

Statistical Summary
Blood pH and Gas/Chemistry Proficiency Testing
Event 13-1 – March 11, 2013

Attached is a summary of participant performance (mean and standard deviation) for the Blood pH and Gas/Chemistry proficiency test survey shipped March 11, 2013. Test specimens were commercially prepared and contained carbon dioxide and oxygen balanced with nitrogen in a physiologically buffered matrix. Five specimens (**G26, G27, G28, G29, G30**) were distributed to each participant laboratory for analysis.

Outlined below is a description of the process utilized in the evaluation of your laboratory's test results.

Target Values: Target values were derived from all-participant mean values calculated by a robust statistical technique. In some instances, instrument-specific targets were utilized for the analytes, pH, Pco₂, and Po₂ and are indicated on the report by an asterisk placed adjacent to the instrument name corresponding to the peer group used. Please note that no peer group target values were utilized for the educational challenges (glucose, sodium, potassium, chloride, ionized calcium, ionized magnesium, and lactate).

Acceptable Ranges: Acceptable ranges for pH, Pco₂, and Po₂ were established using criteria specified by CLIA '88 regulations.

Acceptable ranges for the educational challenges were calculated using the criteria listed below. Although scores were not assigned for these analytes, results noted as outside expected limits should be reviewed for potential sources of error.

Analyte	Criteria
Glucose	± 10 % or ± 6 mg/dL (whichever greater)
Sodium	± 4 mmol/L
Potassium	± 0.5 mmol/L
Chloride	± 5 %
Calcium, ionized	± 0.25 mmol/L
Magnesium, ionized	± 25 %
Lactate	± 15 % or ± 0.4 mmol/L (whichever greater)

The attached statistical report provides a summary of participant data for the five survey specimens. Results for individual instrument systems where the number of laboratories using those systems is three or greater are provided. Mean and Standard Deviation (1 SD) values shown are calculated by a robust statistical technique that does not assume a Gaussian distribution.

Note: The use of brand and/or trade names in this report does not constitute an endorsement of the products on the part of the Wadsworth Center or the New York State Department of Health. Should you have any questions or comments regarding this proficiency survey, please contact the Clinical Chemistry Section at (518) 474-5582 or by e-mail: clinchem@wadsworth.org

Summary of Participant Performance (Mean and Standard Deviation)

pH

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
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6.985 ± 0.024	7.356 ± 0.015	7.570 ± 0.022	7.251 ± 0.015	7.421 ± 0.016	n = 217	[---]	All Instruments
7.001 ± 0.009	7.379 ± 0.004	7.613 ± 0.005	7.277 ± 0.007	7.441 ± 0.004	n = 17	[IAA]	i-STAT
7.000 ± 0.011	7.370 ± 0.000	7.596 ± 0.007	7.250 ± 0.000	7.438 ± 0.008	n = 17	[MAA]	IL Gem Premier 3000
6.996 ± 0.010	7.367 ± 0.005	7.590 ± 0.000	7.254 ± 0.009	7.438 ± 0.007	n = 9	[MAD]	IL Gem Premier 3500
6.983 ± 0.005	7.354 ± 0.008	7.571 ± 0.010	7.240 ± 0.004	7.420 ± 0.007	n = 14	[MAC]	IL Gem Premier 4000
7.031 ± 0.021	7.372 ± 0.004	7.563 ± 0.008	7.277 ± 0.007	7.432 ± 0.005	n = 8	[NOG]	NOVA Critical Care Xpress
7.017 ± 0.008	7.344 ± 0.005	7.567 ± 0.009	7.250 ± 0.005	7.423 ± 0.006	n = 5	[AVQ]	Opti Medical OPTI CCA
6.954 ± 0.018	7.353 ± 0.007	7.554 ± 0.011	7.252 ± 0.009	7.413 ± 0.010	n = 16	[RAX]	Radiometer ABL 80 Flex
6.975 ± 0.005	7.342 ± 0.000	7.549 ± 0.000	7.241 ± 0.002	7.403 ± 0.004	n = 9	[RAN]	Radiometer ABL700 series
6.981 ± 0.009	7.347 ± 0.005	7.553 ± 0.005	7.245 ± 0.005	7.408 ± 0.004	n = 49	[RAP]	Radiometer ABL800 series
7.028 ± 0.019	7.350 ± 0.010	7.534 ± 0.009	7.252 ± 0.007	7.405 ± 0.007	n = 6	[ROW]	Roche OMNI/Cobas series
6.960 ± 0.007	7.348 ± 0.004	7.573 ± 0.005	7.241 ± 0.006	7.420 ± 0.004	n = 33	[BYS]	Siemens Rapid Point 405
7.000 ± 0.005	7.377 ± 0.007	7.591 ± 0.003	7.271 ± 0.005	7.441 ± 0.004	n = 19	[BYT]	Siemens RapidLab 1200 Series

Summary of Participant Performance (Mean and Standard Deviation)

Pco2 (mmHg)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
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72.57 ± 4.79	41.86 ± 1.80	25.25 ± 1.14	52.06 ± 2.71	38.04 ± 1.44	n = 217	[---]	All Instruments
67.82 ± 1.64	38.93 ± 0.86	23.30 ± 0.43	47.77 ± 0.83	34.23 ± 0.59	n = 17	[IAA]	i-STAT
71.01 ± 2.59	42.14 ± 0.82	25.32 ± 0.70	54.51 ± 1.39	38.37 ± 0.88	n = 17	[MAA]	IL Gem Premier 3000
70.31 ± 1.91	42.00 ± 0.00	25.57 ± 0.56	54.67 ± 1.00	38.29 ± 0.61	n = 9	[MAD]	IL Gem Premier 3500
69.44 ± 2.22	40.17 ± 1.07	24.42 ± 0.75	51.44 ± 1.60	36.90 ± 0.59	n = 14	[MAC]	IL Gem Premier 4000
69.65 ± 4.01	41.36 ± 2.56	25.36 ± 1.12	49.98 ± 3.13	37.60 ± 2.48	n = 8	[NOG]	NOVA Critical Care Xpress
72.35 ± 2.05	42.28 ± 1.66	26.22 ± 1.17	50.78 ± 1.25	36.84 ± 0.71	n = 5	[AVQ]	Opti Medical OPTI CCA
76.15 ± 3.08	43.14 ± 0.95	25.45 ± 0.99	53.21 ± 1.26	38.68 ± 0.89	n = 16	[RAX]	Radiometer ABL 80 Flex
72.02 ± 1.84	41.31 ± 0.75	25.61 ± 0.47	50.96 ± 0.89	37.87 ± 0.53	n = 9	[RAN]	Radiometer ABL700 series
70.73 ± 2.07	41.35 ± 0.85	25.83 ± 0.51	50.85 ± 1.29	38.01 ± 0.62	n = 49	[RAP]	Radiometer ABL800 series
70.94 ± 2.52	43.97 ± 1.18	26.45 ± 0.97	54.23 ± 1.37	39.92 ± 1.11	n = 6	[ROW]	Roche OMNI/Cobas series
80.96 ± 2.87	44.17 ± 1.36	25.40 ± 0.91	54.74 ± 2.33	39.30 ± 1.14	n = 33	[BYS]	Siemens Rapid Point 405
74.80 ± 2.06	41.15 ± 1.00	24.01 ± 0.65	51.20 ± 1.59	37.03 ± 0.92	n = 19	[BYT]	Siemens RapidLab 1200 Series

Summary of Participant Performance (Mean and Standard Deviation)

Po2 (mmHg)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
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111.03 ± 6.63	176.99 ± 6.56	74.90 ± 7.68	141.85 ± 6.15	89.26 ± 6.71	n = 217	[---]	All Instruments
121.31 ± 4.61	174.28 ± 5.32	86.64 ± 4.76	145.04 ± 5.34	99.29 ± 4.38	n = 17	[IAA]	i-STAT
111.94 ± 2.29	183.61 ± 4.33	72.85 ± 1.21	146.77 ± 3.44	86.87 ± 1.53	n = 17	[MAA]	IL Gem Premier 3000
113.15 ± 1.48	184.02 ± 4.05	73.85 ± 2.68	145.78 ± 3.11	88.26 ± 1.43	n = 9	[MAD]	IL Gem Premier 3500
117.23 ± 8.02	182.18 ± 7.60	77.83 ± 3.50	146.92 ± 3.91	92.85 ± 3.60	n = 14	[MAC]	IL Gem Premier 4000
110.96 ± 2.13	188.06 ± 4.64	66.70 ± 0.68	144.71 ± 3.58	84.27 ± 0.83	n = 8	[NOG]	NOVA Critical Care Xpress
107.46 ± 2.86	173.23 ± 5.44	80.04 ± 2.57	136.81 ± 3.67	90.98 ± 10.84	n = 5	[AVQ]	Opti Medical OPTI CCA
98.88 ± 2.96	170.04 ± 5.87	57.14 ± 2.07	132.88 ± 7.06	75.83 ± 4.84	n = 16	[RAX]	Radiometer ABL 80 Flex
111.54 ± 2.64	176.12 ± 3.69	74.72 ± 2.12	141.63 ± 4.67	90.42 ± 2.89	n = 9	[RAN]	Radiometer ABL700 series
113.76 ± 2.64	175.50 ± 4.11	78.47 ± 2.28	142.39 ± 3.28	92.71 ± 2.28	n = 49	[RAP]	Radiometer ABL800 series
133.50 ± 2.07	182.73 ± 6.89	93.82 ± 2.46	152.06 ± 2.45	106.86 ± 2.19	n = 6	[ROW]	Roche OMNI/Cobas series
108.67 ± 3.01	173.56 ± 4.23	73.18 ± 3.74	138.18 ± 3.65	87.68 ± 3.83	n = 33	[BYS]	Siemens Rapid Point 405
104.47 ± 4.34	178.04 ± 4.73	68.82 ± 4.94	136.52 ± 5.14	83.02 ± 4.35	n = 19	[BYT]	Siemens RapidLab 1200 Series

Summary of Participant Performance (Mean and Standard Deviation)

Glucose (mg/dL)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
371.3 ± 13.18	192.5 ± 8.28	326.4 ± 10.84	159.0 ± 7.53	227.3 ± 8.05	n = 61	[---]	All Instruments
363.8 ± 2.92	186.5 ± 0.57	330.3 ± 0.90	151.3 ± 0.82	222.0 ± 0.75	n = 4	[IAA]	i-STAT
356.2 ± 6.08	181.5 ± 1.22	318.6 ± 6.88	148.8 ± 4.80	217.1 ± 4.34	n = 4	[MAA]	IL Gem Premier 3000
359.1 ± 15.97	182.6 ± 4.72	320.1 ± 13.31	149.7 ± 3.07	218.0 ± 8.16	n = 3	[MAD]	IL Gem Premier 3500
371.5 ± 8.02	183.0 ± 3.88	326.2 ± 7.67	149.7 ± 2.02	224.8 ± 8.15	n = 4	[MAC]	IL Gem Premier 4000
400.8 ± 19.00	200.0 ± 4.55	335.8 ± 14.54	164.8 ± 2.66	234.6 ± 5.95	n = 7	[NOG]	NOVA Critical Care Xpress
370.1 ± 2.86	192.2 ± 2.36	320.8 ± 3.23	159.7 ± 1.37	226.3 ± 0.51	n = 3	[RAN]	Radiometer ABL700 series
373.9 ± 7.38	196.3 ± 3.68	328.3 ± 7.19	163.3 ± 3.57	230.0 ± 5.60	n = 22	[RAP]	Radiometer ABL800 series
382.2 ± 10.25	199.4 ± 2.31	334.6 ± 5.00	161.8 ± 3.21	233.0 ± 0.75	n = 4	[BYS]	Siemens Rapid Point 405
362.2 ± 4.02	185.7 ± 3.48	306.6 ± 7.52	153.3 ± 2.61	223.1 ± 2.80	n = 5	[BYT]	Siemens RapidLab 1200 Series

Sodium (mmol/L)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
150.7 ± 2.13	128.0 ± 1.87	136.9 ± 2.11	119.4 ± 1.76	132.8 ± 2.15	n = 76	[---]	All Instruments
154.0 ± 0.82	131.0 ± 0.00	140.8 ± 0.47	122.0 ± 0.00	136.0 ± 0.00	n = 7	[IAA]	i-STAT
153.2 ± 1.27	129.5 ± 0.57	138.9 ± 1.13	120.0 ± 0.75	135.5 ± 1.22	n = 4	[MAA]	IL Gem Premier 3000
151.0 ± 1.80	128.3 ± 0.51	138.3 ± 1.37	119.7 ± 0.51	134.0 ± 0.90	n = 3	[MAD]	IL Gem Premier 3500
151.3 ± 1.32	128.8 ± 0.66	138.0 ± 0.82	120.8 ± 0.47	134.2 ± 0.76	n = 7	[MAC]	IL Gem Premier 4000
149.5 ± 1.14	126.2 ± 0.92	134.8 ± 0.66	118.2 ± 0.66	131.0 ± 0.82	n = 7	[NOG]	NOVA Critical Care Xpress
150.7 ± 0.51	128.7 ± 0.51	137.7 ± 0.51	120.0 ± 0.00	133.7 ± 0.51	n = 3	[RAN]	Radiometer ABL700 series
150.7 ± 1.03	128.2 ± 0.80	137.1 ± 1.00	119.6 ± 0.73	132.9 ± 0.87	n = 23	[RAP]	Radiometer ABL800 series
150.6 ± 1.02	127.3 ± 0.51	136.7 ± 0.51	119.7 ± 0.51	132.7 ± 0.51	n = 3	[ROW]	Roche OMNI/Cobas series
149.2 ± 0.76	125.3 ± 0.74	134.8 ± 0.47	116.6 ± 0.56	130.2 ± 0.47	n = 7	[BYS]	Siemens Rapid Point 405
147.1 ± 0.62	126.0 ± 1.42	134.5 ± 0.52	117.0 ± 0.00	130.3 ± 0.49	n = 7	[BYT]	Siemens RapidLab 1200 Series

Potassium (mmol/L)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
6.16 ± 0.12	3.79 ± 0.06	4.83 ± 0.08	2.53 ± 0.08	4.25 ± 0.07	n = 77	[---]	All Instruments
6.08 ± 0.05	3.76 ± 0.06	4.80 ± 0.00	2.50 ± 0.00	4.20 ± 0.00	n = 7	[IAA]	i-STAT
5.92 ± 0.04	3.68 ± 0.04	4.68 ± 0.04	2.45 ± 0.06	4.10 ± 0.00	n = 4	[MAA]	IL Gem Premier 3000
5.97 ± 0.05	3.66 ± 0.10	4.67 ± 0.05	2.43 ± 0.05	4.10 ± 0.00	n = 3	[MAD]	IL Gem Premier 3500
6.30 ± 0.00	3.82 ± 0.05	4.93 ± 0.05	2.50 ± 0.00	4.30 ± 0.00	n = 7	[MAC]	IL Gem Premier 4000
6.35 ± 0.07	3.80 ± 0.00	4.94 ± 0.06	2.60 ± 0.00	4.30 ± 0.00	n = 7	[NOG]	NOVA Critical Care Xpress
6.17 ± 0.05	3.80 ± 0.00	4.90 ± 0.00	2.60 ± 0.00	4.30 ± 0.00	n = 3	[RAN]	Radiometer ABL700 series
6.12 ± 0.06	3.80 ± 0.00	4.84 ± 0.06	2.60 ± 0.00	4.28 ± 0.04	n = 23	[RAP]	Radiometer ABL800 series
6.20 ± 0.00	3.63 ± 0.05	4.77 ± 0.05	2.37 ± 0.05	4.17 ± 0.05	n = 3	[ROW]	Roche OMNI/Cobas series
6.10 ± 0.00	3.80 ± 0.00	4.80 ± 0.00	2.50 ± 0.00	4.23 ± 0.05	n = 8	[BYS]	Siemens Rapid Point 405
6.20 ± 0.00	3.70 ± 0.00	4.80 ± 0.00	2.40 ± 0.00	4.20 ± 0.00	n = 7	[BYT]	Siemens RapidLab 1200 Series

Summary of Participant Performance (Mean and Standard Deviation)

Chloride (mmol/L)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
129.2 ± 3.81	90.3 ± 2.90	102.5 ± 3.05	83.1 ± 2.70	97.3 ± 2.87	n = 51	[---]	All Instruments
127.0 ± 0.90	85.0 ± 0.00	97.3 ± 0.51	79.3 ± 0.51	92.3 ± 0.51	n = 3	[IAA]	i-STAT
129.3 ± 0.90	92.0 ± 0.00	105.3 ± 0.82	84.8 ± 0.41	101.0 ± 0.75	n = 4	[MAC]	IL Gem Premier 4000
134.5 ± 2.51	94.8 ± 1.31	106.8 ± 0.86	87.0 ± 0.55	102.0 ± 0.00	n = 7	[NOG]	NOVA Critical Care Xpress
127.7 ± 0.51	88.7 ± 0.51	100.7 ± 0.51	82.0 ± 0.00	95.7 ± 0.51	n = 3	[RAN]	Radiometer ABL700 series
127.2 ± 0.95	89.2 ± 0.72	101.1 ± 0.63	82.1 ± 0.88	96.1 ± 0.68	n = 18	[RAP]	Radiometer ABL800 series
132.2 ± 0.80	91.0 ± 0.00	103.0 ± 0.64	83.4 ± 0.55	98.0 ± 0.00	n = 5	[BYS]	Siemens Rapid Point 405
133.5 ± 0.57	80.6 ± 34.32	105.0 ± 0.75	86.2 ± 0.41	99.5 ± 1.22	n = 4	[BYT]	Siemens RapidLab 1200 Series

Ionized Calcium (mmol/L)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
1.796 ± 0.076	1.326 ± 0.053	0.733 ± 0.057	1.033 ± 0.037	1.191 ± 0.041	n = 78	[---]	All Instruments
1.807 ± 0.056	1.322 ± 0.026	0.685 ± 0.012	1.008 ± 0.021	1.188 ± 0.015	n = 4	[IAA]	i-STAT
1.830 ± 0.019	1.344 ± 0.011	0.677 ± 0.022	1.018 ± 0.013	1.193 ± 0.014	n = 5	[MAA]	IL Gem Premier 3000
1.821 ± 0.044	1.340 ± 0.009	0.676 ± 0.010	1.010 ± 0.009	1.200 ± 0.009	n = 3	[MAD]	IL Gem Premier 3500
1.786 ± 0.026	1.349 ± 0.025	0.696 ± 0.014	1.034 ± 0.018	1.199 ± 0.010	n = 7	[MAC]	IL Gem Premier 4000
1.763 ± 0.017	1.326 ± 0.009	0.765 ± 0.037	1.030 ± 0.007	1.187 ± 0.016	n = 6	[NOG]	NOVA Critical Care Xpress
1.868 ± 0.045	1.368 ± 0.013	0.795 ± 0.012	1.083 ± 0.009	1.235 ± 0.006	n = 4	[RAN]	Radiometer ABL700 series
1.854 ± 0.028	1.353 ± 0.020	0.791 ± 0.025	1.072 ± 0.015	1.224 ± 0.017	n = 22	[RAP]	Radiometer ABL800 series
1.826 ± 0.010	1.330 ± 0.009	0.703 ± 0.005	0.991 ± 0.020	1.167 ± 0.014	n = 3	[ROW]	Roche OMNI/Cobas series
1.715 ± 0.022	1.283 ± 0.016	0.690 ± 0.021	1.004 ± 0.007	1.155 ± 0.007	n = 9	[BYS]	Siemens Rapid Point 405
1.706 ± 0.025	1.200 ± 0.019	0.723 ± 0.035	1.004 ± 0.020	1.119 ± 0.017	n = 11	[BYT]	Siemens RapidLab 1200 Series

Ionized Magnesium (mmol/L)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
1.405 ± 0.174	0.153 ± 0.097	1.306 ± 0.145	1.133 ± 0.261	0.532 ± 0.307	n = 3	[---]	All Instruments

Lactate (mmol/L)

Specimen: G26	Specimen: G27	Specimen: G28	Specimen: G29	Specimen: G30	Number	[Code]	Instrument
9.72 ± 0.74	4.58 ± 0.26	9.31 ± 0.54	5.43 ± 0.34	6.32 ± 0.35	n = 41	[---]	All Instruments
9.20 ± 0.09	4.30 ± 0.17	9.12 ± 0.04	5.12 ± 0.26	6.04 ± 0.06	n = 5	[MAA]	IL Gem Premier 3000
9.60 ± 0.73	4.55 ± 0.36	9.64 ± 0.82	5.33 ± 0.41	6.35 ± 0.63	n = 3	[MAD]	IL Gem Premier 3500
9.28 ± 0.15	4.23 ± 0.14	9.00 ± 0.09	5.00 ± 0.18	6.05 ± 0.19	n = 3	[MAC]	IL Gem Premier 4000
9.98 ± 0.85	4.66 ± 0.18	9.31 ± 0.76	5.54 ± 0.26	6.38 ± 0.32	n = 18	[RAP]	Radiometer ABL800 series
9.04 ± 0.23	4.50 ± 0.11	8.84 ± 0.31	5.32 ± 0.16	6.27 ± 0.17	n = 4	[BYT]	Siemens RapidLab 1200 Series