

Variability of exhaled breath condensate (EBC) volume and pH using a feedback regulated breathing pattern

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Abstract

Exhaled breath condensate (EBC) is a valuable biological medium for non-invasively measuring biomarkers with the potential to reflect organ systems responses to environmental and dietary exposures and disease processes. Collection of EBC has typically been with spontaneous breathing patterns which induce increased intra- and inter- individual variability in the sample volume and pH, among other parameters. We examined whether a more regulated breathing pattern of fixed tidal volume (TV) and frequency (f) altered the variability of EBC volume and pH. EBC was collected from subjects who were told to breathe with their own determined normal TV and f (“spontaneous”) for 6 or 10 minutes. Subjects were also instructed to breathe with a fixed TV (1 L) and f (10) (“controlled”) using an instrument providing visual and audio cues (Loccioni Gruppa; Angeli di Rosora, Italy) for inhalation/exhalation and volume to better stabilize breathing patterns. EBC volumes from controlled breathing for either 6 or 10 min had a smaller variability vs spontaneous patterns. This difference in EBC volume variability was maintained with 3 sequential EBC collections. For 10 min collections, pH was similar with both breathing patterns. Regulation of breathing patterns presented an advantage in minimizing EBC volume variability. Studies on the possible effect of the 2 breathing patterns on EBC cytokine concentrations are ongoing. [This abstract may not reflect official US EPA policy.]