Statistical Summary

Blood pH and Gas/Chemistry Educational Proficiency Testing
March 12, 2012

Attached is a summary of participant performance (mean and standard deviation) for the Blood pH and Gas/Chemistry educational proficiency survey shipped March 12, 2012. Test specimens were commercially prepared and contained carbon dioxide and oxygen balanced with nitrogen in a physiologically buffered matrix. Five specimens **(G11, G12, G13, G14, G15)** 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. No peer group specific target values were utilized.

Acceptable Ranges: Allowable limits were calculated using the criteria listed below. Although analyte scores were not assigned, 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. Only two (2) laboratories reported results for ionized magnesium, therefore, results for that analyte are not included in the statistical summary. 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)

Glucose (mg/dL)

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
38.7 ± 2.66	324.9 ± 10.68	192.0 ± 7.67	157.9 ± 7.76	88.9 ± 5.38	n = 63	[ ]	All Instruments
36.1 ± 1.27	335.5 ± 3.78	195.0 ± 1.54	160.2 ± 1.07	89.0 ± 1.00	n = 5	[BYS]	Siemens Rapid Point 405
39.1 ± 1.13	308.0 ± 3.00	184.0 ± 2.45	150.3 ± 2.26	86.7 ± 2.26	n = 4	[BYT]	Siemens RapidLab 1200 Series
38.4 ± 0.55	330.0 ± 1.54	188.6 ± 1.09	153.2 ± 1.07	85.5 ± 0.83	n = 5	[IAA]	i-STAT
33.4 ± 2.30	309.2 ± 10.20	178.5 ± 10.70	141.6 ± 8.82	77.6 ± 5.13	n = 6	[MAA]	IL Gem Premier 3000
36.5 ± 0.57	323.5 ± 3.89	184.0 ± 3.36	150.3 ± 2.65	83.0 ± 1.76	n = 4	[MAC]	IL Gem Premier 4000
36.7 ± 2.26	321.7 ± 2.26	180.6 ± 1.02	145.3 ± 1.37	78.7 ± 0.51	n = 3	[MAD]	IL Gem Premier 3500
42.5 ± 2.80	332.7 ± 9.86	200.6 ± 2.11	165.9 ± 2.59	94.8 ± 2.44	n = 8	[NOG]	NOVA Critical Care Xpress
40.7 ± 0.51	323.7 ± 6.85	193.9 ± 3.72	160.5 ± 2.74	90.1 ± 2.86	n = 3	[RAN]	Radiometer ABL700 series
39.6 ± 1.51	325.1 ± 7.48	194.7 ± 4.18	161.9 ± 3.58	91.6 ± 2.36	n = 22	[RAP]	Radiometer ABL800 series

Sodium (mmol/L)

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
157.6 ± 1.71	137.1 ± 2.11	127.6 ± 1.84	119.8 ± 1.91	109.7 ± 1.48	n = 79	[ ]	All Instruments
158.2 ± 1.67	135.0 ± 0.00	125.0 ± 0.00	116.0 ± 0.00	106.2 ± 0.66	n = 7	[BYS]	Siemens Rapid Point 405
155.0 ± 0.70	134.0 ± 0.00	125.0 ± 0.00	117.0 ± 0.00	108.7 ± 1.56	n = 7	[BYT]	Siemens RapidLab 1200 Series
158.0 ± 0.75	140.1 ± 0.60	130.1 ± 0.60	122.0 ± 0.00	109.9 ± 0.85	n = 8	[IAA]	i-STAT
160.9 ± 3.19	138.2 ± 0.84	128.2 ± 0.47	119.7 ± 1.11	108.4 ± 0.83	n = 7	[MAA]	IL Gem Premier 3000
156.2 ± 0.66	137.2 ± 1.39	128.2 ± 0.76	121.2 ± 0.66	110.6 ± 0.56	n = 7	[MAC]	IL Gem Premier 4000
160.3 ± 1.37	140.0 ± 0.90	129.0 ± 0.90	121.0 ± 0.00	110.0 ± 0.00	n = 3	[MAD]	IL Gem Premier 3500
156.2 ± 1.95	135.0 ± 0.00	126.2 ± 0.41	119.0 ± 0.75	110.0 ± 0.91	n = 8	[NOG]	NOVA Critical Care Xpress
158.7 ± 0.51	138.3 ± 0.51	128.3 ± 0.51	120.3 ± 0.51	110.7 ± 0.51	n = 3	[RAN]	Radiometer ABL700 series
158.1 ± 0.83	137.3 ± 0.67	128.1 ± 0.79	120.0 ± 0.89	110.2 ± 0.83	n = 23	[RAP]	Radiometer ABL800 series
156.6 ± 1.02	137.0 ± 0.90	127.3 ± 0.51	120.0 ± 0.00	110.3 ± 0.51	n = 3	[ROW]	Roche OMNI/Cobas series

Potassium (mmol/L)

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
2.36 ± 0.12	4.81 ± 0.08	3.77 ± 0.07	2.55 ± 0.08	7.44 ± 0.15	n = 73	[ ]	All Instruments
2.30 ± 0.00	4.80 ± 0.00	3.77 ± 0.05	2.50 ± 0.00	7.43 ± 0.07	n = 8	[BYS]	Siemens Rapid Point 405
2.29 ± 0.11	4.78 ± 0.05	3.70 ± 0.00	2.47 ± 0.07	7.59 ± 0.17	n = 7	[BYT]	Siemens RapidLab 1200 Series
2.30 ± 0.00	4.80 ± 0.00	3.80 ± 0.00	2.58 ± 0.04	7.23 ± 0.09	n = 8	[IAA]	i-STAT
2.22 ± 0.05	4.70 ± 0.00	3.68 ± 0.05	2.48 ± 0.05	7.40 ± 0.00	n = 7	[MAA]	IL Gem Premier 3000
2.23 ± 0.05	4.70 ± 0.00	3.70 ± 0.00	2.43 ± 0.05	7.47 ± 0.05	n = 3	[MAD]	IL Gem Premier 3500
2.47 ± 0.05	4.95 ± 0.05	3.82 ± 0.04	2.60 ± 0.00	7.72 ± 0.10	n = 8	[NOG]	NOVA Critical Care Xpress
2.50 ± 0.00	4.87 ± 0.05	3.80 ± 0.00	2.60 ± 0.00	7.43 ± 0.05	n = 3	[RAN]	Radiometer ABL700 series
2.44 ± 0.06	4.84 ± 0.06	3.80 ± 0.00	2.60 ± 0.00	7.44 ± 0.07	n = 23	[RAP]	Radiometer ABL800 series
2.23 ± 0.05	4.77 ± 0.05	3.63 ± 0.05	2.37 ± 0.05	7.33 ± 0.05	n = 3	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Chloride (mmol/L)

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
110.8 ± 3.28	102.8 ± 3.49	90.6 ± 2.94	83.3 ± 2.90	73.5 ± 2.41	n = 51	[ ]	All Instruments
111.3 ± 0.97	103.6 ± 0.79	91.0 ± 0.00	83.3 ± 0.51	73.2 ± 0.73	n = 6	[BYS]	Siemens Rapid Point 405
112.7 ± 0.51	106.0 ± 0.00	93.3 ± 0.51	86.6 ± 1.02	76.0 ± 0.90	n = 3	[BYT]	Siemens RapidLab 1200 Series
104.5 ± 0.57	96.7 ± 0.90	85.5 ± 0.57	79.0 ± 0.75	73.0 ± 0.00	n = 4	[IAA]	i-STAT
116.0 ± 0.75	105.8 ± 0.41	92.8 ± 0.41	85.3 ± 0.82	75.5 ± 0.57	n = 4	[MAC]	IL Gem Premier 4000
115.0 ± 0.48	108.2 ± 1.65	95.6 ± 1.06	88.5 ± 1.87	79.1 ± 2.37	n = 8	[NOG]	NOVA Critical Care Xpress
108.3 ± 0.51	100.3 ± 0.51	88.3 ± 0.51	81.3 ± 0.51	71.3 ± 0.51	n = 3	[RAN]	Radiometer ABL700 series
109.4 ± 1.01	101.2 ± 0.99	89.3 ± 0.68	82.2 ± 0.90	72.3 ± 1.07	n = 18	[RAP]	Radiometer ABL800 series

Calcium,ionized (mmol/L)

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
0.990 ± 0.056	0.848 ± 0.052	1.436 ± 0.059	1.122 ± 0.040	1.560 ± 0.056	n = 78	[ ]	All Instruments
0.961 ± 0.010	0.813 ± 0.014	1.403 ± 0.012	1.093 ± 0.007	1.528 ± 0.020	n = 8	[BYS]	Siemens Rapid Point 405
1.004 ± 0.031	0.860 ± 0.031	1.304 ± 0.021	1.103 ± 0.012	1.500 ± 0.023	n = 11	[BYT]	Siemens RapidLab 1200 Series
0.922 ± 0.013	0.802 ± 0.004	1.448 ± 0.029	1.093 ± 0.009	1.500 ± 0.000	n = 4	[IAA]	i-STAT
0.937 ± 0.014	0.800 ± 0.005	1.470 ± 0.014	1.102 ± 0.007	1.578 ± 0.013	n = 7	[MAA]	IL Gem Premier 3000
0.933 ± 0.006	0.808 ± 0.020	1.483 ± 0.020	1.141 ± 0.015	1.624 ± 0.014	n = 7	[MAC]	IL Gem Premier 4000
0.920 ± 0.018	0.794 ± 0.026	1.463 ± 0.005	1.107 ± 0.014	1.587 ± 0.014	n = 3	[MAD]	IL Gem Premier 3500
0.970 ± 0.026	0.832 ± 0.015	1.402 ± 0.008	1.088 ± 0.015	1.517 ± 0.061	n = 7	[NOG]	NOVA Critical Care Xpress
1.070 ± 0.017	0.930 ± 0.017	1.462 ± 0.015	1.170 ± 0.008	1.596 ± 0.023	n = 4	[RAN]	Radiometer ABL700 series
1.045 ± 0.017	0.905 ± 0.019	1.464 ± 0.025	1.164 ± 0.014	1.596 ± 0.024	n = 22	[RAP]	Radiometer ABL800 series
0.973 ± 0.014	0.813 ± 0.005	1.428 ± 0.015	1.090 ± 0.009	1.517 ± 0.014	n = 3	[ROW]	Roche OMNI/Cobas series

Lactate (mmol/L)

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
0.90 ± 0.07	9.35 ± 0.52	4.54 ± 0.26	5.66 ± 0.36	3.65 ± 0.22	n = 41	[ ]	All Instruments
1.02 ± 0.04	9.29 ± 0.31	4.62 ± 0.13	5.73 ± 0.16	3.75 ± 0.12	n = 4	[BYT]	Siemens RapidLab 1200 Series
0.80 ± 0.00	9.10 ± 0.15	4.30 ± 0.00	5.22 ± 0.08	3.43 ± 0.10	n = 6	[MAA]	IL Gem Premier 3000
0.90 ± 0.00	8.80 ± 0.09	4.20 ± 0.09	5.23 ± 0.05	3.47 ± 0.05	n = 3	[MAC]	IL Gem Premier 4000
0.80 ± 0.00	9.29 ± 0.20	4.25 ± 0.19	5.28 ± 0.15	3.43 ± 0.14	n = 3	[MAD]	IL Gem Premier 3500
0.90 ± 0.00	10.53 ± 0.43	5.03 ± 0.09	6.36 ± 0.19	4.09 ± 0.11	n = 4	[NOG]	NOVA Critical Care Xpress
0.90 ± 0.00	9.51 ± 0.30	4.58 ± 0.08	5.76 ± 0.16	3.70 ± 0.09	n = 18	[RAP]	Radiometer ABL800 series

Statistical Summary

Blood pH and Gases
Proficiency Testing

March 12, 2012

Attached is a summary of participant performance (mean and standard deviation) for Blood pH and Gases for the March 12, 2012 proficiency test event. Test specimens were commercially prepared and contained carbon dioxide and oxygen balanced with nitrogen in a physiologically buffered matrix. Five specimens **(G11, G12, G13, G14, G15)** were distributed to each participant laboratory for analysis.

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. These statistical reports are also available on the internet at: http://www.wadsworth.org/chemheme

Should you have any questions regarding these reports or wish to obtain an additional copy, please contact the Clinical Chemistry Section at (518) 474-5582.

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

Summary of Participant Performance (Mean and Standard Deviation)

pH

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
7.715 ± 0.037	7.583 ± 0.024	7.348 ± 0.015	7.260 ± 0.016	7.137 ± 0.023	n = 219	[ ]	All Instruments
7.734 ± 0.018	7.581 ± 0.014	7.348 ± 0.007	7.272 ± 0.011	7.160 ± 0.008	n = 5	[AVQ]	Opti Medical OPTI CCA
7.710 ± 0.008	7.587 ± 0.007	7.341 ± 0.006	7.249 ± 0.008	7.112 ± 0.005	n = 35	[BYS]	Siemens Rapid Point 405
7.726 ± 0.014	7.605 ± 0.007	7.367 ± 0.008	7.279 ± 0.007	7.158 ± 0.007	n = 18	[BYT]	Siemens RapidLab 1200 Series
7.718 ± 0.001	7.595 ± 0.002	7.367 ± 0.000	7.282 ± 0.003	7.164 ± 0.000	n = 3	[COA]	Siemens RapidLab 845
7.801 ± 0.003	7.636 ± 0.006	7.378 ± 0.004	7.293 ± 0.007	7.177 ± 0.006	n = 17	[IAA]	i-STAT
7.760 ± 0.009	7.604 ± 0.008	7.353 ± 0.007	7.259 ± 0.006	7.119 ± 0.006	n = 20	[MAA]	IL Gem Premier 3000
7.745 ± 0.007	7.587 ± 0.007	7.344 ± 0.006	7.253 ± 0.007	7.110 ± 0.000	n = 14	[MAC]	IL Gem Premier 4000
7.760 ± 0.005	7.603 ± 0.007	7.356 ± 0.006	7.262 ± 0.008	7.122 ± 0.007	n = 7	[MAD]	IL Gem Premier 3500
7.700 ± 0.005	7.576 ± 0.008	7.367 ± 0.007	7.287 ± 0.007	7.169 ± 0.008	n = 9	[NOG]	NOVA Critical Care Xpress
7.679 ± 0.008	7.553 ± 0.007	7.338 ± 0.009	7.255 ± 0.008	7.145 ± 0.007	n = 16	[RAX]	Radiometer ABL 80 Flex
7.687 ± 0.004	7.563 ± 0.005	7.337 ± 0.005	7.253 ± 0.004	7.137 ± 0.003	n = 10	[RAN]	Radiometer ABL700 series
7.687 ± 0.005	7.563 ± 0.005	7.336 ± 0.005	7.253 ± 0.004	7.137 ± 0.004	n = 48	[RAP]	Radiometer ABL800 series
7.670 ± 0.000	7.552 ± 0.008	7.344 ± 0.008	7.268 ± 0.008	7.154 ± 0.011	n = 5	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Pco2 (mmHg)

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
17.26 ± 0.85	24.67 ± 1.08	43.08 ± 2.06	50.53 ± 2.36	69.11 ± 3.70	n = 219	[ ]	All Instruments
17.83 ± 0.68	24.60 ± 1.74	41.87 ± 1.25	49.16 ± 0.98	67.33 ± 1.36	n = 5	[AVQ]	Opti Medical OPTI CCA
17.85 ± 0.78	24.98 ± 0.79	45.47 ± 1.61	54.17 ± 2.60	74.21 ± 3.73	n = 35	[BYS]	Siemens Rapid Point 405
16.21 ± 0.61	22.91 ± 0.80	41.65 ± 1.04	49.74 ± 1.27	68.56 ± 2.29	n = 18	[BYT]	Siemens RapidLab 1200 Series
17.51 ± 0.20	24.68 ± 0.15	43.40 ± 0.81	51.18 ± 1.58	68.31 ± 1.42	n = 3	[COA]	Siemens RapidLab 845
17.94 ± 0.34	22.56 ± 0.49	40.12 ± 0.76	46.88 ± 1.17	63.72 ± 1.26	n = 17	[IAA]	i-STAT
16.87 ± 0.96	25.14 ± 0.87	44.90 ± 1.29	52.05 ± 1.26	72.24 ± 1.47	n = 20	[MAA]	IL Gem Premier 3000
16.60 ± 0.73	24.00 ± 0.68	42.54 ± 1.68	49.52 ± 1.21	69.52 ± 1.84	n = 14	[MAC]	IL Gem Premier 4000
17.00 ± 0.82	25.83 ± 0.94	44.81 ± 0.76	51.40 ± 0.94	70.02 ± 0.96	n = 7	[MAD]	IL Gem Premier 3500
17.84 ± 0.36	24.88 ± 0.47	41.90 ± 1.45	48.79 ± 0.93	65.60 ± 2.00	n = 8	[NOG]	NOVA Critical Care Xpress
17.60 ± 1.03	25.00 ± 0.00	44.29 ± 1.26	51.83 ± 1.80	70.56 ± 1.26	n = 17	[RAX]	Radiometer ABL 80 Flex
17.27 ± 0.26	25.08 ± 0.43	42.36 ± 0.56	50.20 ± 1.05	67.97 ± 1.03	n = 10	[RAN]	Radiometer ABL700 series
17.12 ± 0.30	24.90 ± 0.36	42.43 ± 0.73	49.93 ± 0.97	67.51 ± 1.55	n = 48	[RAP]	Radiometer ABL800 series
17.14 ± 0.65	25.41 ± 0.55	44.23 ± 0.93	52.24 ± 0.66	71.93 ± 1.02	n = 5	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Po2 (mmHg)

Specimen: G11	Specimen: G12	Specimen: G13	Specimen: G14	Specimen: G15	Number	[Code]	Instrument
192.83 ± 9.05	74.22 ± 7.58	178.27 ± 8.40	139.86 ± 5.91	158.66 ± 6.96	n = 219	[ ]	All Instruments
187.61 ± 2.63	79.63 ± 2.51	172.54 ± 7.76	134.58 ± 5.70	153.98 ± 8.48	n = 5	[AVQ]	Opti Medical OPTI CCA
191.73 ± 5.97	75.63 ± 5.76	174.19 ± 5.27	137.28 ± 2.24	153.84 ± 2.62	n = 35	[BYS]	Siemens Rapid Point 405
197.01 ± 5.13	68.02 ± 6.24	180.45 ± 5.78	136.10 ± 4.33	158.61 ± 5.89	n = 18	[BYT]	Siemens RapidLab 1200 Series
183.90 ± 10.78	63.58 ± 2.02	177.09 ± 5.94	133.45 ± 5.94	154.06 ± 4.87	n = 3	[COA]	Siemens RapidLab 845
172.36 ± 10.62	82.04 ± 3.89	164.15 ± 6.96	134.31 ± 5.56	150.91 ± 8.37	n = 17	[IAA]	i-STAT
199.49 ± 4.89	70.76 ± 2.16	187.57 ± 5.05	145.33 ± 4.10	166.39 ± 3.67	n = 20	[MAA]	IL Gem Premier 3000
197.90 ± 8.18	74.92 ± 3.32	185.04 ± 9.12	144.11 ± 6.01	163.23 ± 7.07	n = 14	[MAC]	IL Gem Premier 4000
199.96 ± 6.66	71.64 ± 0.83	185.43 ± 5.54	144.30 ± 4.26	165.13 ± 4.99	n = 7	[MAD]	IL Gem Premier 3500
200.95 ± 5.60	66.83 ± 1.70	185.39 ± 7.12	142.52 ± 5.15	164.81 ± 4.40	n = 8	[NOG]	NOVA Critical Care Xpress
182.16 ± 11.20	59.62 ± 5.03	172.20 ± 9.22	133.31 ± 5.76	152.03 ± 6.29	n = 17	[RAX]	Radiometer ABL 80 Flex
190.34 ± 3.32	73.66 ± 2.07	175.57 ± 3.39	140.58 ± 2.70	157.91 ± 2.00	n = 10	[RAN]	Radiometer ABL700 series
191.32 ± 4.47	77.58 ± 2.26	178.19 ± 3.72	141.46 ± 2.68	159.15 ± 3.57	n = 48	[RAP]	Radiometer ABL800 series
194.20 ± 3.62	91.55 ± 1.47	182.45 ± 3.31	150.15 ± 2.99	166.64 ± 3.46	n = 5	[ROW]	Roche OMNI/Cobas series