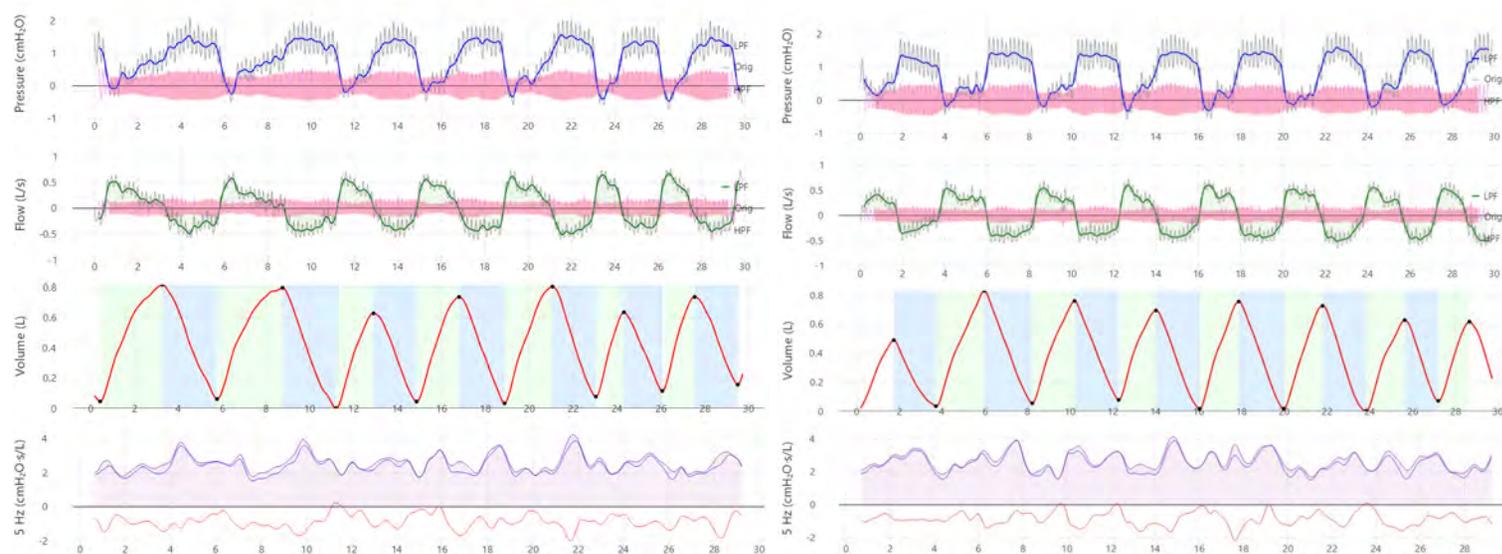


## Breathing Artifacts in Oscillometry

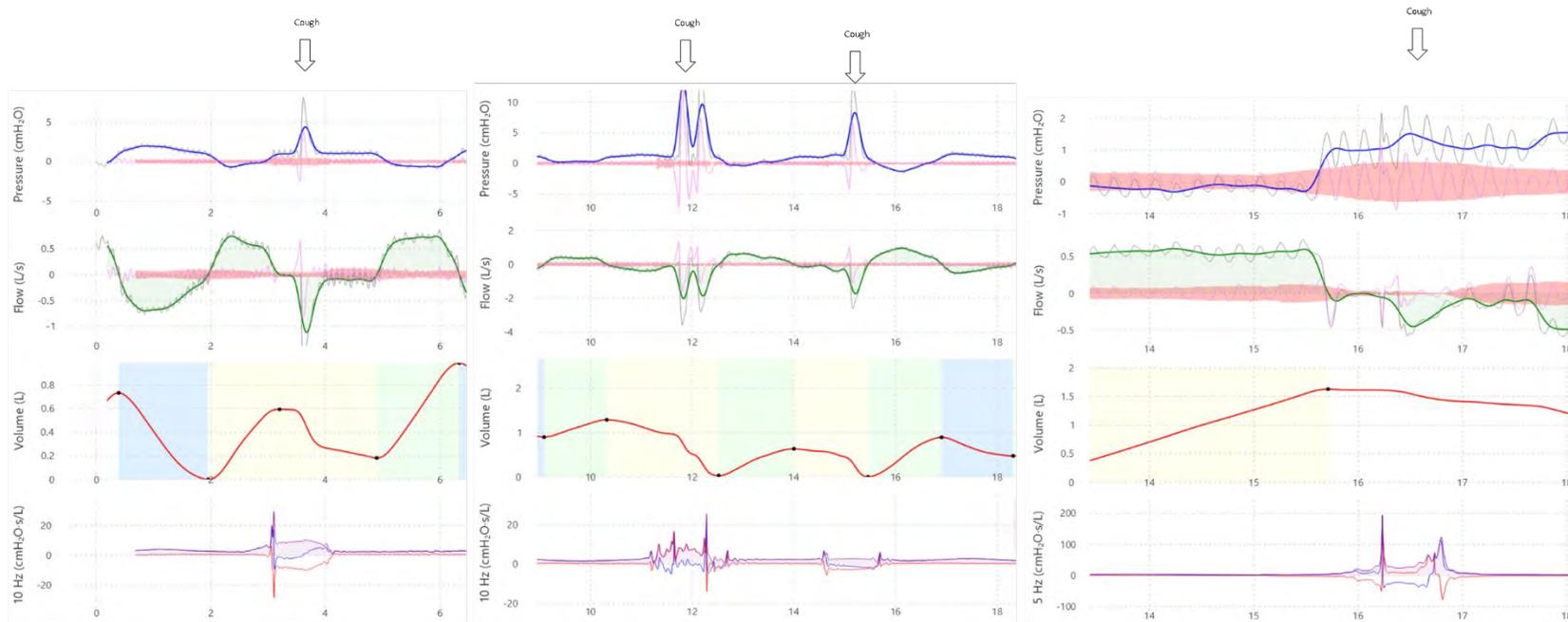
Typical oscillometry devices measure pressure adjacent to the patient's mouth and flow between the patient's mouth and the oscillation source. The oscillation source generates zero or small positive pressure, kept low to avoid opening closed airways that would affect the measurement. Inhalation is defined as positive flow and exhalation as negative flow.



**Figure 1.** Normal breaths during tidal breathing measured with pressure at the mouth (top), flow between oscillator and mouth (second from top), volume transmitted to lungs (second from bottom), and lung resistance at 5 Hz.

## Breathing Artifacts in Oscillometry

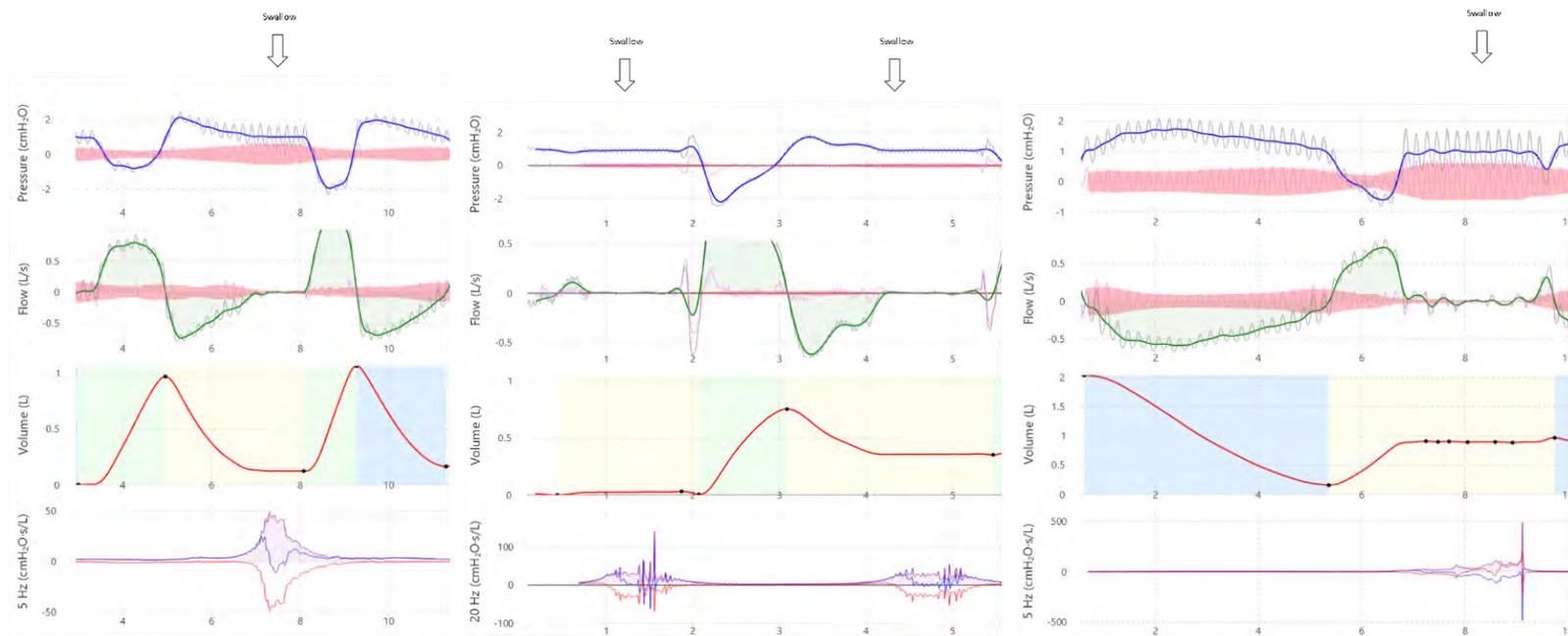
Any deviation in normal breathing can introduce artifacts that interfere with accurate measurements. To minimize these distortions, oscillometry devices use both automatic artifact detection methods and clinical judgment from the test administrator to identify and exclude problematic breaths. Figure 2 illustrates that coughing generates significant fluctuations in flow, volume, and resistance (R), including negative resistance, a physically impossible result. Several quantitative approaches exist for automatic artifact detection to identify compromised breaths, such as thresholds for pressure or flow amplitude, flow acceleration, and coefficient of variation (CoV).



**Figure 2.** Coughs during normal tidal breathing measured with pressure at the mouth (top), flow between oscillator and mouth (second from top), volume transmitted to lungs (second from bottom), and lung resistance at 10 Hz (first two) and 5 Hz (third).

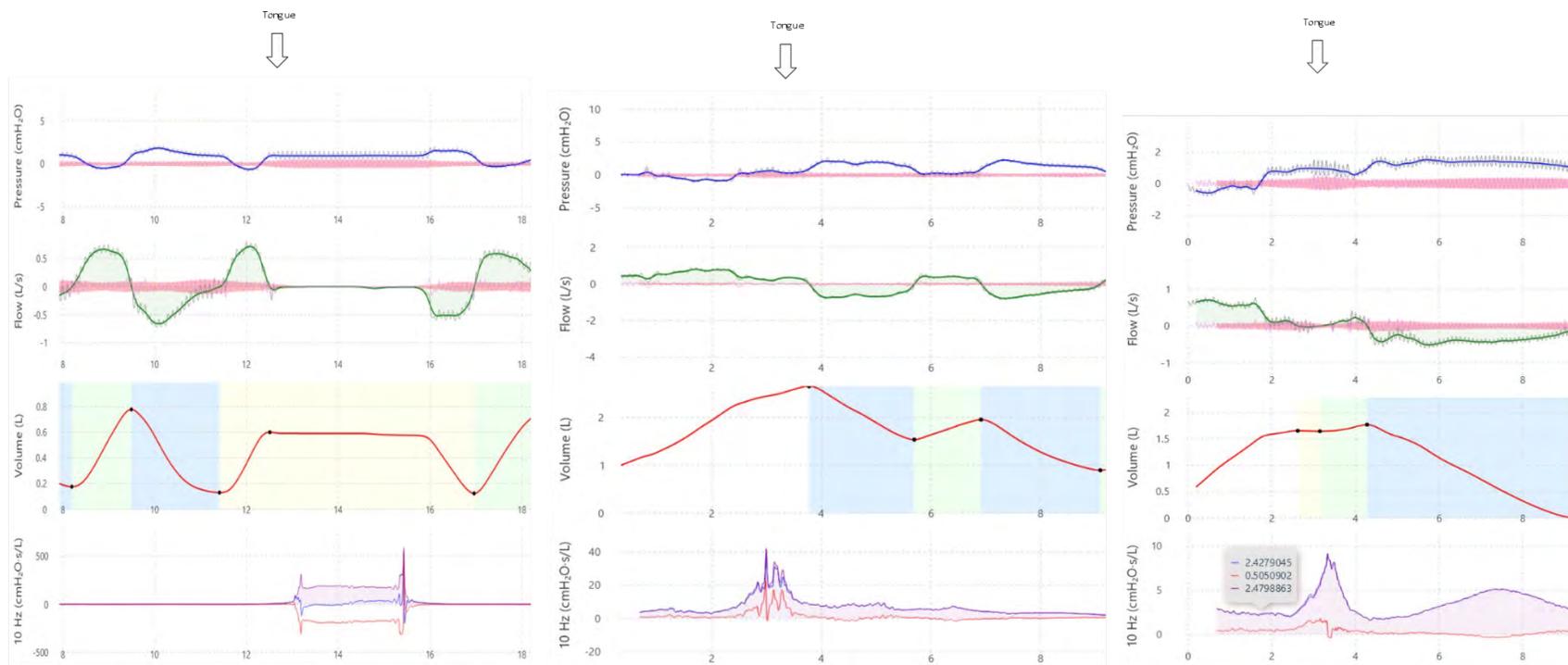
## Breathing Artifacts in Oscillometry

Swallows (Figure 3), tongue blockages (Figure 4), and glottis closures all occlude the airway, generating pauses in the flow and volume signals and distortions in the resistance and reactance.



**Figure 3.** Swallows during normal tidal breathing measured with pressure at the mouth (top), flow between oscillator and mouth (second from top), volume transmitted to lungs (second from bottom), and lung resistance at 5 Hz (bottom).

# Breathing Artifacts in Oscillometry



**Figure 4:** Tongue Blockage