

Statistical Summary
Blood pH and Gas/Chemistry Proficiency Testing
Event 13-2 – July 22, 2013

Attached is a summary of participant performance (mean and standard deviation) for the Blood pH and Gas/Chemistry proficiency test survey shipped July 22, 2013. Test specimens were commercially prepared and contained carbon dioxide and oxygen balanced with nitrogen in a physiologically buffered matrix. Five specimens (**G31, G32, G33, G34, G35**) 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: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code] Instrument
7.248 ± 0.017	7.129 ± 0.024	7.628 ± 0.030	7.506 ± 0.025	7.421 ± 0.017	n = 219	[] All Instruments
7.251 ± 0.014	7.149 ± 0.011	7.640 ± 0.006	7.504 ± 0.016	7.428 ± 0.008	n = 6	[AVQ] Opti Medical OPTI CCA
7.235 ± 0.006	7.102 ± 0.006	7.622 ± 0.004	7.493 ± 0.005	7.417 ± 0.005	n = 31	[BYS] Siemens Rapid Point 405
7.238 ± 0.003	7.103 ± 0.004	7.621 ± 0.004	7.492 ± 0.004	7.418 ± 0.005	n = 4	[BYQ] Siemens Rapid Point 500
7.270 ± 0.007	7.152 ± 0.007	7.646 ± 0.006	7.520 ± 0.004	7.442 ± 0.006	n = 19	[BYT] Siemens RapidLab 1200 Series
7.278 ± 0.006	7.168 ± 0.006	7.685 ± 0.006	7.561 ± 0.004	7.451 ± 0.008	n = 21	[IAA] i-STAT
7.246 ± 0.008	7.110 ± 0.007	7.667 ± 0.006	7.531 ± 0.005	7.435 ± 0.007	n = 16	[MAA] IL Gem Premier 3000
7.248 ± 0.008	7.113 ± 0.008	7.664 ± 0.007	7.530 ± 0.000	7.431 ± 0.004	n = 11	[MAD] IL Gem Premier 3500
7.241 ± 0.005	7.107 ± 0.005	7.640 ± 0.000	7.508 ± 0.005	7.421 ± 0.004	n = 15	[MAC] IL Gem Premier 4000
7.278 ± 0.007	7.162 ± 0.007	7.623 ± 0.004	7.510 ± 0.000	7.431 ± 0.003	n = 8	[NOG] NOVA Critical Care Xpress
7.248 ± 0.010	7.138 ± 0.009	7.602 ± 0.010	7.521 ± 0.011	7.411 ± 0.011	n = 15	[RAX] Radiometer ABL 80 Flex
7.239 ± 0.001	7.129 ± 0.000	7.601 ± 0.001	7.485 ± 0.004	7.404 ± 0.005	n = 7	[RAN] Radiometer ABL700 series
7.240 ± 0.003	7.129 ± 0.003	7.604 ± 0.004	7.484 ± 0.004	7.406 ± 0.004	n = 50	[RAP] Radiometer ABL800 series
7.254 ± 0.009	7.140 ± 0.002	7.586 ± 0.006	7.479 ± 0.006	7.403 ± 0.004	n = 6	[ROW] Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Pco2 (mmHg)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code] Instrument
52.06 ± 2.78	71.45 ± 4.74	21.74 ± 1.04	30.92 ± 1.21	38.12 ± 1.84	n = 219	[] All Instruments
51.91 ± 1.62	70.80 ± 2.00	22.17 ± 1.40	30.61 ± 0.96	37.00 ± 0.95	n = 6	[AVQ] Opti Medical OPTI CCA
56.85 ± 2.26	79.91 ± 3.35	22.52 ± 0.86	32.56 ± 1.05	40.18 ± 1.25	n = 31	[BYS] Siemens Rapid Point 405
56.28 ± 0.90	79.44 ± 3.55	22.88 ± 0.31	32.58 ± 0.46	40.14 ± 0.39	n = 4	[BYQ] Siemens Rapid Point 500
52.04 ± 1.10	70.87 ± 1.51	20.67 ± 0.61	29.76 ± 0.68	36.94 ± 0.82	n = 19	[BYT] Siemens RapidLab 1200 Series
47.67 ± 0.99	65.24 ± 1.52	21.41 ± 0.57	29.72 ± 0.44	34.17 ± 0.52	n = 21	[IAA] i-STAT
52.94 ± 1.45	74.37 ± 2.32	20.68 ± 0.61	31.27 ± 1.13	39.14 ± 1.08	n = 16	[MAA] IL Gem Premier 3000
52.97 ± 0.65	73.51 ± 1.56	20.89 ± 0.87	31.21 ± 0.76	38.98 ± 0.91	n = 11	[MAD] IL Gem Premier 3500
50.73 ± 0.66	72.29 ± 1.40	20.57 ± 0.64	30.37 ± 0.98	36.69 ± 1.18	n = 15	[MAC] IL Gem Premier 4000
49.59 ± 2.02	66.21 ± 3.06	22.16 ± 0.74	32.00 ± 0.00	38.07 ± 0.62	n = 8	[NOG] NOVA Critical Care Xpress
53.39 ± 1.71	73.86 ± 2.82	21.63 ± 0.83	30.61 ± 1.08	38.46 ± 1.27	n = 15	[RAX] Radiometer ABL 80 Flex
51.00 ± 0.56	68.46 ± 0.28	21.80 ± 0.29	30.50 ± 0.26	37.64 ± 0.52	n = 7	[RAN] Radiometer ABL700 series
51.53 ± 1.11	69.39 ± 1.49	22.26 ± 0.36	30.89 ± 0.47	38.27 ± 0.63	n = 50	[RAP] Radiometer ABL800 series
53.51 ± 1.30	73.49 ± 2.31	23.03 ± 0.56	32.42 ± 0.67	40.08 ± 0.90	n = 6	[ROW] Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Po2 (mmHg)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code] Instrument
142.45 ± 5.69	163.26 ± 5.90	131.38 ± 5.76	219.40 ± 8.72	90.61 ± 6.90	n = 219	[] All Instruments
138.21 ± 4.60	163.60 ± 6.52	121.94 ± 8.53	212.23 ± 17.14	90.57 ± 1.77	n = 6	[AVQ] Opti Medical OPTI CCA
139.73 ± 3.23	159.01 ± 5.14	129.16 ± 3.37	219.20 ± 8.00	90.71 ± 3.14	n = 31	[BYS] Siemens Rapid Point 405
136.51 ± 2.14	155.30 ± 4.40	124.69 ± 3.56	215.10 ± 7.75	87.21 ± 2.35	n = 4	[BYQ] Siemens Rapid Point 500
138.80 ± 4.18	163.08 ± 5.09	124.87 ± 3.94	225.08 ± 5.89	84.06 ± 3.44	n = 19	[BYT] Siemens RapidLab 1200 Series
143.72 ± 7.02	161.49 ± 6.46	129.91 ± 7.79	198.81 ± 11.24	103.42 ± 9.95	n = 21	[IAA] i-STAT
147.68 ± 3.89	168.36 ± 3.71	135.08 ± 2.30	224.72 ± 4.56	88.60 ± 1.51	n = 16	[MAA] IL Gem Premier 3000
146.21 ± 1.90	167.13 ± 4.62	135.16 ± 2.07	221.86 ± 4.09	89.08 ± 1.57	n = 11	[MAD] IL Gem Premier 3500
144.81 ± 4.47	165.63 ± 7.90	133.59 ± 3.51	220.06 ± 6.61	90.57 ± 2.94	n = 15	[MAC] IL Gem Premier 4000
144.15 ± 4.76	167.69 ± 1.85	132.29 ± 4.72	231.58 ± 5.84	84.93 ± 2.08	n = 8	[NOG] NOVA Critical Care Xpress
133.19 ± 4.77	158.75 ± 4.56	124.38 ± 3.42	216.75 ± 6.51	76.02 ± 2.80	n = 15	[RAX] Radiometer ABL 80 Flex
141.29 ± 2.02	161.34 ± 3.19	131.49 ± 2.52	215.92 ± 3.38	90.61 ± 2.58	n = 7	[RAN] Radiometer ABL700 series
143.53 ± 2.99	163.33 ± 3.46	133.82 ± 2.60	217.84 ± 4.25	94.04 ± 1.97	n = 50	[RAP] Radiometer ABL800 series
152.03 ± 2.38	170.20 ± 3.26	138.65 ± 2.74	221.09 ± 5.32	109.26 ± 1.24	n = 6	[ROW] Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Glucose (mg/dL)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code]	Instrument
158.8 ± 7.68	87.6 ± 5.34	51.1 ± 2.72	261.3 ± 8.95	228.0 ± 8.03	n = 63	[]	All Instruments
161.5 ± 2.33	87.0 ± 1.00	48.8 ± 0.41	266.7 ± 6.60	232.4 ± 4.45	n = 5	[BYS]	Siemens Rapid Point 405
151.1 ± 2.41	84.9 ± 1.83	51.2 ± 2.10	250.0 ± 3.03	217.6 ± 3.48	n = 5	[BYT]	Siemens RapidLab 1200 Series
151.3 ± 1.38	82.4 ± 0.56	50.0 ± 0.00	256.7 ± 1.21	221.8 ± 1.85	n = 6	[IAA]	i-STAT
150.8 ± 3.80	79.0 ± 4.61	46.7 ± 2.69	254.4 ± 3.49	223.3 ± 7.66	n = 4	[MAA]	IL Gem Premier 3000
145.2 ± 4.10	79.6 ± 3.87	45.7 ± 1.37	266.0 ± 3.61	220.5 ± 7.22	n = 3	[MAD]	IL Gem Premier 3500
151.4 ± 2.91	81.0 ± 1.76	46.5 ± 0.57	256.4 ± 4.70	221.5 ± 1.23	n = 4	[MAC]	IL Gem Premier 4000
164.7 ± 3.48	91.5 ± 2.94	53.0 ± 0.55	271.7 ± 5.61	233.0 ± 5.86	n = 7	[NOG]	NOVA Critical Care Xpress
162.7 ± 3.71	91.2 ± 2.88	52.5 ± 1.43	263.4 ± 7.70	232.4 ± 4.66	n = 23	[RAP]	Radiometer ABL800 series

Sodium (mmol/L)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code]	Instrument
119.5 ± 2.04	109.9 ± 1.25	152.8 ± 1.72	122.1 ± 1.33	132.8 ± 1.97	n = 83	[]	All Instruments
115.8 ± 0.41	106.1 ± 0.60	151.9 ± 1.01	119.9 ± 0.60	130.1 ± 0.60	n = 8	[BYS]	Siemens Rapid Point 405
117.0 ± 0.00	109.8 ± 1.59	150.4 ± 0.53	121.7 ± 0.52	130.1 ± 0.92	n = 8	[BYT]	Siemens RapidLab 1200 Series
122.2 ± 0.41	110.0 ± 0.00	155.6 ± 0.73	121.6 ± 0.73	135.7 ± 0.85	n = 9	[IAA]	i-STAT
120.2 ± 0.41	109.3 ± 0.90	155.8 ± 1.27	123.0 ± 0.75	134.0 ± 0.00	n = 4	[MAA]	IL Gem Premier 3000
120.7 ± 0.51	109.3 ± 0.51	156.7 ± 0.51	123.3 ± 0.51	135.3 ± 0.51	n = 3	[MAD]	IL Gem Premier 3500
120.5 ± 0.57	110.4 ± 0.68	152.3 ± 0.54	123.0 ± 0.00	134.0 ± 0.00	n = 8	[MAC]	IL Gem Premier 4000
118.2 ± 0.66	110.0 ± 0.00	153.0 ± 0.00	120.8 ± 0.66	131.6 ± 0.56	n = 7	[NOG]	NOVA Critical Care Xpress
119.7 ± 0.77	109.8 ± 0.61	152.7 ± 0.99	122.9 ± 0.87	132.8 ± 0.86	n = 25	[RAP]	Radiometer ABL800 series
120.3 ± 0.51	110.3 ± 0.51	151.3 ± 0.51	122.0 ± 0.00	132.7 ± 0.51	n = 3	[ROW]	Roche OMNI/Cobas series

Potassium (mmol/L)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code]	Instrument
2.54 ± 0.09	7.50 ± 0.18	6.70 ± 0.15	3.42 ± 0.09	4.24 ± 0.07	n = 84	[]	All Instruments
2.50 ± 0.00	7.49 ± 0.08	6.70 ± 0.00	3.40 ± 0.00	4.20 ± 0.00	n = 9	[BYS]	Siemens Rapid Point 405
2.41 ± 0.05	7.67 ± 0.05	6.78 ± 0.06	3.40 ± 0.00	4.20 ± 0.00	n = 8	[BYT]	Siemens RapidLab 1200 Series
2.54 ± 0.06	7.27 ± 0.07	6.60 ± 0.00	3.32 ± 0.04	4.20 ± 0.00	n = 9	[IAA]	i-STAT
2.40 ± 0.00	7.40 ± 0.00	6.50 ± 0.00	3.30 ± 0.00	4.10 ± 0.00	n = 4	[MAA]	IL Gem Premier 3000
2.43 ± 0.05	7.44 ± 0.10	6.50 ± 0.00	3.30 ± 0.00	4.13 ± 0.05	n = 3	[MAD]	IL Gem Premier 3500
2.52 ± 0.04	7.70 ± 0.00	6.78 ± 0.07	3.45 ± 0.06	4.30 ± 0.00	n = 8	[MAC]	IL Gem Premier 4000
2.62 ± 0.05	7.76 ± 0.09	6.97 ± 0.07	3.50 ± 0.00	4.34 ± 0.06	n = 7	[NOG]	NOVA Critical Care Xpress
2.60 ± 0.00	7.50 ± 0.00	6.68 ± 0.05	3.50 ± 0.00	4.28 ± 0.04	n = 25	[RAP]	Radiometer ABL800 series
2.37 ± 0.05	7.40 ± 0.00	6.77 ± 0.05	3.30 ± 0.00	4.17 ± 0.05	n = 3	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Chloride (mmol/L)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code]	Instrument
83.2 ± 3.47	72.9 ± 3.20	116.7 ± 3.28	68.9 ± 3.57	97.3 ± 3.08	n = 56	[]	All Instruments
82.8 ± 0.73	72.0 ± 0.90	118.2 ± 0.91	66.7 ± 0.97	98.3 ± 0.51	n = 6	[BYS]	Siemens Rapid Point 405
86.0 ± 0.75	76.5 ± 0.57	118.5 ± 0.57	72.5 ± 2.17	100.0 ± 1.50	n = 4	[BYT]	Siemens RapidLab 1200 Series
77.2 ± 0.41	70.2 ± 0.41	111.1 ± 1.13	65.0 ± 0.00	92.6 ± 1.09	n = 5	[IAA]	i-STAT
85.0 ± 0.00	75.0 ± 0.00	120.5 ± 1.07	72.6 ± 0.55	100.0 ± 0.64	n = 5	[MAC]	IL Gem Premier 4000
88.2 ± 1.71	78.2 ± 1.99	120.4 ± 1.30	74.5 ± 2.20	101.5 ± 1.75	n = 7	[NOG]	NOVA Critical Care Xpress
81.6 ± 0.86	71.7 ± 0.85	114.7 ± 0.97	67.8 ± 1.33	95.9 ± 0.92	n = 19	[RAP]	Radiometer ABL800 series

Ionized Calcium (mmol/L)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code]	Instrument
1.029 ± 0.036	1.470 ± 0.053	0.550 ± 0.067	0.822 ± 0.047	1.192 ± 0.037	n = 85	[]	All Instruments
1.000 ± 0.007	1.451 ± 0.014	0.504 ± 0.019	0.793 ± 0.012	1.161 ± 0.014	n = 10	[BYS]	Siemens Rapid Point 405
1.006 ± 0.017	1.395 ± 0.018	0.586 ± 0.048	0.848 ± 0.030	1.126 ± 0.022	n = 12	[BYT]	Siemens RapidLab 1200 Series
1.015 ± 0.010	1.430 ± 0.000	0.490 ± 0.006	0.746 ± 0.006	1.196 ± 0.006	n = 6	[IAA]	i-STAT
1.016 ± 0.013	1.494 ± 0.013	0.482 ± 0.017	0.780 ± 0.000	1.203 ± 0.028	n = 5	[MAA]	IL Gem Premier 3000
1.017 ± 0.005	1.494 ± 0.010	0.485 ± 0.019	0.773 ± 0.005	1.210 ± 0.009	n = 3	[MAD]	IL Gem Premier 3500
1.029 ± 0.006	1.510 ± 0.015	0.474 ± 0.007	0.800 ± 0.000	1.200 ± 0.012	n = 8	[MAC]	IL Gem Premier 4000
1.022 ± 0.032	1.457 ± 0.032	0.563 ± 0.017	0.821 ± 0.025	1.180 ± 0.023	n = 6	[NOG]	NOVA Critical Care Xpress
1.083 ± 0.005	1.517 ± 0.014	0.642 ± 0.015	0.870 ± 0.009	1.240 ± 0.009	n = 3	[RAN]	Radiometer ABL700 series
1.075 ± 0.008	1.517 ± 0.017	0.613 ± 0.027	0.862 ± 0.007	1.221 ± 0.015	n = 23	[RAP]	Radiometer ABL800 series
0.995 ± 0.012	1.438 ± 0.037	0.510 ± 0.008	0.760 ± 0.011	1.185 ± 0.019	n = 4	[ROW]	Roche OMNI/Cobas series

Ionized Magnesium (mmol/L)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code]	Instrument
0.972 ± 0.096	0.641 ± 0.037	1.076 ± 0.115	1.253 ± 0.113	0.713 ± 0.041	n = 3	[]	All Instruments

Lactate (mmol/L)

Specimen: G31	Specimen: G32	Specimen: G33	Specimen: G34	Specimen: G35	Number	[Code]	Instrument
5.45 ± 0.16	3.51 ± 0.14	1.83 ± 0.11	8.72 ± 0.48	6.36 ± 0.24	n = 45	[]	All Instruments
5.44 ± 0.10	3.58 ± 0.04	2.00 ± 0.00	8.81 ± 0.11	6.32 ± 0.19	n = 4	[BYT]	Siemens RapidLab 1200 Series
5.50 ± 0.06	3.49 ± 0.11	1.80 ± 0.00	9.24 ± 0.28	6.43 ± 0.28	n = 6	[MAA]	IL Gem Premier 3000
5.42 ± 0.15	3.53 ± 0.05	1.80 ± 0.09	9.57 ± 0.23	6.52 ± 0.15	n = 3	[MAD]	IL Gem Premier 3500
5.00 ± 0.09	3.23 ± 0.05	1.67 ± 0.05	8.33 ± 0.32	5.90 ± 0.18	n = 3	[MAC]	IL Gem Premier 4000
5.46 ± 0.11	3.49 ± 0.12	1.81 ± 0.07	8.48 ± 0.31	6.33 ± 0.21	n = 19	[RAP]	Radiometer ABL800 series