

## COMPARISON OF OXYGEN SATURATION AND HEART RATE (HR) MEASUREMENTS FROM MASIMO AND NELLCOR PULSE OXIMETERS IN NEWLY BORN INFANTS

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**Background:** Pulse oximetry is increasingly used in delivery rooms (DRs). Little is known about the newest generation of Nellcor oximeters, the Nellcor Oximax N-600x. We compared:

- HR measurements from Nellcor ( $HR_{\text{Nellcor}}$ ) and Masimo oximeters ( $HR_{\text{Masimo}}$ ), against HR measured via three-lead electrocardiogram (ECG) ( $HR_{\text{ECG}}$ )
- Oxygen saturation ( $SpO_2$ ) measurements between the Nellcor ( $SpO_{2\text{Nellcor}}$ ) and Masimo ( $SpO_{2\text{Masimo}}$ ) oximeters

**Methods:** Infants born via elective caesarean section were studied. ECG leads were placed on the infant's chest. Masimo and Nellcor oximeter sensors were randomly allocated to each foot. Measurements were collected for 10mins. Screens from the oximeters and ECG monitor were video recorded. Data was extracted by pausing the video every 2s to record HR and  $SpO_2$  measurements, and signal quality. The Bland-Altman method was used to determine agreement between HR measurements from the ECG and oximeters, and between  $SpO_2$  measurements from each oximeter.

**Results:** We studied 44 infants of mean(SD) gestational age 38(1) weeks, birth weight 3246(527) grams, and median(IQR) Apgar scores of 9(9) at 1 and 5 minutes. Four infants received resuscitation. The numbers of paired observations were: ECG and Nellcor PO: 9422; ECG and Masimo PO: 8694; Nellcor and Masimo POs: 8382.

The mean difference ( $\pm 2SD$ ) between  $HR_{\text{ECG}}$  and  $HR_{\text{Nellcor}}$  was  $-0.8\text{bpm}$  ( $\pm 11\text{bpm}$ ); between  $HR_{\text{ECG}}$  and  $HR_{\text{Masimo}}$  was  $0.2\text{bpm}$  ( $\pm 9\text{bpm}$ ); and between  $HR_{\text{Masimo}}$  and  $HR_{\text{Nellcor}}$  was  $-0.8\text{bpm}$  ( $\pm 9\text{bpm}$ ). The mean ( $\pm 2SD$ ) difference between  $SpO_{2\text{Masimo}}$  and  $SpO_{2\text{Nellcor}}$  was  $-3\%$  ( $\pm 15\%$ ).

**Conclusion:** Both oximeters measure HR accurately, i.e. within 1bpm of  $HR_{\text{ECG}}$ . There was good agreement between HR and  $SpO_2$  measurements of the oximeters.