~~WHAT IS CLAIMED IS:~~CLAIMS

~~1. A respiratory system configured to deliver a respiratory therapy to a patient, the system also configured to provide information related to the patient, the system comprising:~~

~~a respiratory device comprising a controller, wherein the controller is configured to:~~

~~receive measurements of a first parameter of a flow of gases or representative of performance of a component of the device, the first parameter indicative of the patient's respiration;~~

~~receive measurements of a second parameter of a gases flow or representative of performance of a component of the device, wherein the second parameter has an assumed effect on the first parameter;~~

~~determine whether the assumed effect is valid; and~~

~~discard the first parameter from a validated first parameter dataset in response to the assumed effect being invalid, the controller configured to use the validated first parameter dataset to make an estimate about the patient.~~

~~2. The system of Claim 1, wherein the estimate includes an estimate of the patient's respiratory rate.~~

~~3. The system of Claim 1 or 2, wherein the estimate includes an estimate of whether the patient is wearing a patient interface of the system.~~

~~4. The system of any one of Claims 1-3, wherein the first parameter is flow rate.~~

~~5. The system of any one of Claims 1-4, wherein the device further comprises a blower including a motor, wherein the second parameter is motor speed.~~

~~6. The system of Claim 5, wherein the assumed effect is invalid if the motor speed is below a first threshold.~~

~~7. The system of Claim 5 or 6, wherein the assumed effect is invalid if recent changes in the motor speed are above a second threshold.~~

~~8. The system of any one of Claims 1-7, wherein the second parameter is pressure.~~

~~9. The system of any one of Claims 1-3, wherein the first parameter is flow rate, pressure, motor speed, power to motor, flow resistance, carbon dioxide data, humidity, variants thereof, or any combinations thereof.~~

~~10. The system of any one of Claims 1-9, wherein the flow of gases comprises ambient air.~~

~~11. The system of Claim 10, wherein the flow of gases comprises a supplementary gas.~~

~~12. The system of Claim 11, wherein the supplementary gas comprises oxygen.~~

~~13. The system of Claim 11 or 12, wherein the controller is configured to measure a composition of the flow of gases after the ambient air and the supplementary gas have been mixed.~~

~~14. The system of Claim 13, wherein the assumed effect is invalid if recent changes in the composition of the flow of gases are above a third threshold.~~

~~15. The system of Claim 11 or 12, wherein the controller is configured to measure a flow rate of the supplementary gas into the device.~~

~~16. The system of Claim 15, wherein the assumed effect is invalid if recent changes in the flow rate of the supplementary gas are above a third threshold.~~

~~17. The system of Claim 15 or 16, wherein the controller is configured to control the flow rate of the supplementary gas into the device.~~

~~18. The system of any one of Claims 1-17, wherein if the assumed effect is valid, the controller is configured to make the estimate about the patient using the assumed effect.~~

~~19. The system of Claim 18, wherein the controller is configured to subtract the assumed effect from the first parameter to output a modified first parameter and make the estimate based on the modified first parameter.~~

~~20. The system of any one of Claims 1-19, wherein the controller is configured to perform a frequency analysis of the validated first parameter dataset to make the estimate.~~

~~21. The system of any one of Claims 1-20, wherein the system comprises a non-sealed system.~~

~~22. The system of Claim 21, wherein the system is configured to deliver a nasal high flow therapy.~~

~~23. The system of any one of Claims 1-20, wherein the system comprises a sealed system.~~

~~24. The system of Claim 23, wherein the system is configured to deliver a CPAP therapy.~~

~~25. The system of Claim 23, wherein the system is configured to deliver a bilevel therapy.~~

~~26. A respiratory system configured to deliver a respiratory therapy to a patient, the system also configured to provide information related to the patient, the system comprising:~~

~~a respiratory device comprising a controller, wherein the controller is configured to:~~

~~receive measurements of a first parameter of a gases flow or representative of performance of a component of the device, the first parameter indicative of the patient's respiration;~~

~~receive measurements of a second parameter of a gases flow or representative of performance of a component of the device;~~

~~determine an assumed effect of the second parameter on the first parameter; and~~

~~make an estimate about the patient using the assumed effect from the first parameter to output a modified first parameter.~~

~~27. The system of Claim 26, wherein the controller is configured to subtract the assumed effect from the first parameter to output a modified first parameter and make the estimate based on the modified first parameter.~~

~~28. The system of Claim 26 or 27, wherein the estimate includes an estimate of the patient's respiratory rate.~~

~~29. The system of any one of Claims 26-28, wherein the estimate includes an estimate of whether the patient is wearing a patient interface of the system.~~

~~30. The system of any one of Claims 26-29, wherein the first parameter is flow rate.~~

~~31. The system of any one of Claims 26-30, wherein the device further comprises a blower including a motor and the second parameter is motor speed.~~

~~32. The system of Claim 31, wherein the controller is configured to determine whether the assumed effect is valid and the assumed effect is invalid if the motor speed is below a first threshold.~~

~~33. The system of Claim 31 or 32, wherein the controller is configured to determine whether the assumed effect is valid and the assumed effect is invalid if recent changes in the motor speed are above a second threshold.~~

~~34. The system of any one of Claims 26-33, wherein the second parameter is pressure.~~

~~35. The system of any one of Claims 26-29, wherein the first parameter is flow rate, pressure, motor speed, power to motor, flow resistance, carbon dioxide data, humidity, variants thereof, or any combinations thereof.~~

~~36. The system of any one of Claims 26-35, wherein the flow of gases comprises ambient air.~~

~~37. The system of Claim 36, wherein the flow of gases comprises a supplementary gas.~~

~~38. The system of Claim 37, wherein the supplementary gas comprises oxygen.~~

~~39. The system of Claim 37 or 38, wherein the controller is configured to measure a composition of the flow of gases after the ambient air and the supplementary gas have been mixed.~~

~~40. The system of Claim 39, wherein the controller is configured to determine whether the assumed effect is valid and the assumed effect is invalid if recent changes in the composition of the flow of gases are above a third threshold.~~

~~41. The system of Claim 37 or 38, wherein the controller is configured to measure a flow rate of the supplementary gas into the device.~~

~~42. The system of Claim 41, wherein the controller is configured to determine whether the assumed effect is valid and the assumed effect is invalid if recent changes in the flow rate of the supplementary gas are above a third threshold.~~

~~43. The system of Claim 41 or 42, wherein the controller is configured to control the flow rate of the supplementary gas into the device.~~

~~44. The system of any one of Claims 26-29, wherein the controller is configured to determine whether the assumed effect is valid and discard the measurements of the first parameter in response to the assumed effect being invalid.~~

~~45. The system of any one of Claims 26-44, wherein the controller is configured to perform a frequency analysis of the modified first parameter to make the estimate.~~

~~46. The system of any one of Claims 26-45, wherein the system comprises a non-sealed system.~~

~~47. The system of Claim 46, wherein the system is configured to deliver a nasal high flow therapy.~~

~~48. The system of any one of Claims 26-45, wherein the system comprises a sealed system.~~

~~49. The system of Claim 48, wherein the system is configured to deliver a CPAP therapy.~~

~~50. The system of Claim 48, wherein the system is configured to deliver a bilevel therapy.~~

~~51. A respiratory system configured to deliver a respiratory therapy to a patient, the system also configured to provide information related to the patient, the system comprising:~~

~~a respiratory device comprising:~~

~~a controller; and~~

~~a blower configured to generate a flow of gases, the blower including a motor;~~

~~wherein the controller is configured to receive a gases flow measurement and a measurement indicative of impact of the blower on the gases flow,~~

~~the controller configured to determine:~~

~~whether to add the gases flow measurement to a validated gases flow dataset based at least in part on the measurement indicative of impact of the blower on the gases flow and~~

~~patient connection and/or patient respiratory rate based at least in part on the validated gases flow dataset.~~

~~52. The system of Claim 51, wherein the gases flow measurement is discarded if the measurement indicative of impact of the blower on the gases flow is below a first threshold.~~

~~53. The system of Claim 51 or 52, wherein the gases flow measurement is discarded if recent changes in the measurement indicative of impact of the blower on the gases flow are above a second threshold.~~

~~54. The system of any one of Claims 51-53, wherein the measurement indicative of impact of the blower on the gases flow is a motor speed of the blower.~~

~~55. The system of any one of Claims 51-53, wherein the measurement indicative of impact of the blower on the gases flow is a pressure drop across the blower.~~

~~56. The system of any one of Claims 51-55, wherein the first parameter is flow rate, pressure, flow resistance, carbon dioxide data, humidity, variants thereof, or any combinations thereof.~~

~~57. The system of any one of Claims 51-56, wherein the flow of gases comprises ambient air.~~

~~58. The system of Claim 57, wherein the flow of gases comprises a supplementary gas.~~

~~59. The system of Claim 58, wherein the supplementary gas comprises oxygen.~~

~~60. The system of Claim 58 or 59, wherein the controller is configured to measure a composition of the flow of gases after the ambient air and the supplementary gas have been mixed.~~

~~61. The system of Claim 60, wherein the gases flow measurement is discarded if recent changes in the composition of the flow of gases are above a third threshold.~~

~~62. The system of Claim 58 or 59, wherein the controller is configured to measure a flow rate of the supplementary gas into the device.~~

~~63. The system of Claim 62, wherein the gases flow measurement is discarded if recent changes in the flow rate of the supplementary gas are above a third threshold.~~

~~64. The system of Claim 62 or 63, wherein the controller is configured to control the flow rate of the supplementary gas into the device.~~

~~65. The system of any one of Claims 51-64, wherein the controller is configured to perform a frequency analysis of the validated flow dataset to determine patient connection and/or patient respiratory rate.~~

~~66. The system of any one of Claims 51-65, wherein the system comprises a non-sealed system.~~

~~67. The system of Claim 66, wherein the system is configured to deliver a nasal high flow therapy.~~

~~68. The system of any one of Claims 51-65, wherein the system comprises a sealed system.~~

~~69. The system of Claim 68, wherein the system is configured to deliver a CPAP therapy.~~

~~70. The system of Claim 68, wherein the system is configured to deliver a bilevel therapy.~~

~~71. A respiratory system configured to deliver a respiratory therapy to a patient, the system also configured to provide information related to the patient, the system comprising:~~

~~a respiratory device comprising:~~

~~a controller; and~~

~~a blower configured to generate a flow of gases, the blower including a motor;~~

~~wherein the controller is configured to receive a measured gases flow parameter and a measurement of impact of the blower on the gases flow,~~

~~the controller configured to:~~

~~estimate a gases flow parameter value resulting from the impact of the blower on the gases flow, and~~

~~determine a difference between the measured gases parameter and the estimated gases flow parameter value resulting from the impact of the blower on the gases flow.~~

~~72. The system of Claim 71, wherein the controller is configured to determine patient connection based at least in part on the difference.~~

~~73. The system of Claim 71 or 72, wherein the controller is configured to estimate a respiratory rate based at least in part on the difference.~~

~~74. The system of any one of Claims 71-73, wherein the gases flow parameter is flow rate, pressure, flow resistance, carbon dioxide data, humidity, variants thereof, or any combinations thereof.~~

~~75. The system of any one of Claims 71-74, wherein the measurement indicative of impact of the blower on the gases flow is a motor speed of the blower.~~

~~76. The system of any one of Claims 71-74, wherein the measurement indicative of impact of the blower on the gases flow is a pressure drop across the blower.~~

~~77. The system of any one of Claims 71-76, wherein the estimated gases flow parameter value resulting from the measurement indicative of impact of the blower is above a threshold.~~

~~78. The system of any one of Claims 71-77, wherein the controller is configured to modify the measured gases flow parameter by subtracting the difference from the measured gases flow parameter and perform a frequency analysis of the modified measured gases flow parameter.~~

~~79. The system of any one of Claims 71-78, wherein the system comprises a non-sealed system.~~

~~80. The system of Claim 79, wherein the system is configured to deliver a nasal high flow therapy.~~

~~81. The system of any one of Claims 71-78, wherein the system comprises a sealed system.~~

~~82. The system of Claim 81, wherein the system is configured to deliver a CPAP therapy.~~

~~83. The system of Claim 81, wherein the system is configured to deliver a bilevel therapy.~~

~~84. A respiratory system configured to deliver a respiratory therapy to a patient, the system also configured to provide information related to the patient's breathing, the system comprising:~~

~~a respiratory device comprising a controller, wherein the controller is configured to:~~

~~receive a signal of a parameter of a flow of gases indicative of the patient's respiration;~~

~~perform a frequency analysis of the signal;~~

~~identify a plurality of local maxima of the signal resulting from the frequency analysis; and~~

~~output a frequency with a highest magnitude among the plurality of local maxima as an estimated respiratory rate.~~

~~85. The system of Claim 84, wherein the controller is further configured to filter a magnitude of each waveform associated with each local maximum.~~

~~86. The system of Claim 85, wherein the outputted frequency is a frequency of the highest filtered magnitude.~~

~~87. The system of any one of Claims 84-86, wherein the controller is configured to identify between two and five local maxima.~~

~~88. The system of Claim 87, wherein the controller is configured to identify two local maxima.~~

~~89. The system of Claim 87, wherein the controller is configured to identify three local maxima.~~

~~90. The system of any one of Claims 84-89, wherein at each iteration of a frequency analysis algorithm, each local maximum is estimated to be caused by the same waveform as a previous local maximum if its frequency is within a certain distance of the previous local maximum.~~

~~91. The system of Claim 90, wherein if a local maximum is estimated to be caused by the same waveform as a previous local maximum, a filtered value for the magnitude of the local maximum is determined using the magnitude of the local maximum and a filtered magnitude of the previous local maxima.~~

~~92. The system of any one of Claims 84-91, wherein if a frequency of a local maximum is not within a certain distance of a frequency of any previous local maximum, the local maximum is determined to be caused by a new waveform.~~

~~93. The system of Claim 92, wherein if a local maximum is estimated to be caused by a new waveform, a filtered value for a magnitude of the local maximum begins from zero, the filtered value for the magnitude of the local maximum being determined using the magnitude of the local maximum and an assumed previous magnitude of zero.~~

~~94. The system of any one of Claims 84-93, wherein the frequency analysis comprises a Goertzel algorithm.~~

~~95. The system of Claim 94, wherein the Goertzel algorithm comprises a modified Goertzel algorithm.~~

~~96. The system of Claim 94 or 95, wherein the Goertzel algorithm evaluates a magnitude of frequencies within a typical breathing frequency range.~~

~~97. The system of any one of Claims 84-96, wherein the controller further determines a signal quality of the estimated respiratory rate.~~

~~98. The system of any one of Claims 84-97, wherein the parameter is flow rate, pressure, motor speed, power to motor, flow resistance, carbon dioxide data, humidity, variants thereof, or any combinations thereof.~~

~~99. The system of any one of Claims 84-98, wherein the system comprises a non-sealed system.~~

~~100. The system of Claim 99, wherein the system is configured to deliver a nasal high flow therapy.~~

~~101. The system of any one of Claims 84-98, wherein the system comprises a sealed system.~~

~~102. The system of Claim 101, wherein the system is configured to deliver a CPAP therapy.~~

~~103. The system of Claim 101, wherein the system is configured to deliver a bilevel therapy.~~

~~104. A respiratory system configured to deliver a respiratory therapy to a patient, the system also configured to provide information related to the patient's breathing, the system comprising:~~

~~a respiratory device comprising a display screen and a controller,~~

~~wherein the controller is configured to:~~

~~receive a signal of a parameter of a flow of gases indicative of the patient's respiration;~~

~~estimate the patient's respiratory rate;~~

~~evaluate a signal quality of the estimated respiratory rate; and~~

~~output the estimated respiratory rate for display on the display screen based on the estimated respiratory rate having a sufficient quality.~~

~~105. The system of Claim 104, wherein the controller is configured to determine the estimated respiratory rate by performing a frequency analysis on the signal.~~

~~106. The system of Claim 105, wherein the frequency analysis comprises a Goertzel algorithm.~~

~~107. The system of Claim 106, wherein the Goertzel algorithm comprises a modified Goertzel algorithm.~~

~~108. The system of Claim 106 or 107, wherein the Goertzel algorithm evaluates a magnitude of frequencies within a typical breathing frequency range.~~

~~109. The system of any one of Claims 104-108, wherein evaluating the signal quality is based in part on a magnitude of recent changes in the estimated respiratory rate.~~

~~110. The system of any one of Claims 104-108, wherein evaluating the signal quality is based in part on a magnitude of recent changes in an estimated breath period.~~

~~111. The system of Claim 109 or 110, wherein a larger magnitude of recent changes is indicative of a poorer signal quality.~~

~~112. The system of any one of Claims 104-108, wherein evaluating the signal quality is based in part on a magnitude of recent changes in the estimated respiratory rate and in part on a magnitude of recent changes in an estimated breath period.~~

~~113. The system of Claim 112, wherein evaluating the signal quality is based in part on a running variance of each of an estimated respiratory rate and an estimated breath period.~~

~~114. The system of any one of Claims 104-108, wherein evaluating the signal quality is based in part on a magnitude of a frequency transform associated with the estimated respiratory rate.~~

~~115. The system of Claim 114, wherein smaller magnitudes are indicative of a poorer signal quality.~~

~~116. The system of any one of Claims 104-115, wherein the parameter is flow rate, pressure, motor speed, power to motor, flow resistance, carbon dioxide data, humidity, variants thereof, or any combinations thereof.~~

~~117. The system of any one of Claims 104-116, wherein the system comprises a non-sealed system.~~

~~118. The system of Claim 117, wherein the system is configured to deliver a nasal high flow therapy.~~

~~119. The system of any one of Claims 104-116, wherein the system comprises a sealed system.~~

~~120. The system of Claim 119, wherein the system is configured to deliver a CPAP therapy.~~

~~121. The system of Claim 119, wherein the system is configured to deliver a bilevel therapy.~~

1. A respiratory system configured to deliver a respiratory therapy to a patient, the system also configured to provide information related to the patient, the system comprising:

a respiratory device configured to deliver nasal high flow therapy, the respiratory device comprising a controller, wherein the controller is configured to:

receive measurements of a first parameter of a flow of gases or representative of performance of a component of the respiratory device, wherein the first parameter is a flow rate;

receive measurements of a second parameter of a gases flow or representative of performance of a component of the respiratory device, wherein the second parameter has an assumed effect on the first parameter, wherein the first parameter is calculated independent of the second parameter;

determine whether the assumed effect is valid; and

discard the first parameter from a validated first parameter dataset in response to the assumed effect being invalid, the controller configured to use the validated first parameter dataset to estimate a respiratory rate of the patient.

2. The system of Claim 1, wherein the controller is further configured to estimate whether the patient is wearing a patient interface of the system.

3. The system of Claim 1, wherein the respiratory device further comprises a blower including a motor, wherein the second parameter is a motor speed.

4. The system of Claim 3, wherein the assumed effect is invalid if the motor speed is below a minimum threshold.

5. The system of Claim 3, wherein the assumed effect is invalid if recent changes in the motor speed are above a change in a motor speed threshold.

6. The system of Claim 1, wherein the second parameter is pressure.

7. The system of Claim 1, wherein the flow of gases comprises ambient air.

8. The system of Claim 7, wherein the flow of gases comprises a supplementary gas.

9. The system of Claim 8, wherein the supplementary gas comprises oxygen.

10. The system of Claim 8, wherein the controller is configured to measure a composition of the flow of gases after the ambient air and the supplementary gas have been mixed.

11. The system of Claim 10, wherein the assumed effect is invalid if recent changes in the composition of the flow of gases are above a change in the composition of the flow of gases threshold.

12. The system of Claim 8, wherein the controller is configured to measure a flow rate of the supplementary gas into the respiratory device.

13. The system of Claim 12, wherein the assumed effect is invalid if recent changes in the flow rate of the supplementary gas are above a change in the flow rate of a supplementary gas threshold.

14. The system of Claim 12, wherein the controller is configured to control the flow rate of the supplementary gas into the respiratory device.

15. The system of Claim 1, wherein if the assumed effect is valid, the controller is configured to estimate the respiratory rate of the patient using the assumed effect, wherein the controller is further configured to subtract the assumed effect from the first parameter to output a modified first parameter and estimate the respiratory rate of the patient based on the modified first parameter.

16. The system of Claim 1, wherein the controller is configured to perform a frequency analysis of the validated first parameter dataset to estimate the respiratory rate of the patient.

17. The system of Claim 1, wherein the respiratory system further comprises a non-sealed interface.