



ISSN: 1303 - 2968

SCImago 2016 SJR: 0.981 Cites per Doc. 2-Year: 2.04 3-Year: 2.17
 JCR 2016 IF 2-Year: 1.797 3-Year: 1.970 5-Year: 2.061 Average Citations
 PI: 7.7

FIND ARTICLES

Search on JSSM

Search

Advanced Search >>>

- **Current Issue**  RSS
- **In Press**  RSS



©Journal of Sports Science and Medicine (2015) 14, 203 - 214

Research article

Reliability and Accuracy of Six Hand-Held Blood Lactate Analysers

Jacinta M. Bonaventura¹, Ken Sharpe², Emma Knight³, Kate L. Fuller¹, Rebecca K. Tanner¹, Christopher J. Gore^{1,4} [More Information >>](#)

Received: 14-08-2014 -- Accepted: 18-11-2014 -- Published (online): 01-03-2015

ABSTRACT

The reliability and accuracy of five portable blood lactate (BLa) analysers (Lactate Pro, Lactate Pro2, Lactate Scout+, Xpress™, and Edge) and one handheld point-of-care analyser (i-STAT) were compared to a criterion (Radiometer ABL90). Two devices of each brand of analyser were assessed using 22 x 6 mL blood samples taken from five subjects at rest and during exercise who generated lactate ranging ~1-23 mM. Each sample was measured simultaneously ~6 times on each device. Reliability was assessed as the within-sample standard deviation (wsSD) of the six replicates; accuracy as the bias compared with the ABL90; and overall error (the root mean squared error (√MSE)) was calculated as the square root of (wsSD² and bias²). The √MSE indicated that both the Edge and Xpress had low total error (~0-2 mM) for lactate concentrations <15 mM, whereas the Edge and Lactate Pro2 were the better of the portable analysers for concentrations >15 mM. In all cases, bias (negative) was the major contribution to the √MSE. In conclusion, in a clinical setting where BLa is generally <15 mM the Edge and Xpress devices are relevant, but for athlete testing where peak BLa is important for training prescription the Edge and Lactate Pro2 are preferred.

Key words: Bias, precision, root mean squared error, analytical performance

Key Points

- The reliability of five common portable blood lactate analysers were generally <0.5 mM for concentrations in the range of ~1.0-10 mM.
- For all five portable analysers, the analytical error within a brand was much smaller than the biological variation in blood lactate (BLa).
- Compared with a criterion blood lactate analyser, there was a tendency for all portable analysers to under-read (i.e. a negative bias), which was particularly evident at the highest concentrations (BLa ~15-23 mM).

Article Tools

-  PDF Download
-  Full Text
-  How to Cite
-  Citations in ScholarGoogle
-  Email link to this article
-  Statistics
-  New content alert

[Tweet](#)

Related articles by

- [Bias](#)
- [precision](#)
- [root mean squared error](#)
- [analytical performance](#)

Other articles by

- [Jacinta M. Bonaventura](#)
- [Ken Sharpe](#)
- [Emma Knight](#)
- [Kate L. Fuller](#)
- [Rebecca K. Tanner](#)
- [Christopher J. Gore](#)

JSSM | Copyright 2001-2017 | All rights reserved. | **LEGAL NOTICES** | Publisher

It is forbidden the total or partial reproduction of this web site and the published materials, the treatment of its database, any kind of transition and for any means, either electronic, mechanic or other methods, without the previous written permission of the JSSM.



This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](#).