**Critical Evaluation of New Pulse Oximeters for Low Amplitude Detection.**
Russell G.B., Schuler H.G., Graybeal J.M. *Anesthesiology* 1999;91(3A):A584.

## Introduction

Pulse oximetry, the standard of care for anesthesia, is of limited clinical utility during low perfusion with associated low pulse amplitude (amp). New generation pulse oximeters (PO) claim improved detection during low perfusion. The Biotek Index 2P simulator has been developed with adjustable arterial pulse amp. We tested the hypothesis: POs will accurately report oxygen saturation (SpO2) during hypofusion indicated by low amp.

## Methods

Using a simulator set for SpO2 = 96 and pulse rate = 75, 7 POs were tested with amp varying from 3% to 0%. POs tested included Nellcor Puritan Bennett N200 and NPB 295, Datex Ohmeda 3900 andAS/3, Critcare Poni, Novametrix Oxypleth and Ivy 2000 with Masimo Signal Extraction Technology (SET). Results are presented as the bias ± limits of agreement and failure amp, the amp at which PO failed to correctly report SpO2. POs which did not fail were tested for time to alarm at 0% amp, no pulse signal.

## Results

Agreement varied for POs: N200 -2 ± 1, failed -0.2%, NPB 295 -6 ± 4, no fail (120 sec); 3900 -1 ± 0, failed -0.1%, AS/3 -3 ± 5, failed -0.2%, Poni -2 ± 2 failed – 0.3%, Oxypleth 0 ± 0 no fail (63 sec), Ivy 2000 0 ± 1 no fail (10 sec). All tested POs were within 2% at all levels tested except AS/# and the NPB 295. Only three POs, NPB 295, Oxypelth and Ivy 2000 had no failures. There was a significant difference in alarm delay. NPB 295 took 120 sec to sound alarm, but Ivy 2000 only 10 sec.

## Conclusion

There are significant differences in the ability of POs to detect SpO2 at low pulse amplitude. The Ivy 2000 with Masimo SET was the only oximeter to provide both accuracy during low perfusion and rapid detection of pulsatility loss.