Claims:

~~What is claimed is:~~

~~1. A system to measure a level of an analyte in a gas sample of exhaled breath, the system comprising:~~

~~a pump to draw a flow of gas from a patient;~~

~~a breathing detector to measure a breathing signal in the flow of gas;~~

~~a main channel from the breathing detector to the pump;~~

~~a branch channel in parallel with the main channel, wherein the branch channel connects to the main channel at both ends such that gas drawn through the branch channel can bypass a first portion of the main channel;~~

~~an analyte composition sensor fluidly connected to the branch channel;~~

~~an exhaust downstream of the pump, wherein gas drawn through the branch channel exits through the exhaust, and wherein gas drawn through the first portion of the main channel exits through the exhaust;~~

~~a processor that determines an acceptable breath based on the breathing signal and determines a location of a desired section of the acceptable breath based on the breathing signal; and~~

~~a control system to divert the desired section of breath to the channel and the analyte sensor.~~

~~2. The system of claim 1, wherein a subsection of the bypass channel is isolatable and removable so that the desired section of breath can be captured and removed from the system.~~

~~3. The system of claim 1, wherein the analyte composition sensor is positioned in a side channel of the bypass channel.~~

~~4. The system of claim 1, wherein the analyte sensor is positioned inside the channel.~~

~~5. The system of claim 1, a three-way valve on the upstream end of the bypass channel.~~

~~6. The system of claim 1, a three-way valve on the downstream end of the bypass channel, wherein the control system operates the three-way valve to divert flow through the bypass channel or through the first portion of the main channel.~~

~~7. A breath sampling apparatus comprising:~~

~~a patient interface;~~

~~an inspiratory inlet;~~

~~an expiratory outlet;~~

~~a three-way junction fluidly connected to the patient interface, the inspiratory inlet, and expiratory outlet;~~

~~an inspiratory one-way valve that allows flow from the inspiratory inlet to the three-way junction;~~

~~a first expiratory one-way valve that allows flow from the three-way junction to the expiratory outlet; and~~

~~a second expiratory one-way valve that allows flow from the three-way junction to the expiratory outlet, wherein the second expiratory one-way valve is positioned downstream of the first expiratory one-way valve.~~

~~8. The breath sampling apparatus of claim 7, further comprising a gas sample extraction port positioned between the first expiratory one-way valve and the second expiratory one-way valve.~~

~~9. The breath sampling apparatus of claim 7, further comprising a removable chamber between the three-way junction and the expiratory outlet.~~

~~10. The breath sampling apparatus of claim 7, wherein a diameter of a gas pathway of the apparatus is between 0.375 inches to 0.75 inches.~~

~~11. The breath sampling apparatus of claim 7, an adjustable section between the three-way juncture and the expiratory outlet.~~

12. A breath sampling apparatus comprising:

a patient interface;

an inspiratory inlet;

a three-way valve;

a three-way junction fluidly connected to the patient interface, inspiratory inlet, and the three-way valve;

an inspiratory one-way valve that allows flow from the inspiratory inlet to the three-way junction;

a first expiratory outlet;

a second expiratory outlet, wherein the three-way valve is fluidly connected to the first expiratory outlet, the second expiratory outlet, and the three-way junction;

an expiratory one-way valve that allows flow from the three-way valve to the second expiratory outlet;

a breathing sensor;

a processor that receives a signal from the breathing sensor, identifies a breath sample based on the signal, and diverts flow from the first expiratory outlet to the second expiratory outlet so that the breath sample does not flow through the first expiratory outlet.

~~13~~2. The breath sampling apparatus of claim 1~~2~~, further comprising a gas sample extraction port positioned between the three-way valve and the expiratory one-way valve.

~~14~~3. The breath sampling apparatus of claim 1~~2~~, further comprising a removable chamber between the three-way valve and the expiratory outlet.

~~15~~4. The breath sampling apparatus of claim ~~14~~ 3, wherein the removable chamber comprises the expiratory outlet.

~~16~~5. The breath sampling apparatus of claim 1~~2~~, wherein the breathing sensor is positioned between the inspiratory patient interface and the three-way valve.

~~17~~6. The breath sampling apparatus of claim 1~~2~~, further comprising a removable mouthpiece.

~~18~~7. The breath sampling apparatus of claim 1~~2~~, wherein a diameter of a gas pathway of the apparatus is between 0.375 inches to 0.75 inches.

~~19~~8. The breath sampling apparatus of claim 1~~2~~, an adjustable section between the three-way juncture and the expiratory outlet.

~~20~~9. The breath sampling apparatus of claim-~~19~~ 8, further comprising graduated markings on the adjustable section.