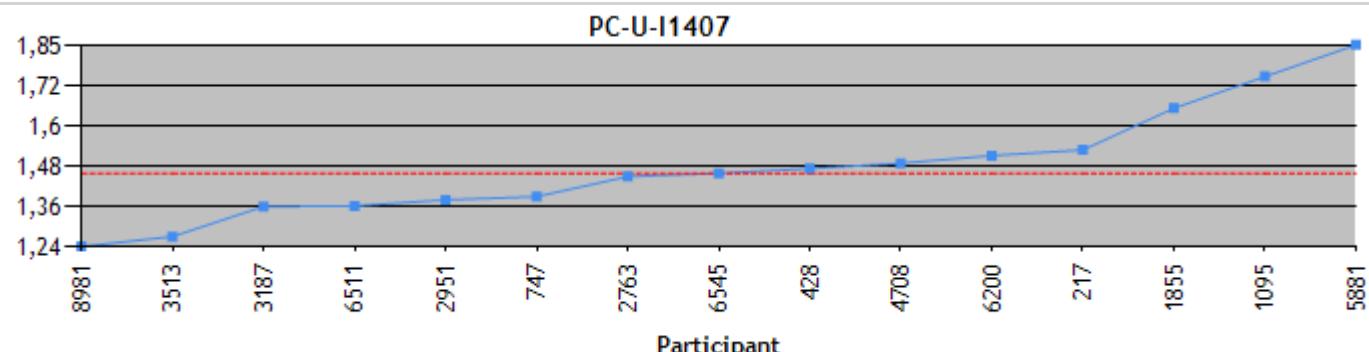
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-I1407	1.46	0.0435	0.146	1.16 - 1.76	Accepted	---
PC-U-I1408	0.882	0.0185	0.0882	0.702 - 1.06	Accepted	---
PC-U-I1409	2.63	0.0785	0.263	2.08 - 3.18	Accepted	---

Statistics
Urine Iodide (µmol/L)

All methods	PC-U-I1407	PC-U-I1408	PC-U-I1409
N	15	15	15
Robust mean Algo A	1.46	0.882	2.63
Robust STDev	0.135	0.0574	0.243
Median	1.46	0.895	2.59
STDev from MAD	0.119	0.0549	0.226
Arithmetic mean	1.48	0.881	2.67
STDev	0.167	0.0732	0.283
CV or Variability	9.2%	6.5%	9.2%

ICP-MS	PC-U-I1407	PC-U-I1408	PC-U-I1409
N	9	9	9
Robust mean Algo A	1.46	0.871	2.63
Robust STDev	0.108	0.0608	0.184
Median	1.46	0.875	2.59
STDev from MAD	0.104	0.0519	0.208
Arithmetic mean	1.46	0.868	2.64
STDev	0.110	0.0589	0.197
CV or Variability	7.4%	7.0%	7.0%

ICP-MS (collision/reaction cell)	PC-U-I1407	PC-U-I1408	PC-U-I1409
N	3	3	3
Robust mean Algo A	1.71	0.933	3.03
Robust STDev	0.177	0.0462	0.306
Median	1.75	0.923	3.07
STDev from MAD	0.140	0.0366	0.306
Arithmetic mean	1.69	0.957	3.03
STDev	0.193	0.0816	0.269
CV or Variability	10.4%	5.0%	10.1%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Urine Iodide (µmol/L)

PC-U-I1407

PC-U-I1408

PC-U-I1409

Individual results
Urine Lead (µmol/L)
Round #2014-03

Participant	PC-U-P1407	z'-score	PC-U-P1408	z'-score	PC-U-P1409	z'-score	Method
176	0.555	0.21	0.285	1.14	4.68	1.13	ICP-MS
194	0.472	-1.69	0.234	-1.20	3.74	-1.61	ND
217	0.560	0.32	0.260	0.00	4.58	0.85	ICP-MS
747	0.547	0.02	0.258	-0.09	4.08	-0.62	ICP-MS
1095	0.620	1.69	0.270	0.46	4.21	-0.23	ICP-MS (C/R)
1109	0.533	-0.30	0.252	-0.35	4.13	-0.48	ND
1855	0.545	-0.01	0.256	-0.19	4.36	0.21	ICP-MS
2182	*4.34*	86.78	0.271	0.50	0.598	-10.83	GFAAS
3167	0.540	-0.14	0.260	0.00	4.54	0.73	GFAAS
3187	0.543	-0.07	0.260	0.00	4.24	-0.15	ICP-MS
3211	0.557	0.25	0.270	0.46	4.17	-0.36	GFAAS
3423	0.550	0.10	0.256	-0.17	4.51	0.65	GFAAS
3776	*3.52*	67.91	2.94	123.59	7.53	9.51	ND
3853	0.532	-0.32	0.254	-0.28	4.15	-0.42	ICP-MS
3970	0.512	-0.79	0.232	-1.31	6.15	5.45	GFAAS
4090	0.550	0.09	0.243	-0.79	4.36	0.21	ICP-MS (C/R)
4708	0.572	0.59	0.270	0.46	4.47	0.53	ICP-MS
4953	0.555	0.21	0.263	0.12	4.41	0.36	ICP-MS
5591	0.580	0.78	0.280	0.92	4.47	0.53	ICP-MS
5654	0.481	-1.50	0.246	-0.66	4.38	0.28	ICP-MS (C/R)
5691	0.540	-0.14	0.260	0.00	4.32	0.09	ICP-MS
5881	0.529	-0.38	0.250	-0.45	4.02	-0.80	ICP-MS (C/R)
6511	0.547	0.03	0.265	0.23	4.14	-0.43	ND
6545	0.540	-0.14	0.260	0.00	4.21	-0.23	ICP-MS
7111	0.547	0.02	0.266	0.28	4.30	0.02	ICP-MS
7804	0.648	2.33	0.0541	-9.51	3.35	-2.75	ND
9674	0.516	-0.68	0.247	-0.62	3.71	-1.71	GFAAS
9759	>LL	---	0.385	5.78	>LL	---	GFAAS
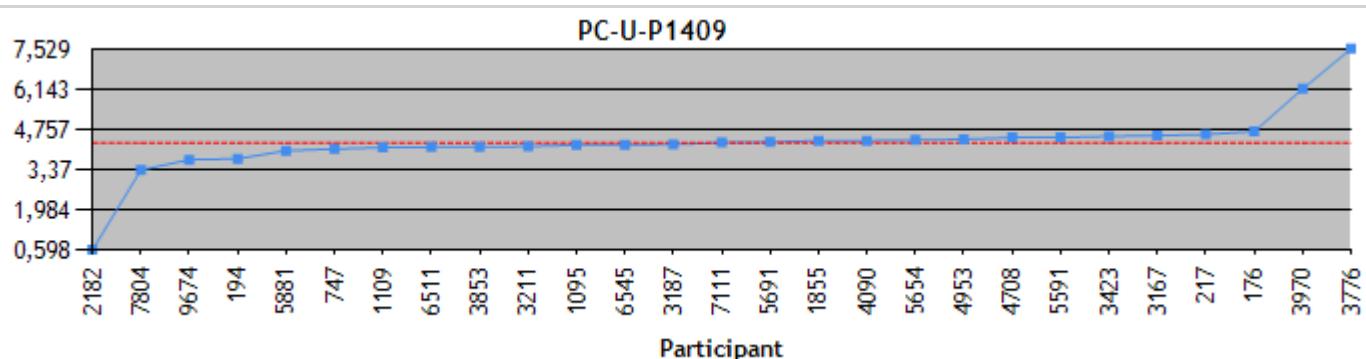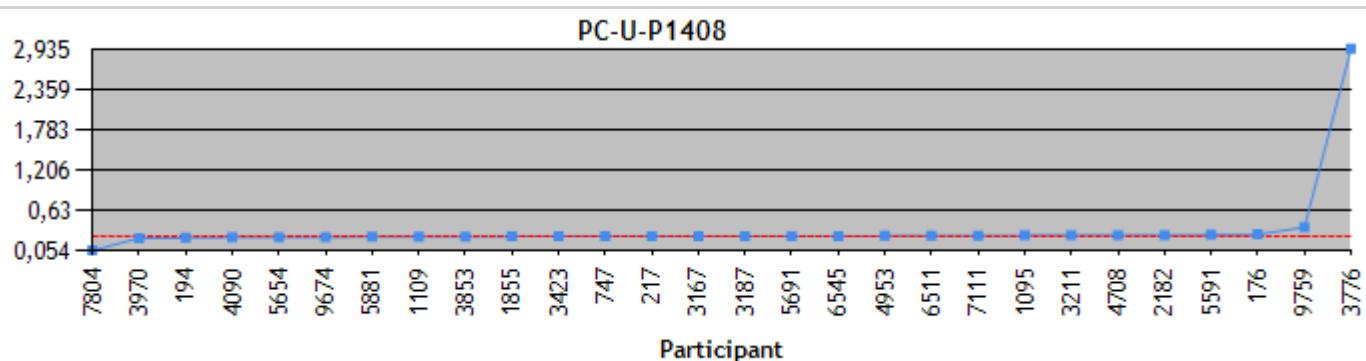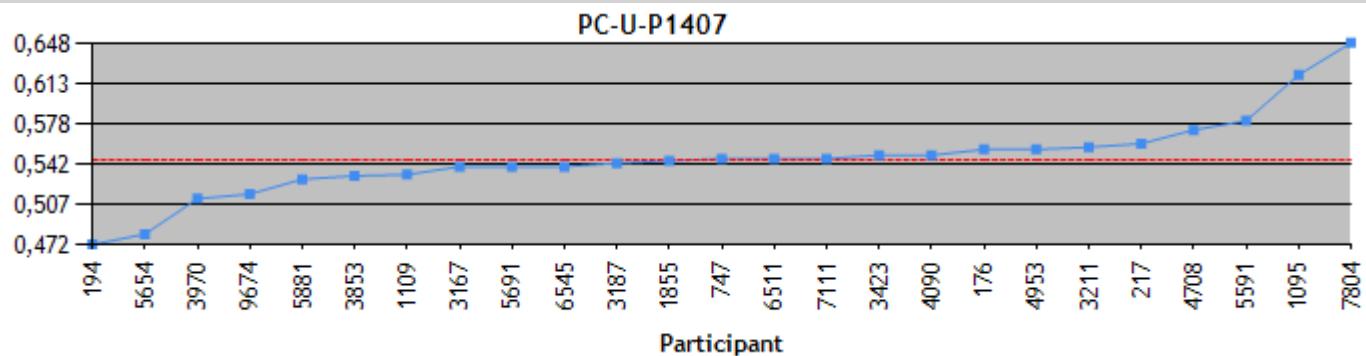
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-P1407	0.546	0.00419	0.0436	0.458 - 0.634	Rejected[1]	---
PC-U-P1408	0.260	0.00353	0.0213	0.217 - 0.303	Rejected[1]	---
PC-U-P1409	4.29	0.0662	0.334	3.61 - 4.97	Rejected[1]	---

Statistics
Urine Lead (μmol/L)

All methods	PC-U-P1407	PC-U-P1408	PC-U-P1409
N	25	28	27
Robust mean Algo A	0.546	0.260	4.29
Robust STDev	0.0168	0.0150	0.275
Median	0.547	0.260	4.30
STDev from MAD	0.0148	0.0147	0.255
Arithmetic mean	0.547	0.351	4.29
STDev	0.0358	0.509	1.07
CV or Variability	3.1%	5.8%	6.4%

Graphite furnace-AAS	PC-U-P1407	PC-U-P1408	PC-U-P1409
N	5	7	6
Robust mean Algo A	0.535	0.261	4.27
Robust STDev	0.0229	0.0182	0.750
Median	0.540	0.260	4.34
STDev from MAD	0.0252	0.0159	0.618
Arithmetic mean	0.535	0.274	3.95
STDev	0.0202	0.0507	1.84
CV or Variability	4.3%	7.0%	17.6%

ICP-MS	PC-U-P1407	PC-U-P1408	PC-U-P1409
N	12	12	12
Robust mean Algo A	0.549	0.262	4.35
Robust STDev	0.0115	0.00530	0.191
Median	0.547	0.260	4.34
STDev from MAD	0.0111	0.00501	0.191
Arithmetic mean	0.551	0.264	4.36
STDev	0.0139	0.00951	0.176
CV or Variability	2.1%	2.0%	4.4%

ICP-MS (collision/reaction cell)	PC-U-P1407	PC-U-P1408	PC-U-P1409
N	4	4	4
Robust mean Algo A	0.544	0.249	4.26
Robust STDev	0.0641	0.00642	0.156
Median	0.540	0.248	4.29
STDev from MAD	0.0515	0.00533	0.130
Arithmetic mean	0.545	0.252	4.24
STDev	0.0579	0.0122	0.170
CV or Variability	11.8%	2.6%	3.7%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Urine Lead (µmol/L)

PC-U-P1407

PC-U-P1408

PC-U-P1409

Individual results
Urine Mercury (nmol/L)
Round #2014-03

Participant	PC-U-H1407	z'-score	PC-U-H1408	z'-score	PC-U-H1409	z'-score	Method
176	74.8	0.67	414	0.52	1380	0.82	ICP-MS
217	65.0	-0.18	347	-0.88	1340	0.53	ICP-MS
428	85.2	1.58	488	2.07	1510	1.70	ICP-MS (C/R)
720	34.9	-2.81	309	-1.67	1220	-0.30	CV
744	79.1	1.05	465	1.60	1650	2.61	ND
1095	69.0	0.17	396	0.15	1250	-0.09	CV
1109	65.8	-0.11	401	0.26	1260	-0.02	ND
1156	24.4	-3.73	202	-3.91	646	-4.16	ND
1418	61.9	-0.45	343	-0.95	1090	-1.16	ND
1865	74.3	0.63	419	0.62	1290	0.21	CV
2629	58.3	-0.77	367	-0.46	1260	0.01	ICP-MS (C/R)
2982	61.0	-0.53	410	0.44	1040	-1.51	CV
3187	60.7	-0.56	366	-0.48	1140	-0.81	ICP-MS
3468	80.7	1.18	401	0.24	1520	1.75	GA-AAS
3513	66.0	-0.10	358	-0.65	1160	-0.68	ICP-MS
3853	69.2	0.18	404	0.31	1320	0.44	ICP-MS
4604	65.0	-0.18	25.4	-7.60	136	-7.63	CV
4708	68.9	0.16	409	0.42	1330	0.44	ICP-MS
4953	71.3	0.37	408	0.40	1370	0.75	ICP-MS
5029	50.5	-1.45	231	-3.31	718	-3.68	ND
5491	60.0	-0.62	428	0.82	1420	1.07	CV
5591	65.3	-0.16	369	-0.43	1250	-0.10	ICP-MS
5654	94.2	2.37	467	1.62	1490	1.54	ICP-MS (C/R)
5691	69.0	0.17	361	-0.59	1380	0.79	ICP-MS
5881	64.8	-0.20	376	-0.26	1230	-0.23	ICP-MS (C/R)
6200	61.6	-0.48	356	-0.70	1220	-0.29	ICP-MS
6210	66.3	-0.07	361	-0.59	1200	-0.42	ND
6511	106	3.41	430	0.86	1480	1.52	ND
6545	70.0	0.25	489	2.08	1670	2.78	ICP-MS
6702	70.5	0.30	398	0.19	1380	0.79	CV
6794	73.8	0.58	393	0.08	1290	0.18	GA-AAS
6892	65.5	-0.14	360	-0.61	1200	-0.43	ND
6920	56.8	-0.90	927	11.24	323	-6.36	ND
7184	70.4	0.29	422	0.69	1350	0.63	CV
7190	62.8	-0.37	388	-0.01	>LL	---	ICP-MS (C/R)
7269	68.0	0.08	397	0.17	1210	-0.35	CV
7864	69.0	0.17	333	-1.17	1150	-0.76	ND
8701	61.2	-0.51	345	-0.92	1150	-0.72	ND
9674	66.8	-0.03	370	-0.40	962	-2.02	CV
9759	84.8	1.54	439	1.04	>LL	---	GA-AAS
9777	68.7	0.14	383	-0.12	1270	0.09	GA-AAS

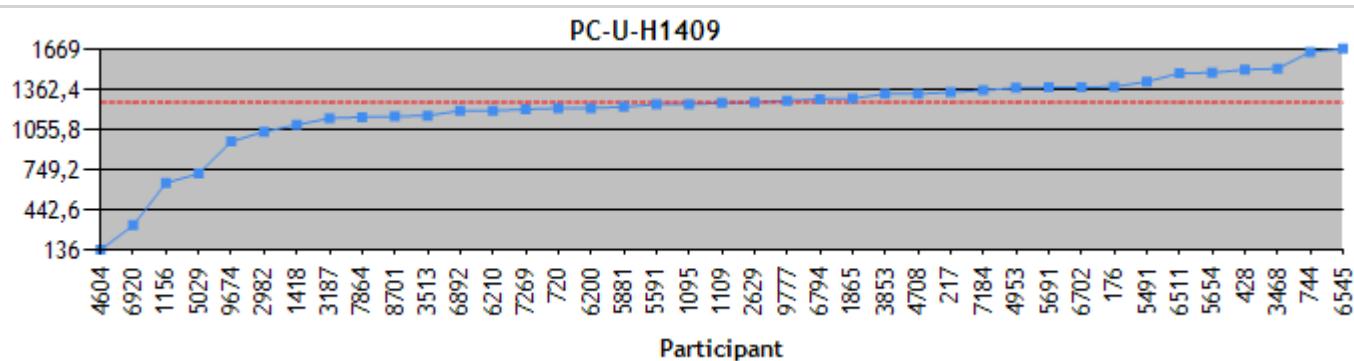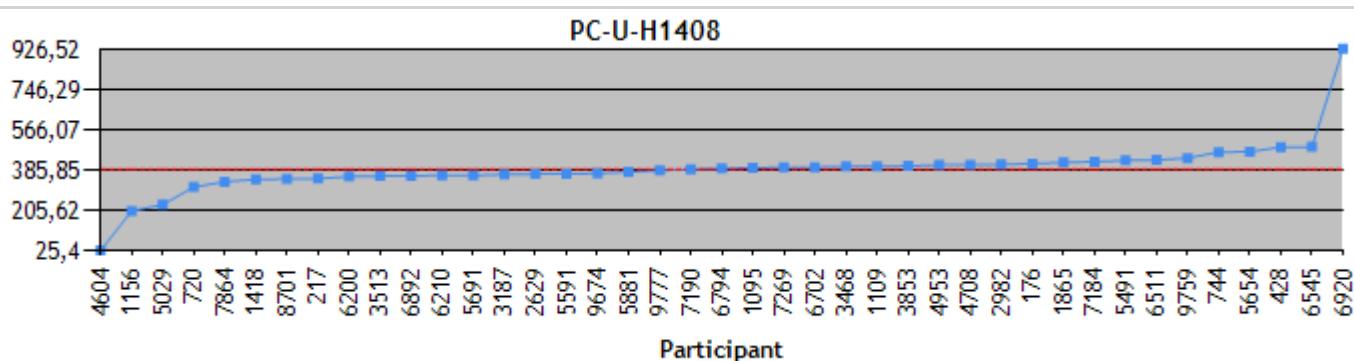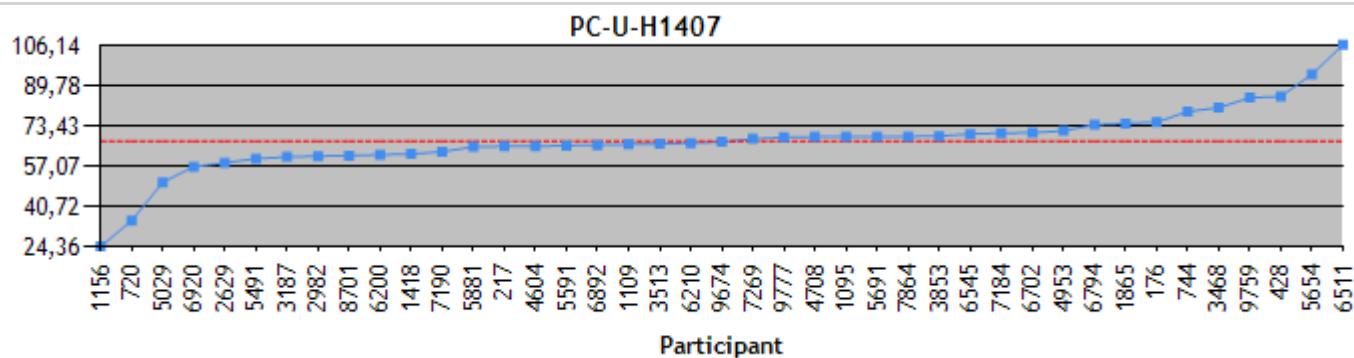|	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-H1407	67.1	1.38	11.4	44.2 - 90.0	Rejected[1]	---
PC-U-H1408	389	9.12	46.9	293 - 485	Rejected[1]	---
PC-U-H1409	1260	34.7	143	965 - 1550	Accepted	---

Criteria of homogeneity: according to ISO/CEI 17043 criteria, mercury in material PC-U-H1407 doesn't respect acceptable heterogeneity. The statistical data are produced as an indication only.

Statistics
Urine Mercury (nmol/L)

All methods	PC-U-H1407	PC-U-H1408	PC-U-H1409
N	41	41	39
Robust mean Algo A	67.1	389	1260
Robust STDev	7.06	46.7	173
Median	66.8	393	1260
STDev from MAD	6.65	46.9	163
Arithmetic mean	67.4	389	1210
STDev	13.3	117	308
CV or Variability	10.5%	12.0%	13.7%

Cold vapor	PC-U-H1407	PC-U-H1408	PC-U-H1409
N	10	10	10
Robust mean Algo A	66.6	393	1200
Robust STDev	5.35	33.6	195
Median	67.4	398	1230
STDev from MAD	4.52	33.9	197
Arithmetic mean	64.0	357	1120
STDev	11.1	122	376
CV or Variability	8.0%	8.5%	16.2%

Gold amalgamation-AAS	PC-U-H1407	PC-U-H1408	PC-U-H1409
N	4	4	3
Robust mean Algo A	77.0	398	1290
Robust STDev	8.11	15.5	23.0
Median	77.2	397	1290
STDev from MAD	8.13	12.7	18.2
Arithmetic mean	77.0	404	1360
STDev	7.15	24.3	138
CV or Variability	10.5%	3.9%	1.8%

ICP-MS	PC-U-H1407	PC-U-H1408	PC-U-H1409
N	11	11	11
Robust mean Algo A	67.6	382	1310
Robust STDev	4.18	31.0	95.2
Median	68.9	369	1330
STDev from MAD	4.30	31.9	82.9
Arithmetic mean	67.4	389	1320
STDev	4.18	41.4	143
CV or Variability	6.2%	8.1%	7.3%

ICP-MS (collision/reaction cell)	PC-U-H1407	PC-U-H1408	PC-U-H1409
N	5	5	4
Robust mean Algo A	68.9	401	1370
Robust STDev	11.0	37.5	168
Median	64.8	388	1370
STDev from MAD	9.61	31.8	185
Arithmetic mean	73.1	417	1370
STDev	15.7	55.9	148
CV or Variability	16.0%	9.4%	12.3%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Urine Mercury (nmol/L)

PC-U-H1407

PC-U-H1408

PC-U-H1409

Individual results
Urine Selenium (µmol/L)
Round #2014-03

Participant	PC-U-N1407	z'-score	PC-U-N1408	z'-score	PC-U-N1409	z'-score	Method
747	2.95	-0.10	1.23	0.16	1.78	0.00	ICP-MS
3187	2.89	-0.24	1.14	-0.21	1.70	-0.27	ICP-MS
3423	2.37	-1.50	1.03	-0.66	1.81	0.11	HG-AAS
3853	3.34	0.85	1.30	0.45	1.92	0.48	ICP-MS (C/R)
4090	2.99	0.00	1.20	0.04	1.73	-0.17	ICP-MS (C/R)
5691	2.72	-0.65	1.11	-0.33	1.51	-0.93	ICP-MS
5881	3.11	0.28	1.17	-0.10	1.76	-0.05	ICP-MS (C/R)
6511	3.77	1.88	1.58	1.62	2.31	1.83	ND
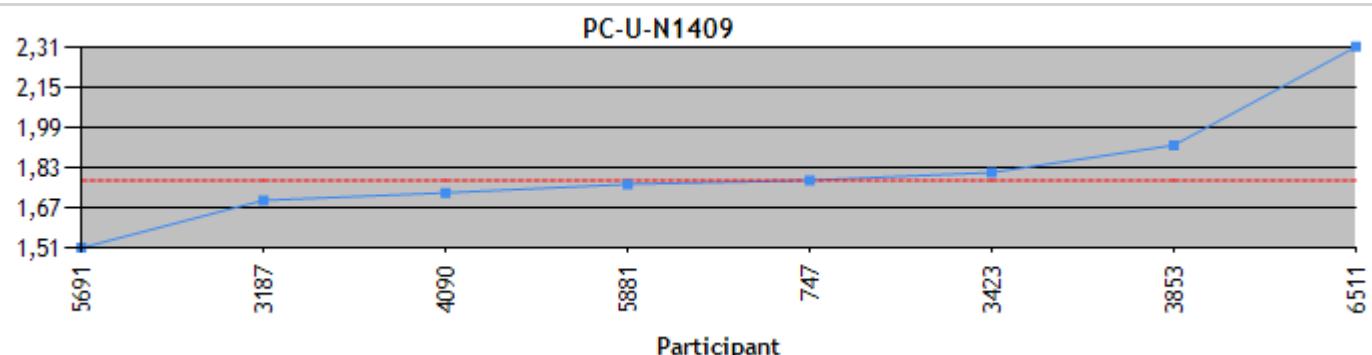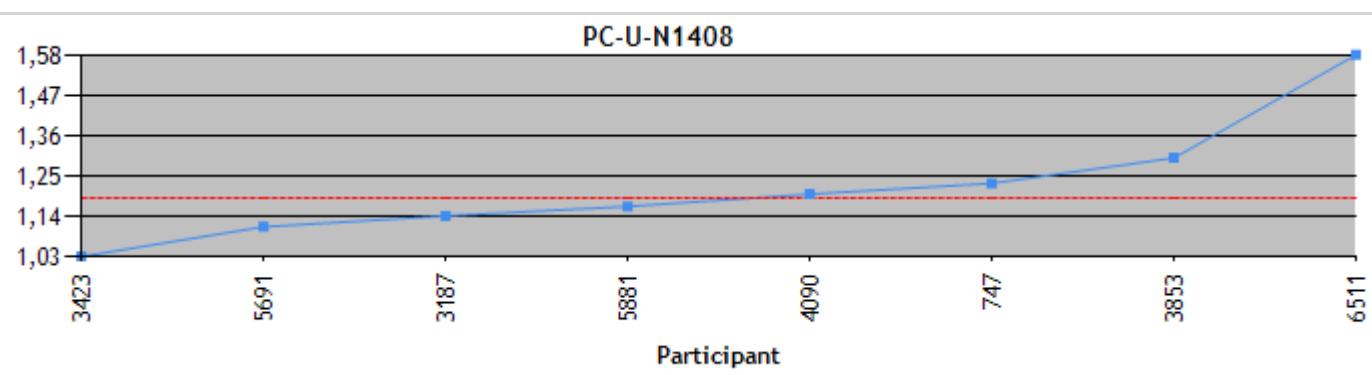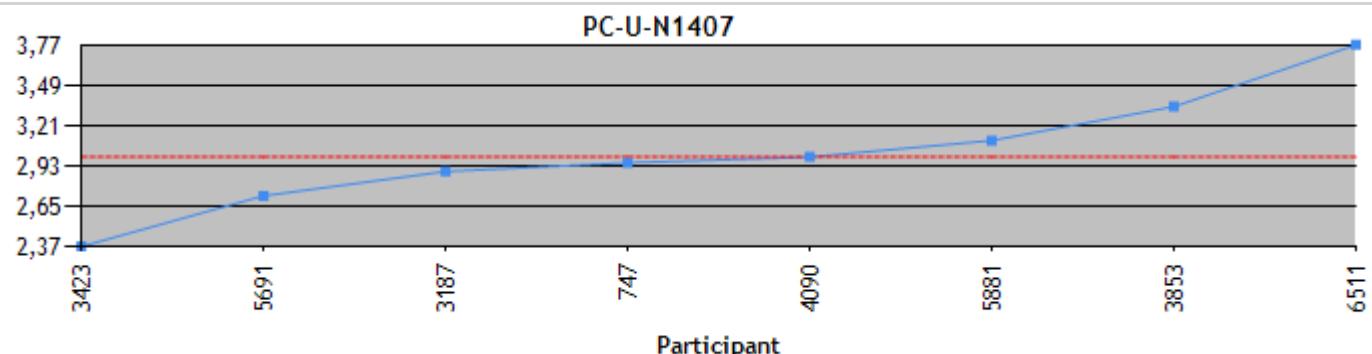
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-N1407	2.99	0.145	0.388	2.16 - 3.82	Accepted	Workers Profile
PC-U-N1408	1.19	0.0460	0.239	0.703 - 1.68	Accepted	Se+4 added
PC-U-N1409	1.78	0.0451	0.288	1.20 - 2.36	Accepted	Workers Profile

Statistics
Urine Selenium (μmol/L)

All methods	PC-U-N1407	PC-U-N1408	PC-U-N1409
N	8	8	8
Robust mean Algo A	2.99	1.19	1.78
Robust STDev	0.329	0.104	0.102
Median	2.97	1.18	1.77
STDev from MAD	0.286	0.0890	0.0847
Arithmetic mean	3.02	1.22	1.82
STDev	0.415	0.168	0.232
CV or Variability	11.0%	8.8%	5.7%

ICP-MS	PC-U-N1407	PC-U-N1408	PC-U-N1409
N	3	3	3
Robust mean Algo A	2.87	1.15	1.67
Robust STDev	0.112	0.0562	0.150
Median	2.89	1.14	1.70
STDev from MAD	0.0890	0.0445	0.119
Arithmetic mean	2.85	1.16	1.66
STDev	0.119	0.0625	0.139
CV or Variability	3.9%	4.9%	9.0%

ICP-MS (collision/reaction cell)	PC-U-N1407	PC-U-N1408	PC-U-N1409
N	3	3	3
Robust mean Algo A	3.15	1.21	1.78
Robust STDev	0.202	0.0645	0.0640
Median	3.11	1.20	1.76
STDev from MAD	0.171	0.0511	0.0507
Arithmetic mean	3.15	1.22	1.80
STDev	0.178	0.0698	0.101
CV or Variability	6.4%	5.3%	3.6%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution
Urine Selenium (µmol/L)

PC-U-N1407

PC-U-N1408

PC-U-N1409

Individual results
Urine Total arsenic (µmol/L)
Round #2014-03

Participant	PC-U-S1407	z'-score	PC-U-S1408	z'-score	PC-U-S1409	z'-score	Method
176	0.387	0.36	1.55	0.89	6.67	0.32	ICP-MS
730	0.387	0.36	1.39	-0.42	6.93	0.81	ICP-MS (C/R)
747	0.338	-0.82	1.34	-0.82	5.80	-1.38	ICP-MS
1109	0.448	1.83	1.71	2.17	7.41	1.75	ND
1476	0.360	-0.29	1.39	-0.41	5.49	-1.98	ICP-MS
1827	0.329	-1.03	1.32	-0.98	5.98	-1.03	ICP-MS (C/R)
1865	0.386	0.33	1.53	0.72	6.89	0.73	ICP-MS (C/R)
2182	0.423	1.23	1.52	0.67	6.81	0.58	GFAAS
2937	0.493	2.90	1.60	1.33	7.10	1.15	ICP-MS
2978	0.367	-0.12	1.41	-0.21	6.19	-0.62	ICP-MS
3187	0.377	0.12	1.43	-0.08	6.22	-0.56	ICP-MS
3423	0.347	-0.60	1.41	-0.21	6.30	-0.41	HG-AAS
3513	0.360	-0.29	1.47	0.25	6.36	-0.29	ICP-MS
3853	0.372	0.00	1.52	0.62	6.74	0.44	ICP-MS (C/R)
4708	0.370	-0.05	1.41	-0.25	6.58	0.14	ICP-MS
4953	0.342	-0.73	1.44	0.01	6.63	0.24	ICP-MS (C/R)
5375	0.343	-0.70	1.40	-0.33	7.24	1.42	ICP-MS
5495	0.400	0.67	1.48	0.34	6.13	-0.74	ICP-MS (C/R)
5591	0.403	0.74	1.61	1.39	7.48	1.89	ICP-MS
5654	0.349	-0.55	1.29	-1.19	5.25	-2.45	ICP-MS (C/R)
5691	0.380	0.19	1.45	0.08	6.22	-0.56	ND
5881	0.383	0.27	1.51	0.59	6.68	0.33	ICP-MS (C/R)
6511	0.382	0.23	1.43	-0.04	6.59	0.16	ND
6545	0.370	-0.05	1.43	-0.08	6.31	-0.39	ICP-MS (C/R)
6892	0.400	0.67	1.34	-0.82	5.45	-2.06	ND
7864	0.334	-0.91	1.40	-0.33	6.45	-0.12	ND
9674	0.266	-2.55	1.31	-1.08	6.90	0.76	GFAAS
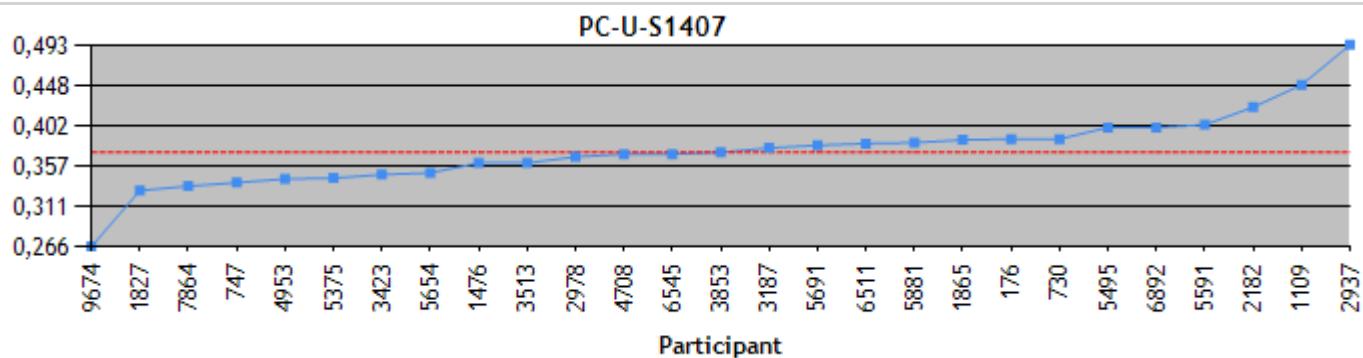
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-S1407	0.372	0.00764	0.0410	0.289 - 0.455	Accepted	MAA added
PC-U-S1408	1.44	0.0205	0.120	1.20 - 1.68	Accepted	Workers Profile
PC-U-S1409	6.51	0.127	0.498	5.48 - 7.54	Accepted	As+3 added

Statistics
Urine Total arsenic (µmol/L)
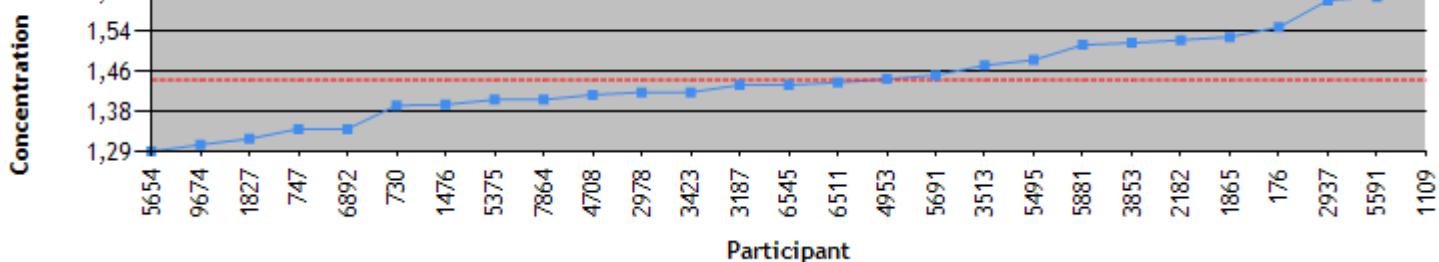
All methods	PC-U-S1407	PC-U-S1408	PC-U-S1409
N	27	27	27
Robust mean Algo A	0.372	1.44	6.51
Robust STDev	0.0317	0.0851	0.526
Median	0.372	1.43	6.58
STDev from MAD	0.0343	0.0757	0.515
Arithmetic mean	0.374	1.45	6.47
STDev	0.0418	0.0977	0.567
CV or Variability	8.5%	5.9%	8.1%

ICP-MS	PC-U-S1407	PC-U-S1408	PC-U-S1409
N	10	10	10
Robust mean Algo A	0.370	1.44	6.51
Robust STDev	0.0237	0.0675	0.718
Median	0.369	1.42	6.47
STDev from MAD	0.0201	0.0593	0.673
Arithmetic mean	0.380	1.46	6.51
STDev	0.0442	0.0938	0.634
CV or Variability	6.4%	4.7%	11.0%

ICP-MS (collision/reaction cell)	PC-U-S1407	PC-U-S1408	PC-U-S1409
N	9	9	9
Robust mean Algo A	0.370	1.43	6.47
Robust STDev	0.0249	0.0972	0.429
Median	0.372	1.44	6.63
STDev from MAD	0.0224	0.105	0.435
Arithmetic mean	0.369	1.43	6.39
STDev	0.0238	0.0857	0.540
CV or Variability	6.7%	6.8%	6.6%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.
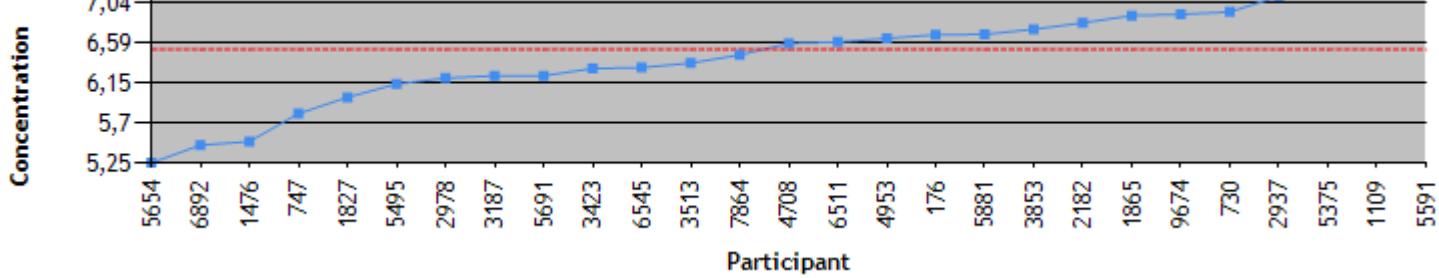
Distribution
Urine Total arsenic (µmol/L)

PC-U-S1407

PC-U-S1408

PC-U-S1409

Individual results
Urine Zinc (μmol/L)
Round #2014-03

Participant	PC-U-R1407	z'-score	PC-U-R1408	z'-score	PC-U-R1409	z'-score	Method
176	4.42	0.39	4.91	0.04	24.6	0.24	ICP-MS
747	4.29	0.05	4.99	0.22	25.5	0.67	ICP-MS
1095	4.45	0.47	5.17	0.63	24.9	0.38	FAAS
1109	4.61	0.90	5.40	1.15	26.0	0.90	ND
1188	4.01	-0.68	4.33	-1.25	22.1	-0.95	ICP-MS (C/R)
1418	4.05	-0.57	4.36	-1.19	22.0	-0.99	ICP-MS (C/R)
2629	3.41	-2.26	4.03	-1.92	21.1	-1.45	ICP-OES
2763	4.17	-0.26	4.88	-0.02	24.0	-0.05	ICP-MS (C/R)
3187	3.83	-1.16	4.36	-1.19	23.5	-0.29	ICP-MS
3211	4.60	0.87	5.50	1.37	25.3	0.57	FAAS
3423	5.06	2.07	5.79	2.01	26.6	1.20	FAAS
3513	3.90	-0.97	4.60	-0.65	25.6	0.71	ICP-MS
3853	4.04	-0.60	4.76	-0.29	23.0	-0.51	ICP-MS
4090	3.27	-2.63	3.98	-2.04	23.4	-0.32	ICP-MS (C/R)
4708	4.24	-0.08	4.96	0.16	24.4	0.14	ICP-MS
4953	4.11	-0.41	4.82	-0.17	23.2	-0.42	ICP-MS
5591	4.00	-0.71	4.90	0.02	23.4	-0.33	FAAS
5691	4.30	0.08	4.80	-0.20	24.4	0.14	ICP-MS
5881	3.68	-1.54	4.37	-1.16	21.9	-1.03	ICP-MS (C/R)
6511	4.62	0.91	5.32	0.96	26.3	1.07	ND
7804	4.79	1.36	1.45	-7.70	6.52	-8.36	ND
8376	4.28	0.02	5.10	0.46	24.5	0.18	FAAS
8454	4.90	1.66	5.37	1.07	24.5	0.19	FAAS
8981	4.28	0.03	6.11	2.73	22.6	-0.71	ND
9759	6.38	5.56	6.69	4.03	26.5	1.13	FAAS
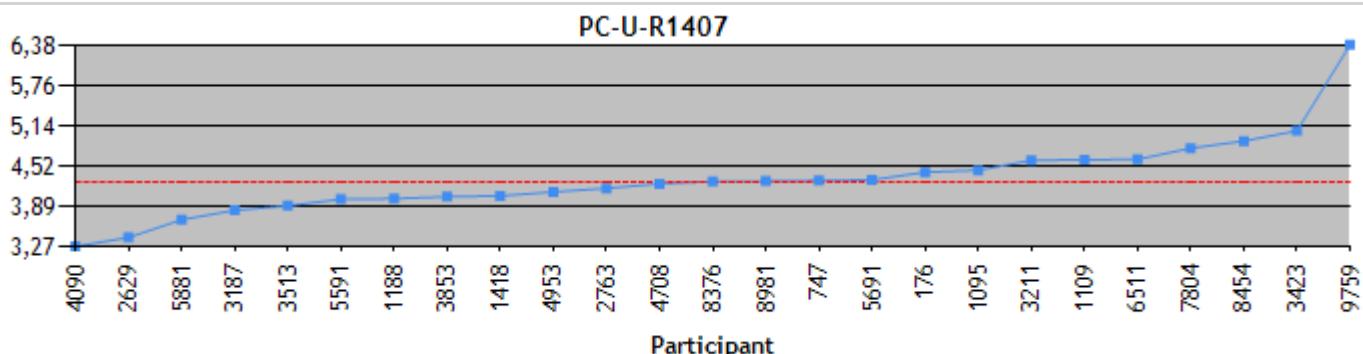
	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-R1407	4.27	0.109	0.364	3.51 - 5.03	Accepted	---
PC-U-R1408	4.89	0.159	0.418	4.00 - 5.78	Accepted	---
PC-U-R1409	24.1	0.438	2.06	19.9 - 28.3	Rejected[1]	---

Statistics
Urine Zinc (µmol/L)
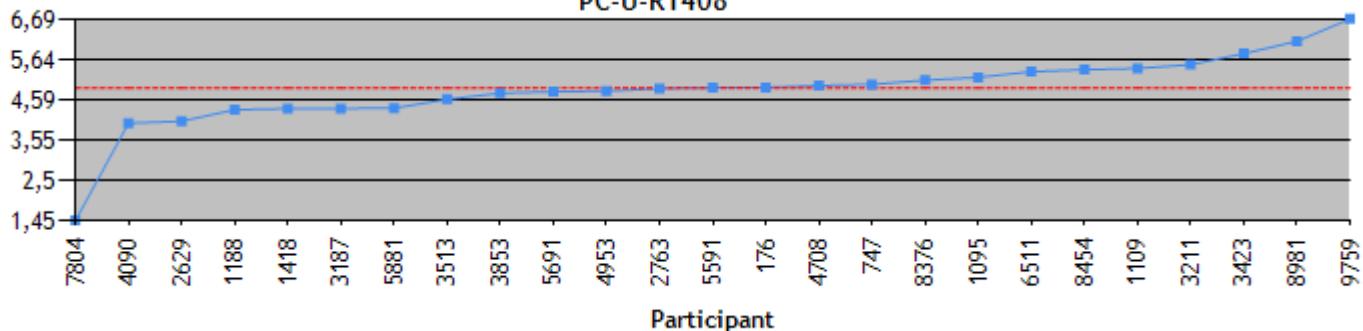
All methods	PC-U-R1407	PC-U-R1408	PC-U-R1409
N	25	25	25
Robust mean Algo A	4.27	4.89	24.1
Robust STDev	0.435	0.637	1.75
Median	4.28	4.90	24.4
STDev from MAD	0.411	0.697	1.77
Arithmetic mean	4.31	4.84	23.4
STDev	0.606	0.943	3.84
CV or Variability	10.2%	13.0%	7.3%

Flame-AAS	PC-U-R1407	PC-U-R1408	PC-U-R1409
N	7	7	7
Robust mean Algo A	4.66	5.40	25.0
Robust STDev	0.523	0.437	0.803
Median	4.60	5.37	24.9
STDev from MAD	0.478	0.405	0.615
Arithmetic mean	4.81	5.50	25.1
STDev	0.781	0.598	1.15
CV or Variability	11.2%	8.1%	3.2%

ICP-MS	PC-U-R1407	PC-U-R1408	PC-U-R1409
N	8	8	8
Robust mean Algo A	4.15	4.80	24.3
Robust STDev	0.222	0.186	1.11
Median	4.18	4.81	24.4
STDev from MAD	0.193	0.187	1.48
Arithmetic mean	4.14	4.77	24.3
STDev	0.207	0.208	0.979
CV or Variability	5.3%	3.9%	4.6%

ICP-MS (collision/reaction cell)	PC-U-R1407	PC-U-R1408	PC-U-R1409
N	5	5	5
Robust mean Algo A	3.91	4.35	22.2
Robust STDev	0.263	0.0516	0.280
Median	4.01	4.36	22.1
STDev from MAD	0.237	0.0403	0.239
Arithmetic mean	3.84	4.38	22.7
STDev	0.365	0.321	0.950
CV or Variability	6.7%	1.2%	1.3%

When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.
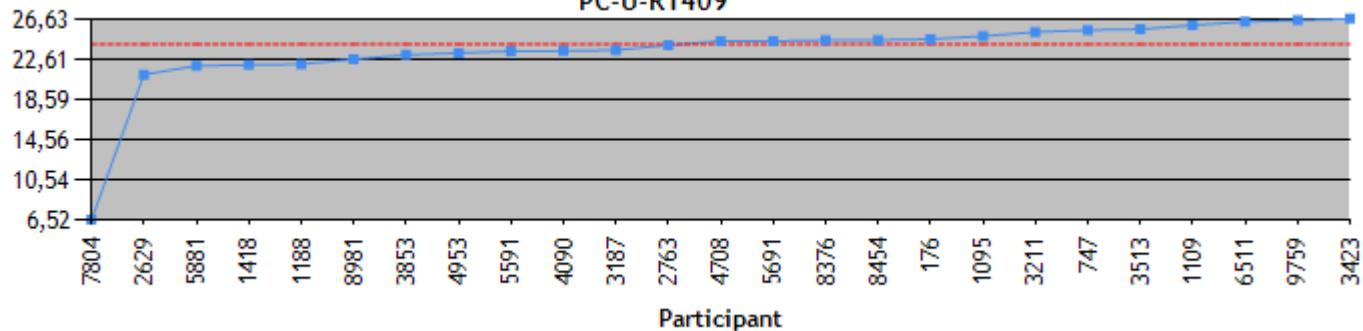
Distribution
Urine Zinc (µmol/L)

PC-U-R1407

PC-U-R1408

PC-U-R1409

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**Interlaboratory Comparison Program
for Metals in Biological Matrices**

ASSIGNED VALUES

ROUND: 2014-03

SHIPPED ON: 2014-04-22

DEADLINE: 2014-05-30

MATRIX	ANALYTE	UNIT	PTM	ASSIGNED VALUE	PTM	ASSIGNED VALUE	PTM	ASSIGNED VALUE
Blood	Cadmium	nmol/L	PC-B-C1407	84.4	PC-B-C1408	15.4	PC-B-C1409	32.4
	Lead	µmol/L	PC-B-L1407	0.154	PC-B-L1408	0.433	PC-B-L1409	1.75
	Mercury	nmol/L	PC-B-M1407	171	PC-B-M1408	12.2	PC-B-M1409	81.2
Serum	Aluminium	µmol/L	PC-S-A1407	2.06	PC-S-A1408	8.38	PC-S-A1409	1.00
	Copper	µmol/L	PC-S-E1407	9.36	PC-S-E1408	13.3	PC-S-E1409	27.7
	Manganese	nmol/L	PC-S-G1407	38.8	PC-S-G1408	60.1	PC-S-G1409	87.1
	Selenium	µmol/L	PC-S-E1407	0.921	PC-S-E1408	1.63	PC-S-E1409	2.70
	Zinc	µmol/L	PC-S-E1407	10.7	PC-S-E1408	16.4	PC-S-E1409	23.6
Urine	Cadmium	nmol/L	PC-U-D1407	27.5	PC-U-D1408	82.7	PC-U-D1409	10.8
	Chromium	nmol/L	PC-U-B1407	307	PC-U-B1408	27.9	PC-U-B1409	147
	Copper	µmol/L	PC-U-R1407	0.176	PC-U-R1408	0.684	PC-U-R1409	11.3
	Fluoride	µmol/L	PC-U-F1407	208	PC-U-F1408	91.7	PC-U-F1409	1180
	Inorganic arsenic	µmol/L	PC-U-S1407	0.280	PC-U-S1408	1.34	PC-U-S1409	6.27
	Iodide	µmol/L	PC-U-I1407	1.46	PC-U-I1408	0.882	PC-U-I1409	2.63
	Lead	µmol/L	PC-U-P1407	0.546	PC-U-P1408	0.260	PC-U-P1409	4.29
	Mercury	nmol/L	PC-U-H1407	67.1	PC-U-H1408	389	PC-U-H1409	1260
	Selenium	µmol/L	PC-U-N1407	2.99	PC-U-N1408	1.19	PC-U-N1409	1.78
	Total arsenic	µmol/L	PC-U-S1407	0.372	PC-U-S1408	1.44	PC-U-S1409	6.51
	Zinc	µmol/L	PC-U-R1407	4.27	PC-U-R1408	4.89	PC-U-R1409	24.1

Centre de toxicologie/INSPQ

945, Ave Wolfe
Quebec, QC
Canada, G1V 5B3

Phone: (418) 650-5115 Ext. 5254
Fax : (418) 654-2148
E-mail : ctq@inspq.qc.ca
http://www.inspq.qc.a/ctq

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de santé publique
Québec ✚✚✚
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**Interlaboratory Comparison Program for Metals in
Biological Matrices (PCI)**

GROUPING OF ANALYTICAL METHODS
FOR STATISTICS

METHODS GROUPING CODE	METHODS GROUPING	METHODS INCLUDED	METHODS CODE
AFS	Atomic fluorescence	Atomic fluorescence	AFS
		Cold vapor-atomic fluorescence	CV-AFS
COLOR	Colorimetry	Colorimetry	Color
CV	Cold vapor	Cold vapor	CV
		Cold vapor-AAS	CV-AAS
ESA	ESA Lead Care TM system	ESA Lead Care TM system	ESA Lead
FAAS	Flame-AAS	Flame-AAS	FAAS
FSE	Fluoride specific electrode	Fluoride specific electrode	FSE
GA-AAS	Gold amalgamation-AAS	Gold amalgamation-AAS	AA-Gold A
GFAAS	Graphite furnace-AAS	Deuterium and other-Graphite furnace-AAS	D2-GFAAS
		Zeeman-Graphite furnace-AAS	Z-GFAAS
HG-AAS	Hydride generation-AAS	Hydride generation-AAS	HG-AAS
HR-ICP-MS	ICP-MS (high resolution)	ICP-MS (high resolution)	HR-ICP-MS
ICP-MS	ICP-MS	ICP-MS	ICP-MS
		ICP-MS (isotopic dilution)	ID-ICP-MS
		ICP-MS (laser ablation/furnace)	ICP-MS (LA)
ICP-MS (C/R)	ICP-MS (collision/reaction cell)	ICP-MS (collision/reaction cell)	ICP-MS(C/R)
ICP-OES	ICP-OES (optical emission)	ICP-OES (optical emission)	ICP-OES
POL	Polarography	Polarography	Polaro

1. Kolmogorov-Smirnov (Lilliefors) test

The Kolmogorov-Smirnov (Lilliefors) statistical test is a tool used to evaluate the normality of a distribution of results. The test can be performed with $N \geq 4$.

The power of the test increases rapidly with the number of observations. For $N \geq 30$, the test will be sensitive to account for small deviations from normality even with the presence of only one outlier.

For a small sample size ($N \leq 10$), the hypothesis that the observations follow a normal distribution will generally be accepted. However, if normality is rejected for $N \leq 10$, this indicates that the observations are far from following a normal distribution and that one or more observations are most likely outliers.

When the normality hypothesis is rejected, the use of robust methods for the determination of the AV by consensus such as the Algorithm A allows to obtain a better estimation of the AV. Outliers are retained except if their deviation from the other observations can be clearly explained as indicated in section 1.1.

The normality hypothesis is rejected when the statistical value is too weak according to the Kolmogorov-Smirnov (Lilliefors) critical value table. The result of the normality of the distribution of each set of observations is provided in the report whether the test is "Accepted" or "Rejected" under the column labeled "KS (Lilliefors)".

*** END OF REPORT ***