Abstract #: 1389779 Evaluation of a Non-Invasive Respiration Monitor for Continuous Monitoring of Respiratory Parameters
Alexander Panasyuk, Michael Lalli, Nicole Yocum, Roman Bokhenik, Lynn Desmarais, Darren Fahy, Jenny Freeman

**Purpose:** Respiratory monitoring in recently extubated patients is suboptimal. There is no clinically useful leading indicator of impending respiratory failure. A Respiratory Volume Monitor (RVM) has been developed to deliver continuous, real-time respiratory volume and rate data. This study aims to test the accuracy of the RVM monitor over a 24 hour period in a cohort of adult subjects.

**Methods:** An impedance-based RVM system (ExSpiron, Respiratory Motion, Inc., Waltham, MA) was tested by comparing RVM respiratory signals with simultaneous readings obtained from a monitoring spirometer (Wright Respirometer, nSpire Health, Inc., Longmont, CO) collected during normal breathing (60 adult subjects, 138 visits, 1752 tests) over a 24 hour period. Values for minute ventilation (MV), tidal volume (TV), and respiratory rate (RR) were calculated from RVM data and compared to spirometry values on Day 1 and 24 hours later on Day 2.

**Results:** After RVM monitor calibration on Day 1, accuracy for MV, TV, and RR were evaluated on Day 1 and Day 2. Across all tests and subjects, the accuracy was 11.8% for MV, 9.5% for TV, and 3.1% for RR on Day 1. On Day 2, MV showed 13.5% accuracy, while TV was 11.7%, and RR was 3.3%.

**Conclusions:** This monitor provides a clinically relevant non-invasive evaluation of respiratory parameters (MV, TV, and RR), delivering accuracy 24 hours after initial electrode placement. Initial data demonstrate acceptable quality for respiratory variability and complexity analysis.

**Clinical Implications:** Close monitoring of thoracic surgical and critical care patients is essential to prevent respiratory compromise, yet to date, monitoring the adequacy of respiration has been suboptimal in non-intubated patients. Critical decisions regarding level of pain medication and reintubation are generally made based on oxygenation data and subjective clinical examination. This monitor has the potential to bridge the monitoring gap in non-intubated patients, providing a leading indicator of respiratory deterioration to help direct timely therapeutic intervention. This could not only reduce complications, but also reduce cost of care.

*Oral Presentation, 1:30 - 2:30 PM, Wednesday, October 24, 2012*

*To be published in Chest Online Abstract Supplement – October 2012*