CLAIMS

1. An apparatus configured to measure pulmonary parameters of a user, comprising:

a sampling unit having a breath sampling port;

at least one pressure sensor located within the sampling unit and in communication with the breath sampling port;

at least one gas sensor configured to detect an analyte of interest from a sample breath exhaled by the user into the breath sampling port, wherein the at least one gas sensor is positioned in the sampling unit and in fluid communication with at least a portion of the sample breath,

a feedback component for providing feedback to the user; and

a processor in communication with the at least one pressure sensor, the at least one gas sensor, and the feedback component;

wherein the processor is configured to prompt a user, using the feedback component, with instructions to exhale a sample breath for a first predetermined period of time into the breath sampling port,

wherein the processor is further configured to measure a pressure change relative to an ambient pressure via the pressure sensor and correlate this pressure to a flow rate,

wherein the processor is further configured to receive a measurement from the at least one gas sensor and correlate this measurement to the analyte of interest from the sample breath,

wherein the processor is further configured to calculate a pulmonary parameter of the user based on the flow rate;

wherein the processor is further configured to prompt the user with instructions to exhale the sample breath at a constant flow rate or constant pressure, and

wherein the processor is further configured to provide an indicator using the feedback component, where the indicator is proportional to the measured pressure change such that the user is encouraged to maintain the indicator constant.

2. The apparatus of claim 1 wherein the processor is configured to further prompt the user with instructions to inhale for a second predetermined period of time through the breath sampling port.

3. The apparatus of claim 1 wherein the processor is further configured to prompt the user with instructions to hold their breath for at least 10 seconds prior to exhaling the sample breath.

4. The apparatus of claim 1 wherein the processor is further configured to prompt a user with instructions to exhale the sample breath for at least 6 to 12 seconds.

5. The apparatus of claim 3 wherein the processor is further configured to prompt the user to exhale for a third predetermined period of time into the breath sampling port.

6. The apparatus of claim 1 wherein the at least one gas sensor is configured to sense a CO level from the sample breath.

7. The apparatus of claim 7 wherein the at least one gas sensor is configured to sense a level of H_2, CH_4, CO_2, O_2, or C_3H_6O.

8. A method of measuring pulmonary parameters of a user, comprising:

prompting the user with instructions to exhale a sample breath into a sampling unit for a first predetermined period of time, and to exhale at a constant flow rate or constant pressure when exhaling the sample breath;

measuring a first pressure change of the sample breath over the first predetermined period of time via a pressure sensor in communication with the sample breath;

correlating the first pressure change to a flow rate via a processor in communication with the pressure sensor;

measuring a biological parameter from the sample breath via at least one gas sensor in fluid communication with at least a portion of the sample breath;

correlating a measurement of the biological parameter to an analyte of interest via the processor in communication with the at least one gas sensor; and

calculating a pulmonary parameter of the user via the processor based on the flow rate; and

providing an indicator using a feedback component for providing feedback to the user, where the indicator is proportional to the measured pressure change such that the user is encouraged to maintain the indicator constant.

9. The method of claim 8 further comprising:

prompting the user with instructions to inhale through the sampling unit for a second predetermined period of time via the pressure sensor;

measuring a second pressure change of the sample breath over the second predetermined period of time; and

determining a total volume of air corresponding to a lung capacity of the user via the processor based on the first and second pressure changes over the first and second predetermined periods of time.

10. The method of claim 8 further comprising comparing the pulmonary parameter against a subsequent pulmonary parameter to estimate lung capacity of the user over time.

11. The method of claim 8 further comprising prompting the user with instructions to hold their breath for at least 10 seconds prior to exhaling the sample breath.

12. The method of claim 8 wherein prompting the user with instructions to exhale comprises prompting the user to exhale the sample breath for at least 6 to 12 seconds.

13. The method of claim 9 further comprising prompting the user to exhale for a third predetermined period of time into the breath sampling port.

14. The method of claim 8 wherein measuring the biological parameter from the sample breath comprises venting a remainder of the sample breath.

15. The method of claim 8 wherein measuring the biological parameter comprises sensing a CO level from the sample breath.

16. The method of claim 8 wherein measuring the biological parameter comprises sensing a level of H_2, CH_4, CO_2, O_2, or C_3H_6O from the sample breath.