**Methods**

*Controlled desaturation*

The study was performed at Victoria Hospital, London Health Sciences Centre in London, Ontario. Before a desaturation procedure, volunteers were screened for exclusion criteria and informed written consent was obtained. FDA 501(k) protocols to test other pulse oximeter units was followed1.

Volunteers were laid flat with one arm raised onto a table and a radial arterial catheter was inserted for SaO2 measurements. The Glia oximeter and CO-oximeter was applied to adjacent fingers on contralateral arm. A Respiract was used to measure background end-tidal PCO2 and PO2 and a desaturation sequence was modified for those values.

At the beginning of the experiment, control oximeter data and two blood samples were drawn while the volunteer was breathing medical air. The volunteer then breathed 100% O2 and a maximum SpO2 was obtained. A hypoxic gas mixture containing nitrogen, oxygen and carbon dioxide was used to serially desaturate the volunteer using the Respiract to an SpO2 of 96-92%, 91-87%, 86-82%, 81-77%, 76-72% and 71-67%. Each plateau was allowed to stabilize for 30 seconds and N oximeter readings and arterial samples were taken at each plateau 20 seconds apart.

1. U.S. Food and Drug Administration. 510(k) clearances, 2009. <http://www.fda.gov/MedicalDevices/ProductsandMedical>Procedures/DeviceApprovalsandClearances/510kClearances/default.htm (accessed 17/03/2013).