

**Statistical Summary
Blood pH and Gas/Chemistry Proficiency Testing
Event 12-2 - July 23, 2012**

Attached is a summary of participant performance (mean and standard deviation) for the Blood pH and Gas/Chemistry proficiency test survey shipped July 23, 2012. Test specimens were commercially prepared and contained carbon dioxide and oxygen balanced with nitrogen in a physiologically buffered matrix. Five specimens (**G16, G17, G18, G19, G20**) 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. Just 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)

pH

Specimen: G16	Specimen: G17	Specimen: G18	Specimen: G19	Specimen: G20	Number	[Code]	Instrument
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7.247 ± 0.017	7.703 ± 0.036	6.978 ± 0.026	7.420 ± 0.017	7.572 ± 0.023	n = 215	[---]	All Instruments
7.244 ± 0.005	7.723 ± 0.011	7.018 ± 0.008	7.422 ± 0.009	7.572 ± 0.008	n = 5	[AVQ]	Opti Medical OPTI CCA
7.217 ± 0.003	7.700 ± 0.003	6.953 ± 0.006	7.400 ± 0.001	7.568 ± 0.000	n = 3	[BYR]	Siemens Rapid Point 400
7.232 ± 0.005	7.692 ± 0.005	6.949 ± 0.008	7.412 ± 0.005	7.570 ± 0.005	n = 32	[BYS]	Siemens Rapid Point 405
7.267 ± 0.006	7.716 ± 0.013	6.991 ± 0.009	7.439 ± 0.008	7.596 ± 0.006	n = 17	[BYT]	Siemens RapidLab 1200 Series
7.277 ± 0.004	7.786 ± 0.005	6.995 ± 0.008	7.449 ± 0.006	7.624 ± 0.004	n = 17	[IAA]	i-STAT
7.249 ± 0.009	7.750 ± 0.004	6.996 ± 0.016	7.433 ± 0.006	7.595 ± 0.006	n = 18	[MAA]	IL Gem Premier 3000
7.239 ± 0.005	7.737 ± 0.009	6.981 ± 0.009	7.424 ± 0.009	7.579 ± 0.007	n = 14	[MAC]	IL Gem Premier 4000
7.252 ± 0.007	7.755 ± 0.011	6.996 ± 0.009	7.438 ± 0.005	7.597 ± 0.015	n = 7	[MAD]	IL Gem Premier 3500
7.280 ± 0.010	7.692 ± 0.006	7.023 ± 0.012	7.431 ± 0.007	7.567 ± 0.009	n = 8	[NOG]	NOVA Critical Care Xpress
7.244 ± 0.013	7.682 ± 0.011	6.938 ± 0.009	7.409 ± 0.008	7.553 ± 0.011	n = 16	[RAX]	Radiometer ABL 80 Flex
7.240 ± 0.002	7.678 ± 0.002	6.972 ± 0.006	7.406 ± 0.003	7.555 ± 0.004	n = 9	[RAN]	Radiometer ABL700 series
7.241 ± 0.005	7.678 ± 0.004	6.974 ± 0.007	7.407 ± 0.005	7.555 ± 0.004	n = 49	[RAP]	Radiometer ABL800 series
7.260 ± 0.011	7.656 ± 0.004	7.027 ± 0.010	7.408 ± 0.009	7.537 ± 0.009	n = 5	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Pco2 (mmHg)

Specimen: G16	Specimen: G17	Specimen: G18	Specimen: G19	Specimen: G20	Number	[Code]	Instrument
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52.22 ± 2.69	17.65 ± 1.02	73.35 ± 4.70	38.06 ± 1.90	25.24 ± 1.21	n = 215	[---]	All Instruments
51.35 ± 0.61	18.73 ± 0.79	70.38 ± 1.56	36.51 ± 3.30	25.81 ± 1.88	n = 5	[AVQ]	Opti Medical OPTI CCA
59.49 ± 1.42	17.70 ± 0.64	83.76 ± 1.02	41.20 ± 0.09	25.97 ± 0.60	n = 3	[BYR]	Siemens Rapid Point 400
56.01 ± 2.58	18.79 ± 1.36	79.93 ± 4.57	40.11 ± 1.37	25.97 ± 1.20	n = 32	[BYS]	Siemens Rapid Point 405
52.23 ± 1.62	16.76 ± 0.83	73.86 ± 3.36	36.99 ± 1.22	23.93 ± 0.95	n = 17	[BYT]	Siemens RapidLab 1200 Series
47.79 ± 1.81	18.27 ± 0.44	68.66 ± 1.25	34.09 ± 0.75	22.98 ± 0.41	n = 17	[IAA]	i-STAT
53.98 ± 1.63	17.00 ± 0.69	73.23 ± 3.00	38.34 ± 0.85	25.77 ± 0.48	n = 18	[MAA]	IL Gem Premier 3000
51.11 ± 1.63	16.35 ± 0.55	71.60 ± 2.74	36.01 ± 0.74	23.74 ± 0.84	n = 14	[MAC]	IL Gem Premier 4000
52.95 ± 1.01	17.00 ± 0.47	72.47 ± 4.05	38.00 ± 0.82	26.00 ± 0.00	n = 7	[MAD]	IL Gem Premier 3500
50.29 ± 1.84	17.88 ± 0.76	69.06 ± 2.69	37.91 ± 0.99	25.26 ± 0.93	n = 8	[NOG]	NOVA Critical Care Xpress
53.29 ± 1.69	17.42 ± 0.89	78.47 ± 2.22	38.79 ± 1.28	25.45 ± 0.81	n = 16	[RAX]	Radiometer ABL 80 Flex
51.42 ± 1.64	17.64 ± 0.49	72.81 ± 1.88	38.39 ± 0.69	25.38 ± 0.48	n = 9	[RAN]	Radiometer ABL700 series
51.26 ± 1.12	17.72 ± 0.45	72.08 ± 1.94	38.30 ± 0.68	25.62 ± 0.43	n = 49	[RAP]	Radiometer ABL800 series
53.19 ± 2.56	18.31 ± 0.35	69.48 ± 2.84	38.91 ± 1.21	26.07 ± 0.78	n = 5	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Po2 (mmHg)

Specimen: G16 -----	Specimen: G17 -----	Specimen: G18 -----	Specimen: G19 -----	Specimen: G20 -----	Number -----	[Code] Instrument -----
143.17 ± 6.74	201.12 ± 8.32	112.44 ± 6.56	90.83 ± 7.36	76.01 ± 8.09	n = 215	[---] All Instruments
135.16 ± 7.96	199.43 ± 5.15	107.10 ± 4.85	91.27 ± 1.62	81.98 ± 3.06	n = 5	[AVQ] Opti Medical OPTI CCA
143.92 ± 3.14	203.67 ± 2.87	109.77 ± 0.76	84.97 ± 1.40	68.97 ± 0.42	n = 3	[BYR] Siemens Rapid Point 400
140.72 ± 3.49	199.57 ± 5.26	110.63 ± 2.15	90.28 ± 3.03	76.43 ± 3.94	n = 32	[BYS] Siemens Rapid Point 405
138.28 ± 5.50	204.99 ± 7.76	104.96 ± 4.71	84.46 ± 6.68	68.98 ± 5.99	n = 17	[BYT] Siemens RapidLab 1200 Series
148.14 ± 4.48	191.49 ± 7.30	123.64 ± 4.42	102.56 ± 6.64	89.24 ± 5.30	n = 17	[IAA] i-STAT
150.90 ± 3.28	209.35 ± 3.73	113.82 ± 2.82	89.36 ± 1.93	74.20 ± 2.06	n = 18	[MAA] IL Gem Premier 3000
149.11 ± 12.38	199.95 ± 7.09	114.30 ± 3.92	92.76 ± 5.14	75.30 ± 2.88	n = 14	[MAC] IL Gem Premier 4000
146.47 ± 6.86	203.05 ± 11.42	110.10 ± 5.89	86.89 ± 3.62	72.59 ± 2.40	n = 7	[MAD] IL Gem Premier 3500
145.09 ± 6.46	207.09 ± 7.40	111.32 ± 3.49	86.00 ± 5.10	68.53 ± 4.11	n = 8	[NOG] NOVA Critical Care Xpress
135.41 ± 6.11	192.65 ± 13.03	103.68 ± 4.54	77.92 ± 3.84	61.44 ± 2.91	n = 16	[RAX] Radiometer ABL 80 Flex
140.28 ± 3.19	198.59 ± 4.49	111.51 ± 1.86	90.10 ± 1.99	74.97 ± 1.82	n = 9	[RAN] Radiometer ABL700 series
143.05 ± 3.43	200.35 ± 5.73	115.52 ± 2.96	94.31 ± 2.75	79.48 ± 2.35	n = 49	[RAP] Radiometer ABL800 series
154.49 ± 4.28	200.26 ± 9.65	133.25 ± 2.01	106.82 ± 2.61	94.31 ± 3.07	n = 5	[ROW] Roche OMNI/Cobas serie

Summary of Participant Performance (Mean and Standard Deviation)

Glucose (mg/dL)

Specimen: G16 -----	Specimen: G17 -----	Specimen: G18 -----	Specimen: G19 -----	Specimen: G20 -----	Number -----	[Code] Instrument -----
158.7 ± 6.31	38.6 ± 2.71	374.3 ± 13.66	229.2 ± 7.05	329.3 ± 10.56	n = 62	[---] All Instruments
161.5 ± 3.63	37.4 ± 2.56	384.1 ± 12.75	233.2 ± 6.79	340.4 ± 10.01	n = 3	[BYS] Siemens Rapid Point 405
156.0 ± 0.90	38.5 ± 1.86	356.3 ± 6.93	220.5 ± 1.86	319.4 ± 3.87	n = 3	[BYT] Siemens RapidLab 1200 Series
156.7 ± 1.37	38.3 ± 0.51	373.3 ± 5.94	228.3 ± 2.45	337.4 ± 3.06	n = 6	[IAA] i-STAT
148.5 ± 5.97	35.1 ± 2.04	367.3 ± 5.89	223.4 ± 6.24	321.8 ± 4.91	n = 4	[MAA] IL Gem Premier 3000
153.0 ± 3.16	32.7 ± 1.53	378.2 ± 8.25	227.5 ± 2.85	331.1 ± 4.67	n = 4	[MAC] IL Gem Premier 4000
150.5 ± 2.74	33.7 ± 0.51	363.7 ± 6.76	215.4 ± 2.56	323.5 ± 6.32	n = 3	[MAD] IL Gem Premier 3500
169.9 ± 2.97	40.8 ± 2.75	405.4 ± 13.86	239.4 ± 4.00	341.9 ± 10.44	n = 7	[NOG] NOVA Critical Care Xpress
160.0 ± 3.58	39.0 ± 0.90	365.7 ± 19.40	227.3 ± 5.97	320.6 ± 15.38	n = 3	[RAN] Radiometer ABL700 series
160.0 ± 3.07	39.5 ± 1.56	373.0 ± 8.61	229.9 ± 4.51	327.5 ± 7.69	n = 23	[RAP] Radiometer ABL800 series

Summary of Participant Performance (Mean and Standard Deviation)

Sodium (mmol/L)

Specimen: G16	Specimen: G17	Specimen: G18	Specimen: G19	Specimen: G20	Number	[Code]	Instrument
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119.4 ± 2.05	154.8 ± 1.50	150.4 ± 1.79	132.8 ± 1.93	137.0 ± 1.84	n = 78	[---]	All Instruments
116.0 ± 0.00	155.0 ± 0.64	149.0 ± 0.00	130.0 ± 0.64	135.0 ± 0.00	n = 5	[BYS]	Siemens Rapid Point 405
117.0 ± 0.00	152.6 ± 0.49	146.2 ± 0.59	130.0 ± 0.00	134.5 ± 0.59	n = 6	[BYT]	Siemens RapidLab 1200 Series
121.7 ± 0.85	155.0 ± 0.69	152.2 ± 0.94	135.4 ± 0.56	139.7 ± 0.61	n = 9	[IAA]	i-STAT
119.5 ± 1.07	157.2 ± 1.07	152.6 ± 1.69	133.9 ± 1.38	138.6 ± 1.33	n = 5	[MAA]	IL Gem Premier 3000
120.6 ± 0.94	154.4 ± 0.56	151.0 ± 0.93	133.8 ± 0.47	138.0 ± 0.00	n = 7	[MAC]	IL Gem Premier 4000
119.7 ± 0.51	156.3 ± 1.37	151.3 ± 0.51	134.0 ± 0.00	138.7 ± 0.51	n = 3	[MAD]	IL Gem Premier 3500
117.6 ± 0.50	153.3 ± 0.70	149.4 ± 0.70	130.8 ± 0.49	135.0 ± 0.00	n = 7	[NOG]	NOVA Critical Care Xpress
120.3 ± 0.51	156.0 ± 0.90	150.6 ± 1.02	133.7 ± 0.51	137.3 ± 0.51	n = 3	[RAN]	Radiometer ABL700 series
119.7 ± 0.92	155.4 ± 0.95	150.4 ± 0.89	132.9 ± 0.73	137.0 ± 0.85	n = 24	[RAP]	Radiometer ABL800 series
120.0 ± 0.00	153.7 ± 0.51	149.4 ± 1.02	132.7 ± 1.37	137.0 ± 0.00	n = 3	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Potassium (mmol/L)

Specimen: G16	Specimen: G17	Specimen: G18	Specimen: G19	Specimen: G20	Number	[Code]	Instrument
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2.54 ± 0.09	2.29 ± 0.12	6.12 ± 0.10	4.24 ± 0.08	4.82 ± 0.08	n = 77	[---]	All Instruments
2.50 ± 0.00	2.30 ± 0.00	6.10 ± 0.00	4.20 ± 0.00	4.80 ± 0.00	n = 6	[BYS]	Siemens Rapid Point 405
2.40 ± 0.03	2.16 ± 0.08	6.13 ± 0.07	4.20 ± 0.00	4.80 ± 0.06	n = 6	[BYT]	Siemens RapidLab 1200 Series
2.53 ± 0.05	2.23 ± 0.05	6.04 ± 0.06	4.20 ± 0.00	4.80 ± 0.00	n = 9	[IAA]	i-STAT
2.44 ± 0.06	2.16 ± 0.06	6.00 ± 0.00	4.10 ± 0.00	4.70 ± 0.00	n = 5	[MAA]	IL Gem Premier 3000
2.50 ± 0.00	2.20 ± 0.00	6.28 ± 0.08	4.30 ± 0.00	4.90 ± 0.00	n = 5	[MAC]	IL Gem Premier 4000
2.43 ± 0.05	2.10 ± 0.00	6.03 ± 0.05	4.10 ± 0.00	4.73 ± 0.05	n = 3	[MAD]	IL Gem Premier 3500
2.60 ± 0.00	2.40 ± 0.00	6.30 ± 0.00	4.30 ± 0.00	4.90 ± 0.00	n = 7	[NOG]	NOVA Critical Care Xpress
2.63 ± 0.05	2.40 ± 0.00	6.17 ± 0.05	4.30 ± 0.00	4.90 ± 0.00	n = 3	[RAN]	Radiometer ABL700 series
2.60 ± 0.00	2.39 ± 0.04	6.11 ± 0.05	4.30 ± 0.00	4.84 ± 0.06	n = 24	[RAP]	Radiometer ABL800 series
2.37 ± 0.05	2.10 ± 0.09	6.17 ± 0.05	4.13 ± 0.05	4.73 ± 0.05	n = 3	[ROW]	Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Chloride (mmol/L)

Specimen: G16	Specimen: G17	Specimen: G18	Specimen: G19	Specimen: G20	Number	[Code]	Instrument or Reagent System
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82.7 ± 3.10	108.3 ± 3.35	129.2 ± 4.18	97.1 ± 3.52	102.3 ± 3.52	n = 52	[---]	All Instruments
83.2 ± 0.41	108.2 ± 0.41	132.2 ± 0.41	98.0 ± 0.00	103.0 ± 0.00	n = 4	[BYS]	Siemens Rapid Point 405
86.3 ± 0.51	110.3 ± 0.51	134.7 ± 0.51	100.3 ± 0.51	106.0 ± 0.00	n = 3	[BYT]	Siemens RapidLab 1200 Series
78.6 ± 1.09	102.4 ± 0.55	126.4 ± 1.09	91.5 ± 0.83	97.0 ± 0.00	n = 5	[IAA]	i-STAT
84.8 ± 0.41	112.2 ± 0.41	128.1 ± 1.13	100.2 ± 0.41	105.0 ± 0.00	n = 4	[MAC]	IL Gem Premier 4000
88.7 ± 2.29	113.4 ± 1.54	134.8 ± 0.91	102.6 ± 1.68	108.2 ± 1.69	n = 7	[NOG]	NOVA Critical Care Xpress
80.7 ± 0.51	106.3 ± 0.51	127.4 ± 1.02	95.0 ± 0.00	100.3 ± 0.51	n = 3	[RAN]	Radiometer ABL700 series
81.6 ± 0.94	107.1 ± 0.92	127.3 ± 1.48	95.6 ± 0.94	100.9 ± 1.17	n = 18	[RAP]	Radiometer ABL800 series

Summary of Participant Performance (Mean and Standard Deviation)

Calcium, ionized (mmol/L)

Specimen: G16 -----	Specimen: G17 -----	Specimen: G18 -----	Specimen: G19 -----	Specimen: G20 -----	Number -----	[Code] Instrument or Reagent System -----
1.037 ± 0.044	0.825 ± 0.062	1.800 ± 0.069	1.200 ± 0.040	0.738 ± 0.057	n = 77	[---] All Instruments
1.003 ± 0.005	0.799 ± 0.011	1.701 ± 0.011	1.158 ± 0.004	0.703 ± 0.014	n = 6	[BYS] Siemens Rapid Point 405
1.019 ± 0.026	0.873 ± 0.060	1.707 ± 0.030	1.134 ± 0.034	0.758 ± 0.057	n = 10	[BYT] Siemens RapidLab 1200 Series
1.008 ± 0.011	0.768 ± 0.019	1.745 ± 0.031	1.198 ± 0.021	0.695 ± 0.008	n = 5	[IAA] i-STAT
1.020 ± 0.010	0.766 ± 0.011	1.835 ± 0.025	1.192 ± 0.008	0.688 ± 0.008	n = 5	[MAA] IL Gem Premier 3000
1.042 ± 0.013	0.778 ± 0.005	1.828 ± 0.023	1.220 ± 0.008	0.702 ± 0.007	n = 7	[MAC] IL Gem Premier 4000
1.008 ± 0.015	0.767 ± 0.005	1.831 ± 0.029	1.200 ± 0.009	0.680 ± 0.009	n = 3	[MAD] IL Gem Premier 3500
0.987 ± 0.038	0.788 ± 0.030	1.761 ± 0.027	1.166 ± 0.032	0.702 ± 0.024	n = 6	[NOG] NOVA Critical Care Xpress
1.088 ± 0.013	0.885 ± 0.006	1.874 ± 0.035	1.239 ± 0.011	0.797 ± 0.009	n = 4	[RAN] Radiometer ABL700 series
1.083 ± 0.016	0.883 ± 0.023	1.836 ± 0.019	1.226 ± 0.014	0.795 ± 0.022	n = 23	[RAP] Radiometer ABL800 series
1.000 ± 0.009	0.790 ± 0.009	1.804 ± 0.010	1.174 ± 0.010	0.697 ± 0.005	n = 3	[ROW] Roche OMNI/Cobas series

Summary of Participant Performance (Mean and Standard Deviation)

Lactate (mmol/L)

Specimen: G16	Specimen: G17	Specimen: G18	Specimen: G19	Specimen: G20	Number	[Code]	Instrument or Reagent System
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5.50 ± 0.26	0.88 ± 0.07	9.98 ± 0.58	6.50 ± 0.30	9.49 ± 0.53	n = 40	[---]	All Instruments
5.57 ± 0.18	1.00 ± 0.00	9.66 ± 0.50	6.39 ± 0.44	9.35 ± 0.68	n = 3	[BYT]	Siemens RapidLab 1200 Series
5.43 ± 0.16	0.82 ± 0.04	9.68 ± 0.49	6.49 ± 0.23	9.66 ± 0.18	n = 4	[MAA]	IL Gem Premier 3000
5.25 ± 0.19	0.90 ± 0.00	9.60 ± 0.36	6.35 ± 0.19	9.28 ± 0.15	n = 3	[MAC]	IL Gem Premier 4000
5.54 ± 0.10	0.83 ± 0.05	9.88 ± 0.15	6.57 ± 0.14	9.87 ± 0.14	n = 3	[MAD]	IL Gem Premier 3500
5.92 ± 0.24	0.87 ± 0.05	10.70 ± 0.72	6.84 ± 0.10	9.72 ± 0.68	n = 3	[NOG]	NOVA Critical Care Xpress
5.49 ± 0.24	0.88 ± 0.06	10.16 ± 0.47	6.47 ± 0.29	9.47 ± 0.48	n = 19	[RAP]	Radiometer ABL800 series