

## **Evaluation of Signal Extraction Technology (SET) in Preventing False Alarms when Using Pulse Oximetry in the Recovery Room.**

Lichtenthal P.R., Wade L.D. *Anesthesiology*. 1996;86(2S):S278.

### **Introduction**

Walk in to a busy recovery room and you are likely to hear a pulse oximeter alarm going off. The frequent triggering of alarms due to extraneous factors is a very real problem. New circuit technology called Signal Extraction Technology (SET) has recently been developed to improve a pulse oximeter's ability to recognize "true" signals from artifacts, and therefore, not trigger an alarm during periods of low blood flow and other extraneous factors which may interfere with good signal acquisition. We compared a pulse oximeter equipped with Masimo SET circuitry (Masimo Corp., Laguna Hills, CA) to an established industry leader in pulse oximetry, in order to assess SET's ability to enhance oximeter performance under conditions which normally cause problems.

### **Methods**

21 patients undergoing surgery participated in this IRB approved study. Upon arrival in the post-operative recovery room, subjects had finger probes from a Nellcor 200 (control) and a prototype pulse oximeter (with Masimo SET) randomly placed on both the ring and index fingers of either hand opposite or on the same side as the blood pressure (BP) cuff. Both probes were then covered with opaque finger sleeves in order to eliminate "crosstalk" between them. SPO2 values were recorded every 5 minutes while blood pressure was measured automatically every 15 minutes. Records were kept of all pulse oximetry alarms. Blood pressure cuff inflation was deliberately used to create a clinical type "low perfusion" state that still allowed some blood flow to the extremity with the probes attached. McNemar's Test was used to compare alarm data.

### **Results**

Eleven males and ten female, ranging in age from 16-83 years participated. Five subjects had the probes placed on the opposite side from the BP cuff. None of these subjects exhibited any disparities in alarm frequency. However, this was not the case for subjects with the finger probes placed on the same side as the BP cuff. These 16 subjects had a total of 74 cuff inflations of which 40 did not cause either pulse oximeter to alarm. 12 inflations caused both pulse oximeters to alarm. There were 19 inflations which caused the control oximeter to alarm while the Masimo SET system did not. This was significantly higher than the 2 inflations in which only the Masimo SET oximeter alarmed ( $p < 0.005$ )

### **Discussion**

The results of our study clearly indicate that the pulse oximeter equipped with SET was usually able to continue functioning during conditions in the recovery room that created measurement problems for the Nellcor 200 pulse oximeter. Frequent false alarming of pulse oximeters due to clinically irrelevant reasons, such as excessive movement or BP cuff inflation, reinforces the tendency to ignore alarms when they occur because of the "cry wolf" phenomenon. This type of development detracts from patient care by desensitizing busy caregivers to true alarm situations. The Masimo SET system helped alleviate this type of false alarm situation in our study, while providing accurate continuous measurement of arterial oxygen saturation in the recovery room.