Respiratory Well-being Index Calculated from Capnometry Waveform and Parameters

Presenting Author: Lara Brewer, Ph.D.

Co-Author: Joseph Orr, Ph.D.

**Background:** During sedation, a patient's breathing pattern may be unstable and their ventilation may be impaired. We have developed a decision support system designed to use parameters derived from capnometry to inform clinicians when ventilation is not optimal. The system provides both an index score (called Respiratory Wellbeing Index, RWI) and a message to help the clinician identify and troubleshoot the problem quickly. The underlying algorithm applies features calculated from the shape of the capnogram and clinical parameters (respiration rate and etCO$_2$) to calculate the index value and select the displayed message.

**Methods:** Brief epochs of capnometry data collected in various clinical settings were evaluated and scored by two pseudo-experts. The expert opinion data were used as the reference measure against which we compared performance of the RWI algorithm. The RWI algorithm was iteratively modified to improve agreement with expert opinion. In addition, the RWI system provides advisory messages based on extreme values of the input features. Examples of these messages might include “no breaths detected”, “etCO$_2$ low” or “prompt patient to breathe”.

**Results:** Figure 1 shows the linear regression analysis of the RWI score and the expert reviewer scores.

![Figure 1. Comparison of the RWI and reviewer scores.](image)

**Discussion:** The automated system’s displayed scores and messages compared well with the pseudo-expert reviewer’s scores and expected messages in this preliminary study. We are currently conducting an expanded study of a comparison of the system’s outputs with true clinical experts’ scores and expected messages.