CLAIMS

1. A continuous monitoring device attachable to a patient, the monitoring device comprising:

an enclosure having a surface that may be adhered to the patient;

a plurality of sensors, each of the plurality of sensors configured to output physiological data relating to a respiratory condition, disorder or ailment of the patient;

a memory configured to store the physiological data; and

a transceiver operable to transmit the physiological data to an external device.

2. The monitoring device of claim 1, wherein the plurality of sensors includes a heart rate sensor and a respiratory sensor.

3. The monitoring device of claim 2, further comprising a pair of electrode pads configured to sense a voltage between the electrode pads, wherein the heart rate sensor and the respiratory sensor are coupled to the pair of electrode pads.

4. The monitoring device of claim 3, further comprising a second pair of electrode pads to which the respiratory sensor is coupled for injection of low-amplitude, high-frequency current.

5. The monitoring device of claim 1, wherein the enclosure has a form factor that is one of the group consisting of: a patch, a wristband, a necklace, and a vest.

6. The monitoring device of claim 1, wherein the plurality of sensors includes at least one of an audio sensor, an accelerometer, a gyroscope or a pressure sensor.

7. The monitoring device of claim 1, wherein the enclosure is fabricated from a flexible compliant material.

8. A system to monitor a respiratory condition of a patient, the system comprising:

a monitor attachable to the patient, the monitor including:

a plurality of sensors, each of the plurality of sensors configured to output physiological data relating to the respiratory condition of the patient; and

a first transceiver configured to transmit the physiological data;

an external device including a second transceiver configured to receive the physiological data from the first transceiver; and

an analytics platform, coupled to the second transceiver, configured to:

analyze the physiological data received from the second transceiver to determine the occurrence of a symptom of the respiratory condition.

9. The system of claim 8, wherein the analytics platform is further configured to analyze environmental data related to the patient in determining the occurrence of the symptom of the respiratory condition.

10. The system of claim 8, wherein the analytics platform is further configured to analyze demographic data related to the patient in determining the occurrence of the symptom of the respiratory condition.

11. The system of claim 8, wherein the symptom is shortness of breath, wherein the plurality of sensors includes an accelerometer, a pressure sensor, and a respiratory sensor, and wherein the analytics platform is configured to determine shortness of breath using a combination of:

breathing effort determined from the pressure sensor and the accelerometer, and

respiration rate determined from the respiratory sensor.

12. The system of claim 8, wherein the plurality of sensors includes an audio sensor, and wherein the analytics platform is further configured to differentiate between a soft wheeze and other adventitious signals based on data from the audio sensor.

13. The system of claim 8, wherein the analytics platform is configured to apply a model to the physiological data to determine the occurrence of a symptom of the respiratory condition.

14. The system of claim 13, wherein the model is configured by machine learning based on collected physiological data and respiratory condition outcome data.

15. The system of claim 8, wherein the analytics platform is further configured to analyze the physiological data to determine a risk evaluation for a respiratory event of the respiratory condition.

16. The system of claim 15, wherein the plurality of sensors includes an impedance plethysmography sensor, and wherein the analytics platform is configured to determine the risk evaluation by:

correlating impedance measurements from the impedance plethysmography sensor with lung volume;

constructing a flow-volume curve from the lung volume;

extracting one or more tidal volume parameters from the flow-volume curve;

deriving features from the tidal volume parameters; and

applying a model to the features to determine the risk evaluation.

17. The system of claim 16, wherein the one or more tidal volume parameters are drawn from the group consisting of:

Time to Peak Expiratory Flow over Expiratory Time;

Volume at Peak Expiratory Flow over Expiratory Tidal Volume; and

Slope of post-peak Expiratory Flow Curve.

18. The system of claim 15, wherein the analytics platform is further configured to issue an alert based on the risk evaluation.

19. The system of claim 18, further comprising an alert device configured to:

receive the alert issued by the analytics platform, and

alert a person on receipt of the alert.

20. A method to monitor a respiratory condition of a patient, the method comprising:

transmitting physiological data from a monitor attached to the patient, the monitor including:

a plurality of sensors, each of the plurality of sensors configured to output physiological data relating to the respiratory condition of the patient; and

a first transceiver configured to transmit the physiological data;

receiving the physiological data on a second transceiver of an external device configured to receive the physiological data from the first transceiver; and

analyzing the physiological data received from the second transceiver via an analytics platform coupled to the second transceiver to determine the occurrence of a symptom of the respiratory condition.