

Statistical Summary
Blood pH and Gas/Chemistry Proficiency Testing
Event 12-3 – November 26, 2012

Attached is a summary of participant performance (mean and standard deviation) for the Blood pH and Gas/Chemistry proficiency test survey shipped November 26, 2012. Test specimens were commercially prepared and contained carbon dioxide and oxygen balanced with nitrogen in a physiologically buffered matrix. Five specimens (**G21, G22, G23, G24, G25**) 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: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code] Instrument System
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7.627 ± 0.028	7.355 ± 0.016	7.248 ± 0.015	7.504 ± 0.023	7.130 ± 0.024	n = 216	[---] All Instruments
7.628 ± 0.028	7.344 ± 0.005	7.250 ± 0.007	7.493 ± 0.012	7.143 ± 0.007	n = 5	[AVQ] Opti Medical OPTI CCA
7.625 ± 0.007	7.348 ± 0.006	7.237 ± 0.007	7.494 ± 0.006	7.103 ± 0.007	n = 34	[BYS] Siemens Rapid Point 405
7.648 ± 0.006	7.379 ± 0.004	7.271 ± 0.005	7.519 ± 0.005	7.155 ± 0.007	n = 18	[BYT] Siemens RapidLab 1200 Series
7.687 ± 0.012	7.381 ± 0.011	7.277 ± 0.008	7.558 ± 0.011	7.165 ± 0.007	n = 17	[IAA] i-STAT
7.661 ± 0.010	7.365 ± 0.006	7.248 ± 0.006	7.530 ± 0.000	7.110 ± 0.006	n = 18	[MAA] IL Gem Premier 3000
7.645 ± 0.009	7.355 ± 0.006	7.240 ± 0.000	7.509 ± 0.008	7.108 ± 0.004	n = 14	[MAC] IL Gem Premier 4000
7.662 ± 0.005	7.366 ± 0.006	7.252 ± 0.009	7.530 ± 0.005	7.112 ± 0.005	n = 7	[MAD] IL Gem Premier 3500
7.622 ± 0.013	7.372 ± 0.007	7.276 ± 0.009	7.507 ± 0.007	7.164 ± 0.008	n = 8	[NOG] NOVA Critical Care Xpress
7.605 ± 0.008	7.348 ± 0.010	7.245 ± 0.009	7.516 ± 0.008	7.139 ± 0.009	n = 16	[RAX] Radiometer ABL 80 Flex
7.604 ± 0.006	7.345 ± 0.005	7.242 ± 0.004	7.485 ± 0.004	7.132 ± 0.004	n = 9	[RAN] Radiometer ABL700 series
7.605 ± 0.005	7.344 ± 0.005	7.242 ± 0.004	7.485 ± 0.004	7.131 ± 0.003	n = 49	[RAP] Radiometer ABL800 series
7.590 ± 0.000	7.348 ± 0.007	7.257 ± 0.008	7.478 ± 0.008	7.141 ± 0.007	n = 5	[ROW] Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Pco2 (mmHg)

Specimen: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code] Instrument System
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21.67 ± 1.11	42.13 ± 1.98	52.01 ± 2.55	30.84 ± 1.31	71.26 ± 4.59	n = 216	[---] All Instruments
22.55 ± 0.48	41.73 ± 0.42	51.97 ± 0.72	31.94 ± 0.98	71.13 ± 1.30	n = 5	[AVQ] Opti Medical OPTI CCA
22.79 ± 0.71	44.46 ± 1.46	55.37 ± 2.32	32.43 ± 1.28	77.62 ± 5.27	n = 34	[BYS] Siemens Rapid Point 405
20.59 ± 0.78	40.66 ± 1.40	51.14 ± 1.36	29.90 ± 0.79	70.39 ± 2.25	n = 18	[BYT] Siemens RapidLab 1200 Series
20.58 ± 0.60	38.73 ± 0.91	47.45 ± 0.91	29.27 ± 0.76	64.97 ± 0.97	n = 17	[IAA] i-STAT
21.22 ± 0.88	43.68 ± 1.36	53.85 ± 1.13	30.77 ± 0.65	76.75 ± 1.74	n = 18	[MAA] IL Gem Premier 3000
20.59 ± 0.56	41.42 ± 1.41	50.41 ± 0.94	29.53 ± 0.61	72.21 ± 1.73	n = 14	[MAC] IL Gem Premier 4000
20.83 ± 0.92	43.26 ± 1.11	53.17 ± 0.92	30.79 ± 0.47	75.00 ± 3.37	n = 7	[MAD] IL Gem Premier 3500
21.61 ± 1.28	40.19 ± 2.49	48.96 ± 3.48	30.37 ± 2.64	66.24 ± 2.20	n = 8	[NOG] NOVA Critical Care Xpress
21.65 ± 1.12	43.14 ± 0.74	53.71 ± 1.60	31.33 ± 0.68	72.82 ± 2.25	n = 16	[RAX] Radiometer ABL 80 Flex
21.85 ± 0.28	41.35 ± 0.55	51.18 ± 0.62	30.60 ± 0.50	68.94 ± 0.71	n = 9	[RAN] Radiometer ABL700 series
21.84 ± 0.42	41.70 ± 0.68	51.33 ± 1.05	30.82 ± 0.50	69.15 ± 1.46	n = 49	[RAP] Radiometer ABL800 series
22.73 ± 0.20	43.83 ± 0.53	53.57 ± 1.08	32.74 ± 0.59	73.47 ± 1.18	n = 5	[ROW] Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Po2 (mmHg)

Specimen: G21 -----	Specimen: G22 -----	Specimen: G23 -----	Specimen: G24 -----	Specimen: G25 -----	Number -----	[Code] Instrument System -----
132.44 ± 6.46	178.55 ± 7.57	142.72 ± 6.28	217.93 ± 9.44	163.19 ± 7.68	n = 216	[---] All Instruments
129.95 ± 7.42	170.32 ± 1.51	137.37 ± 3.51	214.72 ± 6.38	161.05 ± 7.40	n = 5	[AVQ] Opti Medical OPTI CCA
128.56 ± 3.29	173.27 ± 4.43	138.69 ± 3.23	215.44 ± 6.65	157.52 ± 5.00	n = 34	[BYS] Siemens Rapid Point 405
125.67 ± 4.08	178.36 ± 5.53	138.05 ± 3.94	222.14 ± 9.41	160.02 ± 7.21	n = 18	[BYT] Siemens RapidLab 1200 Series
137.28 ± 6.44	175.56 ± 8.65	148.96 ± 5.25	206.15 ± 9.78	165.38 ± 7.07	n = 17	[IAA] i-STAT
138.71 ± 3.26	188.70 ± 6.19	147.88 ± 4.28	225.12 ± 6.96	173.01 ± 4.70	n = 18	[MAA] IL Gem Premier 3000
136.41 ± 5.60	181.28 ± 3.85	144.90 ± 4.00	215.33 ± 4.53	164.56 ± 5.74	n = 14	[MAC] IL Gem Premier 4000
136.03 ± 2.37	186.93 ± 2.24	147.69 ± 3.22	222.79 ± 4.70	170.59 ± 2.59	n = 7	[MAD] IL Gem Premier 3500
133.19 ± 2.63	189.31 ± 8.31	148.52 ± 7.67	234.52 ± 8.47	172.10 ± 8.62	n = 8	[NOG] NOVA Critical Care Xpress
122.29 ± 4.49	174.05 ± 6.81	136.10 ± 4.43	212.34 ± 12.19	157.13 ± 6.06	n = 16	[RAX] Radiometer ABL 80 Flex
130.50 ± 2.05	174.60 ± 2.67	140.35 ± 1.35	214.78 ± 3.31	160.13 ± 2.87	n = 9	[RAN] Radiometer ABL700 series
134.33 ± 2.47	178.48 ± 3.76	143.28 ± 2.84	216.90 ± 5.94	162.64 ± 4.14	n = 49	[RAP] Radiometer ABL800 series
139.53 ± 2.71	185.37 ± 4.08	154.64 ± 3.27	219.12 ± 7.41	173.14 ± 2.53	n = 5	[ROW] Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Glucose (mg/dL)

Specimen: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code]	Instrument System
50.5 ± 2.34	192.4 ± 5.66	159.4 ± 6.08	260.4 ± 8.42	88.6 ± 5.12	n = 62	[---]	All Instruments
50.8 ± 1.89	196.1 ± 3.31	160.7 ± 1.38	262.4 ± 1.52	89.7 ± 2.18	n = 5	[BYS]	Siemens Rapid Point 405
50.8 ± 2.68	186.2 ± 1.27	152.8 ± 3.73	248.4 ± 4.85	87.5 ± 2.32	n = 4	[BYT]	Siemens RapidLab 1200 Series
50.2 ± 1.16	190.6 ± 1.98	155.6 ± 2.05	264.0 ± 1.91	85.0 ± 0.93	n = 5	[IAA]	i-STAT
45.0 ± 1.65	184.2 ± 5.43	150.9 ± 7.44	247.1 ± 15.29	77.5 ± 5.33	n = 4	[MAA]	IL Gem Premier 3000
48.3 ± 0.90	189.5 ± 2.83	153.2 ± 1.96	263.0 ± 4.75	82.7 ± 2.43	n = 4	[MAC]	IL Gem Premier 4000
47.8 ± 2.36	188.7 ± 4.22	151.9 ± 2.05	252.9 ± 8.31	76.9 ± 2.86	n = 3	[MAD]	IL Gem Premier 3500
52.3 ± 2.75	203.8 ± 3.66	166.0 ± 2.66	272.1 ± 3.50	91.2 ± 5.55	n = 6	[NOG]	NOVA Critical Care Xpress
51.0 ± 0.90	192.0 ± 2.70	160.8 ± 4.10	259.2 ± 4.11	89.6 ± 2.56	n = 3	[RAN]	Radiometer ABL700 series
51.1 ± 1.11	193.9 ± 3.29	162.5 ± 3.43	260.1 ± 5.74	91.1 ± 2.96	n = 22	[RAP]	Radiometer ABL800 series

Sodium (mmol/L)

Specimen: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code]	Instrument System
153.2 ± 2.00	127.9 ± 1.90	119.5 ± 2.09	122.0 ± 1.29	109.7 ± 1.42	n = 78	[---]	All Instruments
152.7 ± 0.46	125.3 ± 0.47	116.4 ± 0.52	120.0 ± 0.00	106.6 ± 0.52	n = 8	[BYS]	Siemens Rapid Point 405
149.5 ± 0.92	125.4 ± 0.52	117.0 ± 0.00	121.8 ± 1.01	109.3 ± 1.55	n = 6	[BYT]	Siemens RapidLab 1200 Series
156.0 ± 0.91	130.5 ± 0.57	122.4 ± 0.68	121.7 ± 0.54	110.0 ± 0.00	n = 8	[IAA]	i-STAT
155.7 ± 1.38	128.0 ± 1.00	120.0 ± 0.64	122.4 ± 0.55	109.5 ± 0.83	n = 5	[MAA]	IL Gem Premier 3000
151.0 ± 0.00	128.8 ± 0.76	121.0 ± 0.00	123.0 ± 0.00	111.0 ± 0.82	n = 7	[MAC]	IL Gem Premier 4000
155.7 ± 0.51	128.6 ± 1.02	119.7 ± 0.51	123.0 ± 0.00	109.3 ± 0.51	n = 3	[MAD]	IL Gem Premier 3500
152.1 ± 1.51	126.0 ± 0.90	118.0 ± 0.90	121.0 ± 0.55	110.0 ± 0.00	n = 6	[NOG]	NOVA Critical Care Xpress
153.3 ± 0.51	128.7 ± 0.51	119.7 ± 0.51	123.7 ± 0.51	110.7 ± 0.51	n = 3	[RAN]	Radiometer ABL700 series
153.4 ± 0.95	128.4 ± 0.88	119.8 ± 0.92	122.6 ± 0.86	109.8 ± 0.86	n = 23	[RAP]	Radiometer ABL800 series
153.3 ± 1.37	128.3 ± 0.51	120.3 ± 0.51	121.7 ± 0.51	110.3 ± 0.51	n = 3	[ROW]	Roche OMNI/Cobas series

Potassium (mmol/L)

Specimen: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code]	Instrument System
6.71 ± 0.12	3.79 ± 0.06	2.54 ± 0.08	3.43 ± 0.09	7.51 ± 0.16	n = 79	[---]	All Instruments
6.72 ± 0.05	3.80 ± 0.00	2.50 ± 0.00	3.42 ± 0.04	7.47 ± 0.06	n = 9	[BYS]	Siemens Rapid Point 405
6.80 ± 0.00	3.70 ± 0.00	2.40 ± 0.00	3.40 ± 0.00	7.70 ± 0.05	n = 6	[BYT]	Siemens RapidLab 1200 Series
6.62 ± 0.04	3.80 ± 0.00	2.52 ± 0.04	3.30 ± 0.00	7.26 ± 0.07	n = 8	[IAA]	i-STAT
6.50 ± 0.00	3.64 ± 0.06	2.44 ± 0.06	3.30 ± 0.00	7.50 ± 0.00	n = 5	[MAA]	IL Gem Premier 3000
6.80 ± 0.00	3.80 ± 0.00	2.50 ± 0.00	3.48 ± 0.05	7.75 ± 0.07	n = 7	[MAC]	IL Gem Premier 4000
6.50 ± 0.00	3.63 ± 0.05	2.43 ± 0.05	3.33 ± 0.05	7.50 ± 0.00	n = 3	[MAD]	IL Gem Premier 3500
6.90 ± 0.09	3.80 ± 0.00	2.60 ± 0.00	3.50 ± 0.00	7.72 ± 0.07	n = 6	[NOG]	NOVA Critical Care Xpress
6.67 ± 0.05	3.83 ± 0.05	2.60 ± 0.00	3.50 ± 0.00	7.50 ± 0.00	n = 3	[RAN]	Radiometer ABL700 series
6.70 ± 0.05	3.80 ± 0.00	2.60 ± 0.00	3.50 ± 0.00	7.47 ± 0.06	n = 23	[RAP]	Radiometer ABL800 series
6.80 ± 0.00	3.67 ± 0.05	2.37 ± 0.05	3.30 ± 0.00	7.40 ± 0.00	n = 3	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Chloride (mmol/L)

Specimen: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code]	Instrument System
116.0 ± 3.41	90.1 ± 2.81	82.8 ± 2.81	69.2 ± 3.02	73.1 ± 2.47	n = 52	[---]	All Instruments
116.3 ± 0.97	91.0 ± 0.00	83.0 ± 0.00	68.0 ± 0.00	73.0 ± 0.00	n = 6	[BYS]	Siemens Rapid Point 405
117.5 ± 1.86	92.4 ± 1.02	85.5 ± 1.86	70.7 ± 0.51	74.7 ± 1.37	n = 3	[BYT]	Siemens RapidLab 1200 Series
110.2 ± 1.46	85.8 ± 0.41	78.8 ± 1.27	65.5 ± 0.57	73.0 ± 0.75	n = 4	[IAA]	i-STAT
121.2 ± 0.41	93.0 ± 0.00	85.2 ± 0.41	72.8 ± 0.41	75.5 ± 0.57	n = 4	[MAC]	IL Gem Premier 4000
121.6 ± 0.55	94.9 ± 1.43	88.3 ± 1.68	73.6 ± 1.09	78.5 ± 2.11	n = 6	[NOG]	NOVA Critical Care Xpress
114.7 ± 0.51	88.3 ± 0.51	81.3 ± 0.51	67.8 ± 1.54	71.6 ± 1.02	n = 3	[RAN]	Radiometer ABL700 series
114.6 ± 0.67	88.8 ± 0.83	81.8 ± 0.72	68.1 ± 1.43	71.8 ± 0.85	n = 18	[RAP]	Radiometer ABL800 series

Ionized Calcium (mmol/L)

Specimen: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code]	Instrument System
0.556 ± 0.078	1.322 ± 0.056	1.038 ± 0.039	0.829 ± 0.047	1.478 ± 0.058	n = 78	[---]	All Instruments
0.511 ± 0.024	1.277 ± 0.007	1.007 ± 0.008	0.809 ± 0.014	1.442 ± 0.008	n = 9	[BYS]	Siemens Rapid Point 405
0.576 ± 0.048	1.193 ± 0.019	1.006 ± 0.018	0.848 ± 0.030	1.396 ± 0.020	n = 10	[BYT]	Siemens RapidLab 1200 Series
0.707 ± 0.575	1.914 ± 1.584	1.463 ± 1.223	1.090 ± 0.873	2.085 ± 1.695	n = 4	[IAA]	i-STAT
0.472 ± 0.011	1.351 ± 0.026	1.021 ± 0.014	0.780 ± 0.000	1.521 ± 0.014	n = 5	[MAA]	IL Gem Premier 3000
0.468 ± 0.009	1.360 ± 0.022	1.046 ± 0.013	0.803 ± 0.015	1.530 ± 0.020	n = 7	[MAC]	IL Gem Premier 4000
0.473 ± 0.005	1.340 ± 0.009	1.020 ± 0.000	0.777 ± 0.005	1.506 ± 0.010	n = 3	[MAD]	IL Gem Premier 3500
0.572 ± 0.042	1.282 ± 0.023	1.039 ± 0.040	0.837 ± 0.026	1.447 ± 0.008	n = 5	[NOG]	NOVA Critical Care Xpress
0.628 ± 0.021	1.360 ± 0.015	1.083 ± 0.008	0.871 ± 0.011	1.520 ± 0.008	n = 4	[RAN]	Radiometer ABL700 series
0.630 ± 0.032	1.354 ± 0.018	1.079 ± 0.014	0.870 ± 0.019	1.513 ± 0.022	n = 23	[RAP]	Radiometer ABL800 series
0.513 ± 0.005	1.310 ± 0.009	1.003 ± 0.005	0.763 ± 0.005	1.424 ± 0.026	n = 3	[ROW]	Roche OMNI/Cobas series

Ionized Magnesium (mmol/L)

Specimen: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code]	Instrument System
1.065 ± 0.081	0.137 ± 0.113	0.972 ± 0.078	1.139 ± 0.066	0.642 ± 0.032	n = 3	[---]	All Instruments
1.065 ± 0.081	0.137 ± 0.113	0.972 ± 0.078	1.139 ± 0.066	0.642 ± 0.032	n = 3	[---]	NOVA Biomedical

Lactate (mmol/L)

Specimen: G21	Specimen: G22	Specimen: G23	Specimen: G24	Specimen: G25	Number	[Code]	Instrument System
1.81 ± 0.09	4.58 ± 0.20	5.45 ± 0.24	8.65 ± 0.38	3.49 ± 0.16	n = 40	[---]	All Instruments
1.85 ± 0.04	4.64 ± 0.09	5.51 ± 0.12	8.79 ± 0.23	3.63 ± 0.09	n = 4	[BYT]	Siemens RapidLab 1200 Series
1.70 ± 0.06	4.46 ± 0.26	5.26 ± 0.32	8.72 ± 0.66	3.35 ± 0.16	n = 5	[MAA]	IL Gem Premier 3000
1.73 ± 0.05	4.34 ± 0.10	5.07 ± 0.14	8.63 ± 0.05	3.34 ± 0.10	n = 3	[MAC]	IL Gem Premier 4000
1.76 ± 0.10	4.63 ± 0.23	5.44 ± 0.26	9.06 ± 0.10	3.43 ± 0.05	n = 3	[MAD]	IL Gem Premier 3500
1.82 ± 0.05	4.56 ± 0.12	5.44 ± 0.11	8.51 ± 0.34	3.48 ± 0.11	n = 18	[RAP]	Radiometer ABL800 series