Assessing Desaturation Events with the Area Under the Curve (AUC) on the INVOS™ Cerebral/Somatic Oximeter

- Covidien is committed to continuous improvements, because in the operating room, knowing when to respond is crucial.
- Our aim is to allow clinicians to assess the degree of desaturation events and react when it matters.
- As the market leader we continuously set the standard for NIRS regional saturation, and the Covidien INVOS™ System now offers Area Under the Curve.
The Safety Of Knowing More

Reduce Complications. Improve Outcomes.

The 600 peer-reviewed references and three randomised controlled trials which have used the Invos™ System report numerous patient benefits. These include, but are not limited to reductions in:

- Major organ morbidity or mortality \(^1\)
- Stroke \(^2\)
- Post-op cognitive decline \(^3\)
- Respiratory failure/vent time \(^2\)
- Adverse surgical events \(^4\)
- Coma \(^5\)
- ICU length of stay \(^1\)
- Hospital length of stay \(^6\)

The INVOS™ 5100C System:
Now available with additional features, including

AREA UNDER THE CURVE and TREND LINE AVERAGING.

Ask your local Sales Representative for an upgrade of your system!

- Simple visualisation of AUC on the screen
- User defined thresholds
- AUC Summary Display
- Trend Line Averaging display with 60 minute rolling average of rSO\(_2\).
The INVOS™ System now enables the calculation of Area Under the Curve (AUC), based on user defined thresholds, either as a % below baseline or a fixed value.

With this threshold flexibility, users may quantify desaturations in a wide range of cerebral and somatic applications.

- Values are accumulated throughout the operation.
- Units are minute %.

- In this blinded procedure the patient experienced a desaturation episode over almost an hour.
- The red filled area below the 25% drop from baseline threshold shows the time and depth of desaturation.
- This AUC can be quantified in minutes %, in this case the AUC equals 371 minutes %.
Publications have shown an association between AUC measurements and major complications.

Declines in rSO₂ below 50 or more than 20% from a patient’s baseline are cause for concern and should be an initiator for intervention. Clinical studies have shown that rSO₂ values below 40 – or declines of more than 25% from baseline – are associated with neurologic dysfunction and other adverse outcomes.

Assessing the Adequacy of tissue perfusion matters.

Higher risk of POCD in patients with AUC > 50 min%

Higher risk of prolonged hospital stay in patients with AUC > 50 min%

"Significantly (P 0.014) more patients in the control group (n = 6) had prolonged desaturations (AUC < 70% >150 min%) than in the intervention group (n = 0), and patients having prolonged desaturations tended to have a more frequent MOMM (33% vs 7%, P 0.070) compared with patients without such prolonged desaturations."

"Patients with rSO₂ desaturation score greater than 3,000%-second had a significantly higher risk of early postoperative cognitive decline. The incidence of prolonged rSO₂ desaturation was significantly higher in the cognitive decline group (33%) versus the no-decline group (20%; P 0.024). Patients with rSO₂ desaturation score greater than 3,000%-second also had a near threefold increased risk of prolonged hospital stay (> 6 days) [P 0.007]."
Enabling the New INVOS™ system features easily and quickly!

**Defining thresholds**

AUC calculation can be enabled in the user configuration menu, a fixed threshold or user defined thresholds can be selected. AUC calculation starts automatically after enabling and baseline setting.

Following user defined thresholds can be enabled on the INVOS™ System:
- percentage below baseline ranging from 0 to 30% or
- below a fixed threshold ranging from 30 to 60% rSO₂

With this threshold flexibility, users may quantify desaturation in a wide range of cerebral and somatic applications.

**Viewing AUC Values**

In Normal Mode AUC information can be viewed on the Main Screen and the AUC Summary Screen. The accumulated AUC values can be cleared from the AUC Summary Screen. The AUC Summary Screen displays:
- Baseline rSO₂
- Baseline Set Time
- AUC Collection Start Time
- Cumulative Saturation Below Fixed Threshold or Cumulative Saturation Percentage Below Baseline, as configured
- Patient Identifier
- Collection Date
- Collection Time per channel being monitored.

**Trend Line Averaging**

Viewing a 60 minute rolling average of rSO₂ is useful in clinical situations where there is frequent and wide variability in rSO₂ values.

In some situations this erratic nature of the physiologic measurement can make it difficult to recognise important progressive changes in perfusion. This scenario is best illustrated when monitoring gastro-intestinal O₂ delivery in the neonate.
References:


5. Ganzel BL, Cerrito PB, Edmonds HL. Multimodality neuromonitoring improves CABG recovery. Paper presented at Society of Thoracic Surgeons Annual Meeting; January 2002; Fort Lauderdale, FL.


