**Motion Resistant Pulse Oximetry in Neonates.**

**Background**
Pulse oximetry is widely used in neonates. However, its reliability is often affected by motion artefact. Clinicians confronted with questionable oxygen saturation (SpO2) values often estimate the reliability by correlating heart rate (HR) obtained with the oximeter with that obtained by electrocardiogram.

*Objective:* To compare the effects of motion on SpO2 and HR measurements made with Masimo signal extraction technology and those made with a Nellcor N-200.

**Methods**
Continuous pulse oximetry and HR monitoring were performed in 15 healthy, term infants (mean (SD) birth weight 3408 (458) g) undergoing circumcision, using Masimo and Nellcor pulse oximeters and a standard HR monitor (Hewlett-Packard). Simultaneous minute by minute behavioural activity codes were also assigned. Baseline data were collected for 10 minutes when the infant was quietly asleep and then continued during and after circumcision for a total duration of one hour. The oximeter HR and SpO2 values were compared and related to HR values obtained by ECG during all three periods. The effect of behavioural activity on SpO2 and HR was also evaluated.

**Results**
When compared with results obtained with the Nellcor, the mean SpO2 and HR were higher and the incidence of artefact lower with the Masimo during all three periods. Masimo HR more accurately predicted HR obtained with a standard monitor, with lower residual error. SpO2 and HR values obtained with the Nellcor were lower and more variable during all behavioural states, especially crying, when excessive motion artefact was most likely.

**Conclusions**
The data suggest that Masimo signal extraction technology may offer improvement in pulse oximetry performance, particularly in clinical situations in which extreme motion artefacts are likely.