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**Title:** Prospective comparison of a mobile, unit-use blood gas analysis device with a classical point-of-care blood gas laboratory machine in the daily ICU routine

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**Body:** Technical quality of modern “unit-use” blood gas (BG) analyzers has developed during the last years. In a prospective cohort study, we tested the epoc® device comparing the ABL-800 Flex® machine routinely over 4 weeks in a surgical ICU. 2 nurses took paired BG samples from 8 long-term ventilated patients. Directly measured parameters were: pH, PO<sub>2</sub>, PCO<sub>2</sub>, Na<sup>+</sup>, K<sup>+</sup>, Glucose, Lactate, Hct (epoc), and Hb (ABL); calculated parameters: SO<sub>2</sub>, BE, HCO<sub>3</sub><sup>-</sup>, Hb (epoc), and Hct (ABL). Confounding factors (course of the study, user, patient) were analyzed. For Na<sup>+</sup>, K<sup>+</sup>, and Hb, central lab data were also taken into the analysis. Statistics: t test, Passing-Bablok-Regression, Bland-Altman-Plot, MANOVA. 56 paired samples were analyzed; good accordance was found for K<sup>+</sup>, Glucose, and Lactate; for pH, a systemic deviation (epoc vs. ABL) was seen (delta MW: +0.03), as well as for Na<sup>+</sup> (delta MW: + 5.6); epoc data were nearer to the central lab data compared with the ABL results. For PO<sub>2</sub> and SO<sub>2</sub>, epoc data were lower; similarly epoc PCO<sub>2</sub> was 1,8 mmHg (delta MW) lower as ABL. For one patient, considerably higher Hb values were measured with the epoc device. MANOVA resulted in a low relevance by the user, whereas different patients had a stronger effect. Although several differences between both devices were significant, the majority of parameters had a good accordance. The strongest delta was seen for Na<sup>+</sup>, differences for the pH are clinically not relevant. In conclusion, these data demonstrate that both devices deliver comparable results for most blood gas parameters, and thus are considered as equivalent methods in daily ICU practice.