

Supplementary Materials

Analytical Performances of the Novel i-STAT Alinity Point-of-Care Analyzer

Romaric Larcher^{1,2,*}, Maxence Lottelier³, Stephanie Badiou¹, Anne-Marie Dupuy³, Anne-Sophie Bargnoux¹ and Jean-Paul Cristol¹

¹ Biochemistry and Hormonology Department, Montpellier University Hospital, PhyMedExp (Physiology and Experimental Medicine), INSERM (French Institute of Health and Medical Research), CNRS (French National Centre for Scientific Research), University of Montpellier, 34000 Montpellier, France

² Infectious and Tropical Diseases Department, Nimes University Hospital, 30000 Nimes, France

³ Biochemistry and Hormonology Department, Montpellier University Hospital, 34000 Montpellier, France

* Correspondence: romaric.larcher@chu-nimes.fr; Tel.: +33-466-68-41-49

Table S1. Review of the existing literature on the analytical performance of various Point-of-Care (POC) analyzers

Analyzer	Test	Parameter	Mean	CV (%)
Abbott i STAT 1 or Abbott i STAT Alinity	Cartridge 6+: <i>Measured</i> Na, K, Cl, Glu, BUN/Urea, Hct.	pH PCO ₂ (mmHg) PO ₂ (mmHg)	7.065 / 7.649 59.0 / 23.2 85 / 136	0.05 / 0.06 1.8 / 2.2 2.0 / 1.7
Hand held analyzers	Cartridge CG4+: <i>Measured</i> pH, PO ₂ , PCO ₂ , Lactate.	Lactate (mmol/L)	6.73 / 0.74	0.8 / 2.0
		Na (mmol/L)	123 / 159	0.3 / 0.5
		K (mmol/L)	2.9 / 6.2	1.4 / 0.8
	Cartridge CG8+: <i>Measured</i> Na, K, iCa, Glu, Hct, pH, PO ₂ , PCO ₂ .	Cl (mmol/L)	74 / 115	0.6 / 0.6
		iCa (mmol/L)	0.90 / 1.58	0.8 / 0.8
		Glu (mmol/L)	14.4 / 2.1	0.4 / 2.1
	Cartridge CHEM8+: <i>Measured</i> Na, K, Cl, iCa, Glu, Urea, Crea, Hct, TC02.	Urea (mmol/L)	20.4 / 2.1	2.1 / 4.3
		Creat (μmol/L)	333 / 35	2.0 / 5.2
		Hematocrit (%)	22 / 55	1.0 / 0.9
	Cartridge Crea: <i>Measured</i> Crea.			
	Cartridge E3+: <i>Measured</i> Na, K, Hct.			
	Cartridge EC4+: <i>Measured</i> Na, K, Glu, Hct.			
	Cartridge EC8+: <i>Measured</i> Na, K, Cl, Glu, BUN, Hct, pH, PO ₂ , PCO ₂ .			

	Cartridge EG6+: <i>Measured</i> Na, K, Hct, pH, PO2, PCO2.			
	Cartridge EG7+: <i>Measured</i> Na, K, iCa, Hct, pH, PO2, PCO2.			
	Cartridge G: <i>Measured</i> Glu.			
	Cartridge G3+: <i>Measured</i> pH, PO2, PCO2.			
	Cartridge PT/INR: <i>Measured</i> Prothrombin time; <i>Calculated</i> : International normalized ratio	PT INR	16.5 / 28.7 1.4 / 2.5	2.6 / 6.3 3.7 / 3.7
Nova Stat Profile Prime	Measured: pH, PCO2, PO2, sO2, lactate, O2Hb, COHb, MetHb, HHb, HbF, Hct, Hb,	pH PCO2 (mmHg) PO2 (mmHg)	7.20 / 7.39 / 7.62 57.8 / 40.9 / 19.7 54.9 / 91.2 / 128	0.01 / 0.02 / 0.00 5.83 / 5.43 / 4.12 2.96 / 2.77 / 3.61
Bench top analyzer	Na, K, Cl, iCa, iMg, urea, Creat, Glu, tBil	Lactate (mmol/L) Na (mmol/L) K (mmol/L) Cl (mmol/L) iCa (mmol/L) Glu (mmol/L) Urea (mmol/L) Creat (μmol/L) Hb (g/dL)	2.0 / 6.9 141.2 / 116.3 3.9 / 6.2 128.2 / 99 1.1 / 1.5 4.5 / 15.8 7.3 / 23.1 84.3 / 583.6 14.7 / 8.6	0.06 / 1.62 0.11 / 0.21 0.13 / 0.17 1.18 / 0.65 0.42 / 0.04 0.05 / 1.62 0.92 / 1.84 3.97 / 2.43 0.90 / 0.81
Nova Stat Sensor creatinine	<i>Measured</i> : Crea	Creat (μmol/L)	80.9 / 496.5	7.9 / 7.2
Nova Stat Strip Lactate	<i>Measured</i> : Lactate	Lactate (mmol/L)	0.9 / 6.4	8.2 / 6.8
Radiometer ABL90 FLEX	Measured: pH, PCO2, PO2, sO2, lactate, O2Hb, COHb, MetHb, HHb, HbF, Hb, Na, K,	pH PCO2 (mmHg) PO2 (mmHg)	6.77 / 7.15 / 7.49 20.2 / 28.4 / 66.0 17.5 / 188.9 / 302.1	0.83 / 0.56 / 0.88 1.50 / 1.07 / 1.16 5.23 / 0.63 / 0.33
Bench top analyzer	Cl, iCa, Glu, urea, Crea, tBil	Lactate (mmol/L) Na (mmol/L) K (mmol/L) iCa (mmol/L) Glu (mmol/L) Urea (mmol/L) Creat (μmol/L) Hb (g/dL)	3.5 / 7.5 112.2 / 135.8 / 171.1 1.74 / 3.73 / 6.51 0.31 / 0.81 / 1.54 6.8 / 14.6 4.9 / 14.4 / 30.5 79 / 182 / 573 12.9 / 19.3	0.80 / 1.30 0.22 / 0.26 / 0.18 1.45 / 0.53 / 0.17 1.55 / 0.47 / 0.31 1.32 / 0.70 1.4 / 0.8 / 1.9 2.1 / 1.9 / 1.5 0.27 / 0.19

Roche Cobas b 123	Measured: pH, PCO ₂ , PO ₂ , sO ₂ , lactate,	pH	7.14 / 7.39 / 7.54	0.05 / 0.06 / 0.04
Bench top analyzer	O ₂ Hb, COHb, MetHb, HHb, Hb, Na, K, Cl, iCa, Glu, tBil	PCO ₂ (mmHg)	24.3 / 40.3 / 65.2	0.87 / 0.84 / 1.36
		PO ₂ (mmHg)	62.4 / 98.7 / 145.4	6.07 / 3.16 / 1.95
		Lactate (mmol/L)	1.7 / 3.2 / 10.2	1.31 / 1.73 / 0.94
		K (mmol/L)	3.0 / 4.72 / 7.02	0.52 / 0.50 / 0.52
		iCa (mmol/L)	2.70 / 5.20 / 6.85	0.73 / 0.53 / 0.42
		Glu (mmol/L)	2.5 / 6.2 / 23.5	1.22 / 1.29 / 2.53
		Hb (g/dL)	7.5 / 11.9 / 19.7	1.52 / 1.42 / 1.37
Roche CoaguCheck Pro II	Measured: PT; <i>Calculated:</i> INR	INR	1.28 / 2.94	3.28 / 4.47
Siemens Rapid Point	Measured: pH, PCO ₂ , PO ₂ , sO ₂ , lactate,	pH	7.1 / 7.32 / 7.49	0.09 / 0.05 / 0.004
Bench top analyzer	O ₂ Hb, COHb, MetHb, HHb, Hb, Na, K, Cl, iCa, Glu, tBil	PCO ₂ (mmHg)	78.7 / 43.3 / 25.0	6.07 / 3.3 / 3.4
		PO ₂ (mmHg)	139.7 / 103.1 / 48.1	1.8 / 2.26 / 7.8
		Lactate (mmol/L)		0.7 / 0.8 / 1.21
		Na (mmol/L)	112.2 / 132.9 /	0.5 / 0.65 / 0.84
		K (mmol/L)	152.8	1.09 / 0.80 / 0.7
		Cl (mmol/L)	3.1 / 4.97 / 6.56	1.16 / 0.77 / 1.64
		iCa (mmol/L)	74.7 / 98.1 / 117.9	1.77 / 2.32 / 4.07
		Glu (mmol/L)	1.49 / 1.16 / 0.79	1.02 / 1.15 / 1.94
		Hb (g/dL)	10.9 / 5.1 / 2.6	
			17.8 / 13.8 / 7.7	
Siemens epoc® Blood Analysis System	Measured: pH, PCO ₂ , PO ₂ , TCO ₂ , lactate, Hct, Na, K, Cl, iCa, urea, Crea, Glu.	pH	7.01 / 7.72	0.16 / 0.16
Hand held analyzer		PCO ₂ (mmHg)	70 / 22	1.1 / 3.62
		PO ₂ (mmHg)	67.5 : 189.5	3.75 / 3.85
		Lactate (mmol/L)	0.82 / 5.78	5.39 / 6.78
		Na (mmol/L)	115 / 162	0.72 / 0.49
		K (mmol/L)	2.1 / 5.8	0.0 / 1.16
		Cl (mmol/L)	79.6 / 113.4	1.18 / 1.77
		iCa (mmol/L)	1.54 / 0.64	1.52 2.52
		Glu (mmol/L)	1.9 / 14.6	3.73 / 2.50
		Urea (mmol/L)	18.7 / 1.7	1.97 / 2.89
		Creat (μmol/L)	69 / 340	5.6 / 2.9
		Hematocrit (%)	25 / 44	2.28 / 2;61
Siemens Xprecia Stride™ Coagulation Analyzer	<i>Measured</i> Prothrombin time; <i>Calculated:</i> International normalized ratio	INR	1-2 / 2-3	2.8 / 3
Hand held analyzer				
Werfen GEM 5000	Measured: pH, PCO ₂ , PO ₂ , sO ₂ , lactate,	pH	7.13 / 7.37 / 7.58	0.1 / 0.09 / 0.04
Bench top analyzer	O ₂ Hb, COHb, MetHb, HHb, Hb, Na, K, Cl, iCa, Glu, tBil	PCO ₂ (mmHg)	14 / 37.7 / 90	0 / 2.5 / 2.3
		PO ₂ (mmHg)	31.8 / 87 / 349.5	5.7 / 3.0 / 4.0
		Lactate (mmol/L)	0.8 : 1.6 / 2.3	4.3 / 3.7 / 1.0

		Na (mmol/L)	124.1 / 139.6 / 154	0.4 / 0.6 / 0.3
		K (mmol/L)	2.4 / 4.6 / 7.7	0.0 / 0.6 / 0.8
		Cl (mmol/L)	85.6 / 108.5 / 141.8	0.7 / 0.5 / 0.4
		iCa (mmol/L)	0.64 / 1.16 / 1.59	0.8 / 0.8 / 1.1
		Glu (mmol/L)	2.4 / 5.7 / 21.3	3.4 / 2.1 / 1.5
		Hb (g/dL)	7.7 / 14.7 / 21	1.7 / 0.9 / 0.8
Werfen GEM Chem STAT	Measured: pH, PCO ₂ , TCO ₂ , lactate, Hte Hb, Na, K, Cl, iCa, Glu, ureaCrea	pH	7.13 / 7.36 / 7.51	0.11 / 0.06 / 0.33
		PCO ₂ (mmHg)	90.2 / 37.4 / 15.7	3.09 / 2.07 / 3.94
		Lactate (mmol/L)	8.4 / 5.1 / 1.7	2.33 / 3.46 / 4.92
Bench top analyzer		Na (mmol/L)	124.1 / 138.8 /	0.58 / 0.51 / 0.68
		K (mmol/L)	151.7	1.69 / 1.17 / 0.96
		Cl (mmol/L)	2.6 / 4.6 / 7.4	0.9 / 0.73 / 0.79
		iCa (mmol/L)	92.2 / 107.1 / 135.6	1.58 / 1.36 / 1.48
		Glu (mmol/L)	0.9 / 1.1 / 1.6	0.82 / 1.2 / 2.06
		Urea (mmol/L)	21.4 / 6.4 / 4.4	2.6 / 3.4 / 3.92
		Creat (μmol/L)	5.6 / 13.4 : 20.3	5.86 / 3.13 / 2.33
		Hematocrit (%)	75.1 / 219.2 / 412.8 22 / 42 / 67	2.49 / 0.37 / 0.57
Instrumentation laboratory Hemochron Signature Elite system.	Hemochron Signature Elite Fresh Whole-Blood PT Cartridge	INR	2.3 / 8.9	0.7 / 0.43* (*SD)
		TP	26 / 55	7.4 / 5
Hand held analyzer	Hemochron Signature Elite Citrate PT Cartridge			

Sodium (Na), Potassium (K), Chloride (Cl), Glucose (Glu), Blood urea nitrogen (BUN/Urea), Hematocrit (Hct), Hemoglobin (Hb), Partial pressure of oxygen (PO₂), Partial pressure of carbon dioxide (PCO₂), Bicarbonate (HCO₃), Total carbon dioxide (TCO₂), Base excess (BE), Oxygen saturation (sO₂), Ionized calcium (iCa), Creatinine (Crea), Anion gap (AnGap), Estimated glomerular filtration rate (eGFR), O₂Hb, oxyhemoglobin; COHb, carboxyhemoglobin; MetHb, methemoglobin; HHb, deoxyhemoglobin; HbF, fetal hemoglobin tBil, total bilirubin;

Table S1 references

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