Improving Sleep & Sedation Safety for Patients in the ICU - Simple effective and low cost brainstem function monitor

**MAJOR NEED TO IMPROVE SLEEP & SEDATION IN ICU**

80% of critical care patients worldwide experience sedation and sleep deprivation. Sleep is less efficient, more fragmented, disrupted, less restorative and lighter than normal. Circadian rhythm is disrupted.

Unnecessarily deep and lengthy sedation has substantial medical and economic consequences such as:

- Increased 180-day mortality (3-5%)
- Costs of managing ICU (prolonged stays, 15% of hospital $)
- Greater long term reliance on healthcare (elderly, payors)

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**LABORATORY SLEEP TOOLS (PSG) NOT FOR ROUTINE ICU USE**

Clinical standards of brain and sleep monitoring are expensive, cumbersome, require specialists to administer and perform post-hoc analysis, and are limited to specialty indications. ($500-$3,500 / test)

- Subjective physical exams are periodic, vary widely and wake patients and interrupt sleep
- Consumer trackers have not worked with ICU physiology

**SOLUTION**

Optimize sleep quality and titrate drug levels with a simple low cost and non-invasive brainstem function monitor

- Our technology: directly measure the brainstem, the neurological center for wakefulness, consciousness and circadian rhythm
- Continuous real-time sleep quality and sedation levels displayed on simple bedside monitor

**INITIAL CLINICAL VALIDATION**

Two clinical studies demonstrate correlation between brainstem signal and level of sedation

- Point of care display of sleep level developed in a pilot sample

**PROJECT TEAM AND COMPANY**

Michael Baltay, MSEng., CEO

Tyler Hartman, MD Neonatal Sleep and Implementation Specialist

Julian Bunn, Ph.D., Principal Computational Scientist

www.brainstembiometrics.com

**PROGRAM AND DELIVERABLES**

Adaptation and advancement of signal processing and machine learning routines

- Collection of adult sleep records with simultaneous EEG/PSG and OMT training data
- Adaptation of machine learning routines from neonatal work to adults

Clinical study: Using Ocular Micro Tremor (OMT) as a Novel Means to Stage Sleep

- Dartmouth Hitchcock Clinics, Sleep Center
- 20 adult patients undergoing routine in-laboratory PSG
- Simultaneous recording of OMT signal
- 200 stage transitions scored and compared

Commercialization: program work will be used in two larger approved follow-on studies