

EVALUATION OF THE BRAHMS THERMO FISHER CT-PROAVP/COPEPTIN ASSAY

for all of **US**

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Introduction

Copeptin is the C-terminal glycoprotein of the pro-vasopressin precursor hormone. It is produced in the hypothalamus, cleaved during axonal transport and stored in the posterior pituitary gland.

Copeptin is released in response to changes in osmolality and other factors such as fear and pain. Its physiological role is still largely unknown, however, it is indicated in various disease states and has been extensively researched in Diabetes Insipidus. It has the potential to be a surrogate marker for Anti-diuretic Hormone (ADH), which is plagued by very stringent pre-analytical conditions.

Aim

Evaluate the performance of the BRAHMS Thermo Fisher CT-proAVP/Copeptin assay on the BRAHMS Thermo Fisher Kryptor Compact Plus with the intention of replacing the Anti-diuretic hormone (ADH) assay.

Method

55 patient samples referred to our laboratory for ADH measurement were used to correlate with Copeptin. Linearity study was performed on a patient with high Copeptin levels and serially diluted (1 in 4, 1 in 8, and 1 in 16) using the on-board diluent. Precision studies were conducted on two levels of manufacturer's controls performed in triplicates across five days.

Samples were also sent to Pathology Queensland for proficiency testing as a NATA requirement.

Results

Correlation with the ADH assay indicated poor agreement (Spearman Rank correlation coefficient =0.47), with the BRAHMS CT-ProAVP/Copeptin assay giving a negative bias.

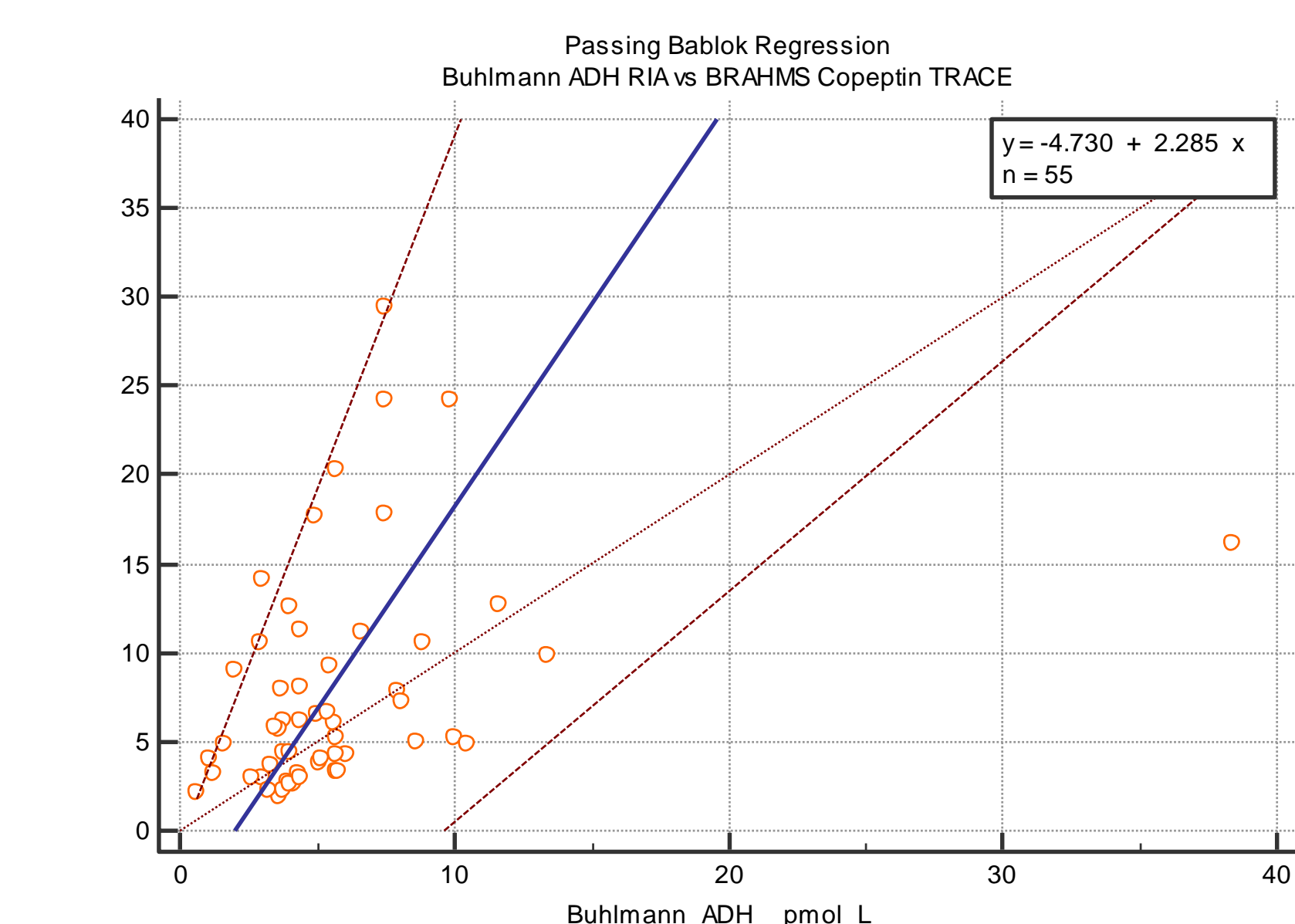


Figure 1: Passing Bablok Regression. — Denotes linear regression line; — denotes line of equality; --- denotes confidence interval of the regression line.

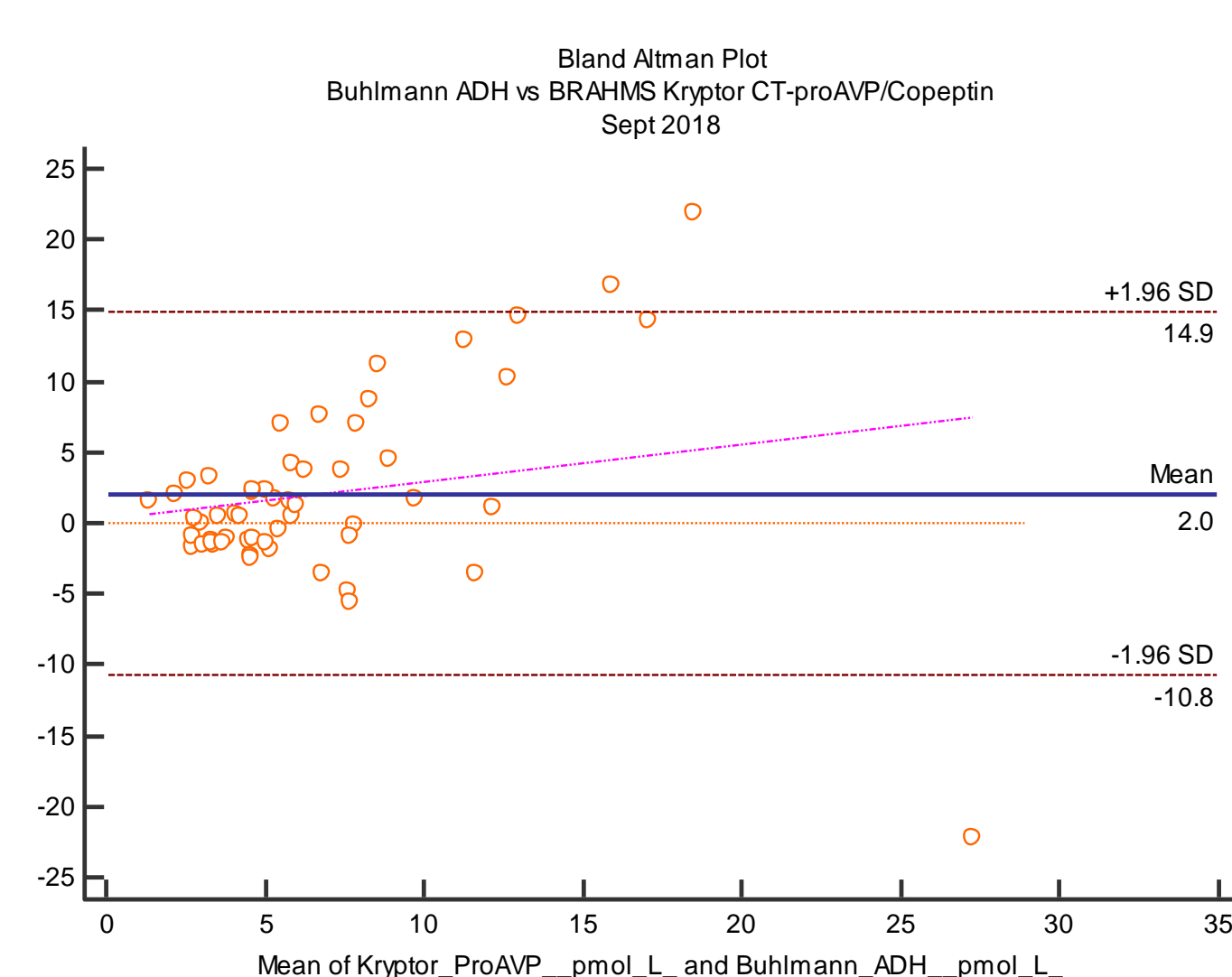


Figure 2: Bland-Altman plot. — Denotes mean difference (Kryptor CT-ProAVP/Copeptin – Buhlmann ADH); --- denotes 2 SD from the mean difference

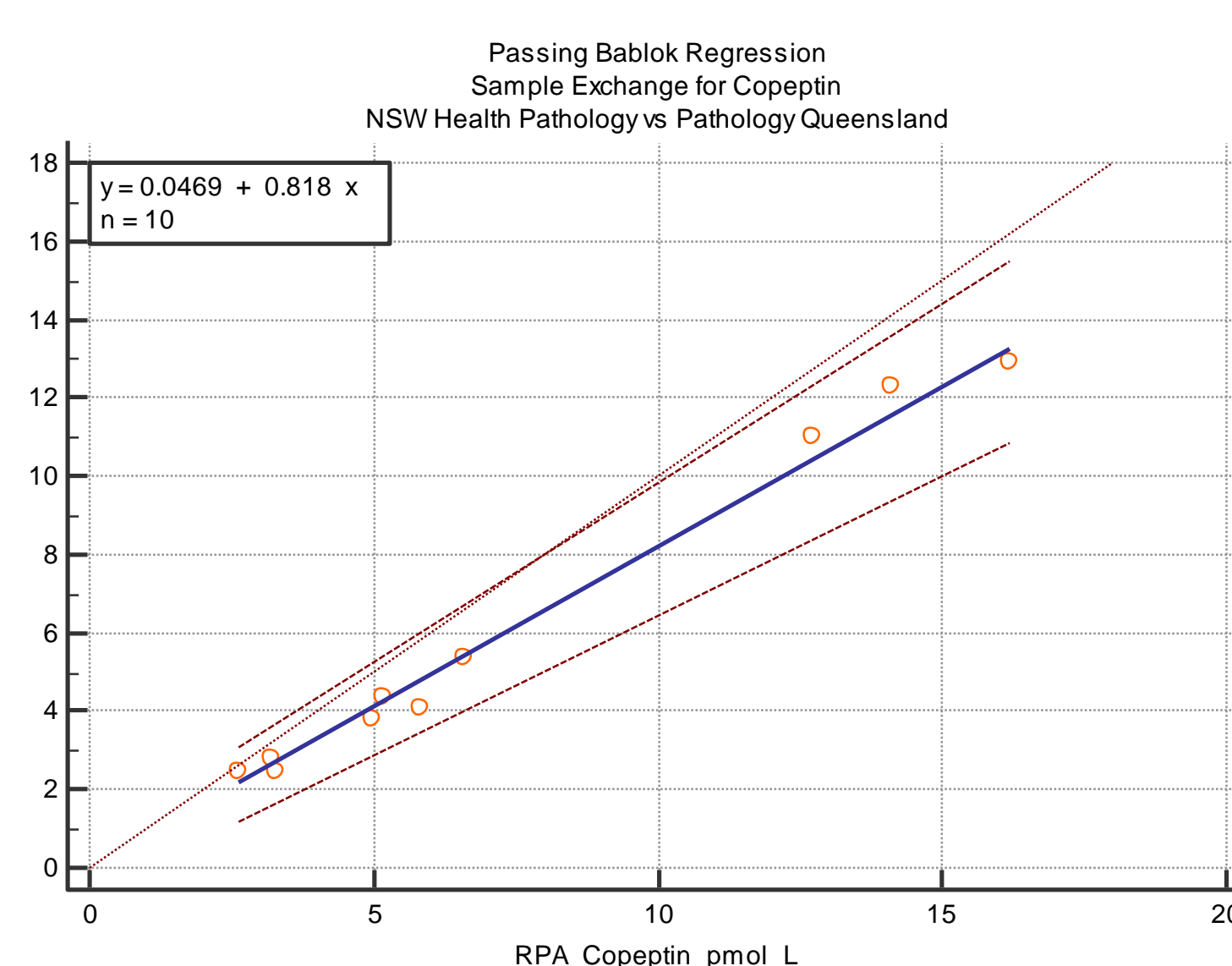


Figure 3: Passing Bablok regression showing agreement between Copeptin levels performed at 2 sites- NSW Health Pathology and Pathology Queensland. Spearman Rank correlation coefficient =0.976 (95%CI : 0.898 to 0.994).

Assay Performance	Copeptin level
LoD	0.69 pmol/L
LoQ (TE 40%)	1.23 pmol/L
Assay Range	0.7 to 500 pmol/L

Table 1: Assay performance of the Copeptin assay as indicated by the manufacturer. The Limit of Quantitation (LoQ) is the lowest reportable concentration where the Total Error is 40%.

Serial dilutions of a patient sample with the on-board diluent shows recovery rate of 99-101%

Dilution Factor (%)	Expected Copeptin level (pmol/L)	Observed Copeptin level (pmol/L)	Recovery
100	384		
25	96.0	95	99 %
12.5	48.0	48	100%
6.25	24.0	24.3	101%

Intra-assay Precision	Mean Copeptin	CV
	6.2 pmol/L	6.6%
	111 pmol/L	4.8%

Inter-assay Precision	Mean Copeptin	CV
	6.2 pmol/L	6.7%
	110 pmol/L	4.9%

Table 2: Precision of the BRAHMS Thermo fisher CT-ProAVP/Copeptin assay

Conclusion

Correlation with the ADH assay has shown poor agreement between ADH and Copeptin. However, this is not reflective of the Copeptin assay, but rather whether pre-analytical conditions were maintained for ADH analysis. Collection for ADH requires bloods to be collected in pre-chilled EDTA tube, spun down and separated immediately. The sample must be kept frozen during transportation and analysis is performed on an ice bath.

Copeptin, however, is a more stable molecule (up to 14 days at 4°C) and hence the results are more reliable.

The BRAHMS Thermo Fisher CT-ProAVP/Copeptin assay is a robust, reliable and quick assay.

Our laboratory has implemented the assay and this will be replacing the ADH assay in the diagnosis of Diabetes Insipidus.

References

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