Institut national de santé publique Québec
Centre de toxicologie

INTERLABORATORY COMPARISON PROGRAM FOR METALS IN BIOLOGICAL MATRICES (PCI)

REPORT FOR ROUND: **2014-02**

PTMS SHIPPING DATE: **2014-03-10**

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SCC Accredited PTP
PSEA
Accrédité CCN
TM

Scope of accreditation: The concentration of Selenium in materials PC-S-E1406 and PC-U-N1406 as well as Iodide in material PC-U-I1404 exceed the level of our scope of accreditation.

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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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

INTRODUCTION

Dear PCI participants:

This report includes the results and performance evaluations of round 2014-02.

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

All analytes meet the homogeneity criteria as per ISO/CEI 17043 and 13528 guidelines.

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/page

Individual results

Blood Cadmium (nmol/L)

Round #2014-02

Participant	PC-B-C1404	z'-score	PC-B-C1405	z'-score	PC-B-C1406	z'-score	Method
176	18.7	-0.05	121	-0.49	48.9	-0.99	ICP-MS
194	22.5	1.52	128	0.19	55.2	0.26	ND
217	19.0	0.06	116	-0.94	50.8	-0.62	ICP-MS
747	18.6	-0.08	126	0.00	53.5	-0.08	ICP-MS
1095	20.0	0.49	136	0.97	58.6	0.93	ICP-MS (C/R)
1188	20.1	0.54	126	0.00	53.4	-0.10	ICP-MS (C/R)
1418	18.1	-0.27	130	0.38	56.7	0.55	ICP-MS (C/R)
1865	19.1	0.13	129	0.29	56.8	0.57	ICP-MS (C/R)
2305	15.8	-1.25	111	-1.51	51.4	-0.50	ND
2991	21.9	1.27	130	0.42	59.9	1.19	ND
3187	18.4	-0.16	123	-0.29	51.9	-0.40	ICP-MS
3211	18.5	-0.12	120	-0.59	52.5	-0.28	GFAAS
3248	15.5	-1.37	109	-1.63	45.9	-1.59	GFAAS
3853	19.3	0.19	136	1.00	57.1	0.64	ICP-MS
4708	19.1	0.12	128	0.19	54.7	0.16	ICP-MS
4953	20.3	0.61	132	0.55	56.3	0.48	ICP-MS
5591	17.2	-0.66	117	-0.92	49.0	-0.97	ICP-MS
5654	18.8	-0.01	111	-1.49	48.0	-1.16	ICP-MS (C/R)
5691	18.0	-0.33	116	-0.97	53.0	-0.18	ICP-MS
6511	18.7	-0.05	130	0.38	57.8	0.78	ND
6545	18.0	-0.33	120	-0.58	51.9	-0.40	ICP-MS
6689	13.6	**-2.14**	131	0.44	48.7	-1.04	GFAAS
6794	26.0	**2.96**	140	1.36	58.1	0.83	GFAAS
6858	14.8	-1.64	129	0.32	52.5	-0.27	ICP-MS
7760	19.2	0.18	132	0.63	56.3	0.48	ICP-MS
9777	22.2	1.42	132	0.58	62.6	1.72	GFAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-B-C1404	18.8	0.312	2.41	13.9 - 23.7	Rejected	---
PC-B-C1405	126	1.83	10.1	105 - 147	Accepted	---
PC-B-C1406	53.9	1.04	4.92	43.8 - 64.0	Accepted	---

Statistics
Blood Cadmium (nmol/L)

All methods	PC-B-C1404	PC-B-C1405	PC-B-C1406
N	26	26	26
Robust mean Algo A	18.8	126	53.9
Robust STDev	1.27	7.47	4.25
Median	18.7	128	53.5
STDev from MAD	1.08	7.01	4.51
Arithmetic mean	18.9	125	53.9
STDev	2.53	8.33	4.05
CV or Variability	6.8%	5.9%	7.9%

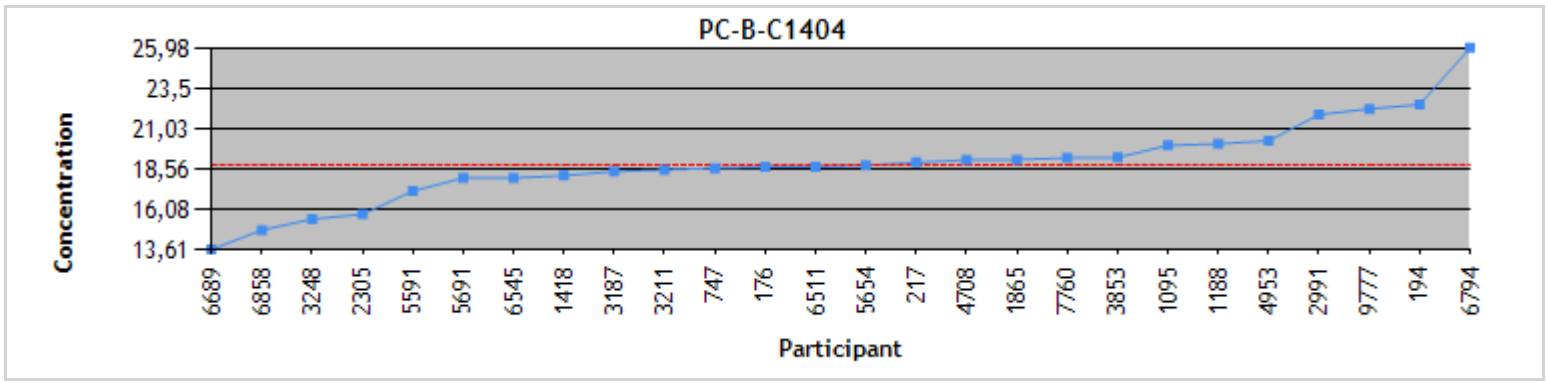
Graphite furnace-AAS	PC-B-C1404	PC-B-C1405	PC-B-C1406
N	5	5	5
Robust mean Algo A	19.2	126	53.5
Robust STDev	5.69	13.4	7.72
Median	18.5	131	52.5
STDev from MAD	5.55	14.0	8.29
Arithmetic mean	19.2	126	53.5
STDev	5.02	11.9	6.81
CV or Variability	29.7%	10.6%	14.4%

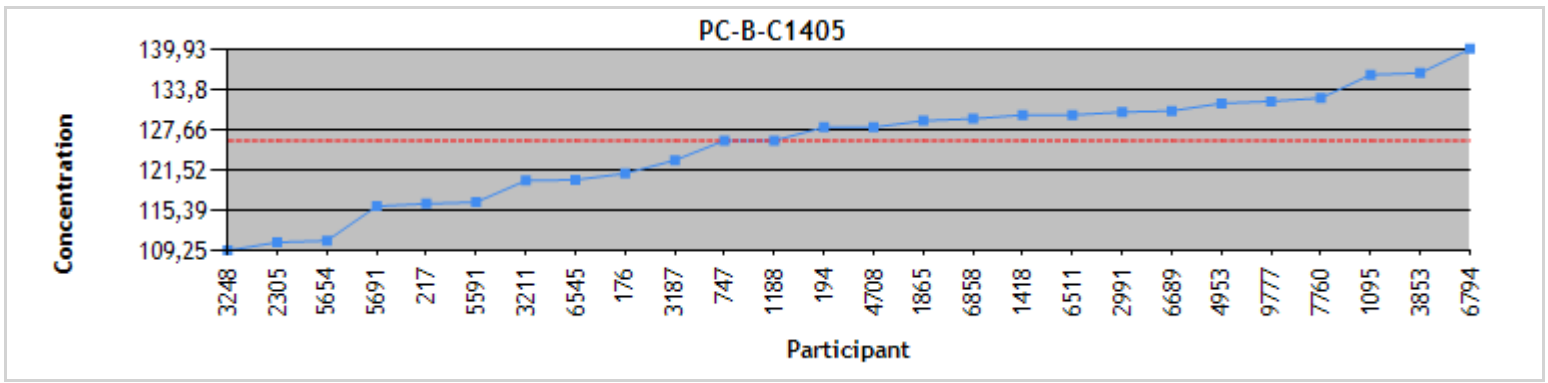
ICP-MS	PC-B-C1404	PC-B-C1405	PC-B-C1406
N	12	12	12
Robust mean Algo A	18.6	125	53.0
Robust STDev	0.918	7.84	3.09
Median	18.6	125	52.8
STDev from MAD	0.898	8.87	2.89
Arithmetic mean	18.4	125	53.0
STDev	1.37	6.91	2.73
CV or Variability	4.9%	6.3%	5.8%

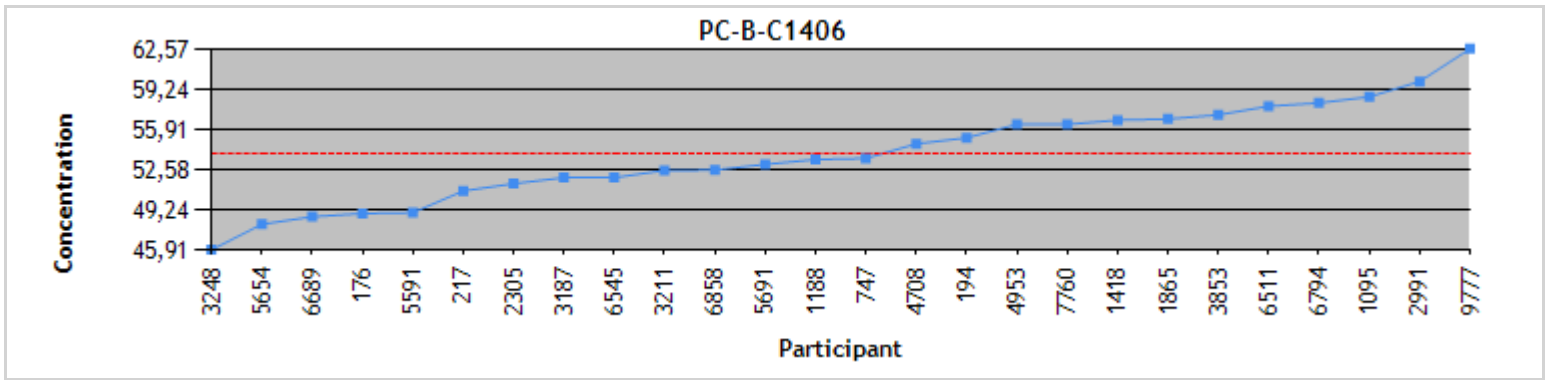
ICP-MS (collision/reaction cell)	PC-B-C1404	PC-B-C1405	PC-B-C1406
N	5	5	5
Robust mean Algo A	19.2	129	55.6
Robust STDev	0.939	5.60	2.93
Median	19.1	129	56.7
STDev from MAD	1.30	4.44	2.87
Arithmetic mean	19.2	126	54.7
STDev	0.828	9.43	4.16
CV or Variability	4.9%	4.4%	5.3%

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
Blood Cadmium (nmol/L)







Individual results

Blood Lead (µmol/L)

Round #2014-02

Participant	PC-B-L1404	z'-score	PC-B-L1405	z'-score	PC-B-L1406	z'-score	Method
194	0.0820	-0.29	0.980	**-2.17**	0.598	-1.73	ND
217	0.0900	0.24	1.25	1.09	0.730	0.93	ICP-MS
226	0.0917	0.35	1.12	-0.49	0.709	0.51	ICP-MS
317	<LD	---	1.18	0.24	0.705	0.42	GFAAS
387	0.0680	-1.22	1.22	0.74	0.685	0.02	GFAAS
636	0.0940	0.51	1.28	1.48	0.750	1.33	ICP-MS
747	0.0870	0.04	1.15	-0.12	0.678	-0.12	ICP-MS
1095	0.0900	0.24	1.20	0.48	0.730	0.93	GFAAS
1188	0.0888	0.16	1.08	-0.97	0.642	-0.85	ICP-MS (C/R)
1418	0.0931	0.45	1.21	0.54	0.699	0.31	ND
1632	0.0936	0.48	1.19	0.37	0.714	0.60	GFAAS
1761	<LQ	---	1.13	-0.37	0.661	-0.46	GFAAS
1855	0.0820	-0.29	1.12	-0.43	0.652	-0.65	ICP-MS
1865	0.0820	-0.29	1.18	0.21	0.690	0.12	ICP-MS (C/R)
2305	0.0500	**-2.42**	1.01	-1.81	0.630	-1.09	ND
2397	0.531	**29.59**	1.15	-0.14	0.671	-0.26	GFAAS
2516	0.0840	-0.16	1.12	-0.48	0.665	-0.38	GFAAS
2580	0.0600	-1.76	1.17	0.12	0.730	0.93	GFAAS
2629	0.100	0.91	1.30	1.69	0.730	0.93	ICP-MS (C/R)
2635	0.100	0.91	1.28	1.45	0.720	0.73	ND
2907	0.0874	0.06	1.14	-0.20	0.690	0.12	ICP-MS
2937	0.110	1.57	1.23	0.84	0.740	1.13	GFAAS
2982	0.100	0.91	1.09	-0.89	0.610	-1.49	GFAAS
2991	0.0909	0.30	1.24	0.96	0.736	1.05	ND
3150	0.0800	-0.43	1.25	1.09	0.710	0.52	GFAAS
3167	0.0200	**-4.42**	1.08	-0.97	0.660	-0.48	GFAAS
3187	0.0887	0.15	1.16	0.00	0.679	-0.10	ICP-MS
3211	0.0600	-1.76	1.17	0.12	0.670	-0.28	GFAAS
3215	0.0700	-1.09	1.17	0.12	0.640	-0.89	GFAAS
3248	0.100	0.91	1.06	-1.21	0.680	-0.08	GFAAS
3423	0.0454	**-2.73**	1.07	-1.09	0.611	-1.46	GFAAS
3513	0.0800	-0.43	1.13	-0.36	0.690	0.12	ICP-MS
3853	0.100	0.91	1.22	0.72	0.700	0.32	ICP-MS
3970	0.0386	**-3.18**	1.15	-0.14	0.666	-0.36	GFAAS
4082	0.0900	0.24	1.23	0.84	0.709	0.50	ICP-MS
4708	0.0886	0.15	1.15	-0.12	0.676	-0.16	ICP-MS
4953	0.0579	-1.90	1.22	0.74	0.714	0.61	GFAAS
5291	0.0700	-1.09	1.19	0.36	0.740	1.13	ND
5432	***1.82***	**115.36**	1.05	-1.30	0.792	**2.17**	GFAAS
5491	0.0910	0.31	1.20	0.48	0.720	0.73	GFAAS
5556	0.0792	-0.48	1.15	-0.08	0.709	0.51	GFAAS
5591	0.0800	-0.43	1.11	-0.60	0.640	-0.89	ICP-MS
5654	0.0898	0.22	1.12	-0.49	0.620	-1.29	ICP-MS (C/R)
5691	0.0800	-0.43	1.10	-0.72	0.630	-1.09	ICP-MS

Individual results
Blood Lead (µmol/L)
Round #2014-02

Participant	PC-B-L1404	z'-score	PC-B-L1405	z'-score	PC-B-L1406	z'-score	Method
6200	0.0820	-0.29	1.12	-0.43	0.667	-0.34	ICP-MS
6234	0.105	1.24	1.17	0.12	0.607	-1.55	GFAAS
6276	0.0994	0.86	1.18	0.27	0.689	0.10	ICP-MS
6511	0.0898	0.22	1.17	0.08	0.708	0.49	ND
6545	0.0900	0.24	1.15	-0.12	0.660	-0.48	ICP-MS
6794	0.100	0.93	1.10	-0.68	0.686	0.05	GFAAS
7111	0.0760	-0.69	1.13	-0.39	0.649	-0.70	ICP-MS
7269	<LQ	---	1.25	1.09	0.730	0.93	GFAAS
7311	0.0900	0.24	1.15	-0.12	0.670	-0.28	ICP-MS
7760	0.0213	**-4.33**	1.03	-1.55	0.552	**-2.66**	ICP-MS
7804	<LQ	---	1.16	0.04	0.589	-1.92	ND
7932	0.139	**3.50**	1.18	0.23	0.734	1.01	GFAAS
8701	0.0940	0.51	1.10	-0.69	0.690	0.12	ND

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-B-L1404	0.0864	0.00227	0.0149	0.0564 - 0.116	Rejected	---
PC-B-L1405	1.16	0.0100	0.0820	0.995 - 1.33	Accepted	---
PC-B-L1406	0.684	0.00711	0.0491	0.585 - 0.783	Accepted	---

Statistics
Blood Lead (µmol/L)

All methods	PC-B-L1404	PC-B-L1405	PC-B-L1406
N	52	57	57
Robust mean Algo A	0.0864	1.16	0.684
Robust STDev	0.0131	0.0606	0.0429
Median	0.0888	1.15	0.686
STDev from MAD	0.0130	0.0551	0.0408
Arithmetic mean	0.0914	1.16	0.682
STDev	0.0656	0.0671	0.0459
CV or Variability	15.2%	5.2%	6.3%

Graphite furnace-AAS	PC-B-L1404	PC-B-L1405	PC-B-L1406
N	21	25	25
Robust mean Algo A	0.0825	1.16	0.690
Robust STDev	0.0266	0.0618	0.0430
Median	0.0840	1.17	0.686
STDev from MAD	0.0243	0.0603	0.0408
Arithmetic mean	0.101	1.16	0.690
STDev	0.102	0.0583	0.0449
CV or Variability	32.2%	5.3%	6.2%

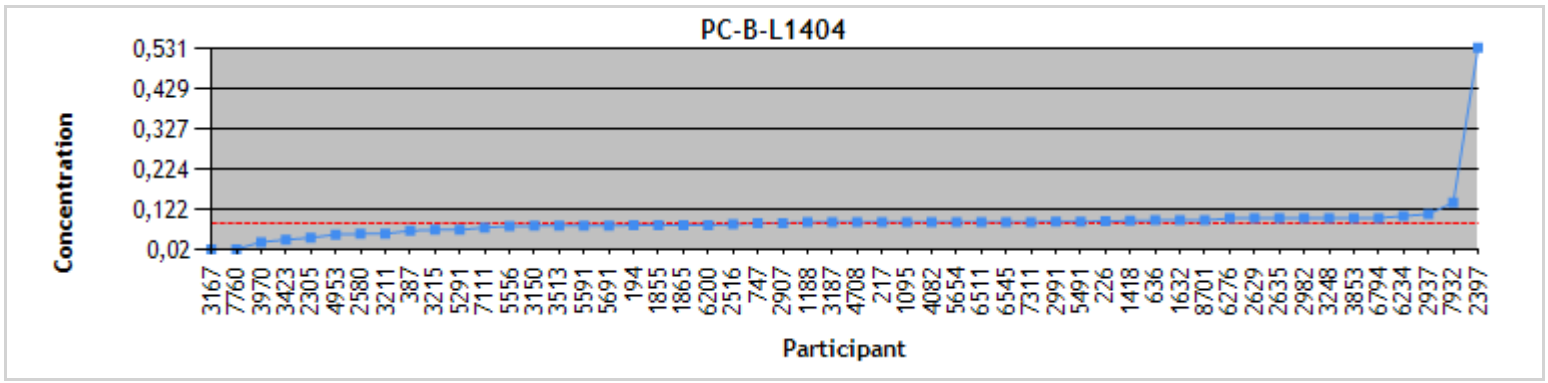
ICP-MS	PC-B-L1404	PC-B-L1405	PC-B-L1406
N	19	19	19
Robust mean Algo A	0.0869	1.15	0.677
Robust STDev	0.00756	0.0424	0.0336
Median	0.0886	1.15	0.678
STDev from MAD	0.00801	0.0386	0.0326
Arithmetic mean	0.0841	1.15	0.675
STDev	0.0165	0.0583	0.0423
CV or Variability	8.7%	3.7%	5.0%

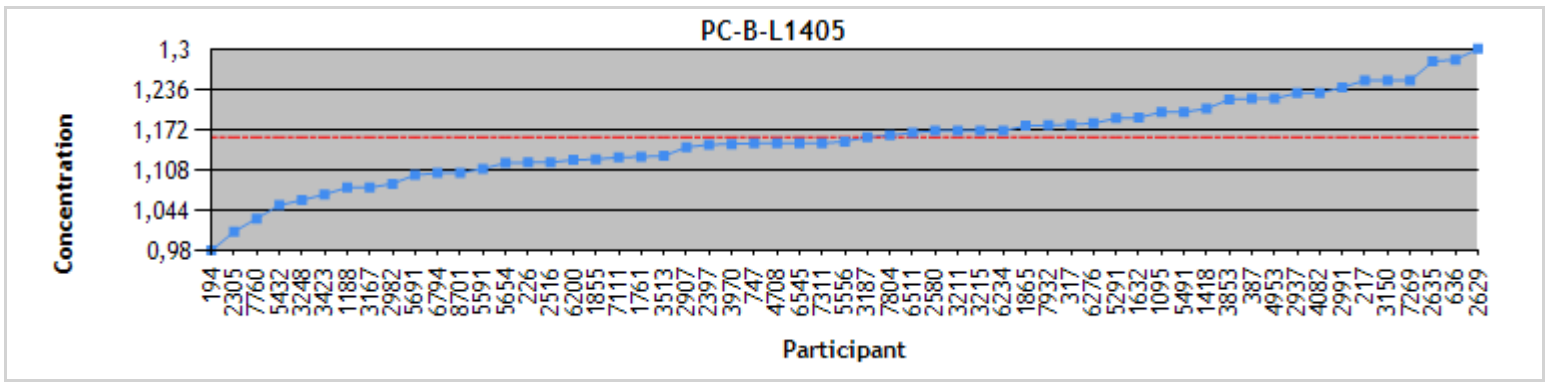
ICP-MS (collision/reaction cell)	PC-B-L1404	PC-B-L1405	PC-B-L1406
N	4	4	4
Robust mean Algo A	0.0896	1.16	0.671
Robust STDev	0.00735	0.0873	0.0558
Median	0.0893	1.15	0.666
STDev from MAD	0.00573	0.0724	0.0519
Arithmetic mean	0.0902	1.17	0.671
STDev	0.00741	0.0960	0.0492
CV or Variability	8.2%	7.5%	8.3%

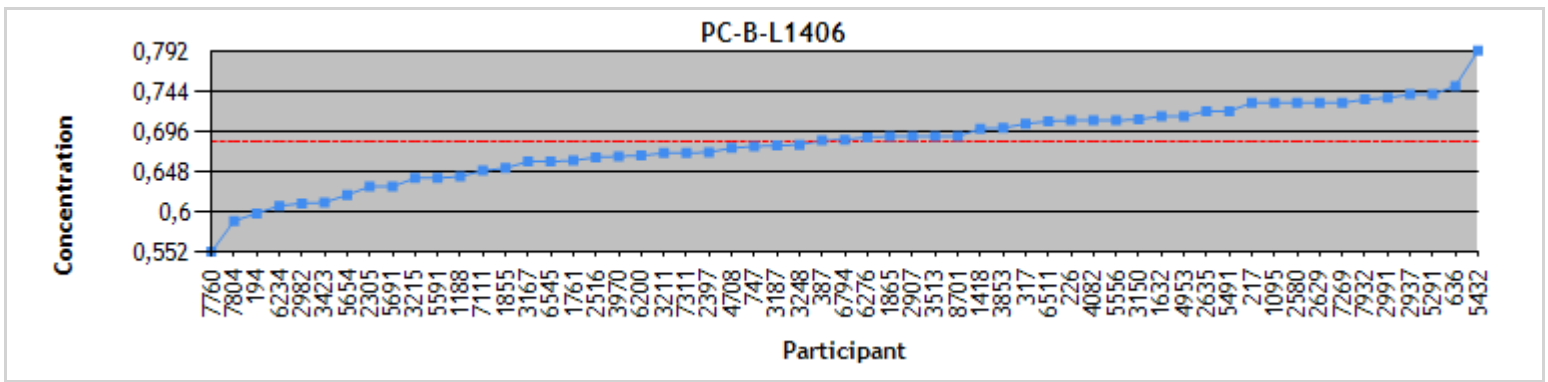
When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution

Blood Lead (µmol/L)







Individual results

Blood Mercury (nmol/L)

Round #2014-02

Participant	PC-B-M1404	z'-score	PC-B-M1405	z'-score	PC-B-M1406	z'-score	Method
176	<LQ	---	59.8	1.33	99.7	0.44	ICP-MS
217	13.0	-1.01	52.0	0.11	60.0	**-2.92**	ICP-MS
428	16.5	0.73	53.8	0.40	94.2	-0.02	ICP-MS
747	14.8	-0.10	49.3	-0.31	93.1	-0.12	ICP-MS
1095	16.0	0.51	54.0	0.42	104	0.80	CV
1156	32.7	**8.94**	76.0	**3.85**	101	0.52	ND
1188	12.9	-1.06	46.5	-0.75	92.7	-0.15	ICP-MS (C/R)
1418	15.2	0.08	48.2	-0.48	86.6	-0.67	ND
1865	17.0	0.99	54.2	0.45	103	0.71	CV
2907	<LQ	---	53.3	0.32	98.2	0.31	ICP-MS
3187	14.4	-0.30	50.5	-0.12	95.5	0.08	ICP-MS
3468	17.2	1.09	54.3	0.46	94.7	0.02	GA-AAS
3513	14.0	-0.51	54.0	0.42	103	0.72	ICP-MS
3853	15.0	0.00	55.0	0.58	108	1.14	ICP-MS
4708	14.4	-0.30	49.4	-0.30	91.8	-0.23	ICP-MS
4953	15.0	0.00	51.3	0.01	95.7	0.10	ICP-MS
5591	13.9	-0.56	50.6	-0.11	91.0	-0.30	ICP-MS
5654	13.6	-0.70	49.9	-0.22	91.4	-0.26	ICP-MS (C/R)
5691	14.0	-0.51	48.0	-0.51	88.0	-0.55	ICP-MS
5881	16.0	0.48	52.3	0.16	101	0.53	ICP-MS (C/R)
6511	14.0	-0.53	52.3	0.16	94.7	0.02	ND
6545	19.2	**2.12**	52.8	0.23	96.8	0.19	ICP-MS
6892	16.5	0.76	55.5	0.65	102	0.63	ND
6920	12.7	-1.18	48.3	-0.47	363	**22.72**	ND
7263	21.7	**3.38**	45.0	-0.99	85.9	-0.72	GA-AAS
7269	<LQ	---	49.0	-0.36	13.0	**-6.90**	CV
9313	16.1	0.55	>LL	---	>LL	---	ICP-MS
9674	<LQ	---	<LQ	---	93.7	-0.07	CV
9759	9.97	**-2.54**	39.9	-1.78	74.8	-1.67	GA-AAS
9777	14.1	-0.45	38.2	**-2.03**	83.2	-0.96	GA-AAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-B-M1404	15.0	0.439	1.93	11.0 - 19.0	Rejected	Organic
PC-B-M1405	51.3	0.873	6.37	38.4 - 64.2	Rejected	Inorganic
PC-B-M1406	94.5	1.97	11.6	70.9 - 118	Rejected	Organic

Statistics

Blood Mercury (nmol/L)

All methods	PC-B-M1404	PC-B-M1405	PC-B-M1406
N	26	28	29
Robust mean Algo A	15.0	51.3	94.5
Robust STDev	1.79	3.69	8.47
Median	14.9	51.7	94.7
STDev from MAD	1.69	3.63	8.79
Arithmetic mean	15.8	51.6	100
STDev	4.11	6.58	53.5
CV or Variability	11.9%	7.2%	9.0%

Cold vapor	PC-B-M1404	PC-B-M1405	PC-B-M1406
N	NA	3	4
Robust mean Algo A	NA	53.9	96.9
Robust STDev	NA	0.356	9.18
Median	NA	54.0	98.3
STDev from MAD	NA	0.282	7.62
Arithmetic mean	NA	52.4	78.4
STDev	NA	2.94	43.8
CV or Variability	NA	0.7%	9.5%

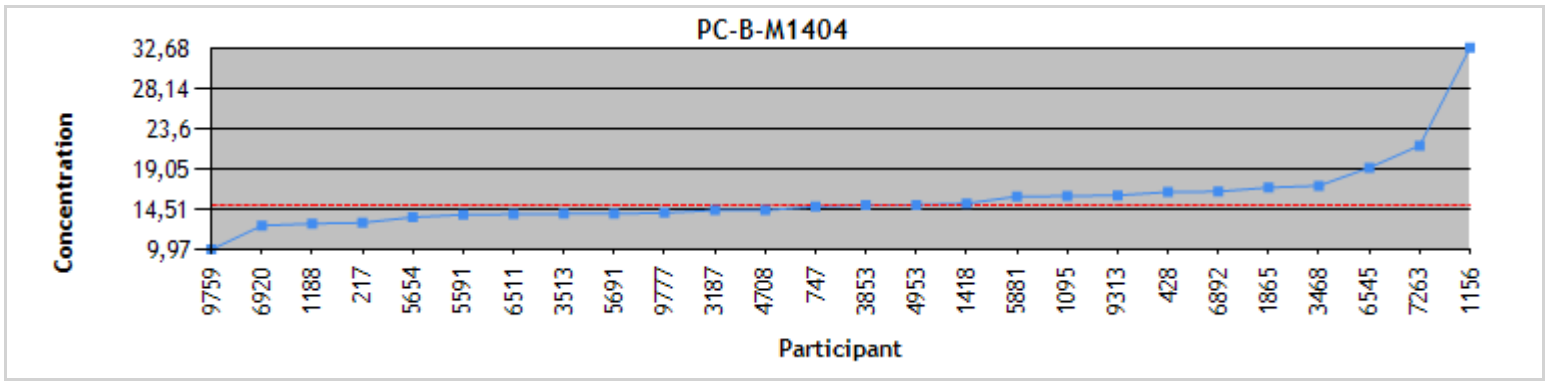
Gold amalgamation-AAS	PC-B-M1404	PC-B-M1405	PC-B-M1406
N	4	4	4
Robust mean Algo A	15.7	43.2	84.6
Robust STDev	5.60	5.98	9.31
Median	15.6	42.4	84.6
STDev from MAD	5.32	4.98	8.28
Arithmetic mean	15.7	44.3	84.6
STDev	4.94	7.21	8.21
CV or Variability	35.6%	13.8%	11.0%

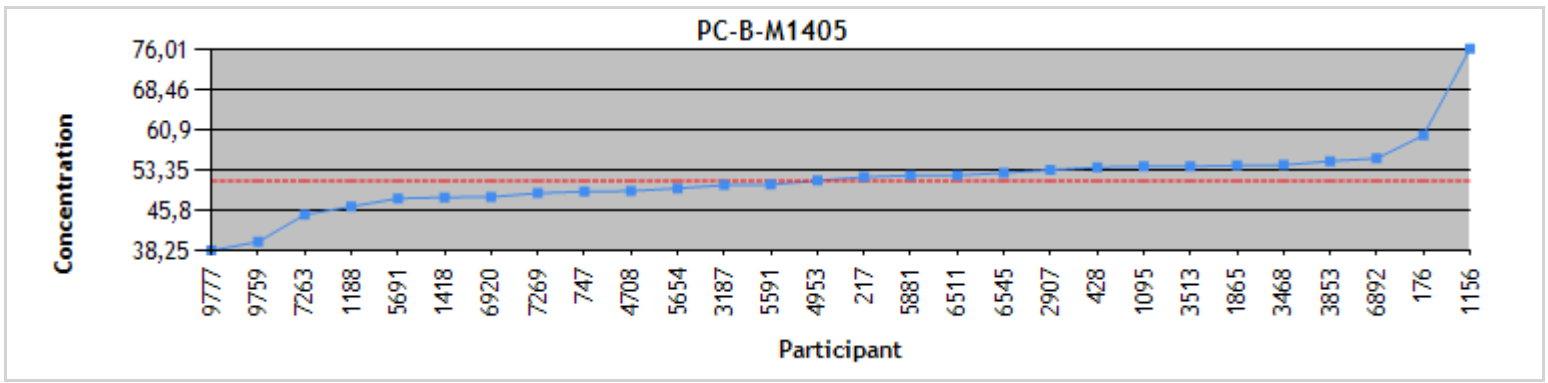
ICP-MS	PC-B-M1404	PC-B-M1405	PC-B-M1406
N	12	13	13
Robust mean Algo A	14.7	52.0	95.2
Robust STDev	1.00	2.74	5.81
Median	14.6	52.0	95.5
STDev from MAD	0.890	2.73	5.49
Arithmetic mean	15.0	52.3	93.5
STDev	1.62	3.08	11.3
CV or Variability	6.8%	5.3%	6.1%

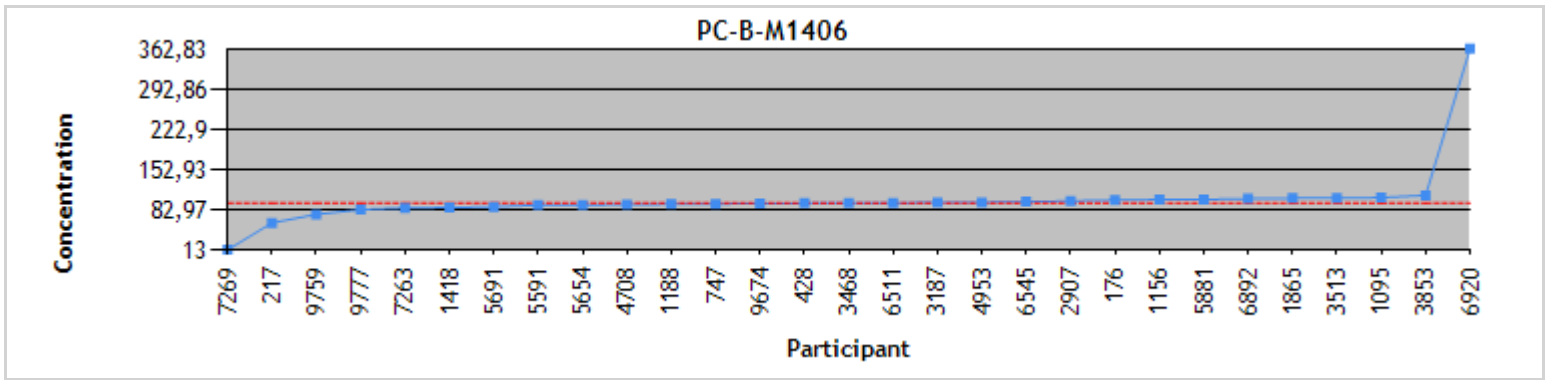
ICP-MS (collision/reaction cell)	PC-B-M1404	PC-B-M1405	PC-B-M1406
N	3	3	3
Robust mean Algo A	13.9	49.6	93.2
Robust STDev	1.33	3.33	2.38
Median	13.6	49.9	92.7
STDev from MAD	1.05	3.62	1.88
Arithmetic mean	14.2	49.6	94.9
STDev	1.60	2.94	5.03
CV or Variability	9.6%	6.7%	2.5%

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 Mercury (nmol/L)







Individual results

Serum Aluminium (µmol/L)

Round #2014-02

Participant	PC-S-A1404	z'-score	PC-S-A1405	z'-score	PC-S-A1406	z'-score	Method
217	0.490	0.09	3.27	-0.05	1.82	0.17	ICP-MS
387	0.560	0.87	3.20	-0.22	1.74	-0.17	GFAAS
636	0.516	0.38	3.31	0.06	1.85	0.31	ICP-MS
747	0.524	0.47	3.44	0.37	1.75	-0.13	ICP-MS
1095	0.470	-0.13	3.53	0.59	1.89	0.46	GFAAS
1418	0.456	-0.29	2.91	-0.94	1.53	-1.03	ICP-MS (C/R)
1855	0.445	-0.41	3.11	-0.43	1.74	-0.16	ICP-MS
1865	0.437	-0.50	3.17	-0.31	1.69	-0.39	GFAAS
2305	0.0700	**-4.57**	3.23	-0.15	1.53	-1.05	ND
2580	0.510	0.31	3.69	0.98	2.07	1.22	GFAAS
2629	0.450	-0.36	2.96	-0.81	1.78	0.00	GFAAS
2763	<LQ	---	3.41	0.29	2.00	0.92	ICP-MS
3150	0.480	-0.02	3.48	0.46	1.87	0.38	GFAAS
3167	0.440	-0.47	3.31	0.05	1.74	-0.17	GFAAS
3513	0.410	-0.80	3.25	-0.10	1.73	-0.21	ICP-MS (C/R)
3853	0.770	**3.20**	3.37	0.20	1.73	-0.21	ICP-MS
4953	0.519	0.41	3.19	-0.25	1.70	-0.32	GFAAS
5291	0.420	-0.69	2.61	-1.66	1.62	-0.67	ND
5556	0.412	-0.78	3.34	0.13	1.80	0.09	GFAAS
5654	0.482	0.00	3.24	-0.12	1.53	-1.03	ICP-MS (C/R)
5691	0.500	0.20	2.87	-1.03	1.59	-0.80	ICP-MS
5881	0.434	-0.54	3.42	0.32	1.81	0.12	ICP-MS (C/R)
5955	0.480	-0.02	3.41	0.29	1.85	0.29	ND
6511	0.478	-0.04	3.40	0.27	1.82	0.17	ND
6702	0.480	-0.02	3.35	0.15	1.80	0.08	GFAAS
7804	0.530	0.53	3.11	-0.44	1.59	-0.80	ND
8376	0.526	0.49	3.57	0.68	1.99	0.88	GFAAS
8454	0.550	0.75	3.17	-0.29	1.95	0.71	GFAAS
9759	0.530	0.53	3.51	0.54	1.99	0.88	GFAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-A1404	0.482	0.0125	0.0892	0.302 - 0.662	Rejected	---
PC-S-A1405	3.29	0.0437	0.407	2.47 - 4.11	Accepted	---
PC-S-A1406	1.78	0.0301	0.236	1.30 - 2.26	Accepted	---

Statistics

Serum Aluminium (µmol/L)

All methods	PC-S-A1404	PC-S-A1405	PC-S-A1406
N	28	29	29
Robust mean Algo A	0.482	3.29	1.78
Robust STDev	0.0528	0.188	0.129
Median	0.480	3.31	1.78
STDev from MAD	0.0585	0.182	0.111
Arithmetic mean	0.477	3.27	1.78
STDev	0.105	0.230	0.145
CV or Variability	11.0%	5.7%	7.3%

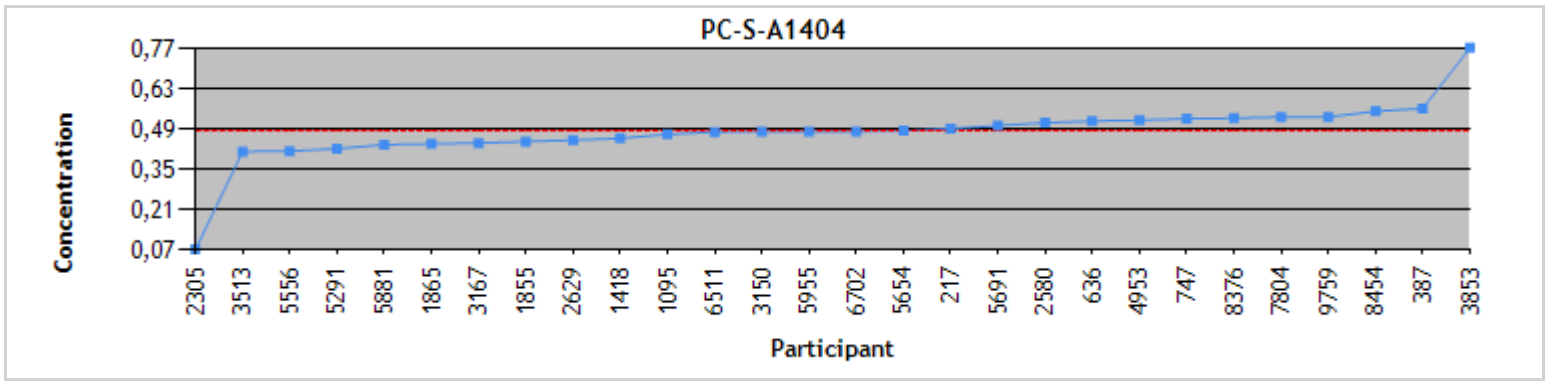
Graphite furnace-AAS	PC-S-A1404	PC-S-A1405	PC-S-A1406
N	13	13	13
Robust mean Algo A	0.490	3.35	1.84
Robust STDev	0.0530	0.226	0.128
Median	0.480	3.34	1.80
STDev from MAD	0.0593	0.247	0.132
Arithmetic mean	0.490	3.34	1.85
STDev	0.0468	0.205	0.123
CV or Variability	10.8%	6.8%	7.0%

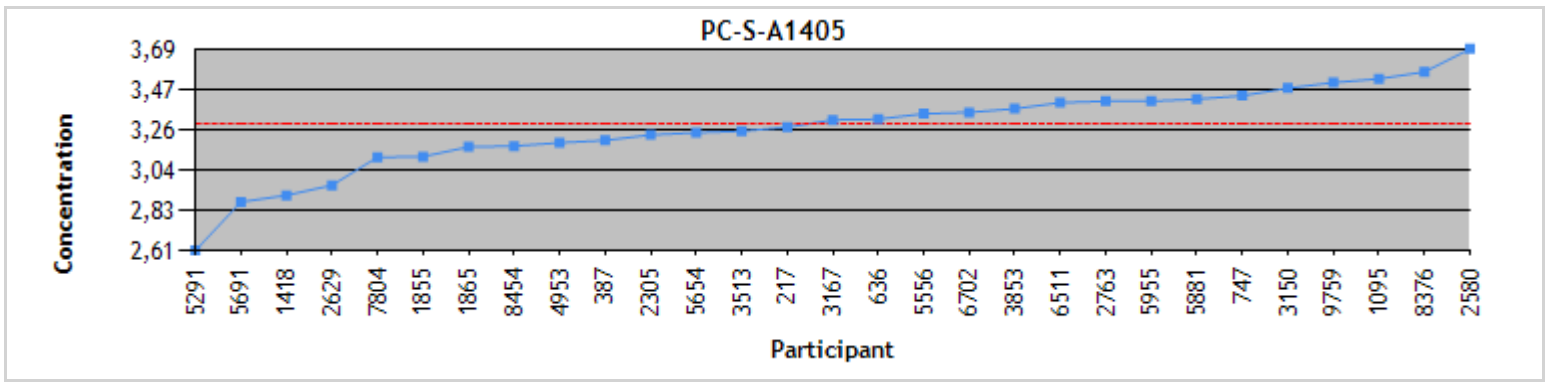
ICP-MS	PC-S-A1404	PC-S-A1405	PC-S-A1406
N	6	7	7
Robust mean Algo A	0.508	3.29	1.77
Robust STDev	0.0303	0.155	0.114
Median	0.508	3.31	1.75
STDev from MAD	0.0252	0.142	0.104
Arithmetic mean	0.541	3.26	1.78
STDev	0.116	0.201	0.127
CV or Variability	6.0%	4.7%	6.4%

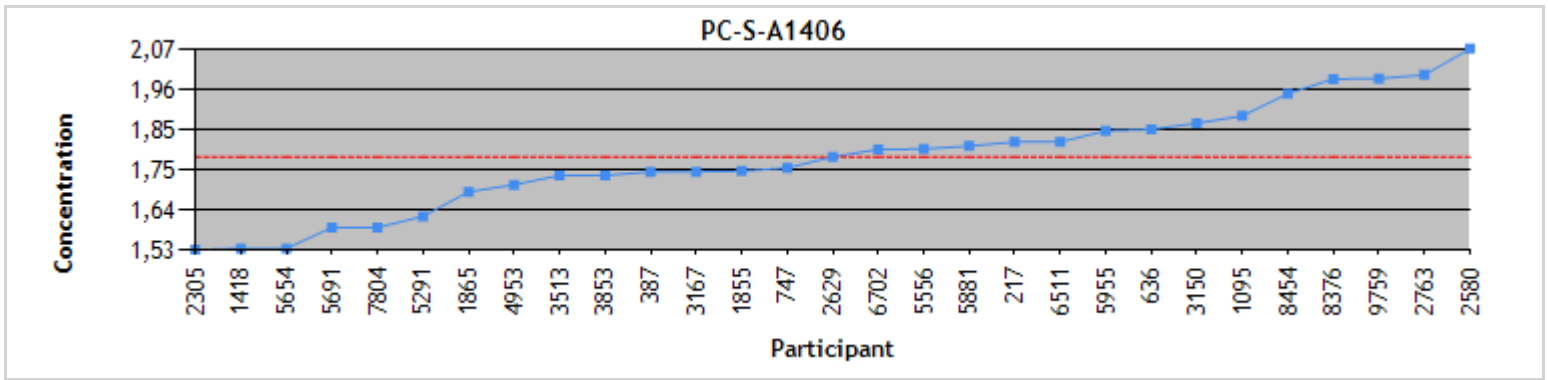
ICP-MS (collision/reaction cell)	PC-S-A1404	PC-S-A1405	PC-S-A1406
N	4	4	4
Robust mean Algo A	0.445	3.24	1.65
Robust STDev	0.0350	0.174	0.158
Median	0.445	3.25	1.63
STDev from MAD	0.0340	0.133	0.145
Arithmetic mean	0.445	3.20	1.65
STDev	0.0308	0.216	0.139
CV or Variability	7.9%	5.4%	9.6%

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
Serum Aluminium (µmol/L)







Individual results

Serum Copper (µmol/L)

Round #2014-02

Participant	PC-S-E1404	z'-score	PC-S-E1405	z'-score	PC-S-E1406	z'-score	Method
217	42.6	1.64	18.1	1.90	4.20	1.59	FAAS
226	38.2	-0.40	14.6	-1.28	3.19	-0.27	ICP-MS (C/R)
387	43.4	**2.04**	18.2	1.94	4.28	1.74	GFAAS
428	38.4	-0.33	15.7	-0.24	3.62	0.52	ICP-MS (C/R)
636	39.9	0.37	15.2	-0.70	3.24	-0.19	ICP-MS
747	39.1	0.00	16.3	0.27	3.31	-0.06	ICP-MS
1095	39.5	0.19	16.2	0.18	3.50	0.30	FAAS
1188	38.8	-0.14	16.1	0.09	3.33	-0.02	ICP-MS (C/R)
1300	39.5	0.19	16.8	0.76	3.30	-0.07	FAAS
1855	39.5	0.19	15.7	-0.24	3.15	-0.36	ICP-MS
2305	36.2	-1.35	3.50	**-11.29**	14.8	**21.24**	ND
2516	39.4	0.15	3.70	**-11.11**	3.22	-0.22	GFAAS
2580	40.6	0.70	16.7	0.63	3.90	1.04	FAAS
2763	40.7	0.75	16.6	0.54	3.30	-0.07	ICP-MS (C/R)
2907	46.3	**3.36**	19.6	**3.27**	3.87	0.98	ICP-MS
2982	38.9	-0.07	16.4	0.38	3.42	0.14	FAAS
3150	38.3	-0.38	14.9	-0.99	3.10	-0.44	FAAS
3211	36.8	-1.08	15.3	-0.63	3.30	-0.07	FAAS
3423	36.2	-1.36	14.7	-1.13	2.72	-1.15	FAAS
3513	38.9	-0.09	16.2	0.18	3.40	0.11	ICP-MS
3773	40.8	0.80	16.0	0.04	2.74	-1.10	ICP-MS (C/R)
3853	37.8	-0.60	15.2	-0.71	3.30	-0.07	ICP-MS
4082	40.2	0.52	16.5	0.45	3.38	0.07	ICP-MS (C/R)
4953	41.4	1.08	16.6	0.54	3.41	0.14	ICP-MS
5291	38.9	-0.09	13.9	-1.90	2.40	-1.74	ND
5556	38.7	-0.18	16.2	0.19	3.93	1.10	FAAS
5591	40.3	0.56	17.1	0.99	3.90	1.04	GFAAS
5596	36.8	-1.09	15.1	-0.82	3.17	-0.31	ICP-MS (C/R)
5654	30.4	**-4.06**	14.0	-1.79	2.82	-0.97	ICP-MS (C/R)
5691	37.4	-0.80	15.1	-0.81	3.00	-0.63	ICP-MS
5881	39.2	0.04	16.7	0.67	3.32	-0.04	ICP-MS (C/R)
5955	40.5	0.66	16.4	0.36	3.22	-0.22	ND
6511	38.9	-0.08	15.4	-0.52	3.19	-0.27	ND
6711	38.3	-0.37	16.8	0.72	4.08	1.37	FAAS
7311	39.5	0.17	15.9	-0.06	3.43	0.17	ICP-MS
7804	41.8	1.29	16.4	0.33	3.62	0.52	ND
8376	40.9	0.84	16.6	0.54	4.20	1.59	FAAS
8454	40.6	0.70	17.3	1.17	3.33	-0.02	FAAS
8981	35.7	-1.59	14.9	-0.99	2.20	**-2.11**	ND
9677	36.7	-1.15	14.6	-1.23	2.84	-0.93	ICP-OES
9759	37.5	-0.75	16.3	0.23	3.27	-0.12	FAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-E1404	39.1	0.376	2.10	34.8 - 43.4	Accepted	---
PC-S-E1405	16.0	0.193	1.09	13.8 - 18.2	Rejected	---
PC-S-E1406	3.34	0.0548	0.537	2.26 - 4.42	Rejected	---

Statistics
Serum Copper (µmol/L)

All methods	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	41	41	41
Robust mean Algo A	39.1	16.0	3.34
Robust STDev	1.93	0.987	0.281
Median	39.1	16.2	3.31
STDev from MAD	1.90	0.946	0.241
Arithmetic mean	39.1	15.5	3.63
STDev	2.47	2.94	1.85
CV or Variability	4.9%	6.2%	8.4%

Flame-AAS	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	13	13	13
Robust mean Algo A	39.1	16.4	3.55
Robust STDev	1.91	0.663	0.492
Median	38.9	16.4	3.42
STDev from MAD	2.14	0.562	0.472
Arithmetic mean	39.1	16.3	3.56
STDev	1.78	0.932	0.462
CV or Variability	4.9%	4.0%	13.9%

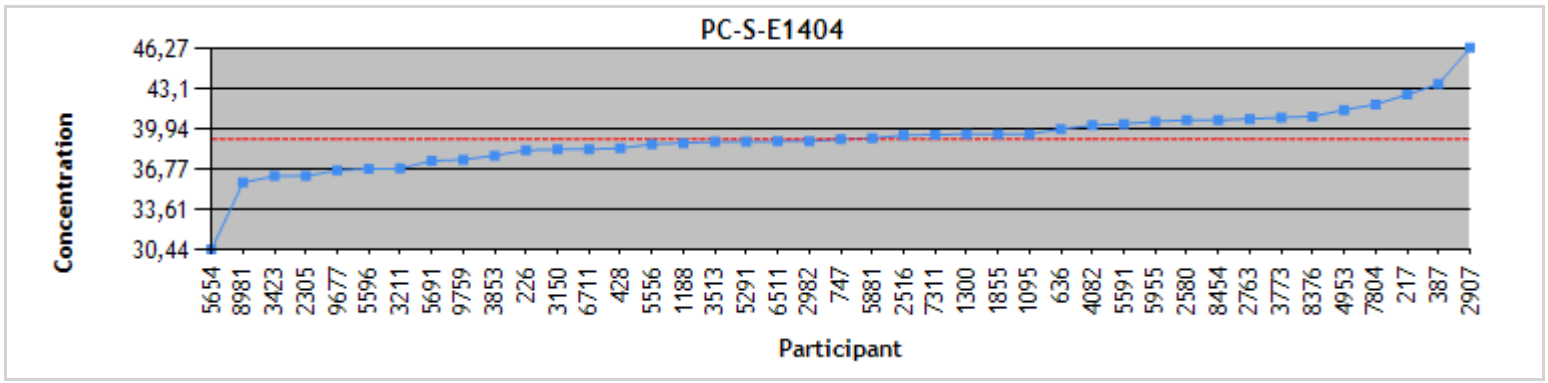
Graphite furnace-AAS	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	3	3	3
Robust mean Algo A	40.7	16.7	3.80
Robust STDev	1.67	1.97	0.609
Median	40.3	17.1	3.90
STDev from MAD	1.32	1.56	0.564
Arithmetic mean	41.1	13.0	3.80
STDev	2.12	8.06	0.537
CV or Variability	4.1%	11.8%	16.0%

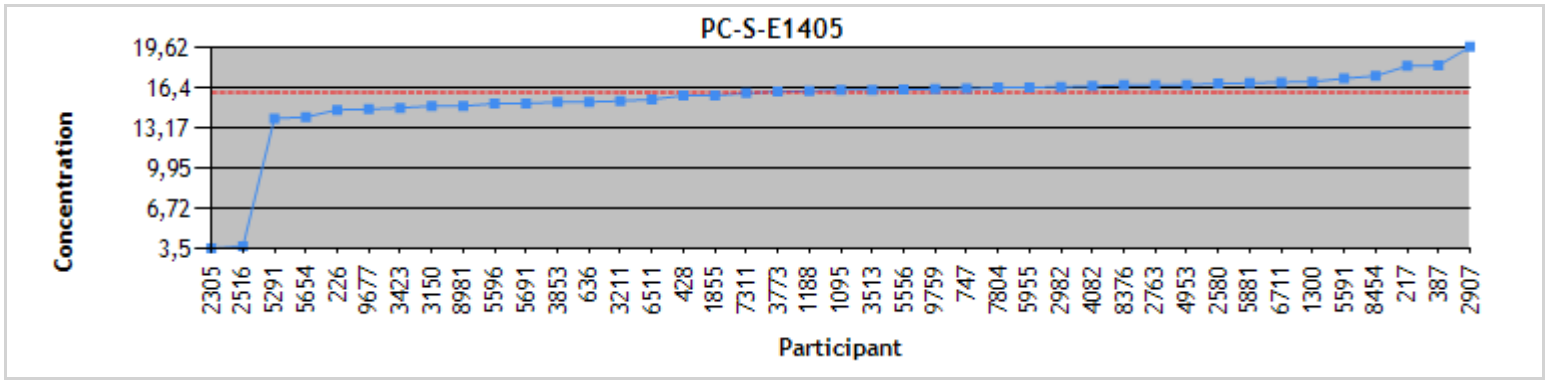
ICP-MS	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	9	9	9
Robust mean Algo A	39.4	16.0	3.32
Robust STDev	1.05	0.820	0.167
Median	39.5	15.9	3.31
STDev from MAD	0.830	0.997	0.155
Arithmetic mean	40.0	16.2	3.35
STDev	2.63	1.38	0.241
CV or Variability	2.7%	5.1%	5.0%

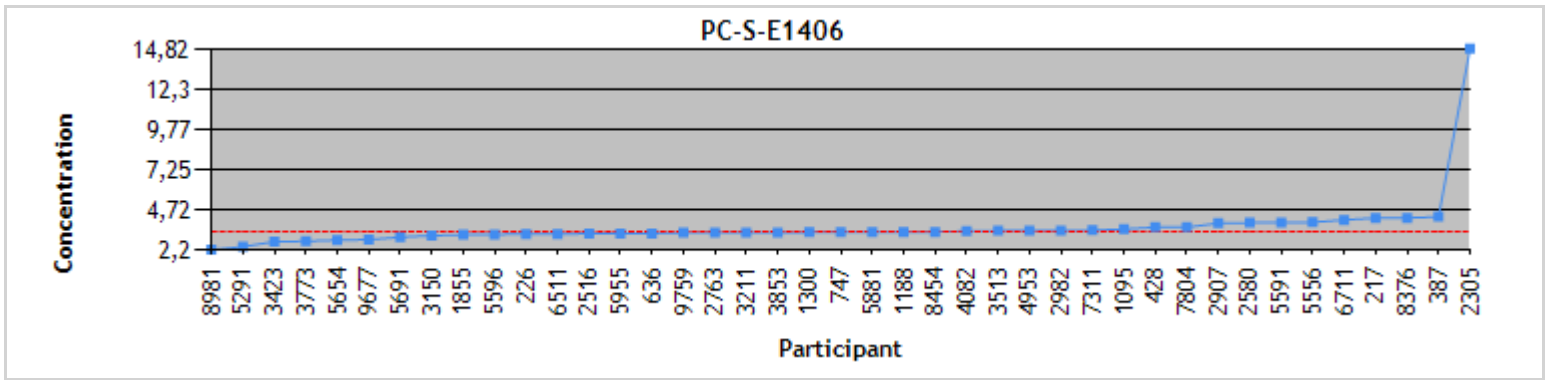
ICP-MS (collision/reaction cell)	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	9	9	9
Robust mean Algo A	38.8	15.8	3.26
Robust STDev	1.93	0.860	0.170
Median	38.8	16.0	3.30
STDev from MAD	2.08	0.821	0.156
Arithmetic mean	38.2	15.7	3.21
STDev	3.17	0.952	0.275
CV or Variability	5.0%	5.4%	5.2%

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)







Individual results

Serum Manganese (nmol/L)

Round #2014-02

Participant	PC-S-G1404	z'-score	PC-S-G1405	z'-score	PC-S-G1406	z'-score	Method
217	101	**3.56**	134	1.95	53.0	**20.21**	ICP-MS
747	72.3	0.52	116	0.78	12.6	0.63	ICP-MS
1188	68.8	0.15	109	0.33	13.1	0.87	ICP-MS (C/R)
2629	68.8	0.15	91.2	-0.83	8.01	-1.59	GFAAS
2763	61.0	-0.68	89.3	-0.96	10.6	-0.34	ICP-MS (C/R)
6511	72.4	0.53	119	0.98	11.1	-0.10	ND
8376	58.2	-0.97	91.6	-0.81	11.1	-0.10	GFAAS
9759	54.6	-1.36	83.7	-1.32	9.10	-1.07	ICP-MS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-G1404	67.4	4.26	8.42	48.5 - 86.3	Rejected	---
PC-S-G1405	104	8.50	12.8	73.3 - 135	Accepted	---
PC-S-G1406	11.3	1.12	1.74	7.17 - 15.4	Rejected	---

Statistics

Serum Manganese (nmol/L)

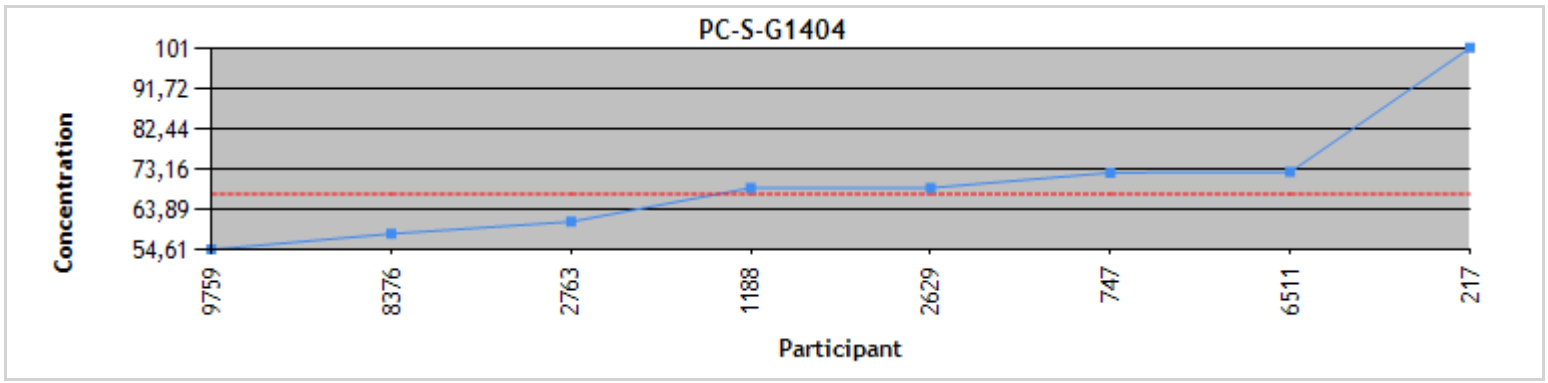
All methods	PC-S-G1404	PC-S-G1405	PC-S-G1406
N	8	8	8
Robust mean Algo A	67.4	104	11.3
Robust STDev	9.64	19.2	2.53
Median	68.8	100	11.1
STDev from MAD	8.49	19.8	2.59
Arithmetic mean	69.7	104	16.1
STDev	14.3	17.9	15.0
CV or Variability	14.3%	18.6%	22.3%

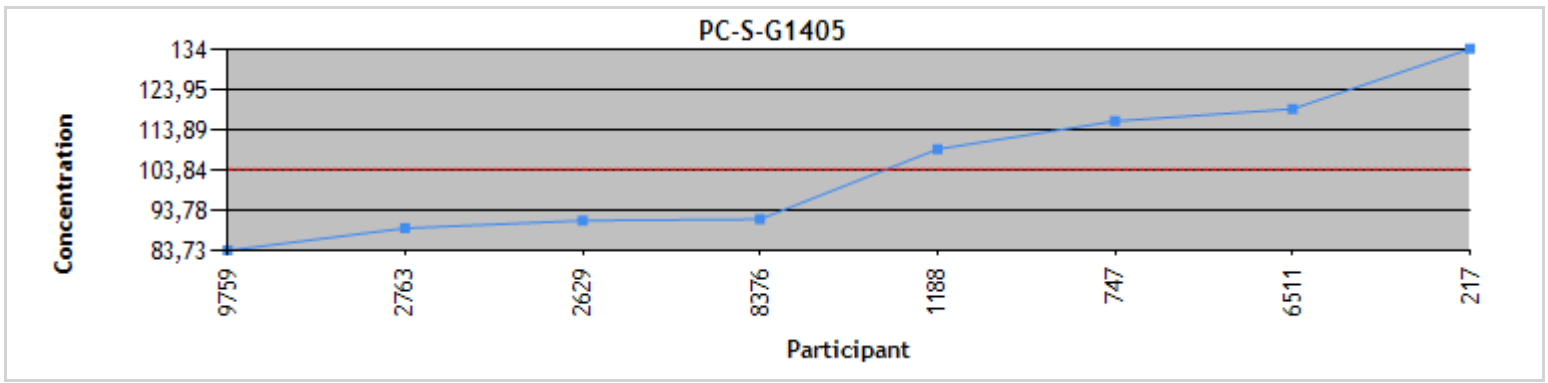
ICP-MS	PC-S-G1404	PC-S-G1405	PC-S-G1406
N	3	3	3
Robust mean Algo A	76.0	111	14.0
Robust STDev	26.6	28.9	6.55
Median	72.3	116	12.6
STDev from MAD	26.2	26.7	5.19
Arithmetic mean	76.0	111	24.9
STDev	23.4	25.5	24.4
CV or Variability	34.9%	26.0%	46.7%

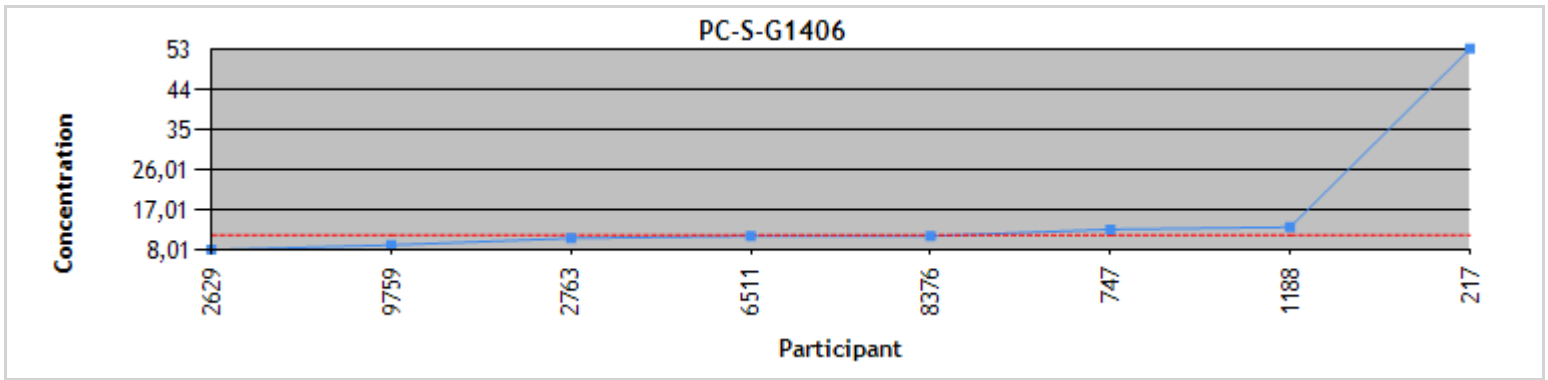
When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution

Serum Manganese (nmol/L)







Individual results

Serum Selenium (µmol/L)

Round #2014-02

Participant	PC-S-E1404	z'-score	PC-S-E1405	z'-score	PC-S-E1406	z'-score	Method
217	4.81	1.29	1.76	1.06	0.450	0.84	ICP-MS
226	4.04	-0.82	1.47	-0.84	0.390	-0.19	ICP-MS (C/R)
428	4.48	0.39	1.67	0.48	0.428	0.46	ICP-MS (C/R)
636	4.35	0.03	1.58	-0.14	0.387	-0.24	ICP-MS
747	4.27	-0.19	1.66	0.40	0.411	0.17	ICP-MS
1095	4.35	0.03	1.59	-0.07	0.530	**2.21**	GFAAS
1188	4.62	0.77	1.79	1.26	0.432	0.53	ICP-MS (C/R)
1300	4.55	0.57	1.81	1.40	0.583	**3.12**	HG-AAS
1855	>LL	---	1.67	0.48	0.393	-0.14	ICP-MS (C/R)
2305	4.17	-0.47	1.72	0.80	0.610	**3.59**	ND
2516	4.15	-0.52	1.52	-0.53	0.420	0.33	GFAAS
2763	4.57	0.63	1.73	0.86	0.390	-0.19	ICP-MS (C/R)
3150	5.36	**2.81**	1.61	0.07	0.570	**2.90**	GFAAS
3513	4.16	-0.50	1.52	-0.53	0.350	-0.88	ICP-MS (C/R)
3773	4.36	0.06	1.53	-0.49	0.334	-1.14	ICP-MS (C/R)
3853	4.27	-0.19	1.59	-0.07	0.390	-0.19	ICP-MS (C/R)
4082	4.38	0.11	1.66	0.40	0.398	-0.05	ICP-MS (C/R)
4590	4.57	0.63	1.46	-0.93	0.266	**-2.32**	GFAAS
4953	4.22	-0.34	1.58	-0.11	0.394	-0.12	ICP-MS (C/R)
5291	4.28	-0.17	1.31	-1.93	0.300	-1.73	ND
5556	4.72	1.06	1.56	-0.28	0.448	0.81	GFAAS
5596	4.42	0.23	1.60	0.00	0.350	-0.88	ICP-MS (C/R)
5654	5.21	**2.41**	1.96	**2.40**	0.405	0.07	ICP-MS (C/R)
5691	3.90	-1.21	1.41	-1.26	0.260	**-2.42**	ICP-MS
5881	4.44	0.28	1.67	0.47	0.410	0.16	ICP-MS (C/R)
5955	4.34	0.00	1.58	-0.13	0.404	0.05	ND
6511	4.18	-0.44	1.64	0.28	0.450	0.83	ND
6545	4.43	0.25	1.73	0.86	0.450	0.84	ICP-MS
6711	4.33	-0.03	1.55	-0.33	0.400	-0.02	ICP-MS
7311	4.27	-0.19	1.62	0.13	0.370	-0.53	ICP-MS
7804	3.58	**-2.09**	1.47	-0.86	0.990	**10.12**	ND
8376	3.90	-1.22	1.38	-1.43	0.389	-0.21	GFAAS
8454	3.74	-1.65	1.52	-0.53	0.250	**-2.59**	GFAAS
9759	4.34	0.01	1.58	-0.15	0.248	**-2.62**	GFAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-E1404	4.34	0.0548	0.359	3.61 - 5.07	Accepted	---
PC-S-E1405	1.60	0.0241	0.149	1.30 - 1.90	Accepted	---
PC-S-E1406	0.401*	0.0138	0.0566	0.284 - 0.518	Rejected	---

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

Statistics
Serum Selenium (µmol/L)

All methods	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	33	34	34
Robust mean Algo A	4.34	1.60	0.401
Robust STDev	0.252	0.112	0.0644
Median	4.34	1.59	0.399
STDev from MAD	0.242	0.104	0.0608
Arithmetic mean	4.36	1.60	0.419
STDev	0.354	0.130	0.132
CV or Variability	5.8%	7.0%	16.1%

Graphite furnace-AAS	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	8	8	8
Robust mean Algo A	4.35	1.53	0.390
Robust STDev	0.479	0.0696	0.143
Median	4.35	1.54	0.404
STDev from MAD	0.445	0.0669	0.196
Arithmetic mean	4.39	1.53	0.390
STDev	0.509	0.0750	0.126
CV or Variability	11.0%	4.5%	36.7%

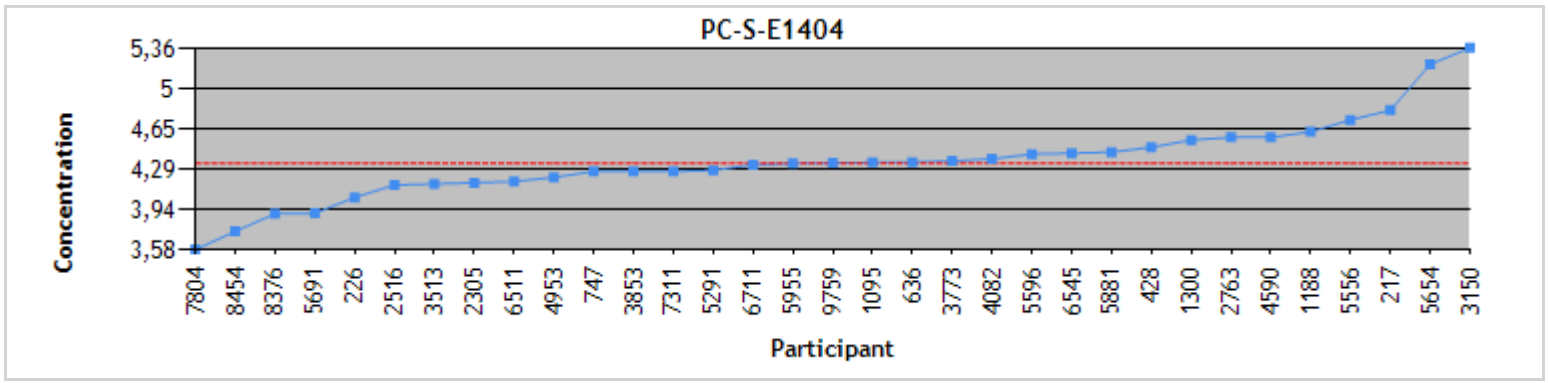
ICP-MS	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	7	7	7
Robust mean Algo A	4.33	1.62	0.400
Robust STDev	0.107	0.117	0.0478
Median	4.33	1.62	0.400
STDev from MAD	0.0890	0.104	0.0445
Arithmetic mean	4.34	1.62	0.390
STDev	0.269	0.118	0.0646
CV or Variability	2.5%	7.2%	11.9%

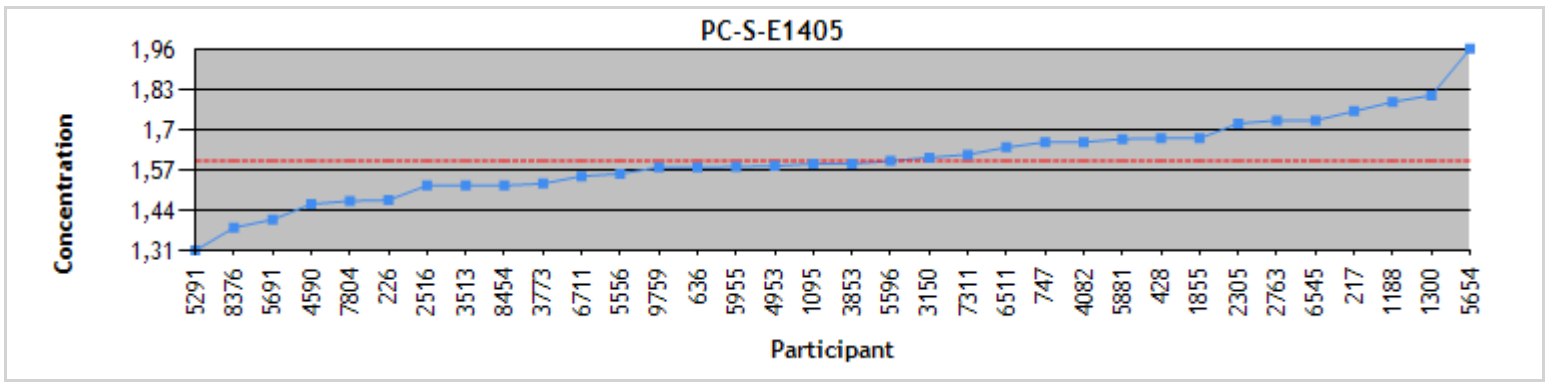
ICP-MS (collision/reaction cell)	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	12	13	13
Robust mean Algo A	4.39	1.64	0.393
Robust STDev	0.219	0.111	0.0213
Median	4.40	1.66	0.393
STDev from MAD	0.222	0.104	0.0182
Arithmetic mean	4.43	1.65	0.390
STDev	0.298	0.129	0.0292
CV or Variability	5.0%	6.8%	5.4%

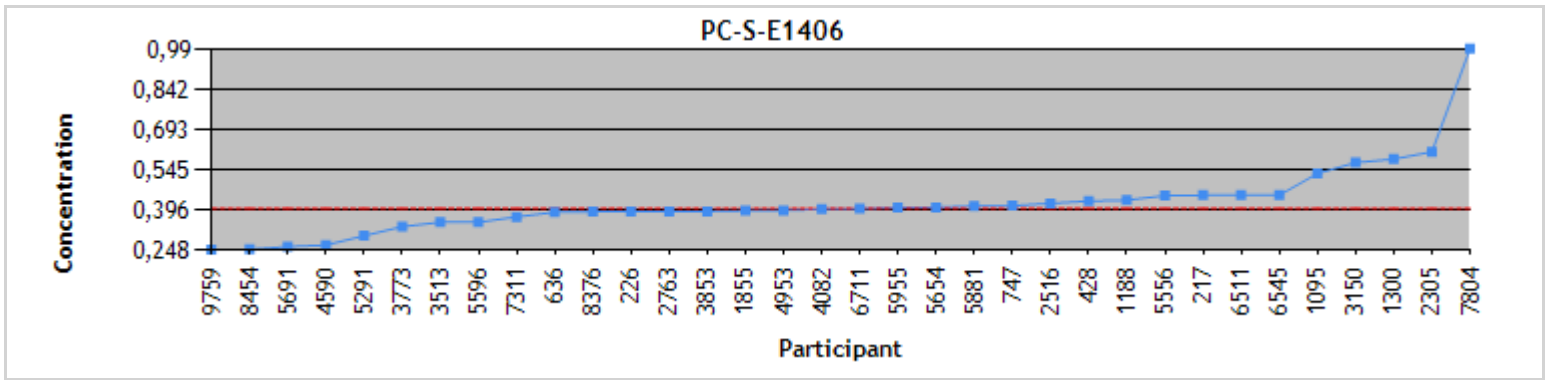
When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution

Serum Selenium (µmol/L)







Individual results

Serum Zinc (µmol/L)

Round #2014-02

Participant	PC-S-E1404	z'-score	PC-S-E1405	z'-score	PC-S-E1406	z'-score	Method
217	39.2	0.27	17.3	0.35	4.58	**2.56**	FAAS
226	38.1	-0.03	16.3	-0.24	3.64	0.02	ICP-MS (C/R)
428	35.3	-0.76	15.1	-0.96	3.21	-1.13	ICP-MS (C/R)
636	39.1	0.23	17.0	0.17	3.72	0.23	ICP-MS
747	39.1	0.24	17.3	0.36	3.32	-0.84	ICP-MS
1095	36.7	-0.39	16.4	-0.18	3.90	0.73	FAAS
1188	38.5	0.08	17.0	0.16	3.69	0.16	ICP-MS (C/R)
1300	38.2	0.01	17.3	0.35	3.52	-0.31	FAAS
1855	37.1	-0.28	15.9	-0.45	3.12	-1.38	ICP-MS
2305	35.3	-0.77	4.45	**-7.35**	16.0	**33.50**	ND
2516	37.4	-0.21	16.3	-0.24	3.70	0.19	FAAS
2580	38.2	0.00	16.7	0.00	2.30	**-3.59**	FAAS
2763	37.6	-0.16	16.6	-0.06	3.53	-0.27	ICP-MS (C/R)
2907	43.8	1.46	19.0	1.39	<LQ	---	ICP-MS
2982	30.7	-1.97	12.1	**-2.75**	<LQ	---	FAAS
3150	38.5	0.08	17.3	0.36	3.60	-0.08	FAAS
3211	38.5	0.08	17.6	0.54	3.60	-0.08	FAAS
3423	42.7	1.20	16.6	-0.08	1.95	**-4.53**	FAAS
3513	37.8	-0.11	17.2	0.30	3.90	0.73	ICP-MS
3773	41.7	0.92	17.7	0.60	3.07	-1.50	ICP-MS (C/R)
3853	38.4	0.06	16.5	-0.15	3.86	0.62	ICP-MS
4082	38.5	0.08	17.0	0.18	3.60	-0.08	ICP-MS (C/R)
4953	40.0	0.48	17.5	0.48	3.58	-0.14	ICP-MS
5291	47.3	**2.40**	21.4	**2.82**	6.00	**6.40**	ND
5556	39.1	0.25	15.6	-0.66	3.97	0.93	FAAS
5591	39.4	0.32	18.9	1.32	4.70	**2.89**	FAAS
5596	37.2	-0.28	16.6	-0.09	3.67	0.10	ICP-MS (C/R)
5654	35.2	-0.79	15.0	-0.99	4.04	1.11	ICP-MS (C/R)
5691	35.1	-0.82	15.4	-0.78	3.30	-0.89	ICP-MS
5881	38.5	0.08	17.3	0.38	3.43	-0.54	ICP-MS (C/R)
5955	37.6	-0.16	16.5	-0.12	3.48	-0.40	ND
6511	38.2	0.01	16.4	-0.16	3.64	0.02	ND
6711	37.1	-0.28	16.3	-0.24	3.81	0.49	ICP-MS
7311	38.7	0.13	17.2	0.29	3.77	0.38	ICP-MS
7804	50.5	**3.23**	20.9	**2.50**	<LQ	---	ND
8376	37.9	-0.08	16.6	-0.04	4.76	**3.04**	FAAS
8454	35.2	-0.79	16.3	-0.24	2.63	**-2.70**	FAAS
8981	34.5	-0.97	15.9	-0.48	3.10	-1.43	ND
9677	37.1	-0.29	15.8	-0.54	2.82	**-2.18**	ICP-OES
9759	42.5	1.14	20.0	1.99	5.03	**3.78**	FAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-S-E1404	38.2	0.334	3.78	30.6 - 45.8	Rejected	---
PC-S-E1405	16.7	0.194	1.66	13.4 - 20.0	Rejected	---
PC-S-E1406	3.63	0.0893	0.360	2.89 - 4.37	Rejected	---

Statistics
Serum Zinc (µmol/L)

All methods	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	40	40	37
Robust mean Algo A	38.2	16.7	3.63
Robust STDev	1.69	0.980	0.434
Median	38.2	16.6	3.64
STDev from MAD	1.54	0.989	0.388
Arithmetic mean	38.5	16.6	3.99
STDev	3.37	2.52	2.16
CV or Variability	4.4%	5.9%	12.0%

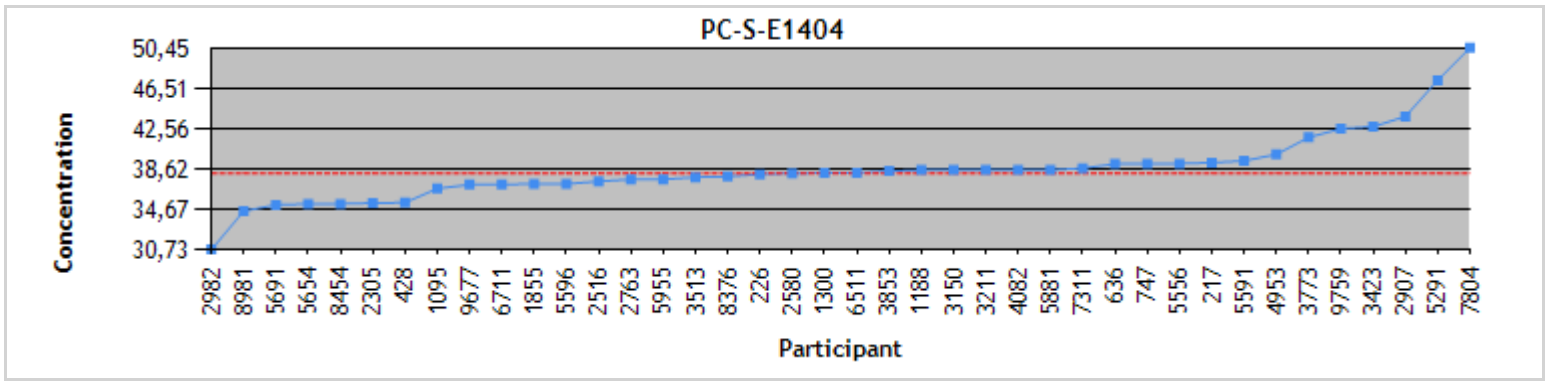
Flame-AAS	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	14	14	13
Robust mean Algo A	38.3	16.8	3.72
Robust STDev	1.51	0.914	1.06
Median	38.4	16.7	3.70
STDev from MAD	1.36	0.902	1.31
Arithmetic mean	38.2	16.8	3.71
STDev	2.92	1.76	0.957
CV or Variability	3.9%	5.4%	28.6%

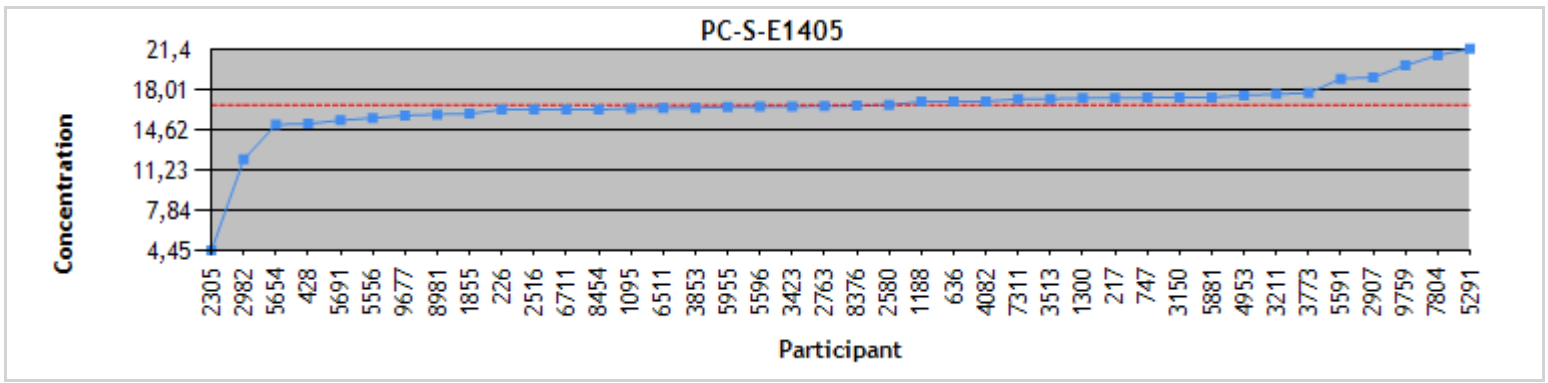
ICP-MS	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	10	10	9
Robust mean Algo A	38.4	16.9	3.65
Robust STDev	1.64	0.826	0.237
Median	38.6	17.1	3.72
STDev from MAD	1.61	0.782	0.214
Arithmetic mean	38.6	16.9	3.60
STDev	2.27	0.995	0.284
CV or Variability	4.3%	4.9%	6.5%

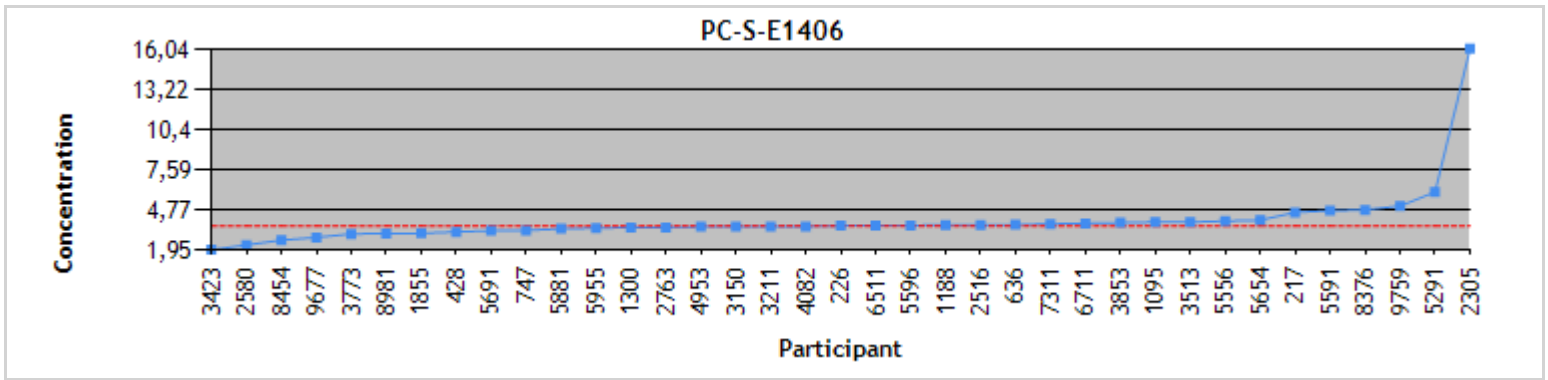
ICP-MS (collision/reaction cell)	PC-S-E1404	PC-S-E1405	PC-S-E1406
N	9	9	9
Robust mean Algo A	38.0	16.6	3.57
Robust STDev	0.908	0.728	0.161
Median	38.1	16.6	3.60
STDev from MAD	0.740	0.593	0.133
Arithmetic mean	37.8	16.5	3.54
STDev	1.94	0.916	0.283
CV or Variability	2.4%	4.4%	4.5%

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
Serum Zinc (µmol/L)







Individual results

Urine Cadmium (nmol/L)

Round #2014-02

Participant	PC-U-D1404	z'-score	PC-U-D1405	z'-score	PC-U-D1406	z'-score	Method
217	8.01	-0.32	34.3	-0.64	64.3	-1.00	ICP-MS
747	8.10	-0.25	35.5	-0.27	70.5	0.09	ICP-MS
1095	9.40	0.71	41.2	1.44	81.5	**2.02**	ICP-MS (C/R)
1109	9.96	1.13	39.6	0.95	78.1	1.42	ND
1418	7.92	-0.39	36.9	0.16	71.7	0.30	ICP-MS (C/R)
1865	7.92	-0.39	34.9	-0.46	67.1	-0.51	ICP-MS (C/R)
2937	6.00	-1.81	26.3	**-3.04**	48.0	**-3.86**	ICP-MS
2991	7.92	-0.39	38.3	0.58	69.6	-0.08	ND
3187	7.79	-0.48	36.1	-0.09	70.7	0.12	ICP-MS
3211	5.30	**-2.33**	32.8	-1.08	65.1	-0.86	GFAAS
3423	9.25	0.60	39.4	0.90	72.9	0.52	GFAAS
3853	12.2	**2.81**	43.5	**2.12**	73.1	0.55	ICP-MS
4466	9.28	0.62	32.4	-1.19	63.0	-1.23	GFAAS
4708	8.10	-0.25	36.3	-0.03	69.4	-0.11	ICP-MS
4953	8.18	-0.20	36.5	0.02	70.7	0.13	ICP-MS
5591	8.70	0.19	35.7	-0.21	67.6	-0.42	ICP-MS
5654	7.92	-0.39	32.9	-1.04	62.4	-1.33	ICP-MS (C/R)
5691	9.00	0.41	40.0	1.08	74.0	0.70	ICP-MS
5881	8.90	0.34	36.7	0.08	69.6	-0.08	ICP-MS (C/R)
6511	8.27	-0.12	36.4	0.00	69.7	-0.06	ND
6545	8.36	-0.06	34.2	-0.66	64.4	-0.98	ICP-MS
6689	8.98	0.40	33.6	-0.83	---	---	GFAAS
6794	4.00	**-3.29**	36.9	0.16	76.4	1.13	GFAAS
6858	7.37	-0.79	33.4	-0.89	64.8	-0.91	ICP-MS
6920	8.94	0.37	35.9	-0.15	70.1	0.01	ND
7760	8.64	0.15	37.8	0.42	72.3	0.40	ICP-MS
8701	8.00	-0.33	36.8	0.13	76.0	1.05	ND
9759	10.7	1.66	38.3	0.56	72.1	0.36	GFAAS
9777	15.3	**5.08**	41.8	1.61	72.2	0.39	GFAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-D1404	8.44	0.214	1.33	5.74 - 11.1	Rejected	---
PC-U-D1405	36.4	0.683	3.27	29.7 - 43.1	Accepted	---
PC-U-D1406	70.0	1.09	5.59	58.6 - 81.4	Accepted	---

Statistics
Urine Cadmium (nmol/L)

All methods	PC-U-D1404	PC-U-D1405	PC-U-D1406
N	29	29	28
Robust mean Algo A	8.44	36.4	70.0
Robust STDev	0.923	2.94	4.61
Median	8.27	36.4	70.3
STDev from MAD	0.923	2.90	4.10
Arithmetic mean	8.57	36.4	69.5
STDev	1.99	3.37	6.21
CV or Variability	10.9%	8.1%	6.6%

Graphite furnace-AAS	PC-U-D1404	PC-U-D1405	PC-U-D1406
N	7	7	6
Robust mean Algo A	8.97	36.5	71.1
Robust STDev	2.60	4.09	4.45
Median	9.25	36.9	72.1
STDev from MAD	2.11	4.88	3.79
Arithmetic mean	8.97	36.5	70.3
STDev	3.68	3.60	5.12
CV or Variability	29.0%	11.2%	6.3%

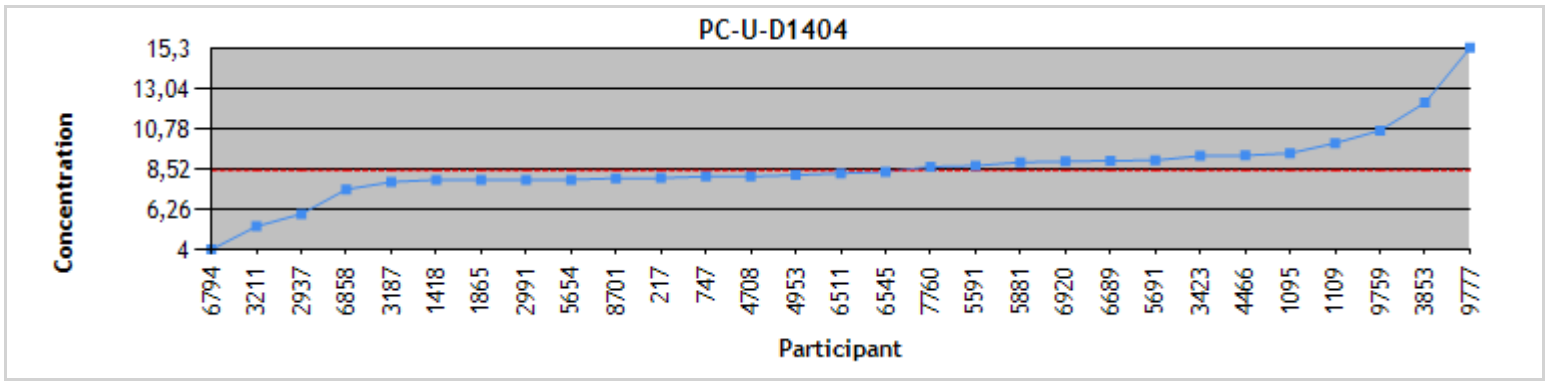
ICP-MS	PC-U-D1404	PC-U-D1405	PC-U-D1406
N	12	12	12
Robust mean Algo A	8.21	35.9	68.8
Robust STDev	0.664	2.60	4.19
Median	8.14	35.9	70.0
STDev from MAD	0.629	2.48	4.10
Arithmetic mean	8.37	35.8	67.5
STDev	1.44	4.08	6.98
CV or Variability	8.1%	7.2%	6.1%

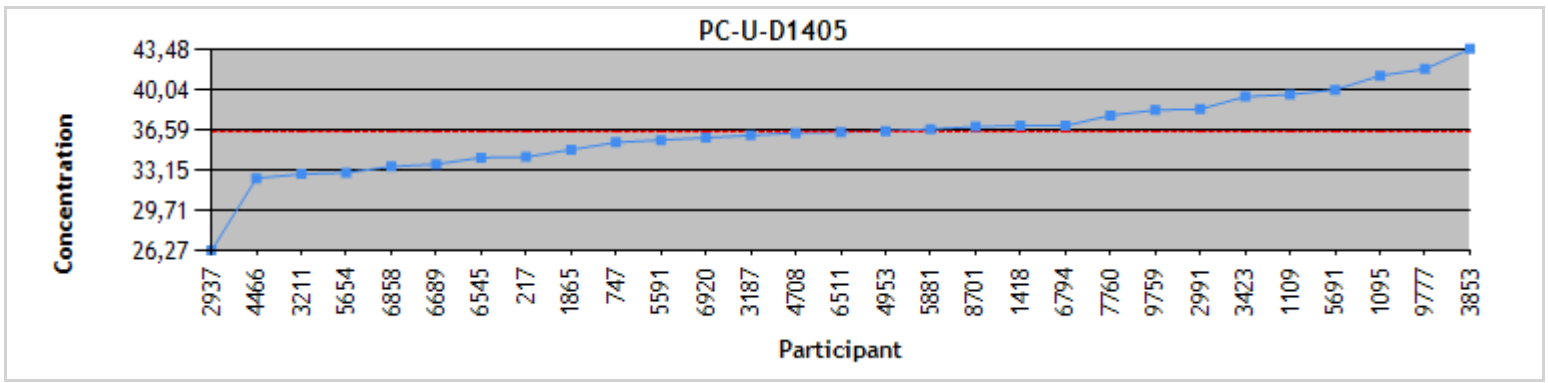
ICP-MS (collision/reaction cell)	PC-U-D1404	PC-U-D1405	PC-U-D1406
N	5	5	5
Robust mean Algo A	7.92	36.4	69.5
Robust STDev	0.00	3.23	4.82
Median	7.92	36.7	69.6
STDev from MAD	0.00	2.64	3.69
Arithmetic mean	8.41	36.5	70.5
STDev	0.697	3.07	7.07
CV or Variability	0.0%	8.9%	6.9%

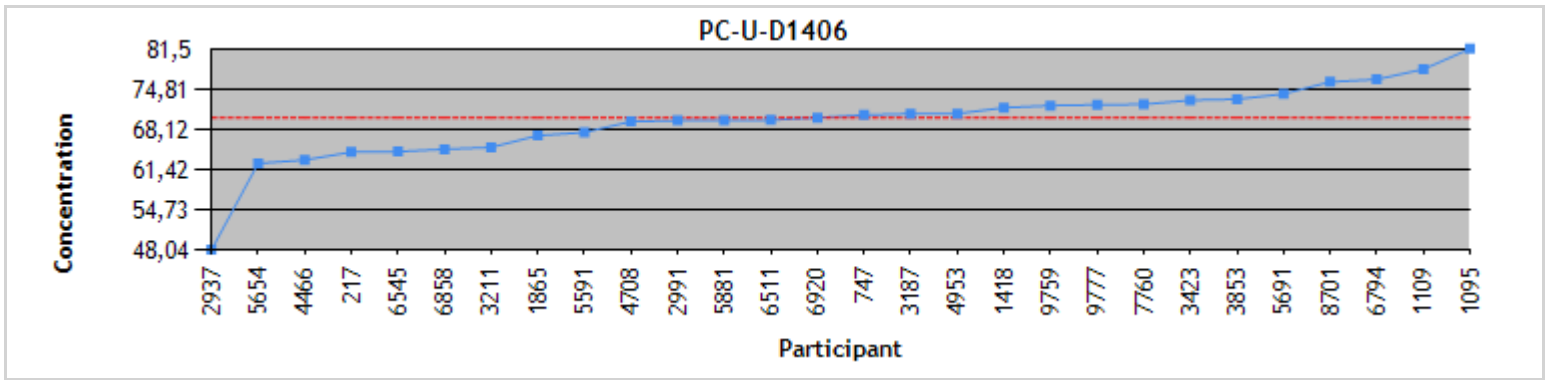
When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution

Urine Cadmium (nmol/L)







Individual results

Urine Chromium (nmol/L)

Round #2014-02

Participant	PC-U-B1404	z'-score	PC-U-B1405	z'-score	PC-U-B1406	z'-score	Method
176	53.9	-0.14	406	-0.24	82.7	-0.64	ICP-MS (C/R)
217	55.6	0.07	401	-0.37	92.3	0.25	ND
747	50.8	-0.51	412	-0.06	86.0	-0.34	ICP-MS (C/R)
1095	54.0	-0.12	419	0.14	90.0	0.04	GFAAS
1418	49.6	-0.65	405	-0.26	82.5	-0.66	ICP-MS (C/R)
1865	57.7	0.33	392	-0.62	89.0	-0.05	ICP-MS (C/R)
2397	56.0	0.12	408	-0.17	110	1.90	GFAAS
2982	54.8	-0.02	452	1.08	91.5	0.18	GFAAS
3187	53.5	-0.18	410	-0.11	89.1	-0.05	ICP-MS (C/R)
3853	64.6	1.16	440	0.73	92.3	0.25	ICP-MS
4604	73.1	**2.19**	435	0.60	91.2	0.15	ND
4708	55.4	0.05	430	0.46	93.8	0.39	ICP-MS
4837	21.6	**-4.03**	245	**-4.85**	36.0	**-5.00**	GFAAS
5491	63.0	0.97	396	-0.52	95.0	0.50	GFAAS
5691	50.0	-0.60	362	-1.49	78.0	-1.08	ICP-MS (C/R)
5881	58.3	0.40	423	0.26	91.0	0.13	ICP-MS (C/R)
6511	59.4	0.53	429	0.43	95.4	0.54	ND
6545	64.6	1.16	444	0.87	106	1.51	ICP-MS (C/R)
8701	46.9	-0.98	364	-1.44	86.5	-0.29	ND
9759	53.9	-0.14	423	0.26	90.4	0.07	GFAAS
9777	39.7	-1.84	461	1.36	71.7	-1.67	GFAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-B1404	55.0	1.75	8.10	38.4 - 71.6	Accepted	---
PC-U-B1405	414	7.28	34.1	344 - 484	Accepted	---
PC-U-B1406	89.6	1.66	10.6	68.1 - 111	Rejected	---

Statistics
Urine Chromium (nmol/L)

All methods	PC-U-B1404	PC-U-B1405	PC-U-B1406
N	21	21	21
Robust mean Algo A	55.0	414	89.6
Robust STDev	6.42	26.7	6.07
Median	54.8	412	90.4
STDev from MAD	5.95	25.0	5.71
Arithmetic mean	54.1	407	87.6
STDev	10.2	44.9	14.4
CV or Variability	11.7%	6.4%	6.8%

Graphite furnace-AAS	PC-U-B1404	PC-U-B1405	PC-U-B1406
N	7	7	7
Robust mean Algo A	53.7	418	89.7
Robust STDev	3.69	36.2	8.47
Median	54.0	419	90.4
STDev from MAD	2.97	34.1	6.83
Arithmetic mean	49.0	401	83.5
STDev	13.9	72.3	23.7
CV or Variability	6.9%	8.7%	9.4%

ICP-MS (collision/reaction cell)	PC-U-B1404	PC-U-B1405	PC-U-B1406
N	8	8	8
Robust mean Algo A	54.5	408	86.9
Robust STDev	5.12	16.1	6.55
Median	53.7	408	87.5
STDev from MAD	5.71	14.2	6.13
Arithmetic mean	54.8	407	88.0
STDev	5.14	23.7	8.37
CV or Variability	9.4%	3.9%	7.5%

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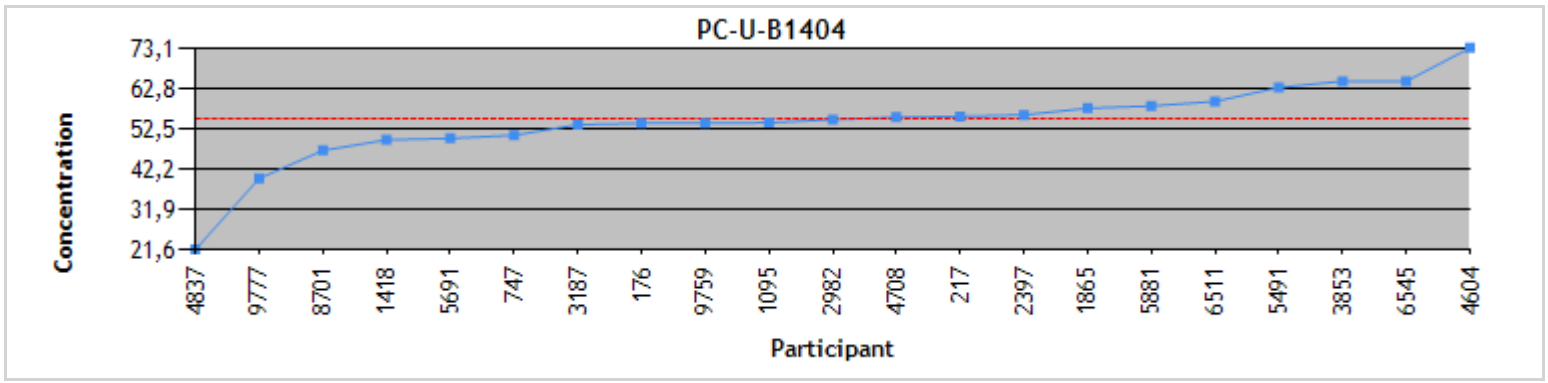
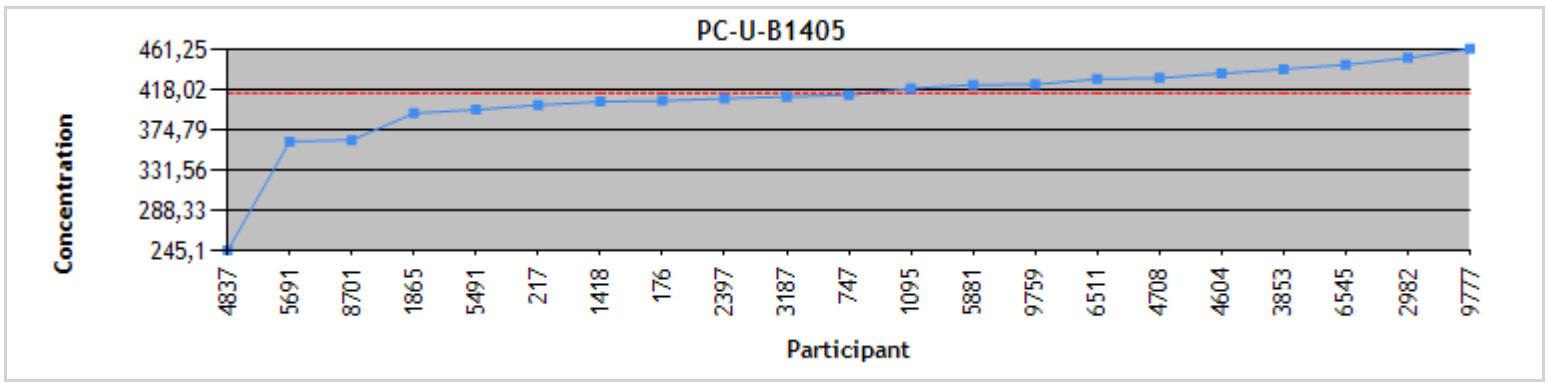
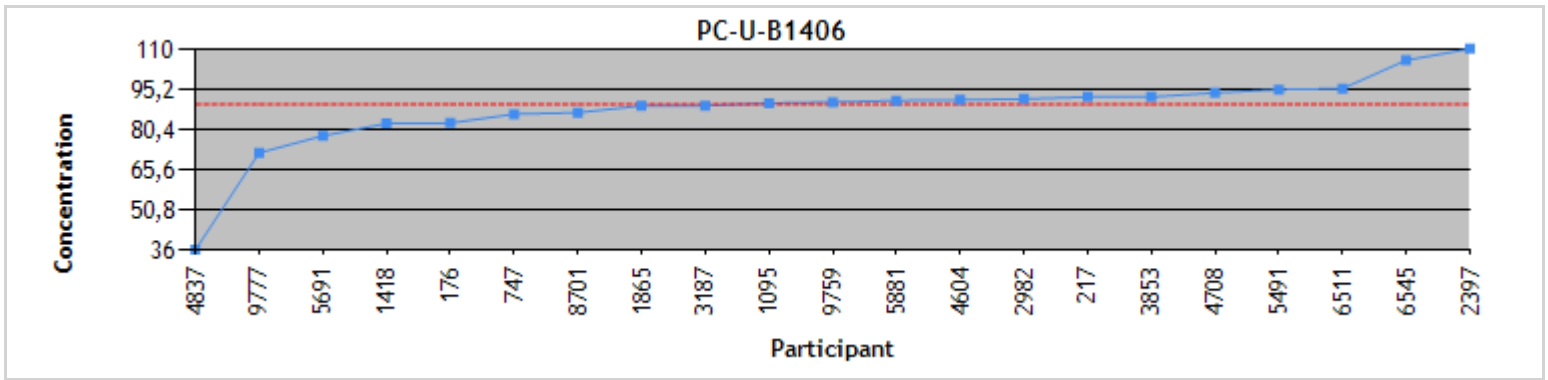
Distribution

Urine Chromium (nmol/L)







Individual results

Urine Copper (µmol/L)

Round #2014-02

Participant	PC-U-R1404	z'-score	PC-U-R1405	z'-score	PC-U-R1406	z'-score	Method
176	0.346	0.13	3.19	-0.32	1.10	-0.30	ICP-MS
387	0.328	-0.43	2.57	**-2.69**	1.02	-1.17	GFAAS
747	0.357	0.46	3.45	0.64	1.18	0.53	ICP-MS
1095	0.360	0.55	4.22	**3.57**	1.29	1.70	ICP-MS (C/R)
1188	0.321	-0.64	3.19	-0.34	1.08	-0.53	ICP-MS (C/R)
1418	0.296	-1.40	3.24	-0.13	1.05	-0.82	ICP-MS (C/R)
1855	0.315	-0.83	3.02	-0.98	1.04	-0.97	ICP-MS
2629	0.360	0.55	2.98	-1.14	1.02	-1.13	ICP-OES
2763	0.361	0.58	3.30	0.08	1.15	0.21	ICP-MS (C/R)
3187	0.373	0.94	3.40	0.46	1.15	0.21	ICP-MS
3423	0.393	1.56	3.46	0.70	1.12	-0.15	FAAS
3513	0.340	-0.06	3.30	0.08	1.18	0.53	ICP-MS
3853	0.360	0.55	3.32	0.15	1.11	-0.21	ICP-MS
4708	0.333	-0.27	3.33	0.19	1.11	-0.21	ICP-MS
4953	0.308	-1.02	3.26	-0.09	1.13	-0.03	ICP-MS
5556	0.283	-1.78	3.38	0.39	1.21	0.87	GFAAS
5591	0.450	**3.28**	3.51	0.87	1.25	1.27	ICP-MS
5654	0.316	-0.79	3.17	-0.40	1.03	-1.03	ICP-MS (C/R)
5691	0.400	1.76	3.40	0.46	1.20	0.74	ICP-MS
5881	0.329	-0.38	3.43	0.58	1.16	0.34	ICP-MS (C/R)
6511	0.345	0.08	3.53	0.93	1.16	0.37	ND
7804	0.850	**15.43**	2.74	**-2.05**	1.10	-0.32	ND
8376	0.293	-1.48	3.57	1.09	1.08	-0.57	GFAAS
8981	<LD	---	2.20	**-4.10**	<LD	---	ND
9759	0.297	-1.35	2.71	**-2.15**	1.34	**2.25**	GFAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-R1404	0.342	0.00982	0.0314	0.276 - 0.408	Rejected	---
PC-U-R1405	3.28	0.0547	0.258	2.75 - 3.81	Accepted	---
PC-U-R1406	1.13	0.0199	0.0921	0.942 - 1.32	Accepted	---

Statistics
Urine Copper (µmol/L)

All methods	PC-U-R1404	PC-U-R1405	PC-U-R1406
N	24	25	24
Robust mean Algo A	0.342	3.28	1.13
Robust STDev	0.0385	0.219	0.0781
Median	0.342	3.30	1.12
STDev from MAD	0.0354	0.196	0.0768
Arithmetic mean	0.363	3.24	1.14
STDev	0.111	0.389	0.0832
CV or Variability	11.3%	6.7%	6.9%

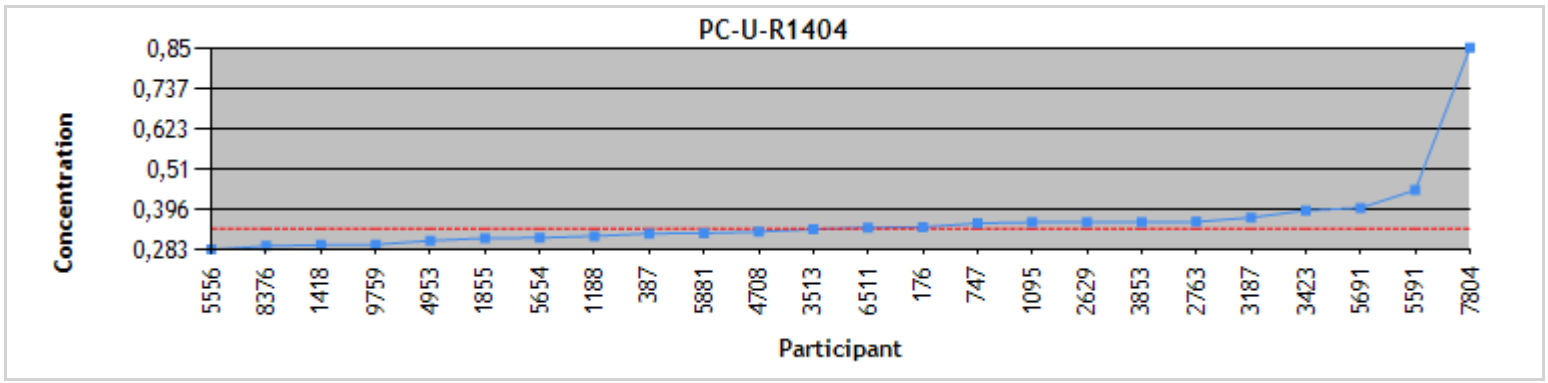
Graphite furnace-AAS	PC-U-R1404	PC-U-R1405	PC-U-R1406
N	4	4	4
Robust mean Algo A	0.296	3.06	1.16
Robust STDev	0.0131	0.557	0.164
Median	0.295	3.05	1.14
STDev from MAD	0.0105	0.603	0.142
Arithmetic mean	0.300	3.06	1.16
STDev	0.0193	0.491	0.144
CV or Variability	4.4%	18.2%	14.1%

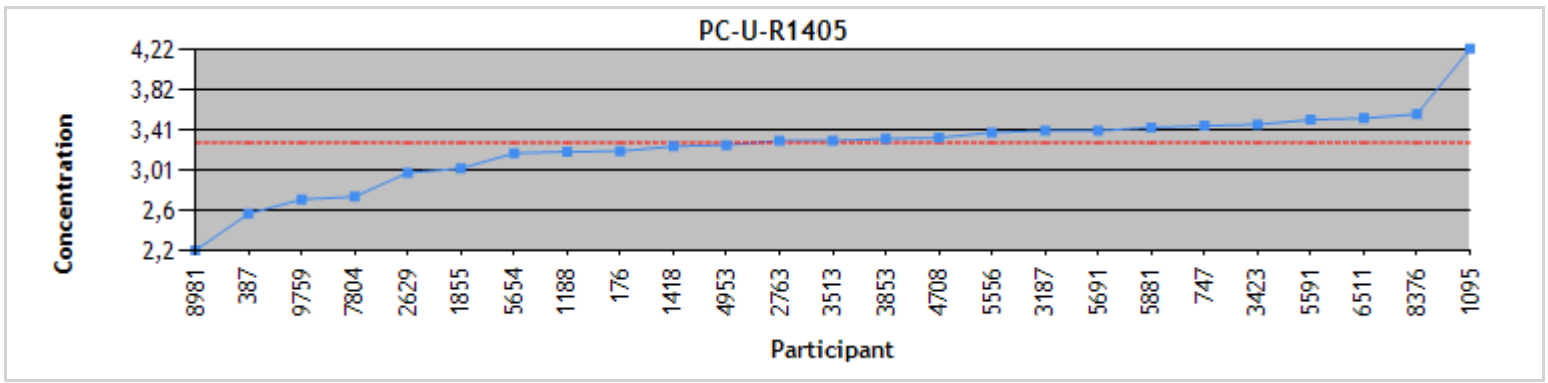
ICP-MS	PC-U-R1404	PC-U-R1405	PC-U-R1406
N	10	10	10
Robust mean Algo A	0.352	3.33	1.14
Robust STDev	0.0343	0.122	0.0599
Median	0.352	3.33	1.14
STDev from MAD	0.0297	0.111	0.0582
Arithmetic mean	0.358	3.32	1.14
STDev	0.0420	0.139	0.0601
CV or Variability	9.7%	3.7%	5.2%

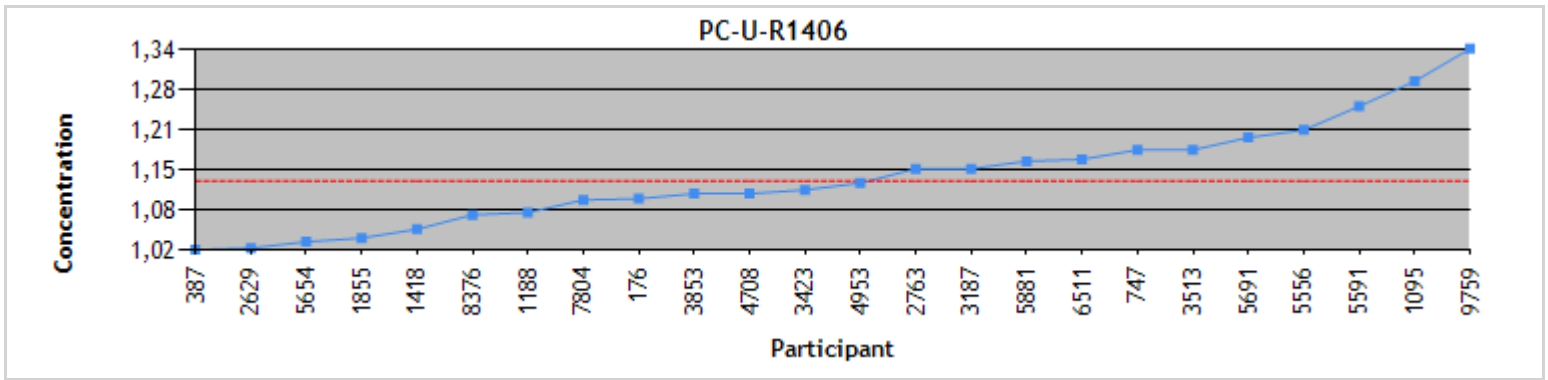
ICP-MS (collision/reaction cell)	PC-U-R1404	PC-U-R1405	PC-U-R1406
N	6	6	6
Robust mean Algo A	0.331	3.30	1.12
Robust STDev	0.0292	0.142	0.0880
Median	0.325	3.27	1.12
STDev from MAD	0.0287	0.133	0.0813
Arithmetic mean	0.331	3.43	1.13
STDev	0.0257	0.399	0.0948
CV or Variability	8.8%	4.3%	7.9%

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
Urine Copper (µmol/L)







Individual results

Urine Fluoride (µmol/L)

Round #2014-02

Participant	PC-U-F1404	z'-score	PC-U-F1405	z'-score	PC-U-F1406	z'-score	Method
176	13.9	-0.23	414	0.27	183	0.23	FSE
1095	13.0	-0.57	408	0.00	172	-0.69	FSE
1418	14.2	-0.14	380	-1.20	176	-0.36	ND
2629	14.2	-0.14	342	**-2.83**	152	**-2.42**	FSE
4604	17.3	0.94	413	0.19	181	0.11	ND
5132	18.0	1.21	403	-0.22	189	0.82	ND
5881	12.5	-0.76	414	0.28	174	-0.49	FSE
6200	14.7	0.05	403	-0.21	181	0.09	FSE
6234	15.2	0.21	405	-0.12	181	0.09	ND
6545	16.1	0.53	417	0.40	186	0.51	FSE
6702	14.1	-0.18	425	0.73	186	0.52	FSE
7269	13.0	-0.57	404	-0.17	181	0.09	FSE
8701	15.0	0.13	423	0.63	188	0.68	ND
9759	42.1	**9.78**	342	**-2.83**	158	-1.92	FSE
9908	14.3	-0.10	413	0.20	182	0.18	FSE

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-F1404	14.6	0.459	2.78	8.97 - 20.2	Rejected	---
PC-U-F1405	408	3.45	23.0	361 - 455	Accepted	---
PC-U-F1406	180	2.29	11.3	157 - 203	Accepted	---

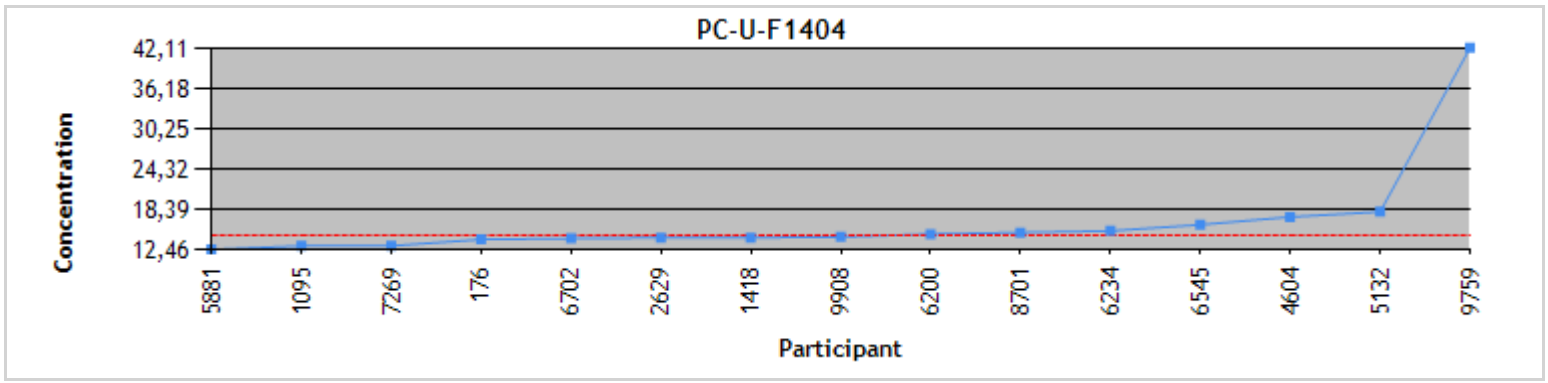
Statistics
Urine Fluoride (µmol/L)

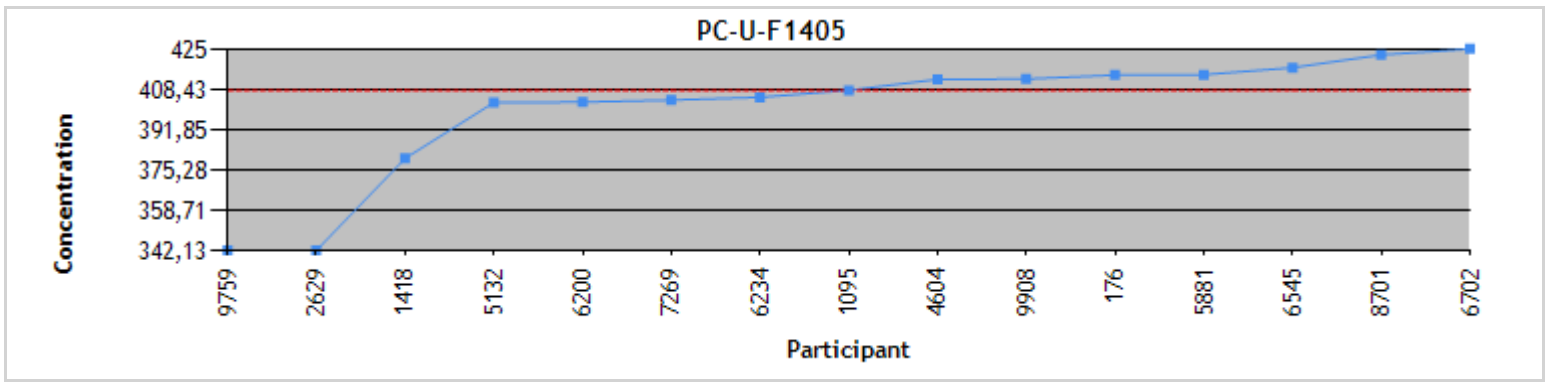
All methods	PC-U-F1404	PC-U-F1405	PC-U-F1406
N	15	15	15
Robust mean Algo A	14.6	408	180
Robust STDev	1.42	10.7	7.10
Median	14.3	408	181
STDev from MAD	1.31	9.26	7.34
Arithmetic mean	16.5	400	178
STDev	7.24	25.9	10.5
CV or Variability	9.7%	2.6%	3.9%

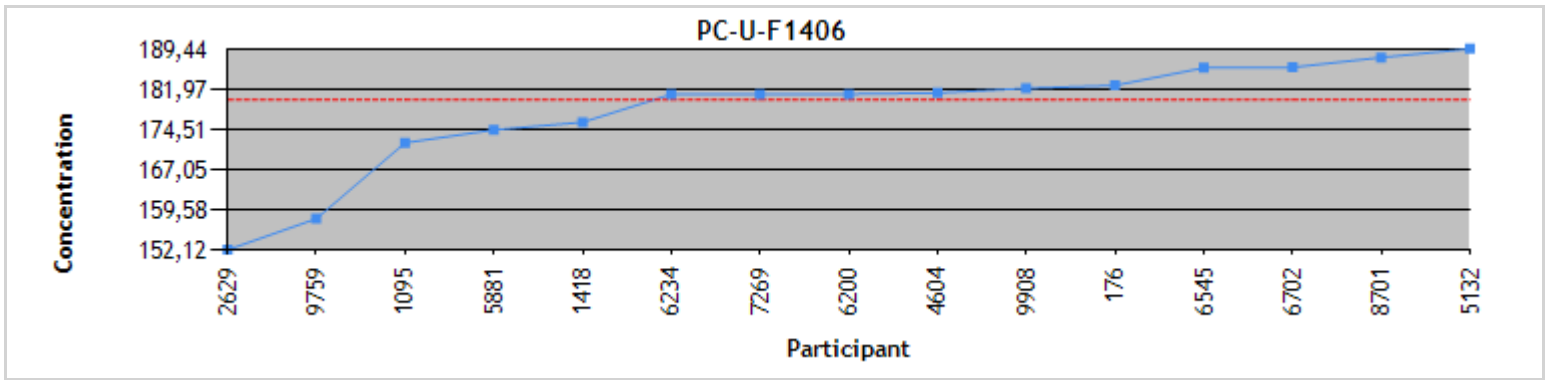
Fluoride specific electrode	PC-U-F1404	PC-U-F1405	PC-U-F1406
N	10	10	10
Robust mean Algo A	14.2	409	179
Robust STDev	1.39	10.8	7.12
Median	14.2	410	181
STDev from MAD	1.29	9.86	7.30
Arithmetic mean	16.8	398	176
STDev	8.95	30.3	11.8
CV or Variability	9.8%	2.6%	4.0%

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)







Individual results

Urine Inorganic arsenic (µmol/L)

Round #2014-02

Participant	PC-U-S1404	z'-score	PC-U-S1405	z'-score	PC-U-S1406	z'-score	Method
217	2.40	-1.23	0.410	0.30	4.02	-0.43	GFAAS
317	2.72	-0.07	0.414	0.38	4.51	0.73	GFAAS
428	2.67	-0.25	0.348	-0.87	4.51	0.74	ICP-MS (C/R)
747	2.94	0.72	0.444	0.95	4.71	1.21	ICP-MS (C/R)
1095	2.94	0.72	0.430	0.69	4.52	0.76	GFAAS
1418	2.76	0.07	0.471	1.47	5.12	**2.17**	HG-AAS
1820	2.99	0.90	0.399	0.10	4.03	-0.40	GFAAS
1827	2.58	-0.58	0.368	-0.50	3.92	-0.66	ICP-MS (C/R)
1865	1.90	**-3.05**	0.410	0.30	3.16	**-2.45**	HG-AAS
2580	2.89	0.56	0.428	0.65	4.78	1.37	GFAAS
2978	2.44	-1.08	0.367	-0.51	3.80	-0.94	ICP-MS
3215	>LL	---	0.320	-1.41	>LL	---	GFAAS
3423	2.90	0.58	0.404	0.19	4.07	-0.30	HG-AAS
3853	2.78	0.15	0.406	0.23	4.37	0.39	ICP-MS (C/R)
5375	2.69	-0.18	0.425	0.59	4.12	-0.19	ICP-MS
5495	2.83	0.34	0.282	**-2.13**	4.14	-0.14	ICP-MS (C/R)
5691	2.63	-0.40	0.400	0.11	3.72	-1.14	ND
5881	2.17	**-2.07**	0.361	-0.63	3.28	**-2.17**	HG-AAS
6511	2.84	0.35	0.364	-0.56	4.03	-0.40	ND
6545	3.05	1.12	0.360	-0.65	4.14	-0.14	ND
7162	2.59	-0.54	0.414	0.38	4.51	0.72	ND
8701	2.86	0.43	0.380	-0.27	4.35	0.35	ND

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-S1404	2.74	0.0595	0.270	2.19 - 3.29	Accepted	Workers Profile
PC-U-S1405	0.394	0.0100	0.0515	0.289 - 0.499	Accepted	As+3 added
PC-U-S1406	4.20	0.117	0.406	3.35 - 5.05	Accepted	As+5 added

Statistics

Urine Inorganic arsenic (µmol/L)

All methods	PC-U-S1404	PC-U-S1405	PC-U-S1406
N	21	22	21
Robust mean Algo A	2.74	0.394	4.20
Robust STDev	0.218	0.0375	0.429
Median	2.76	0.402	4.14
STDev from MAD	0.210	0.0402	0.498
Arithmetic mean	2.69	0.391	4.18
STDev	0.282	0.0425	0.467
CV or Variability	8.0%	9.5%	10.2%

Graphite furnace-AAS	PC-U-S1404	PC-U-S1405	PC-U-S1406
N	5	6	5
Robust mean Algo A	2.84	0.410	4.37
Robust STDev	0.155	0.0214	0.379
Median	2.89	0.412	4.51
STDev from MAD	0.142	0.0215	0.399
Arithmetic mean	2.79	0.400	4.37
STDev	0.240	0.0409	0.334
CV or Variability	5.5%	5.2%	8.7%

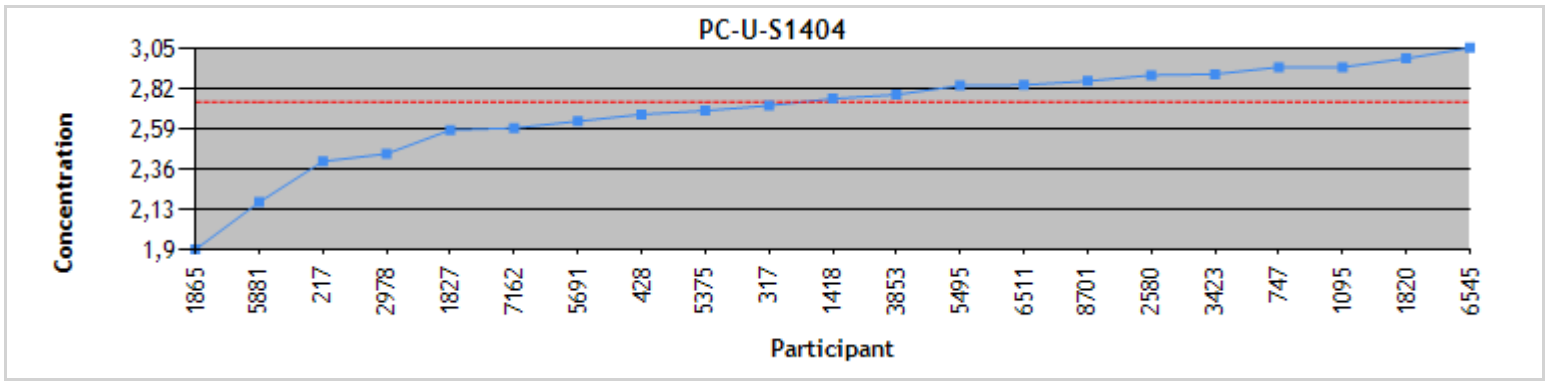
Hydride generation-AAS	PC-U-S1404	PC-U-S1405	PC-U-S1406
N	4	4	4
Robust mean Algo A	2.43	0.409	3.80
Robust STDev	0.542	0.0463	0.813
Median	2.46	0.407	3.68
STDev from MAD	0.544	0.0360	0.675
Arithmetic mean	2.43	0.411	3.91
STDev	0.478	0.0453	0.900
CV or Variability	22.3%	11.3%	21.4%

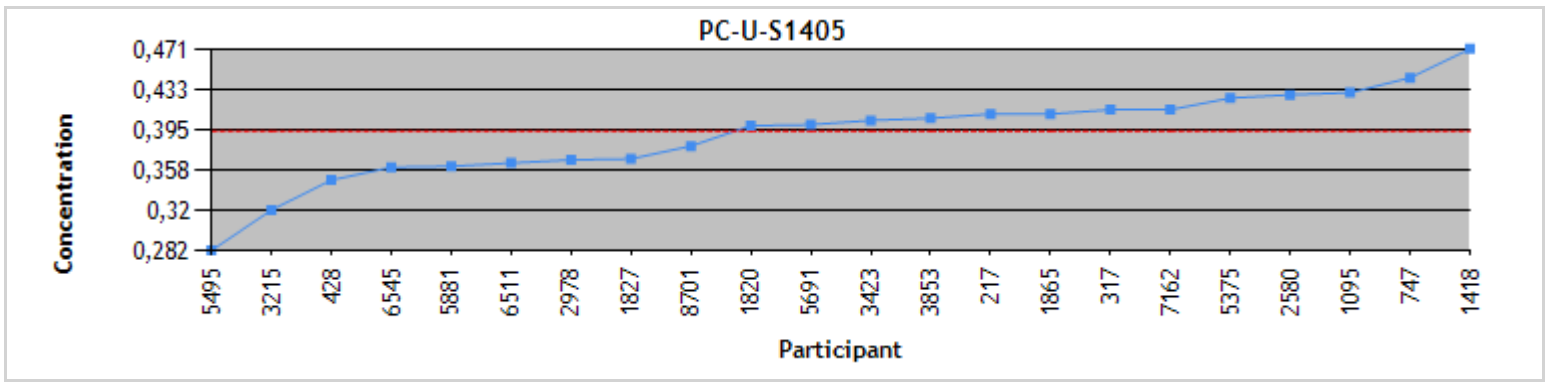
ICP-MS (collision/reaction cell)	PC-U-S1404	PC-U-S1405	PC-U-S1406
N	5	5	5
Robust mean Algo A	2.76	0.370	4.33
Robust STDev	0.159	0.0688	0.350
Median	2.78	0.368	4.37
STDev from MAD	0.167	0.0564	0.332
Arithmetic mean	2.76	0.370	4.33
STDev	0.140	0.0611	0.309
CV or Variability	5.8%	18.6%	8.1%

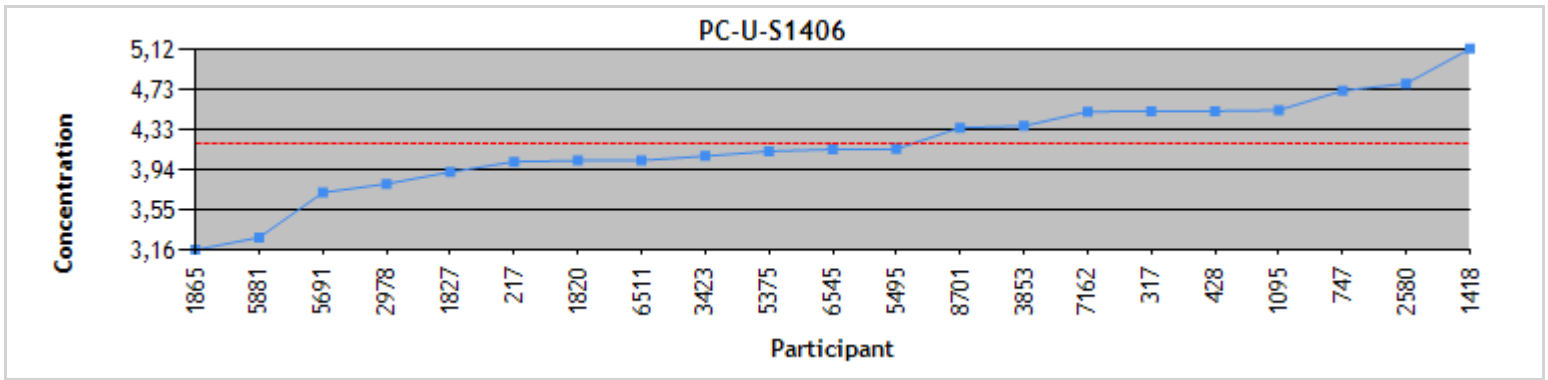
When fewer than 20 results were considered for statistical treatment of all or a sub-sample of results, the accuracy of statistical data may be questionable.

Distribution

Urine Inorganic arsenic (µmol/L)







Individual results

Urine Iodide (µmol/L)

Round #2014-02

Participant	PC-U-I1404	z'-score	PC-U-I1405	z'-score	PC-U-I1406	z'-score	Method
217	3.49	0.53	0.460	1.68	2.59	0.55	ICP-MS
428	3.33	0.04	0.383	-0.25	2.38	-0.28	ICP-MS (C/R)
747	3.35	0.12	0.387	-0.15	2.45	0.00	ICP-MS
1095	3.50	0.56	0.510	**2.93**	2.55	0.39	ICP-MS (C/R)
1855	3.50	0.55	0.426	0.81	2.49	0.16	ICP-MS
2629	4.57	**3.69**	0.500	**2.68**	3.01	**2.21**	ND
2763	3.15	-0.47	0.381	-0.30	2.26	-0.75	ICP-MS
3187	3.30	-0.03	0.383	-0.25	2.45	0.00	ICP-MS
3513	2.94	-1.08	0.320	-1.83	2.04	-1.62	ICP-MS
4708	3.23	-0.23	0.383	-0.25	2.39	-0.24	ICP-MS
5881	3.46	0.43	0.394	0.02	2.90	1.77	ICP-MS (C/R)
6200	3.54	0.66	0.439	1.15	2.62	0.69	ICP-MS
6511	2.98	-0.97	0.382	-0.27	2.23	-0.89	ND
6545	3.17	-0.41	0.400	0.18	2.32	-0.51	ICP-MS
8981	3.01	-0.88	0.260	**-3.33**	2.33	-0.47	ND

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-I1404	3.31*	0.0827	0.331	2.63 - 3.99	Rejected	---
PC-U-I1405	0.393	0.00739	0.0393	0.313 - 0.473	Accepted	---
PC-U-I1406	2.45	0.0648	0.245	1.94 - 2.96	Accepted	---

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

Statistics
Urine Iodide (µmol/L)

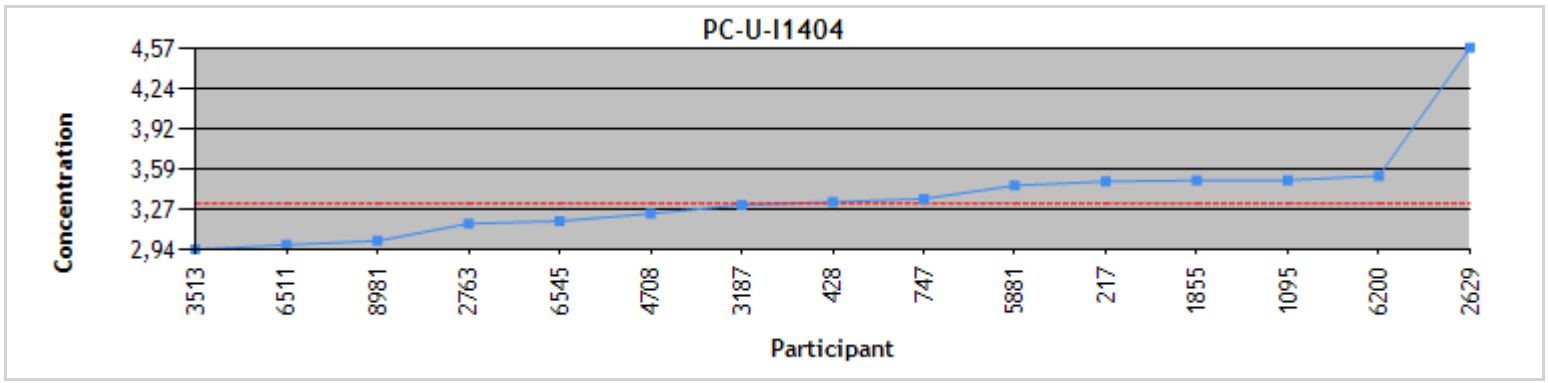
All methods	PC-U-I1404	PC-U-I1405	PC-U-I1406
N	15	15	15
Robust mean Algo A	3.31	0.393	2.45
Robust STDev	0.256	0.0229	0.201
Median	3.33	0.387	2.45
STDev from MAD	0.257	0.0193	0.193
Arithmetic mean	3.37	0.401	2.47
STDev	0.388	0.0630	0.249
CV or Variability	7.7%	5.8%	8.2%

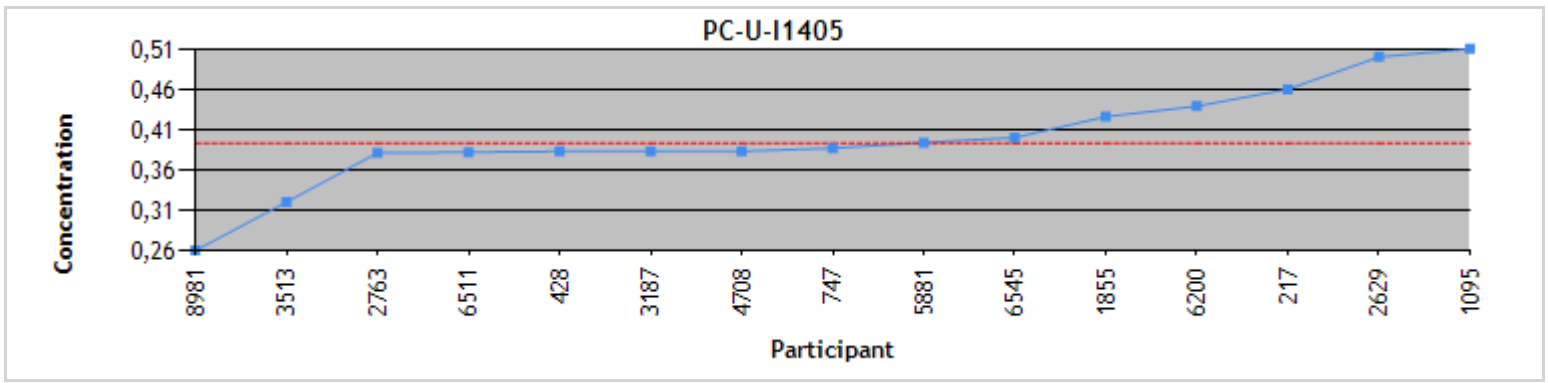
ICP-MS	PC-U-I1404	PC-U-I1405	PC-U-I1406
N	9	9	9
Robust mean Algo A	3.30	0.393	2.41
Robust STDev	0.213	0.0225	0.170
Median	3.30	0.387	2.45
STDev from MAD	0.222	0.0193	0.193
Arithmetic mean	3.30	0.398	2.40
STDev	0.196	0.0407	0.179
CV or Variability	6.5%	5.7%	7.1%

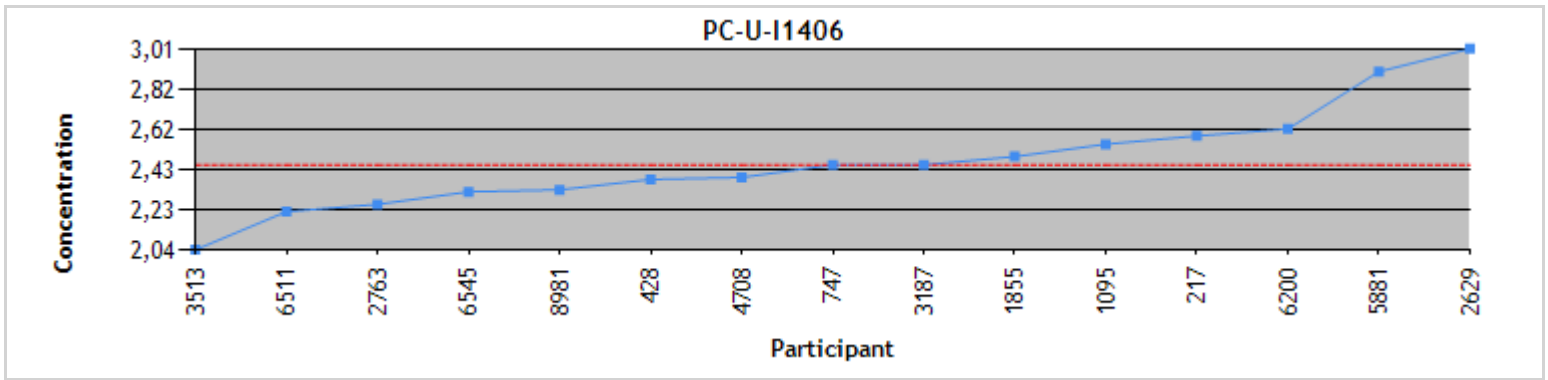
ICP-MS (collision/reaction cell)	PC-U-I1404	PC-U-I1405	PC-U-I1406
N	3	3	3
Robust mean Algo A	3.44	0.399	2.61
Robust STDev	0.0791	0.0206	0.301
Median	3.46	0.394	2.55
STDev from MAD	0.0627	0.0164	0.252
Arithmetic mean	3.43	0.429	2.61
STDev	0.0911	0.0704	0.265
CV or Variability	2.3%	5.2%	11.5%

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
Urine Iodide (µmol/L)







Individual results

Urine Lead (µmol/L)

Round #2014-02

Participant	PC-U-P1404	z'-score	PC-U-P1405	z'-score	PC-U-P1406	z'-score	Method
176	0.801	0.00	0.179	-0.16	0.0869	-0.33	ICP-MS
194	0.502	**-4.63**	0.132	**-3.14**	0.0730	-1.99	ND
217	0.850	0.76	0.230	**3.14**	0.100	1.25	ICP-MS
747	0.777	-0.37	0.178	-0.19	0.0878	-0.22	ICP-MS
1095	0.830	0.45	0.190	0.58	0.100	1.25	ICP-MS (C/R)
1109	0.851	0.78	0.194	0.81	0.0963	0.81	ND
1855	0.792	-0.15	0.179	-0.16	0.0869	-0.33	ICP-MS
2182	0.864	0.97	0.198	1.08	0.114	**2.91**	GFAAS
3167	0.830	0.45	0.230	**3.14**	0.130	**4.85**	GFAAS
3187	0.801	0.00	0.177	-0.26	0.0897	0.01	ICP-MS
3211	0.908	1.66	0.189	0.51	0.0900	0.05	GFAAS
3423	0.869	1.05	0.192	0.68	0.0917	0.25	GFAAS
3853	0.753	-0.74	0.173	-0.51	0.0850	-0.55	ICP-MS
3970	0.845	0.67	0.183	0.15	0.0820	-0.91	GFAAS
4708	0.770	-0.48	0.173	-0.51	0.0871	-0.30	ICP-MS
4953	0.796	-0.07	0.178	-0.19	0.0898	0.02	ICP-MS
5591	0.780	-0.33	0.180	-0.06	0.0900	0.05	ICP-MS
5654	0.739	-0.96	0.160	-1.33	0.0808	-1.06	ICP-MS (C/R)
5691	0.690	-1.72	0.150	-1.99	0.0800	-1.15	ICP-MS
5881	0.756	-0.69	0.169	-0.75	0.0847	-0.58	ICP-MS (C/R)
6511	0.798	-0.04	0.181	0.00	0.0898	0.02	ND
6545	0.790	-0.17	0.170	-0.70	0.0900	0.05	ICP-MS
7111	0.791	-0.15	0.175	-0.38	0.0870	-0.31	ICP-MS
9674	0.806	0.08	0.243	**3.99**	0.132	**5.11**	GFAAS
9759	>LL	---	0.192	0.71	0.0840	-0.67	GFAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-P1404	0.801	0.0126	0.0633	0.672 - 0.930	Accepted	---
PC-U-P1405	0.181	0.00348	0.0152	0.150 - 0.212	Rejected	---
PC-U-P1406	0.0896	0.00187	0.00812	0.0729 - 0.106	Rejected	---

Statistics
Urine Lead (µmol/L)

All methods	PC-U-P1404	PC-U-P1405	PC-U-P1406
N	24	25	25
Robust mean Algo A	0.801	0.181	0.0896
Robust STDev	0.0492	0.0139	0.00747
Median	0.797	0.179	0.0897
STDev from MAD	0.0485	0.0138	0.00697
Arithmetic mean	0.791	0.184	0.0923
STDev	0.0776	0.0238	0.0140
CV or Variability	6.2%	7.7%	8.3%

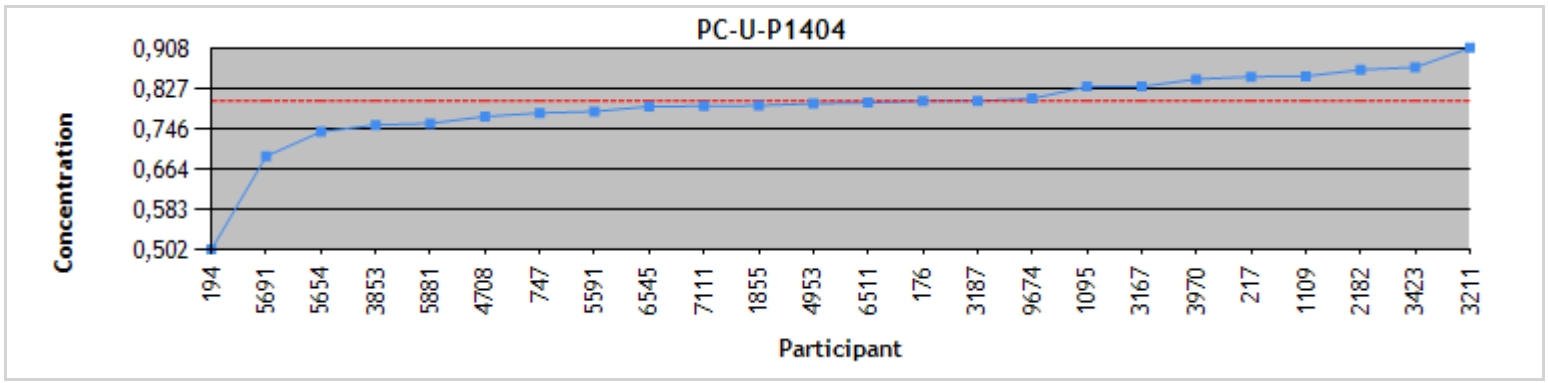
Graphite furnace-AAS	PC-U-P1404	PC-U-P1405	PC-U-P1406
N	6	7	7
Robust mean Algo A	0.853	0.195	0.0982
Robust STDev	0.0347	0.00923	0.0163
Median	0.854	0.192	0.0917
STDev from MAD	0.0287	0.00859	0.0143
Arithmetic mean	0.854	0.204	0.103
STDev	0.0352	0.0231	0.0216
CV or Variability	4.1%	4.7%	16.6%

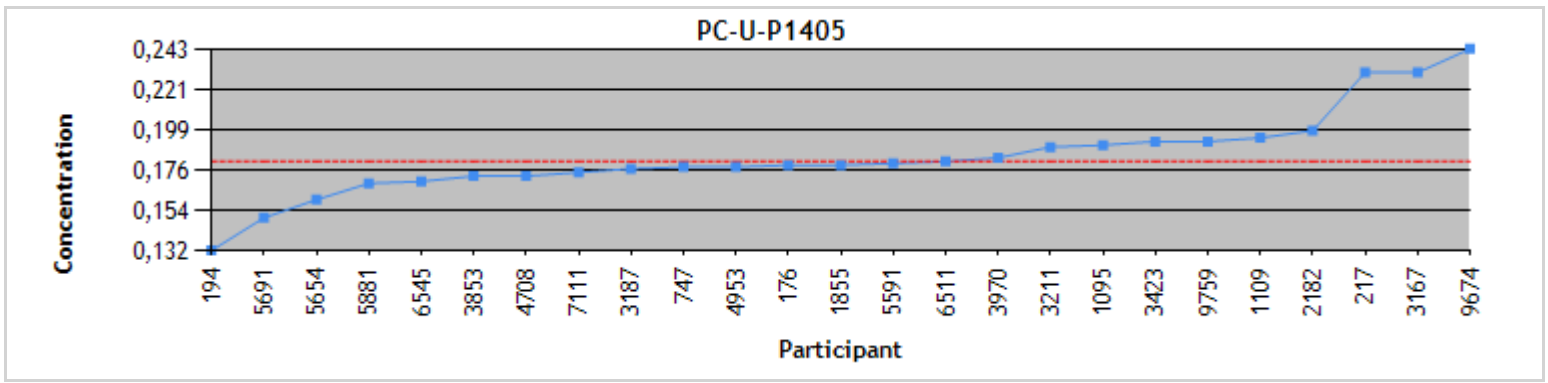
ICP-MS	PC-U-P1404	PC-U-P1405	PC-U-P1406
N	12	12	12
Robust mean Algo A	0.787	0.176	0.0880
Robust STDev	0.0169	0.00391	0.00285
Median	0.791	0.178	0.0875
STDev from MAD	0.0157	0.00371	0.00339
Arithmetic mean	0.783	0.178	0.0883
STDev	0.0373	0.0181	0.00461
CV or Variability	2.1%	2.2%	3.2%

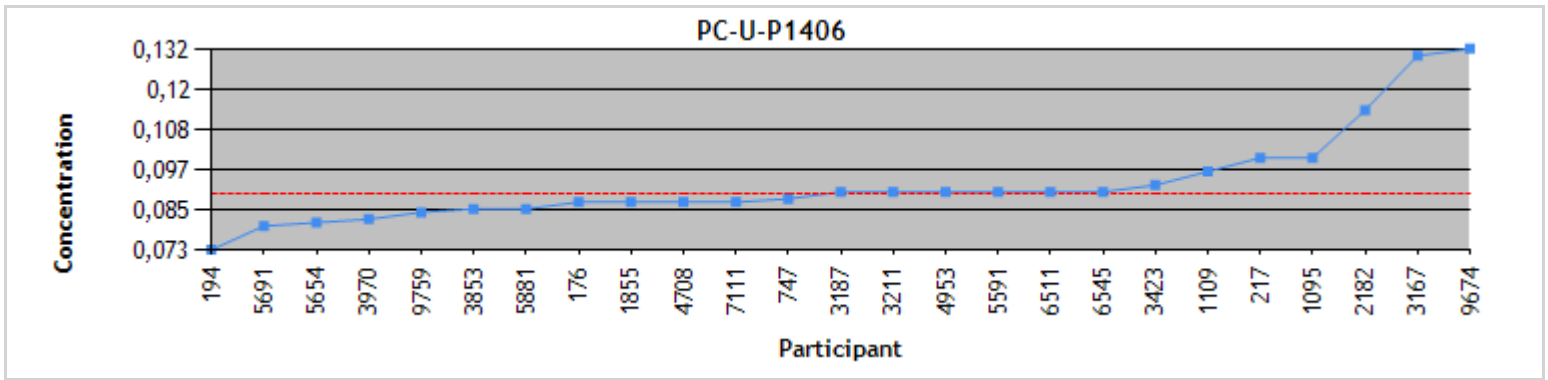
ICP-MS (collision/reaction cell)	PC-U-P1404	PC-U-P1405	PC-U-P1406
N	3	3	3
Robust mean Algo A	0.763	0.173	0.0864
Robust STDev	0.0324	0.0170	0.00741
Median	0.756	0.169	0.0847
STDev from MAD	0.0257	0.0135	0.00587
Arithmetic mean	0.775	0.173	0.0885
STDev	0.0483	0.0153	0.0101
CV or Variability	4.2%	9.8%	8.6%

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 Lead (µmol/L)







Individual results

Urine Mercury (nmol/L)

Round #2014-02

Participant	PC-U-H1404	z'-score	PC-U-H1405	z'-score	PC-U-H1406	z'-score	Method
176	588	0.44	140	0.46	214	0.27	ICP-MS
217	477	-1.23	119	-0.65	177	-1.11	ICP-MS
428	588	0.44	150	1.00	205	-0.06	ICP-MS (C/R)
720	454	-1.58	125	-0.34	145	**-2.30**	CV
1095	578	0.28	130	-0.05	205	-0.07	CV
1156	577	0.27	123	-0.42	261	1.98	ND
1418	498	-0.92	130	-0.05	210	0.11	ND
1865	565	0.09	142	0.57	222	0.57	CV
2629	593	0.51	137	0.33	188	-0.70	ICP-MS (C/R)
2982	529	-0.44	127	-0.20	211	0.16	CV
3187	538	-0.31	117	-0.75	184	-0.85	ICP-MS
3468	405	**-2.31**	128	-0.16	213	0.22	GA-AAS
3513	636	1.15	151	1.08	214	0.26	ICP-MS
3853	615	0.84	139	0.43	222	0.55	ICP-MS
4604	574	0.22	134	0.16	220	0.48	ND
4708	568	0.13	129	-0.11	212	0.18	ICP-MS
4953	633	1.11	145	0.76	224	0.64	ICP-MS
5491	627	1.02	159	1.51	239	1.18	CV
5591	555	-0.07	127	-0.20	197	-0.36	ICP-MS
5654	644	1.28	147	0.85	203	-0.15	ICP-MS (C/R)
5691	435	-1.86	107	-1.29	143	**-2.36**	ICP-MS
5881	597	0.57	131	-0.02	213	0.22	ICP-MS (C/R)
6200	558	-0.01	123	-0.43	198	-0.34	ICP-MS
6210	560	0.02	127	-0.24	202	-0.19	ND
6511	607	0.71	136	0.27	182	-0.91	ND
6545	341	**-3.26**	78.3	**-2.84**	95.9	**-4.10**	ICP-MS
6702	558	-0.01	133	0.11	219	0.44	CV
6794	602	0.64	143	0.66	229	0.81	GA-AAS
6892	559	0.00	127	-0.22	202	-0.18	ND
6920	495	-0.96	124	-0.36	188	-0.70	ND
7184	614	0.82	135	0.22	217	0.37	CV
7190	>LL	---	120	-0.61	197	-0.35	ND
7269	566	0.10	131	0.00	207	0.00	CV
7864	534	-0.37	113	-0.97	221	0.52	ND
8701	524	-0.52	124	-0.40	207	0.01	ND
9674	155	**-6.05**	236	**5.65**	633	**15.73**	CV
9759	587	0.42	136	0.25	225	0.68	GA-AAS
9777	280	**-4.18**	128	-0.16	135	**-2.64**	GA-AAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-H1404	559	11.5	65.7	426 - 692	Accepted	---
PC-U-H1405	131	2.15	18.4	93.9 - 168	Rejected	---
PC-U-H1406	207	3.69	26.9	153 - 261	Rejected	---

Statistics
Urine Mercury (nmol/L)

All methods	PC-U-H1404	PC-U-H1405	PC-U-H1406
N	37	38	38
Robust mean Algo A	559	131	207
Robust STDev	56.0	10.6	18.2
Median	565	130	209
STDev from MAD	52.5	9.89	16.8
Arithmetic mean	536	133	213
STDev	102	22.0	76.3
CV or Variability	10.0%	8.1%	8.8%

Cold vapor	PC-U-H1404	PC-U-H1405	PC-U-H1406
N	9	9	9
Robust mean Algo A	557	135	217
Robust STDev	56.1	8.89	16.9
Median	565	133	217
STDev from MAD	52.5	8.56	14.8
Arithmetic mean	516	146	255
STDev	144	35.1	144
CV or Variability	10.1%	6.6%	7.8%

Gold amalgamation-AAS	PC-U-H1404	PC-U-H1405	PC-U-H1406
N	4	4	4
Robust mean Algo A	468	133	217
Robust STDev	175	6.89	14.2
Median	496	132	219
STDev from MAD	146	5.68	11.8
Arithmetic mean	468	134	201
STDev	154	7.32	44.0
CV or Variability	37.3%	5.2%	6.5%

ICP-MS	PC-U-H1404	PC-U-H1405	PC-U-H1406
N	11	11	11
Robust mean Algo A	549	127	197
Robust STDev	82.6	17.8	26.1
Median	558	127	198
STDev from MAD	84.2	17.4	24.4
Arithmetic mean	540	125	189
STDev	90.4	20.3	39.0
CV or Variability	15.1%	14.0%	13.3%

ICP-MS (collision/reaction cell)	PC-U-H1404	PC-U-H1405	PC-U-H1406
N	4	4	4
Robust mean Algo A	596	141	204
Robust STDev	8.13	9.91	9.32
Median	595	142	204
STDev from MAD	6.65	9.24	7.43
Arithmetic mean	606	141	202
STDev	26.0	8.74	10.4
CV or Variability	1.4%	7.0%	4.6%

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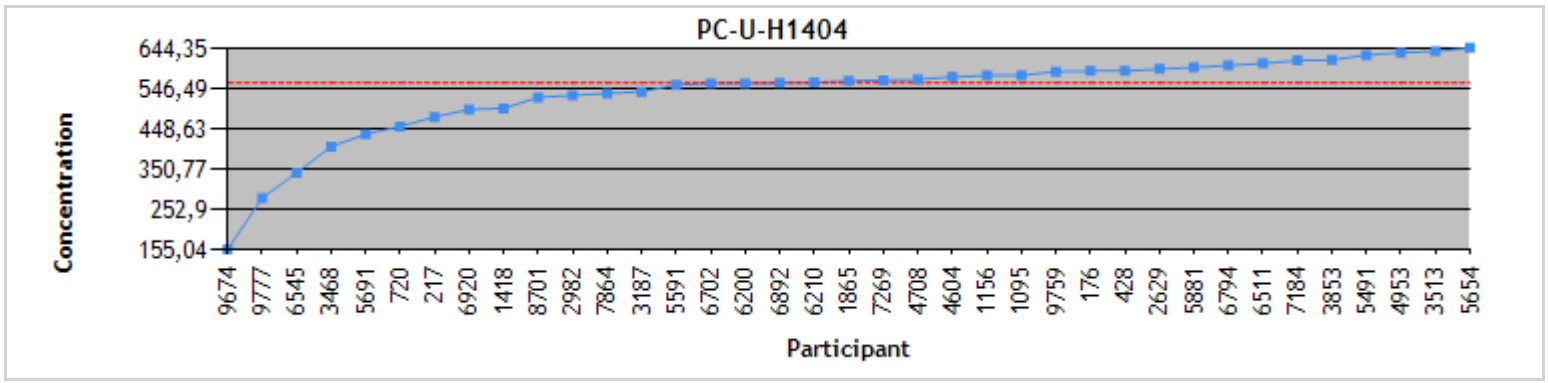
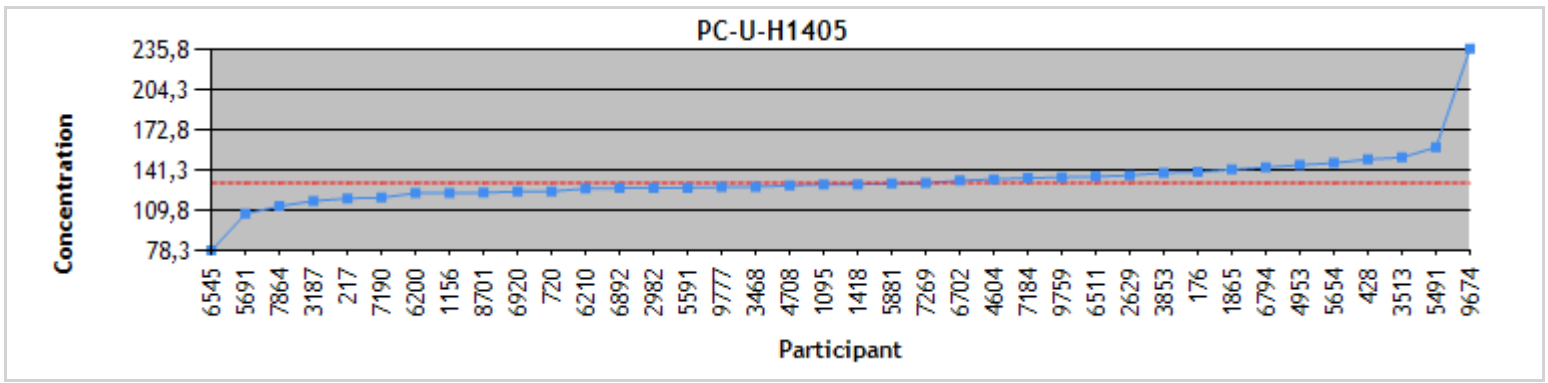
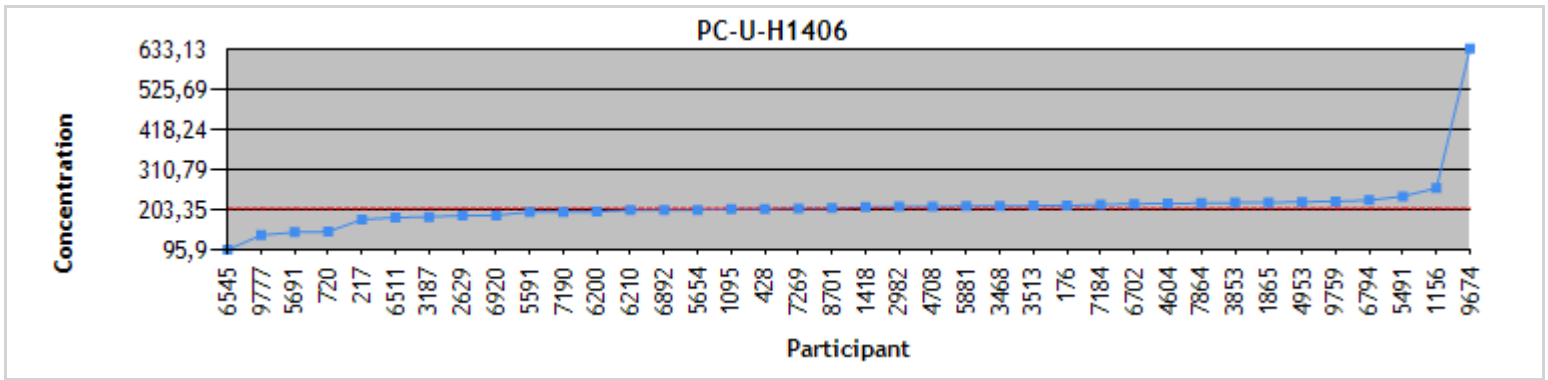
Distribution
Urine Mercury (nmol/L)







Individual results

Urine Selenium (µmol/L)

Round #2014-02

Participant	PC-U-N1404	z'-score	PC-U-N1405	z'-score	PC-U-N1406	z'-score	Method
747	1.88	0.00	2.25	0.28	5.08	-0.13	ICP-MS
3187	1.84	-0.11	2.22	0.18	4.97	-0.30	ICP-MS
3423	1.37	-1.42	2.17	0.04	5.65	0.78	HG-AAS
3853	4.94	**8.60**	2.04	-0.37	1.79	**-5.39**	ICP-MS (C/R)
5691	1.53	-0.98	1.85	-0.95	4.91	-0.40	ICP-MS
5881	1.89	0.02	2.10	-0.19	5.42	0.42	ICP-MS (C/R)
6511	2.15	0.76	2.63	1.43	5.75	0.94	ND

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-N1404	1.88	0.197	0.296	1.17 - 2.59	Rejected	Workers Profile
PC-U-N1405	2.16	0.0647	0.319	1.51 - 2.81	Accepted	Se+4 added
PC-U-N1406	5.16*	0.264	0.567	3.91 - 6.41	Accepted	Spiked with TMSe

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

Statistics
Urine Selenium (µmol/L)

All methods	PC-U-N1404	PC-U-N1405	PC-U-N1406
N	7	7	7
Robust mean Algo A	1.88	2.16	5.16
Robust STDev	0.417	0.137	0.559
Median	1.88	2.17	5.08
STDev from MAD	0.399	0.113	0.505
Arithmetic mean	2.23	2.18	4.79
STDev	1.22	0.238	1.36
CV or Variability	22.2%	6.3%	10.8%

ICP-MS	PC-U-N1404	PC-U-N1405	PC-U-N1406
N	3	3	3
Robust mean Algo A	1.82	2.21	4.99
Robust STDev	0.0749	0.0562	0.0978
Median	1.84	2.22	4.97
STDev from MAD	0.0593	0.0445	0.0890
Arithmetic mean	1.75	2.11	4.99
STDev	0.192	0.223	0.0862
CV or Variability	4.1%	2.5%	2.0%

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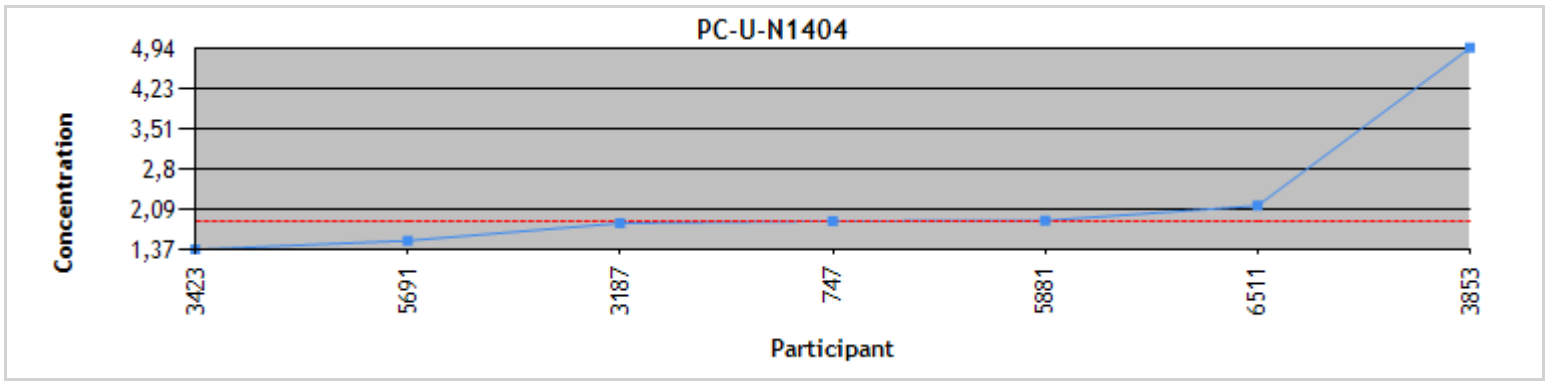
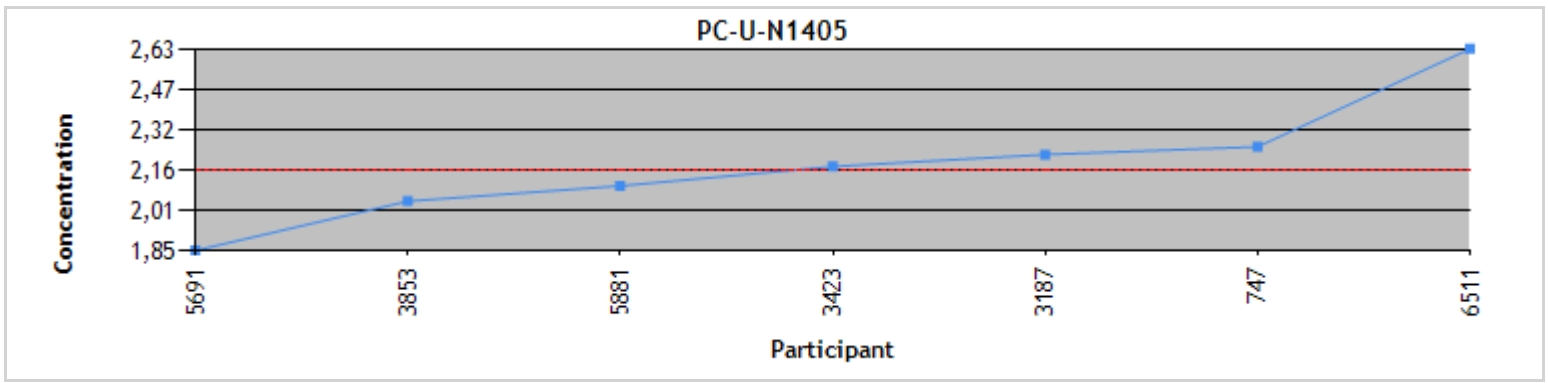
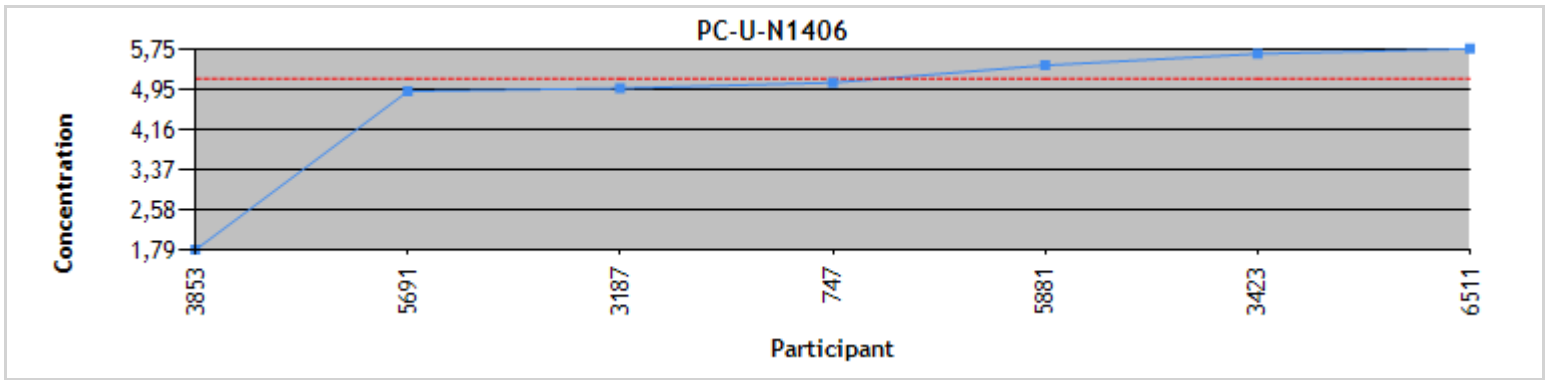
Distribution
Urine Selenium (µmol/L)







Individual results

Urine Total arsenic (µmol/L)

Round #2014-02

Participant	PC-U-S1404	z'-score	PC-U-S1405	z'-score	PC-U-S1406	z'-score	Method
176	3.12	-0.26	0.440	0.16	4.24	-0.47	ICP-MS
747	3.09	-0.39	0.429	-0.09	4.21	-0.57	ICP-MS
1109	3.78	**2.31**	0.494	1.32	5.05	1.81	ND
1827	3.09	-0.39	0.403	-0.65	4.31	-0.29	ICP-MS (C/R)
1865	3.39	0.79	0.422	-0.24	4.68	0.79	ICP-MS (C/R)
2182	3.11	-0.32	0.454	0.45	4.43	0.06	GFAAS
2937	2.52	**-2.66**	0.441	0.17	3.55	**-2.47**	ICP-MS
2978	3.15	-0.16	0.410	-0.50	4.38	-0.09	ICP-MS
3187	3.22	0.12	0.424	-0.20	4.37	-0.11	ICP-MS
3423	3.16	-0.12	0.464	0.68	4.33	-0.22	HG-AAS
3513	3.25	0.24	0.450	0.37	4.59	0.51	ICP-MS
3853	3.44	0.99	0.424	-0.20	4.71	0.86	ICP-MS (C/R)
4708	3.25	0.24	0.424	-0.20	4.40	-0.03	ICP-MS
4953	3.46	1.05	0.416	-0.36	4.70	0.82	ICP-MS (C/R)
5375	3.00	-0.75	0.436	0.07	4.16	-0.71	ICP-MS
5495	3.07	-0.47	0.296	**-2.99**	4.18	-0.65	ICP-MS (C/R)
5591	2.98	-0.85	0.439	0.13	4.25	-0.47	ICP-MS
5654	3.13	-0.23	0.460	0.58	4.16	-0.72	ICP-MS (C/R)
5691	3.11	-0.32	0.410	-0.50	4.22	-0.54	ND
5881	3.50	1.21	0.439	0.12	4.82	1.17	ICP-MS (C/R)
6511	3.22	0.13	0.438	0.10	4.54	0.38	ND
6545	3.68	1.93	0.500	1.45	5.14	**2.09**	ND
6892	3.28	0.35	0.467	0.74	4.15	-0.74	ND
7864	2.76	-1.68	0.374	-1.28	3.98	-1.24	ND
9674	3.51	1.26	0.246	**-4.07**	4.70	0.82	GFAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-S1404	3.19	0.0393	0.251	2.68 - 3.70	Accepted	Workers Profile
PC-U-S1405	0.433	0.00680	0.0456	0.341 - 0.525	Accepted	As+3 added
PC-U-S1406	4.41	0.0758	0.341	3.71 - 5.11	Accepted	As+5 added

Statistics

Urine Total arsenic (µmol/L)

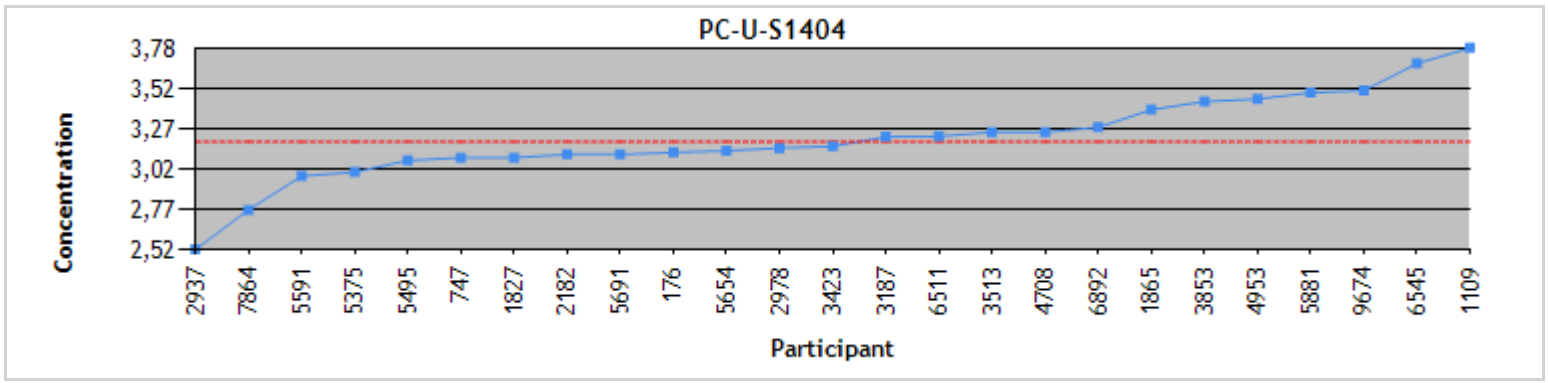
All methods	PC-U-S1404	PC-U-S1405	PC-U-S1406
N	25	25	25
Robust mean Algo A	3.19	0.433	4.41
Robust STDev	0.157	0.0272	0.303
Median	3.16	0.436	4.37
STDev from MAD	0.133	0.0264	0.311
Arithmetic mean	3.21	0.424	4.41
STDev	0.269	0.0540	0.343
CV or Variability	4.9%	6.3%	6.9%

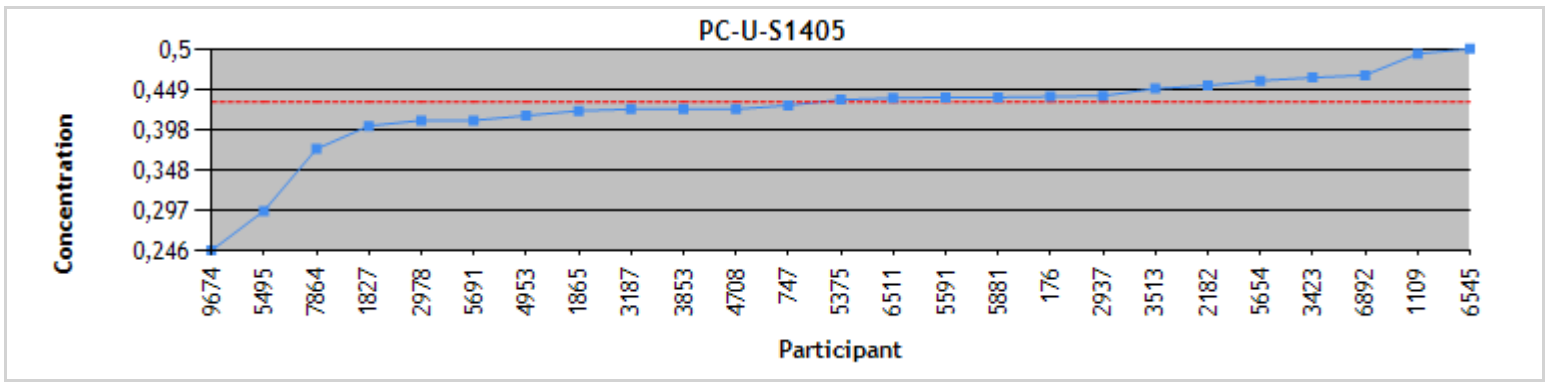
ICP-MS	PC-U-S1404	PC-U-S1405	PC-U-S1406
N	9	9	9
Robust mean Algo A	3.10	0.434	4.28
Robust STDev	0.151	0.0112	0.175
Median	3.12	0.436	4.25
STDev from MAD	0.183	0.0104	0.185
Arithmetic mean	3.06	0.433	4.24
STDev	0.229	0.0121	0.290
CV or Variability	4.9%	2.6%	4.1%

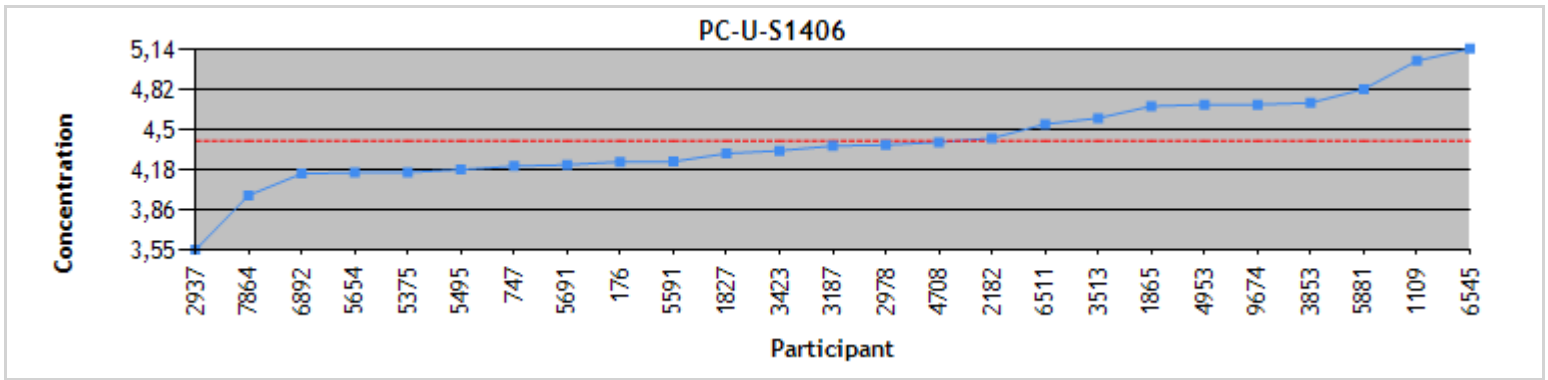
ICP-MS (collision/reaction cell)	PC-U-S1404	PC-U-S1405	PC-U-S1406
N	7	7	7
Robust mean Algo A	3.32	0.421	4.58
Robust STDev	0.181	0.0274	0.216
Median	3.39	0.422	4.68
STDev from MAD	0.158	0.0251	0.202
Arithmetic mean	3.30	0.408	4.51
STDev	0.190	0.0530	0.281
CV or Variability	5.5%	6.5%	4.7%

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 Total arsenic (µmol/L)







Individual results

Urine Zinc (µmol/L)

Round #2014-02

Participant	PC-U-R1404	z'-score	PC-U-R1405	z'-score	PC-U-R1406	z'-score	Method
176	7.08	0.05	11.8	0.32	16.2	0.26	ICP-MS
747	7.20	0.25	11.9	0.40	16.0	0.15	ICP-MS
1095	7.23	0.30	11.9	0.40	16.6	0.59	FAAS
1188	7.10	0.08	11.5	-0.05	15.6	-0.15	ICP-MS (C/R)
1418	6.43	-1.01	10.9	-0.57	15.3	-0.33	ICP-MS (C/R)
2629	6.28	-1.26	10.3	-1.19	14.1	-1.27	ICP-OES
2763	6.91	-0.23	11.5	0.00	15.7	-0.07	ICP-MS (C/R)
3187	7.29	0.39	11.7	0.20	15.8	0.00	ICP-MS
3211	7.60	0.90	12.4	0.91	16.9	0.81	FAAS
3423	12.0	**8.18**	13.6	**2.09**	18.3	1.86	FAAS
3513	7.62	0.93	11.9	0.40	16.5	0.48	ICP-MS
3853	6.38	-1.10	10.7	-0.83	14.3	-1.12	ICP-MS
4708	7.02	-0.05	11.6	0.10	15.9	0.07	ICP-MS
4953	6.93	-0.20	11.3	-0.17	16.1	0.23	ICP-MS
5591	7.10	0.08	11.7	0.20	16.2	0.29	FAAS
5691	6.30	-1.23	10.6	-0.91	15.1	-0.51	ICP-MS
5881	7.10	0.08	11.2	-0.28	15.2	-0.41	ICP-MS (C/R)
6511	7.63	0.95	12.8	1.31	16.9	0.78	ND
7804	3.63	**-5.61**	5.80	**-5.74**	9.01	**-4.97**	ND
8376	7.03	-0.04	11.3	-0.22	15.6	-0.18	FAAS
8454	7.32	0.44	11.6	0.10	15.5	-0.22	FAAS
8981	6.90	-0.25	14.5	**3.02**	16.3	0.37	ND
9759	1.79	**-8.62**	2.42	**-9.15**	3.58	**-8.95**	FAAS

	Assigned value	Standard uncertainty	σ pt	Acceptable range	K-S (Lilliefors)	Species
PC-U-R1404	7.05	0.0980	0.601	5.83 - 8.27	Rejected	---
PC-U-R1405	11.5	0.148	0.986	9.51 - 13.5	Rejected	---
PC-U-R1406	15.8	0.214	1.35	13.1 - 18.5	Rejected	---

Statistics
Urine Zinc (µmol/L)

All methods	PC-U-R1404	PC-U-R1405	PC-U-R1406
N	23	23	23
Robust mean Algo A	7.05	11.5	15.8
Robust STDev	0.376	0.568	0.819
Median	7.08	11.6	15.8
STDev from MAD	0.314	0.470	0.742
Arithmetic mean	6.87	11.1	15.1
STDev	1.74	2.44	3.02
CV or Variability	5.3%	4.9%	5.2%

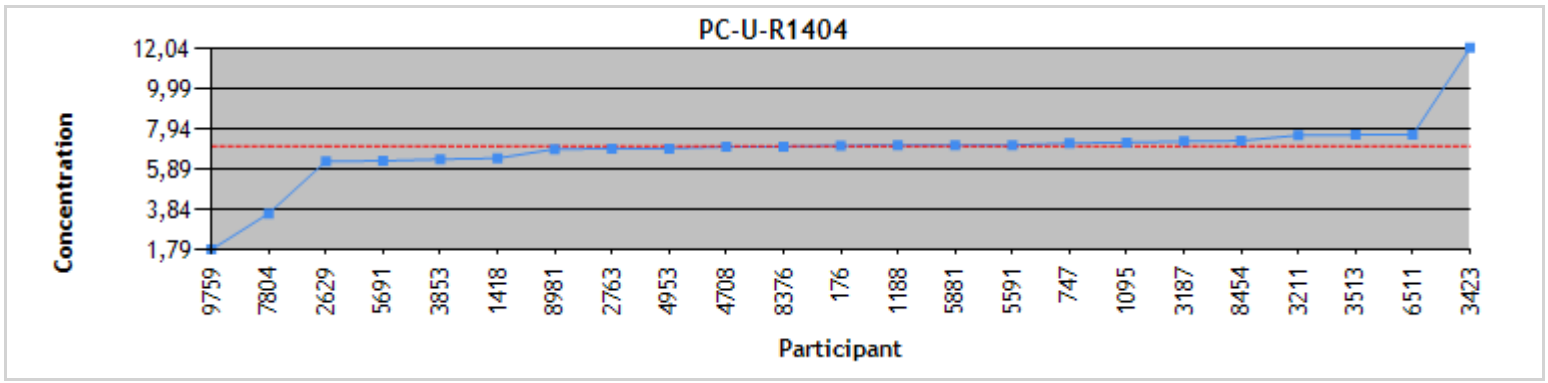
Flame-AAS	PC-U-R1404	PC-U-R1405	PC-U-R1406
N	7	7	7
Robust mean Algo A	7.25	11.8	16.2
Robust STDev	0.363	0.719	1.17
Median	7.23	11.7	16.2
STDev from MAD	0.303	0.618	1.04
Arithmetic mean	7.16	10.7	14.7
STDev	2.97	3.73	4.98
CV or Variability	5.0%	6.1%	7.2%

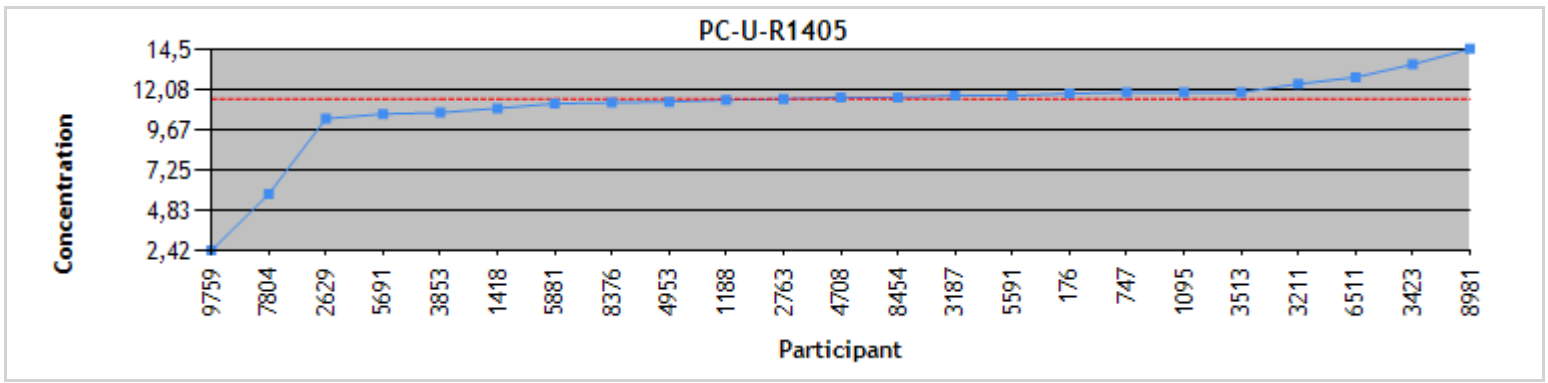
ICP-MS	PC-U-R1404	PC-U-R1405	PC-U-R1406
N	8	8	8
Robust mean Algo A	7.03	11.6	15.9
Robust STDev	0.349	0.385	0.335
Median	7.05	11.7	16.0
STDev from MAD	0.290	0.371	0.277
Arithmetic mean	6.98	11.4	15.7
STDev	0.446	0.528	0.706
CV or Variability	5.0%	3.3%	2.1%

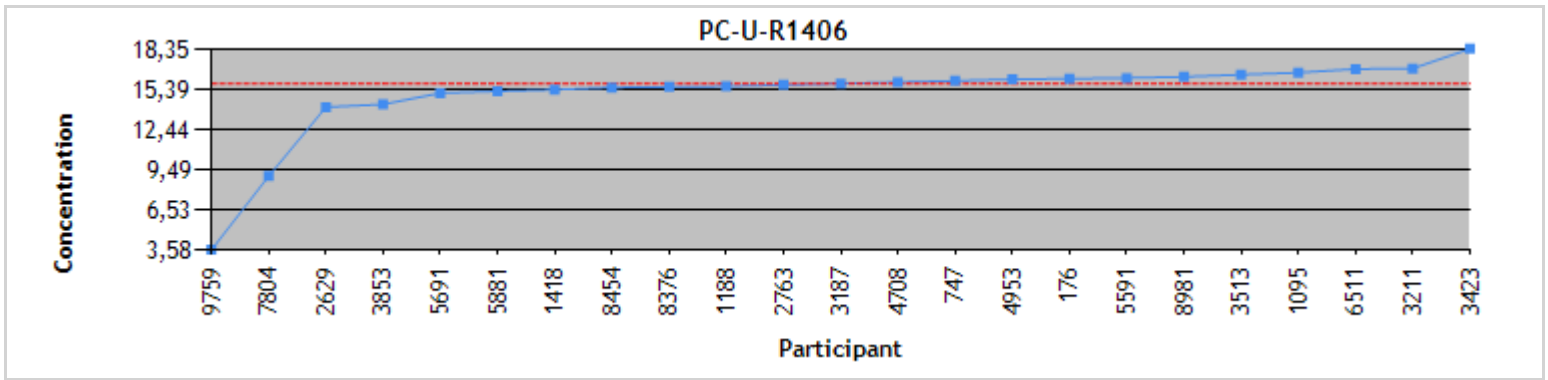
ICP-MS (collision/reaction cell)	PC-U-R1404	PC-U-R1405	PC-U-R1406
N	4	4	4
Robust mean Algo A	6.97	11.3	15.5
Robust STDev	0.168	0.248	0.243
Median	7.00	11.3	15.5
STDev from MAD	0.139	0.206	0.260
Arithmetic mean	6.88	11.3	15.5
STDev	0.312	0.258	0.215
CV or Variability	2.4%	2.2%	1.6%

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 Zinc (µmol/L)







ASSIGNED VALUES

ROUND: 2014-02
SHIPPED ON: 2014-03-10
DEADLINE: 2014-04-18

MATRIX	ANALYTE	UNIT	PTM	ASSIGNED VALUE	PTM	ASSIGNED VALUE	PTM	ASSIGNED VALUE
Blood	Cadmium	nmol/L	PC-B-C1404	18.8	PC-B-C1405	126	PC-B-C1406	53.9
	Lead	µmol/L	PC-B-L1404	0.0864	PC-B-L1405	1.16	PC-B-L1406	0.684
	Mercury	nmol/L	PC-B-M1404	15.0	PC-B-M1405	51.3	PC-B-M1406	94.5
Serum	Aluminium	µmol/L	PC-S-A1404	0.482	PC-S-A1405	3.29	PC-S-A1406	1.78
	Copper	µmol/L	PC-S-E1404	39.1	PC-S-E1405	16.0	PC-S-E1406	3.34
	Manganese	nmol/L	PC-S-G1404	67.4	PC-S-G1405	104	PC-S-G1406	11.3
	Selenium	µmol/L	PC-S-E1404	4.34	PC-S-E1405	1.60	PC-S-E1406	0.401
	Zinc	µmol/L	PC-S-E1404	38.2	PC-S-E1405	16.7	PC-S-E1406	3.63
Urine	Cadmium	nmol/L	PC-U-D1404	8.44	PC-U-D1405	36.4	PC-U-D1406	70.0
	Chromium	nmol/L	PC-U-B1404	55.0	PC-U-B1405	414	PC-U-B1406	89.6
	Copper	µmol/L	PC-U-R1404	0.342	PC-U-R1405	3.28	PC-U-R1406	1.13
	Fluoride	µmol/L	PC-U-F1404	14.6	PC-U-F1405	408	PC-U-F1406	180
	Inorganic arsenic	µmol/L	PC-U-S1404	2.74	PC-U-S1405	0.394	PC-U-S1406	4.20
	Iodide	µmol/L	PC-U-I1404	3.31	PC-U-I1405	0.393	PC-U-I1406	2.45
	Lead	µmol/L	PC-U-P1404	0.801	PC-U-P1405	0.181	PC-U-P1406	0.0896
	Mercury	nmol/L	PC-U-H1404	559	PC-U-H1405	131	PC-U-H1406	207
	Selenium	µmol/L	PC-U-N1404	1.88	PC-U-N1405	2.16	PC-U-N1406	5.16
	Total arsenic	µmol/L	PC-U-S1404	3.19	PC-U-S1405	0.433	PC-U-S1406	4.41
	Zinc	µmol/L	PC-U-R1404	7.05	PC-U-R1405	11.5	PC-U-R1406	15.8

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

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

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