

## BACKGROUND

Pulse oximetry is increasingly used for the evaluation of sleep disordered breathing (SDB) in adults.<sup>1</sup> It is easy to use and provides accurate information on both baseline oxygen levels and intermittent falls in oxygenation. Accurate interpretation of these measurements in children requires knowledge of reference values. In children, these are not yet available for the new generation of motion-resistant pulse oximetry.

## METHODS

- As part of a population based, cross-sectional study on the prevalence of SDB in primary school children, all children attending the third grade of 27 randomly selected regular primary schools located in Hannover, Germany were asked to participate.
- Nocturnal home pulse oximetry (NHPO) recordings were performed using a motion-resistant oximeter (VitaGuard® 300, getemed, Teltow, Germany) with a new generation oximeter module (Masimo SET®, software version 3.0.2.1, 2-4 s averaging mode; Masimo Corp; Irvine, CA).
- A study nurse explained handling of the pulse oximeter to the children in their classroom. Children were instructed to start the recording at bedtime and terminate it in the morning.
- Recordings were analyzed for the minimum and median SpO<sub>2</sub> value found (SATmin and SAT50) and the value below which SpO<sub>2</sub> was 5% and 10% of time (SAT5 and SAT10).
- Furthermore, the time with SpO<sub>2</sub> ≤90% and 92% (T90 and T92) was calculated, as were the number of falls in SpO<sub>2</sub> by >4% and ≤90% and 92% (D4, D90 and D92 events).
- Total and artifact-free recording time, SAT5, SAT10, SAT50 and D4 events were calculated using data analysis software (Matlab®; MathSoft Inc; Cambridge, MA).
- D90 and D92 events, as well as T90 and T92 were visually confirmed to exclude spuriously low values not identified by the software tool.
- Indices of all desaturation events were calculated per hour of artifact-free recording (TI90, TI92, DI4, DI90 and DI92).

## RESULTS

- Of 1760 children attending the third grade, 1144 (65%) were enrolled. 95 children had moved or were ill at the time of study, thus, 1091 recordings were obtained.
- Of these, 95 had to be excluded because of insufficient artifact-free recording time (<5 h).
- Mean (SD; range) age, height and weight of the remaining 996 children (508 boys) was 9.6 y (0.6; 7.4-12.4), 139.3 cm (7.1; 122-167) and 33.9 kg (7.8; 19-89).
- Median (range; 5<sup>th</sup> centile) values for SATmin, SAT5, SAT10 and SAT50 were 92.6 (71-97; 88), 96.9 (53-99; 95), 97.2 (76-99; 96) and 98.1 (93-100; 97).
- Median (range; 95<sup>th</sup> centile) values for TI90, TI92, DI4, DI90 and DI92 were 0.2 (0.0-11.3; 1.1), 0.7 (0.0-49.4; 3.0), 1.4 (0.0-12.9; 3.9), 0.0 (0.0-1.43; 0.2) and 0.1 (0.0-2.6; 0.6).

## CONCLUSION

- Baseline SpO<sub>2</sub> values <97% were uncommon in these children, as were intermittent desaturations to 90% or less.
- These data may serve as a basis for the interpretation of NHPO recordings in children referred for SDB.

## Oxygen Saturation

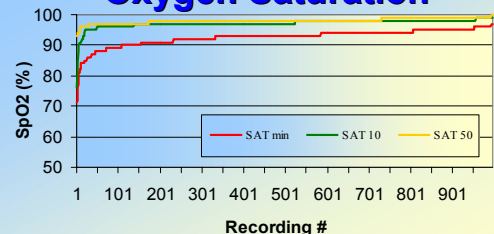


Fig. 1. Distribution of overnight baseline oxygen saturation values in the 996 recordings

## SpO<sub>2</sub> Baseline Values

	Mean ±SD	Median	IQR*	Range	5th Centile	2.5th Centile
SAT <sub>min</sub>	92.6±2.8	93	92-94	71-97	88	85
SAT <sub>5</sub>	96.9±2.6	97	97-98	53-99	95	94
SAT <sub>10</sub>	97.2±1.5	97	97-98	76-99	96	95
SAT <sub>50</sub>	98.1±0.8	98	98-99	93-100	97	96

\*IQR= Interquartile Range (25<sup>th</sup> Centile - 75<sup>th</sup> Centile)

Table 1. Descriptive statistics for SpO<sub>2</sub> baseline values

## Oxygen Desaturation Indices

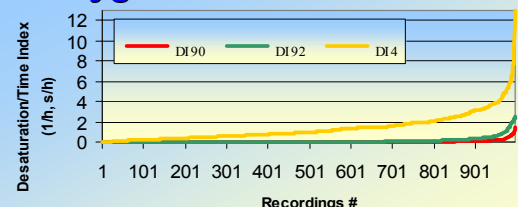


Fig. 2. Distribution of overnight oxygen desaturation indices in the 996 recordings

## SpO<sub>2</sub> Desaturation Values

	Mean±SD	Median	IQR*	Range	95th Centile	97.5th Centile
DI90	0.0±0.1	0	0-0	0-1.43	0.2	0.3
DI92	0.1±0.3	0	0-0.1	0-2.6	0.6	1
DI4	1.4±1.3	1	0.5-1.9	0-12.9	3.9	4.9
TI90	0.2±0.8	0	0-0	0-11.33	1.1	1.9
TI92	0.7±2.9	0	0-0.3	0-49.4	3	6.3

\*IQR= Interquartile Range (25<sup>th</sup> Centile - 75<sup>th</sup> Centile)

Table 2. Descriptive statistics for desaturation events and indices

## References

- Netzer N, Eliasson AH, Netzer C, Kristo DA. Overnight pulse oximetry for sleep-disordered breathing in adults: A review. Chest 2001;120:625-633