

## **Blood pH and Gas/Chemistry Educational Proficiency Test Program**

### **Statistical Summary - November 2013 (Event 13-3)**

This statistical report summarizes participant data for the five Blood pH and Gas/Chemistry proficiency survey specimens shipped November 4, 2013. Test specimens were commercially prepared and contained carbon dioxide and oxygen balanced with nitrogen in a physiologically buffered matrix. Five specimens (G36, G37, G38, G39, G40) 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 ( $\pm 1$  SD) values are calculated by a robust statistical technique that does not assume a Gaussian distribution.

Disclaimer:

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 regarding this report, please contact the Clinical Chemistry Section at (518) 474-5582.

## Summary of Participant Performance (Mean and Standard Deviation)

## pH

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code] Instrument System
7.358 ± 0.017	7.708 ± 0.038	6.985 ± 0.026	7.574 ± 0.026	7.249 ± 0.017	n = 222	[ ] All Instruments
7.390 ± 0.006	7.783 ± 0.005	7.004 ± 0.008	7.622 ± 0.005	7.280 ± 0.006	n = 20	[IAA] i-STAT
7.366 ± 0.006	7.761 ± 0.007	6.995 ± 0.011	7.597 ± 0.008	7.247 ± 0.006	n = 15	[MAA] IL Gem Premier 3000
7.367 ± 0.005	7.763 ± 0.000	6.997 ± 0.011	7.600 ± 0.000	7.251 ± 0.005	n = 12	[MAD] IL Gem Premier 3500
7.352 ± 0.009	7.729 ± 0.008	6.989 ± 0.009	7.571 ± 0.008	7.241 ± 0.007	n = 15	[MAC] IL Gem Premier 4000
7.375 ± 0.004	7.693 ± 0.007	7.025 ± 0.011	7.568 ± 0.007	7.277 ± 0.006	n = 7	[NOG] NOVA Critical Care Xpress
7.356 ± 0.008	7.726 ± 0.010	7.032 ± 0.007	7.583 ± 0.007	7.261 ± 0.007	n = 6	[AVQ] Opti Medical OPTI CCA
7.349 ± 0.010	7.678 ± 0.012	6.942 ± 0.009	7.551 ± 0.009	7.242 ± 0.009	n = 17	[RAX] Radiometer ABL 80 Flex
7.350 ± 0.000	7.692 ± 0.004	6.966 ± 0.007	7.561 ± 0.005	7.241 ± 0.006	n = 4	[RAY] Radiometer ABL 90 Flex
7.344 ± 0.004	7.680 ± 0.002	6.972 ± 0.005	7.551 ± 0.003	7.241 ± 0.000	n = 5	[RAN] Radiometer ABL700 series
7.345 ± 0.004	7.680 ± 0.002	6.978 ± 0.007	7.553 ± 0.005	7.243 ± 0.004	n = 53	[RAP] Radiometer ABL800 series
7.349 ± 0.004	7.654 ± 0.006	7.022 ± 0.010	7.530 ± 0.005	7.254 ± 0.005	n = 6	[ROW] Roche OMNI/Cobas series
7.352 ± 0.007	7.698 ± 0.005	6.958 ± 0.008	7.575 ± 0.007	7.237 ± 0.004	n = 27	[BYS] Siemens Rapid Point 405
7.352 ± 0.006	7.700 ± 0.004	6.961 ± 0.011	7.577 ± 0.008	7.239 ± 0.004	n = 7	[BYQ] Siemens Rapid Point 500
7.380 ± 0.003	7.721 ± 0.009	7.004 ± 0.007	7.600 ± 0.007	7.271 ± 0.002	n = 19	[BYT] Siemens RapidLab 1200 Series

Summary of Participant Performance (Mean and Standard Deviation)

Pco2 (mmHg)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code] Instrument System
41.76 ± 2.00	17.55 ± 0.92	72.76 ± 4.80	25.18 ± 1.25	52.34 ± 3.06	n = 222	[ ] All Instruments
38.49 ± 0.89	18.39 ± 0.42	68.90 ± 1.18	23.21 ± 0.34	48.09 ± 1.07	n = 20	[IAA] i-STAT
42.70 ± 0.77	16.32 ± 0.83	72.86 ± 2.87	24.77 ± 0.80	55.30 ± 1.51	n = 15	[MAA] IL Gem Premier 3000
42.50 ± 0.78	16.50 ± 0.57	72.60 ± 3.02	25.00 ± 0.00	54.81 ± 1.52	n = 12	[MAD] IL Gem Premier 3500
40.41 ± 0.72	17.16 ± 1.01	70.74 ± 3.67	24.18 ± 0.53	51.92 ± 0.92	n = 15	[MAC] IL Gem Premier 4000
41.00 ± 0.59	18.08 ± 0.83	69.08 ± 3.40	25.68 ± 0.39	50.18 ± 1.60	n = 7	[NOG] NOVA Critical Care Xpress
41.61 ± 0.66	17.93 ± 0.79	69.36 ± 1.48	25.00 ± 0.00	51.01 ± 0.21	n = 6	[AVQ] Opti Medical OPTI CCA
43.23 ± 1.00	17.46 ± 0.71	78.79 ± 3.15	25.54 ± 0.71	54.19 ± 1.77	n = 17	[RAX] Radiometer ABL 80 Flex
41.25 ± 0.28	17.87 ± 0.25	70.14 ± 1.93	25.44 ± 0.43	51.07 ± 0.70	n = 4	[RAY] Radiometer ABL 90 Flex
40.94 ± 0.81	17.59 ± 0.58	70.54 ± 2.18	25.86 ± 0.21	50.56 ± 0.90	n = 5	[RAN] Radiometer ABL700 series
41.18 ± 0.74	17.76 ± 0.36	71.24 ± 2.09	25.97 ± 0.41	51.25 ± 1.13	n = 53	[RAP] Radiometer ABL800 series
43.48 ± 0.77	17.93 ± 0.37	72.18 ± 0.31	26.80 ± 0.46	53.98 ± 0.82	n = 6	[ROW] Roche OMNI/Cobas series
45.16 ± 1.60	18.04 ± 0.57	82.22 ± 3.88	25.94 ± 0.89	56.67 ± 1.67	n = 27	[BYS] Siemens Rapid Point 405
44.60 ± 1.30	17.82 ± 0.08	78.48 ± 3.20	25.83 ± 0.90	55.19 ± 3.85	n = 7	[BYQ] Siemens Rapid Point 500
41.22 ± 1.14	16.13 ± 0.59	73.08 ± 2.23	23.49 ± 0.74	51.22 ± 1.68	n = 19	[BYT] Siemens RapidLab 1200 Series

Summary of Participant Performance (Mean and Standard Deviation)

Po2 (mmHg)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code]	Instrument System
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178.52 ± 7.74	200.58 ± 8.93	112.29 ± 6.77	75.71 ± 9.24	141.68 ± 6.24	n = 222	[ ]	All Instruments
169.11 ± 6.18	179.89 ± 7.27	117.29 ± 5.75	86.54 ± 3.43	139.73 ± 5.05	n = 20	[IAA]	i-STAT
187.68 ± 4.95	208.60 ± 5.52	113.42 ± 2.67	73.08 ± 1.60	148.36 ± 4.24	n = 15	[MAA]	IL Gem Premier 3000
186.80 ± 3.07	206.32 ± 4.12	114.27 ± 2.44	72.59 ± 2.54	147.64 ± 3.32	n = 12	[MAD]	IL Gem Premier 3500
180.12 ± 6.33	203.30 ± 8.07	113.61 ± 2.99	73.92 ± 2.35	143.96 ± 4.41	n = 15	[MAC]	IL Gem Premier 4000
186.22 ± 4.29	211.96 ± 2.39	111.25 ± 2.26	67.43 ± 2.11	146.06 ± 4.15	n = 7	[NOG]	NOVA Critical Care Xpress
171.72 ± 3.02	190.29 ± 10.67	105.78 ± 10.13	79.51 ± 1.72	135.54 ± 5.13	n = 6	[AVQ]	Opti Medical OPTI CCA
170.84 ± 9.05	192.44 ± 7.36	100.52 ± 3.92	59.87 ± 3.25	134.42 ± 4.62	n = 17	[RAX]	Radiometer ABL 80 Flex
175.86 ± 7.19	200.70 ± 3.17	101.21 ± 2.61	55.13 ± 2.18	138.50 ± 4.08	n = 4	[RAY]	Radiometer ABL 90 Flex
173.84 ± 0.41	198.40 ± 4.56	111.69 ± 2.70	75.95 ± 3.39	140.64 ± 2.05	n = 5	[RAN]	Radiometer ABL700 series
178.11 ± 4.27	199.39 ± 4.26	114.99 ± 3.09	79.39 ± 2.54	142.93 ± 3.69	n = 53	[RAP]	Radiometer ABL800 series
181.68 ± 3.62	203.99 ± 4.71	134.56 ± 1.84	94.05 ± 2.08	153.11 ± 1.57	n = 6	[ROW]	Roche OMNI/Cobas series
177.73 ± 6.06	200.07 ± 7.24	111.08 ± 3.43	75.71 ± 5.20	139.42 ± 3.62	n = 27	[BYS]	Siemens Rapid Point 405
175.00 ± 5.01	198.69 ± 4.97	110.19 ± 2.89	74.60 ± 3.84	137.69 ± 3.16	n = 7	[BYQ]	Siemens Rapid Point 500
178.16 ± 5.04	202.30 ± 4.36	104.30 ± 4.24	66.51 ± 5.21	134.91 ± 4.37	n = 19	[BYT]	Siemens RapidLab 1200 Series

Summary of Participant Performance (Mean and Standard Deviation)

Glucose (mg/dL)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code]	Instrument System
192.5 ± 8.65	37.5 ± 3.38	373.6 ± 16.92	328.0 ± 11.92	158.8 ± 9.17	n = 68	[ ]	All Instruments
186.1 ± 1.33	37.0 ± 0.55	359.4 ± 4.59	322.7 ± 3.08	151.0 ± 0.55	n = 6	[IAA]	i-STAT
183.2 ± 14.55	31.1 ± 1.13	361.2 ± 6.42	324.9 ± 14.08	145.0 ± 5.15	n = 4	[MAA]	IL Gem Premier 3000
183.5 ± 5.12	34.0 ± 0.93	368.3 ± 2.66	322.2 ± 10.24	148.0 ± 2.45	n = 5	[MAC]	IL Gem Premier 4000
204.4 ± 6.01	37.6 ± 3.26	402.9 ± 13.44	336.8 ± 12.11	166.2 ± 5.58	n = 6	[NOG]	NOVA Critical Care Xpress
195.6 ± 4.11	39.6 ± 1.55	376.9 ± 8.05	331.5 ± 6.47	163.6 ± 3.73	n = 25	[RAP]	Radiometer ABL800 series
195.1 ± 1.13	35.2 ± 1.96	389.8 ± 5.46	336.5 ± 1.22	161.3 ± 3.77	n = 4	[BYS]	Siemens Rapid Point 405
184.5 ± 2.45	37.9 ± 1.83	350.7 ± 9.64	308.8 ± 6.91	151.4 ± 3.58	n = 5	[BYT]	Siemens RapidLab 1200 Series

Sodium (mmol/L)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code]	Instrument System
127.9 ± 1.94	154.9 ± 1.71	150.4 ± 2.37	136.8 ± 2.30	119.2 ± 2.01	n = 85	[ ]	All Instruments
131.0 ± 0.00	156.7 ± 0.85	153.4 ± 0.56	140.4 ± 0.56	122.2 ± 0.65	n = 9	[IAA]	i-STAT
129.3 ± 0.90	159.7 ± 0.82	153.5 ± 2.67	140.7 ± 0.90	120.5 ± 0.57	n = 4	[MAA]	IL Gem Premier 3000
129.3 ± 0.51	158.3 ± 0.51	153.7 ± 0.51	139.3 ± 0.51	120.3 ± 1.37	n = 3	[MAD]	IL Gem Premier 3500
128.2 ± 0.41	154.0 ± 0.00	150.7 ± 0.69	137.8 ± 0.41	121.0 ± 0.00	n = 8	[MAC]	IL Gem Premier 4000
126.3 ± 0.51	154.2 ± 0.73	150.3 ± 0.51	135.3 ± 0.51	118.0 ± 0.55	n = 6	[NOG]	NOVA Critical Care Xpress
128.3 ± 0.51	156.0 ± 0.00	151.3 ± 0.51	137.3 ± 0.51	119.0 ± 0.00	n = 3	[RAY]	Radiometer ABL 90 Flex
128.1 ± 0.74	155.1 ± 1.03	150.0 ± 1.26	136.5 ± 0.95	119.0 ± 0.87	n = 27	[RAP]	Radiometer ABL800 series
128.3 ± 0.51	153.7 ± 0.51	150.0 ± 0.90	137.3 ± 0.51	120.3 ± 0.51	n = 3	[ROW]	Roche OMNI/Cobas series
125.2 ± 0.41	154.5 ± 1.22	148.7 ± 0.90	132.8 ± 2.11	116.3 ± 0.90	n = 4	[BYS]	Siemens Rapid Point 405
125.0 ± 0.00	154.0 ± 0.00	148.1 ± 0.15	134.4 ± 0.46	116.0 ± 0.90	n = 3	[BYQ]	Siemens Rapid Point 500
125.3 ± 0.54	152.4 ± 0.68	146.0 ± 0.97	133.9 ± 0.60	116.9 ± 0.60	n = 8	[BYT]	Siemens RapidLab 1200 Series

Potassium (mmol/L)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code]	Instrument System
3.78 ± 0.06	2.29 ± 0.10	6.11 ± 0.09	4.81 ± 0.07	2.53 ± 0.08	n = 86	[ ]	All Instruments
3.80 ± 0.00	2.26 ± 0.06	6.07 ± 0.05	4.80 ± 0.00	2.50 ± 0.00	n = 9	[IAA]	i-STAT
3.65 ± 0.06	2.15 ± 0.06	6.00 ± 0.00	4.72 ± 0.04	2.42 ± 0.04	n = 4	[MAA]	IL Gem Premier 3000
3.67 ± 0.05	2.13 ± 0.05	6.00 ± 0.09	4.70 ± 0.00	2.40 ± 0.00	n = 3	[MAD]	IL Gem Premier 3500
3.80 ± 0.00	2.20 ± 0.00	6.20 ± 0.00	4.90 ± 0.00	2.50 ± 0.00	n = 8	[MAC]	IL Gem Premier 4000
3.80 ± 0.00	2.40 ± 0.00	6.35 ± 0.06	5.00 ± 0.00	2.60 ± 0.00	n = 6	[NOG]	NOVA Critical Care Xpress
3.73 ± 0.05	2.30 ± 0.00	6.00 ± 0.00	4.70 ± 0.00	2.57 ± 0.05	n = 3	[RAY]	Radiometer ABL 90 Flex
3.80 ± 0.00	2.37 ± 0.05	6.11 ± 0.05	4.80 ± 0.00	2.60 ± 0.00	n = 27	[RAP]	Radiometer ABL800 series
3.63 ± 0.05	2.13 ± 0.05	6.20 ± 0.00	4.80 ± 0.00	2.37 ± 0.05	n = 3	[ROW]	Roche OMNI/Cobas series
3.76 ± 0.06	2.24 ± 0.06	6.10 ± 0.00	4.80 ± 0.00	2.50 ± 0.00	n = 5	[BYS]	Siemens Rapid Point 405
3.80 ± 0.00	2.27 ± 0.05	6.05 ± 0.05	4.79 ± 0.02	2.49 ± 0.01	n = 3	[BYQ]	Siemens Rapid Point 500
3.70 ± 0.00	2.20 ± 0.08	6.09 ± 0.09	4.77 ± 0.07	2.40 ± 0.00	n = 8	[BYT]	Siemens RapidLab 1200 Series

Summary of Participant Performance (Mean and Standard Deviation)

Chloride (mmol/L)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code]	Instrument System
90.0 ± 2.94	108.4 ± 3.39	129.0 ± 3.99	102.6 ± 3.03	83.0 ± 2.80	n = 59	[ ]	All Instruments
84.0 ± 0.00	102.4 ± 1.09	125.6 ± 1.09	96.5 ± 0.83	78.2 ± 0.80	n = 5	[IAA]	i-STAT
93.0 ± 0.00	113.6 ± 0.55	129.0 ± 0.64	106.0 ± 0.00	85.4 ± 0.55	n = 5	[MAC]	IL Gem Premier 4000
94.0 ± 0.00	112.0 ± 0.55	134.5 ± 1.02	106.3 ± 0.97	86.8 ± 0.73	n = 6	[NOG]	NOVA Critical Care Xpress
88.7 ± 0.99	106.8 ± 1.13	127.8 ± 1.25	101.3 ± 1.12	81.8 ± 0.88	n = 21	[RAP]	Radiometer ABL800 series
90.0 ± 0.00	109.3 ± 1.58	134.3 ± 2.69	103.2 ± 1.27	82.8 ± 0.41	n = 4	[BYS]	Siemens Rapid Point 405
91.0 ± 0.00	108.0 ± 0.00	131.3 ± 0.51	103.3 ± 0.51	84.0 ± 0.00	n = 3	[BYQ]	Siemens Rapid Point 500
93.5 ± 0.57	111.0 ± 0.75	132.4 ± 3.91	105.5 ± 1.22	86.2 ± 0.41	n = 4	[BYT]	Siemens RapidLab 1200 Series

Ionized Calcium (mmol/L)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code]	Instrument System
1.325 ± 0.052	0.823 ± 0.053	1.784 ± 0.073	0.732 ± 0.048	1.033 ± 0.031	n = 89	[ ]	All Instruments
1.339 ± 0.013	0.758 ± 0.011	1.769 ± 0.021	0.692 ± 0.008	1.011 ± 0.013	n = 5	[IAA]	i-STAT
1.336 ± 0.011	0.760 ± 0.008	1.781 ± 0.015	0.685 ± 0.009	1.032 ± 0.010	n = 8	[MAC]	IL Gem Premier 4000
1.352 ± 0.011	0.771 ± 0.019	1.831 ± 0.021	0.680 ± 0.000	1.016 ± 0.013	n = 5	[MAA]	IL Gem Premier 3000
1.347 ± 0.014	0.770 ± 0.009	1.835 ± 0.027	0.674 ± 0.010	1.028 ± 0.024	n = 3	[MAD]	IL Gem Premier 3500
1.328 ± 0.039	0.820 ± 0.015	1.774 ± 0.036	0.738 ± 0.008	1.037 ± 0.011	n = 5	[NOG]	NOVA Critical Care Xpress
1.284 ± 0.010	0.803 ± 0.005	1.687 ± 0.014	0.720 ± 0.000	1.017 ± 0.005	n = 3	[RAY]	Radiometer ABL 90 Flex
1.373 ± 0.005	0.867 ± 0.005	1.866 ± 0.039	0.777 ± 0.005	1.077 ± 0.005	n = 3	[RAN]	Radiometer ABL700 series
1.357 ± 0.018	0.872 ± 0.020	1.830 ± 0.016	0.781 ± 0.017	1.066 ± 0.012	n = 26	[RAP]	Radiometer ABL800 series
1.320 ± 0.018	0.795 ± 0.012	1.841 ± 0.011	0.698 ± 0.004	0.993 ± 0.009	n = 4	[ROW]	Roche OMNI/Cobas series
1.275 ± 0.012	0.800 ± 0.011	1.684 ± 0.030	0.706 ± 0.009	1.008 ± 0.014	n = 6	[BYS]	Siemens Rapid Point 405
1.283 ± 0.005	0.793 ± 0.014	1.697 ± 0.014	0.693 ± 0.014	1.004 ± 0.010	n = 3	[BYQ]	Siemens Rapid Point 500
1.200 ± 0.000	0.866 ± 0.036	1.688 ± 0.029	0.745 ± 0.045	1.015 ± 0.022	n = 12	[BYT]	Siemens RapidLab 1200 Series

Ionized Magnesium (mmol/L)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code]	Instrument System
0.153 ± 0.097	1.325 ± 0.153	1.508 ± 0.320	1.259 ± 0.172	0.967 ± 0.069	n = 3	[ ]	All Instruments

Lactate (mmol/L)

Specimen: G36	Specimen: G37	Specimen: G38	Specimen: G39	Specimen: G40	Number	[Code]	Instrument System
4.61 ± 0.20	0.89 ± 0.09	10.00 ± 0.66	9.59 ± 0.46	5.50 ± 0.28	n = 53	[ ]	All Instruments
4.45 ± 0.27	0.75 ± 0.06	9.33 ± 0.27	9.45 ± 0.26	5.24 ± 0.16	n = 6	[MAA]	IL Gem Premier 3000
4.43 ± 0.14	0.77 ± 0.05	9.39 ± 0.52	9.50 ± 0.36	5.43 ± 0.23	n = 3	[MAD]	IL Gem Premier 3500
4.10 ± 0.08	0.82 ± 0.04	8.82 ± 0.04	8.50 ± 0.18	4.81 ± 0.11	n = 4	[MAC]	IL Gem Premier 4000
4.42 ± 0.15	0.87 ± 0.05	10.20 ± 0.72	9.42 ± 1.15	5.45 ± 0.46	n = 3	[RAY]	Radiometer ABL 90 Flex
4.67 ± 0.09	0.90 ± 0.00	10.41 ± 0.28	9.81 ± 0.20	5.64 ± 0.18	n = 21	[RAP]	Radiometer ABL800 series
4.74 ± 0.12	0.97 ± 0.05	9.90 ± 0.43	9.64 ± 0.40	5.42 ± 0.23	n = 3	[BYQ]	Siemens Rapid Point 500
4.60 ± 0.08	1.00 ± 0.00	10.08 ± 0.31	9.36 ± 0.32	5.47 ± 0.09	n = 4	[BYT]	Siemens RapidLab 1200 Series