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Evaluation of the Enterprise Point-Of-Care (EPOC) System for Blood Gas and Electrolyte Analysis in Dogs

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Objective

- Evaluate the analytical precision and comparability of blood gas and electrolytes analyses of the Enterprise Point-of-Care (EPOC) system to the Stat Profile Critical Care Xpress Analyzer (CCX - NOVA) in dogs.



Introduction

- Point-of-care testing (POCT)
 - Emergent Conditions - Quick decisions
- MDB (Blood Gas, Electrolytes, Metabolites)
- Blind or delayed treatment when POCT is not available*

◆NOVA



*Mock T, Morrison D, Yatscoff R. Evaluation of the i-STAT system: a portable chemistry analyzer for the measurement of sodium, potassium, chloride, urea, glucose, and hematocrit. Clin Biochem. 1995;28:187Y192.16.



Introduction

- Previous study compared EPOC to i-STAT in people
- Results showed that EPOC has comparable performance

- i-STAT



- EPOC



EPOC

- Enterprise Point-of-care*



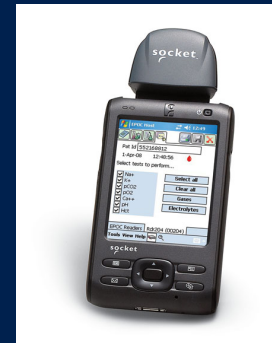
*Epocal, Corp. Ontario, Canada

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EPOC



Test Card



PDA - Host Mobile Computer



Reader

EPOC Data Manager

Connected to : EDM DB 2.1.0 User: epocsysadmin EPOC Link @ 192.168.10.10 : 45002 ✓ DB : ✓ 2.1.0 [Log Off](#)

EPOC Manager > Tests > Blood Tests

Blood Tests QA Tests EPOC System

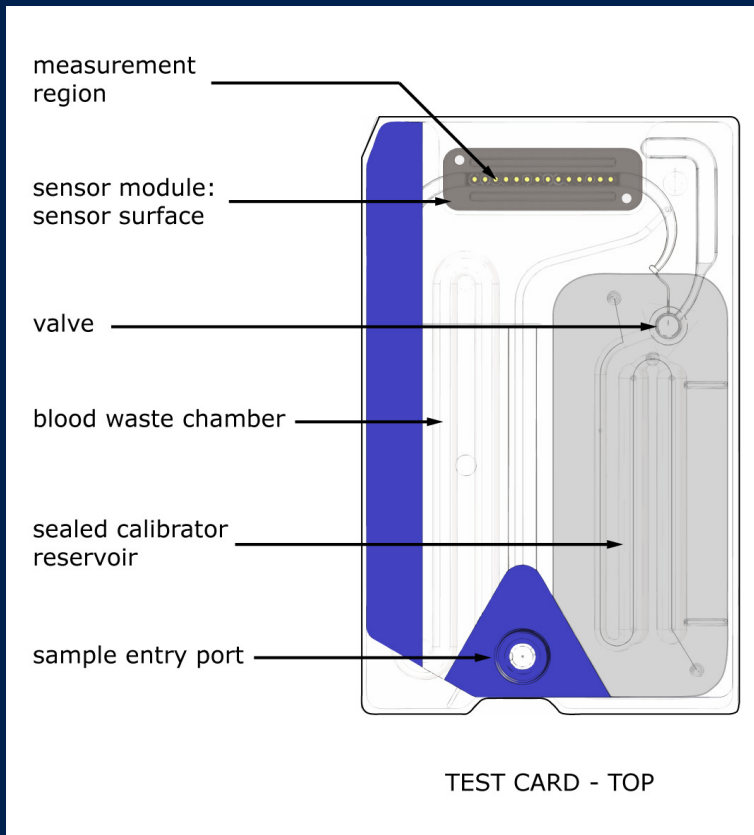
Blood Tests (last 7 days) - 24 tests

Date/Time	Patient ID	Operator	Host	Reader	Status	Critical	LIS
29-Oct-08 14:33		administrator	EPOC Host 00558BC	Aldin QA Rdr	Incomplete	--	Not Sent
29-Oct-08 14:27	administrat12	administrator	EPOC Host 00558BC	Aldin QA Rdr	iQC	--	Not Accepted
29-Oct-08 14:23		administrator	EPOC Host 00558BC	Aldin QA Rdr	Incomplete	--	Not Sent
29-Oct-08 14:14	administrat11	administrator	EPOC Host 00558BC	Aldin QA Rdr	Incomplete	--	Not Sent
29-Oct-08 13:48	administrat10	administrator	EPOC Host 00558BC	Aldin QA Rdr	iQC	--	Not Accepted
29-Oct-08 13:17	administrator00	administrator	EPOC Host 00558BC	Aldin QA Rdr	OK	yes	Not Accepted
28-Oct-08 16:13	administrator	administrator	EPOC Host 00558BC	Aldin QA Rdr	Incomplete	--	Not Sent

Data Manager Software



EPOC Test Card



Test Card Reagents

Measured Values

- pH
- pCO₂
- pO₂
- Sodium
- Potassium
- Ionized Calcium
- Glucose
- Lactate
- Hematocrit

Calculated Values

- HCO₃
- TCO₂

RESULT SCREEN

Analyte	Result	Ref
pH	7.186	↓
pCO ₂	54.0 mmHg	↑
pO ₂	191.0 mmHg	↑
Na ⁺	115 mmol/L	↓
K ⁺	4.4 mmol/L	●
Ca ⁺⁺	0.54 mmol/L	↓
Hct	40 %	●

Analyte	Result	Ref
dHgb	13.4 g/dL	●
HCO ₃ -act	20.4 mmol/L	↓
cTCO ₂	22.1 mmol/L	●
BE(ecf)	-7.8 mmol/L	↓
BE(b)	-8.2 mmol/L	↓
O ₂ SAT	99.4 %	↑

Analyte	Result	Ref
pH(T)	7.159	↓
pCO ₂ (T)	59.0 mmHg	↑
pO ₂ (T)	201.8 mmHg	↑

Materials and Methods

- Canine venous sample was collected in heparinized green-top collection tubes – Total 30 samples
- Samples were analyzed within three minutes of collection
- EPOC + Test Cards provided by Epocal
- Comparative analyzer (NOVA) provided by the University of Illinois – VTH – Emergency Service



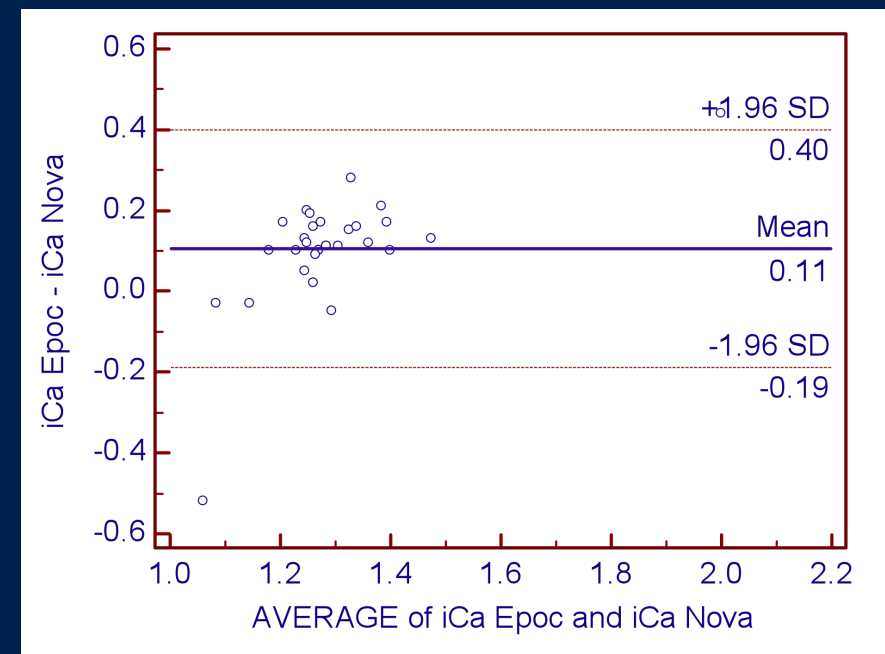
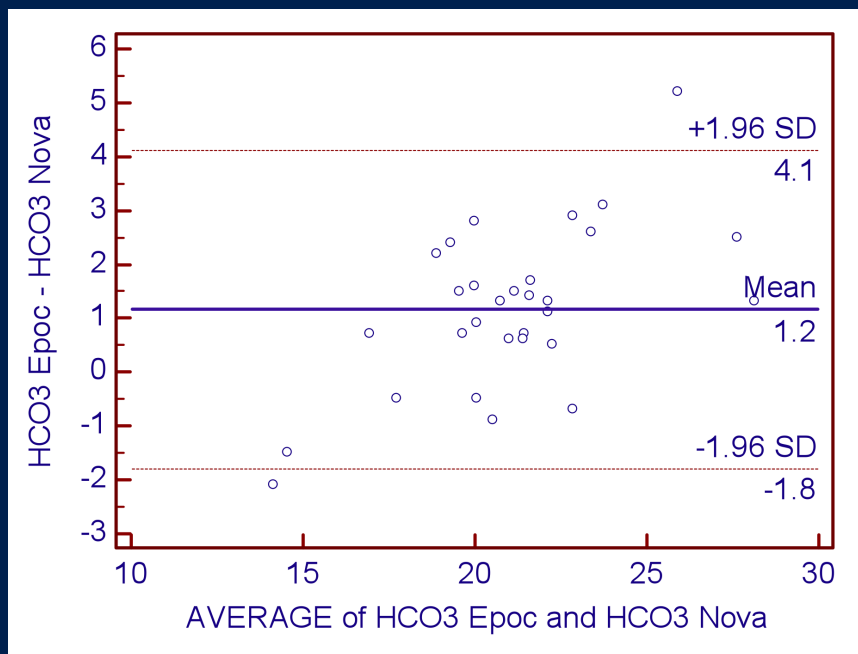
Materials and Methods

- Venous sample was first run on NOVA and the result used for clinical treatment
- Leftover sample was used immediately to test the EPOC system
- The two results were saved and analyzed using the Bland-Altman Plot



Results

- EPOC correlated well with NOVA for all analytes tested with no clinically significant differences noted.



Discussion

- Acute care settings require rapid turnaround of blood tests
- Blood gas analysis traditionally require a bench-top analyzer
- Handheld analyzers – EPOC, small size and minimal maintenance requirement.
- EPOC was analytically comparable to NOVA



Discussion

- EPOC – previous studies in people.
- Performance of the EPOC system was comparable to the i-STAT analyzer for all analytes with correlation coefficients ranging from 0.880 to 0.990.



Discussion

- Comparison of Epoc to i-STAT in Horses.
 - *Wide range of samples from different clinical cases*
 - *Ph, pCO₂, pO₂, HCT, Na, K, iCa, Glu, and Lac*
 - *Correlation coefficient ranged from 0.921 to 0.997*
- Comparison of Epoc to i-STAT in Dogs (unpublished data)
 - Clinically similar results



Discussion

- Technical Advantages noted:
 - Room temperature storage test cards
 - Wireless capabilities
 - Technical work



Conclusions

- New portable blood analyzer for conducting critical care testing at the point of care.
- Initial menu of blood gas and electrolytes demonstrated similar clinical results to the NOVA system
- Overall the operators found the EPOC to be easy to use



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