

CLAIMS

1. A nasal cannula interface for supplying a gases flow to a patient comprising:
a nasal cannula defining at least a portion of a gases flow path and comprising
a body having a base portion and at least one prong extending from the base portion, the at least one prong being configured to direct the gases flow to an orifice of the patient, and
one or more sensors configured to measure a parameter,
wherein the body further comprises a top surface and a rear surface, the rear surface being adjacent the patient in use of the nasal cannula interface; wherein
an outer surface of the one or more sensors is flush with the top surface or the rear surface.
2. The nasal cannula interface of claim 1, wherein at least one of the one or more sensors is a patient sensor, and the parameter is a physiological parameter of the patient.
3. The nasal cannula interface of any of the preceding claims, wherein the parameter is a measure of blood oxygenation of the patient.
4. The nasal cannula interface of any of the preceding claims, wherein the at least one prong is configured to be received in one or more nares of the patient.
5. The nasal cannula interface of any of the preceding claims, wherein one or more of the at least one prong is configured to form a seal with one of the nares of the patient.
6. The nasal cannula interface of any of claims 1 to 4, wherein one or more of the at least one prong is configured be received in one of the nares of the patient in an unsealed manner.
7. The nasal cannula interface of any of the preceding claims, further comprising a head securement assembly.
8. The nasal cannula interface of claim 7, wherein the head securement assembly comprises one or more straps.

9. The nasal cannula interface of claim 7, wherein the head securement assembly comprises one or more facial pads.
10. The nasal cannula interface of claim 9, wherein the or each facial pad comprises an adhesive surface to adhere to the patient's skin.
11. The nasal cannula interface of claim 9 or 10, wherein the or each facial pad comprises two distinct patches.
12. The nasal cannula interface of claim 11, wherein the two distinct patches are removably coupled.
13. The nasal cannula interface of any of the preceding claims, further comprising a pair of side arms.
14. The nasal cannula interface of claim 13, wherein the pair of side arms is integral with the body of the nasal cannula.
15. The nasal cannula interface of claim 13 or 14, when dependent on any of claims 7 to 9, wherein the head securement assembly is connected to the side arms.
16. The nasal cannula interface of claim 13 or 14, when dependent on any of claims 9 to 12, wherein the facial pads are located on the side arms.
17. The nasal cannula interface of any of the preceding claims, wherein the outer surface of the patient sensor is flush with the top surface, and the top surface is a patient contacting surface, or the outer surface of the patient sensor is flush with the rear surface and the rear surface is a patient contacting surface.
18. The nasal cannula interface of any of the preceding claims, wherein at least one of the one or more sensors is a pulse oximeter.
19. The nasal cannula interface of claim 18, wherein the pulse oximeter is a reflectance type pulse oximeter.

20. The nasal cannula interface of any of the preceding claims, further comprising a second prong extending from the base portion.
21. The nasal cannula interface of claim 20, wherein the one or more sensors are located between the two prongs.
22. The nasal cannula interface of any of the preceding claims, wherein the at least one prong extends from the top surface of the body of the nasal cannula, and the one or more sensors are located on said top surface.
23. The nasal cannula interface of any of the preceding claims, wherein the one or more sensors are arranged to contact the patient's columella whilst the nasal cannula interface is in use.
24. The nasal cannula interface of any of claims 1 to 20, wherein the at least one prong extends from a top surface of the body of the nasal cannula, and the one or more sensors are located on a surface of the body that is adjacent to said top surface.
25. The nasal cannula interface of any of claims 1 to 20, or 24, wherein the one or more sensors are positioned on the body of the nasal cannula so as to contact the patient's upper lip whilst the nasal cannula interface is in use.
26. The nasal cannula interface of any of the preceding claims, further comprising:
a gases inlet conduit for receiving the gases flow from a flow source, the gases inlet conduit defining at least a portion of a gases flow path; and
an interface connector for receiving the gases flow from the gases inlet conduit and directing the gases flow towards the at least one prong.
27. The nasal cannula interface of claim 26, further comprising a set of wires, and wherein the gases inlet conduit further comprises a patient end, and a distal end,
wherein the patient end is connected to the interface connector,
the distal end comprises an interface inlet, the interface inlet comprising a set of electrical contacts, and

the set of wires of the nasal cannula interface provides electrical communication between the one or more sensors and the set of electrical contacts of the interface inlet.

28. The nasal cannula interface of claim 27, wherein the set of electrical contacts of the interface inlet comprises a planar surface, and

wherein the planar surface is substantially perpendicular to a longitudinal axis of a lumen of the interface inlet.

29. The nasal cannula interface of claim 27, wherein the set of electrical contacts of the interface inlet comprises a pin and/or a socket of a pin and socket electrical connector, and

wherein a longitudinal axis of the pin and/or socket is substantially parallel to a longitudinal axis of a lumen of the interface inlet.

30. The nasal cannula interface of any of claims 27 to 29, wherein the set of electrical contacts of the interface inlet are in a fixed position relative to the remainder of the interface inlet.

31. The nasal cannula interface of any of claims 27 to 30, further comprising a mesh layer surrounding the outer surface of at least a portion of the nasal cannula or the gases inlet conduit,

wherein the mesh comprises a plurality of interwoven filaments, and

at least a portion of the set of wires of the nasal cannula interface are interwoven with the filaments of the mesh layer.

32. The nasal cannula interface of any of claims 27 to 31, wherein at least a portion of the set of wires of the nasal cannula interface are embedded into at least a portion of the body of the nasal cannula, the interface connector of the nasal cannula, or the gases inlet conduit.

33. The nasal cannula interface of any of claims 27 to 32, wherein at least a portion of the set of wires of the nasal cannula interface are located on an outer surface of at least a portion of the body of the nasal cannula, the interface connector of the nasal cannula, or the gases inlet conduit.

34. The nasal cannula interface of any of claims 27 to 33, wherein at least a portion of the set of wires of the nasal cannula interface are located on an inner surface of at least a portion of

the body of the nasal cannula, the interface connector of the nasal cannula, or the gases inlet conduit.

~~35. — A nasal cannula interface for supplying a gases flow to a patient comprising:~~
~~a gases inlet conduit for receiving the gases flow from a flow source, the gases inlet conduit defining at least a portion of a gases flow path and comprising a patient end and a distal end,~~
~~a first set of wires,~~
~~one or more sensors configured to be placed on the patient's skin and configured to measure at least one parameter, and~~
~~a nasal cannula defining at least a portion of a gases flow path and comprising~~
~~a body having a base portion and at least one prong extending from the base portion, the at least one prong being configured to direct the gases flow to an orifice of the patient, and~~
~~an interface connector for receiving the gases flow from the gases inlet conduit and directing the gases flow towards the at least one prong, and~~
~~wherein the patient end is connected to the interface connector,~~
~~the distal end comprises an interface inlet, the interface inlet comprising a set of electrical contacts, and~~
~~the first set of wires of the nasal cannula interface provides electrical communication between the one or more sensors and the set of electrical contacts of the interface inlet.~~

~~36. — The nasal cannula interface of claim 35, wherein the at least one prong is configured to be received in one or more nares of the patient.~~

~~37. — The nasal cannula interface of claim 35 or 36, wherein the at least one prong is configured to form a seal with one of the nares of the patient.~~

~~38. — The nasal cannula interface of claim 35 or 36, wherein the at least one prong is configured to be received in one of the nares of the patient in an unsealed manner.~~

~~39. — The nasal cannula interface of any of claims 35 to 38, further comprising a second prong extending from the base portion.~~

~~40. — The nasal cannula interface of any of claims 35 to 39, wherein at least one of the one or more sensors is a patient sensor, and the parameter is a physiological parameter of the patient.~~

~~41. — The nasal cannula interface of claim 40, wherein the physiological parameter is a measure of blood oxygenation of the patient.~~

~~42. — The nasal cannula interface of any of claims 35 to 41, wherein at least one of the one or more sensors is a pulse oximeter.~~

~~43. — The nasal cannula interface of claim 42, wherein the pulse oximeter is a reflectance-type pulse oximeter.~~

~~44. — The nasal cannula interface of claim 42, wherein the pulse oximeter is a transmissive pulse oximeter.~~

~~45. — The nasal cannula interface of any of claims 35 to 44, wherein the body of the nasal cannula further comprises a pair of side arms.~~

~~46. — The nasal cannula interface of any of claims 35 to 45, further comprising a head securement assembly.~~

~~47. — The nasal cannula interface of claim 46 when dependent on claim 45, wherein the head securement assembly is connected to the side arms.~~

~~48. — The nasal cannula interface of claim 46 or 47, wherein the head securement assembly comprises one or more straps.~~

~~49. — The nasal cannula interface of any of claims 35 to 48, wherein the sensors are moveable relative to the body of the nasal cannula interface.~~

~~50. — The nasal cannula interface of any of claims 35 to 49, further comprising a sensor arm, wherein the one or more sensors are located on the sensor arm.~~

~~51.—The nasal cannula interface of claim 50, wherein the sensor arm is rigid such that it cannot be easily bent by a user.~~

~~52.—The nasal cannula interface of claim 50, wherein the sensor arm is resiliently deformable such that it can be easily bent by a user.~~

~~53.—The nasal cannula interface of and of claims 50 to 52, wherein a surface of the sensor arm comprises an adhesive such that the surface is capable of adhering to the patient's skin.~~

~~54.—The nasal cannula interface of any of claims 50 to 53, wherein a length of the sensor arm is adjustable.~~

~~55.—The nasal cannula interface of claim 54, wherein the length of sensor arm is adjustable through telescopic motion.~~

~~56.—The nasal cannula interface of any of claims 50 to 55 when dependent on claim 63, wherein the head securement assembly further comprises a sensor mount connected to one of the straps, wherein the sensor arm projects from the sensor mount.~~

~~57.—The nasal cannula interface of claim 56, wherein the sensor mount is moveably connected to one of the straps.~~

~~58.—The nasal cannula interface of claim 57, wherein the sensor mount is slidably connected to one of the straps.~~

~~59.—The nasal cannula interface of any of claims 56 to 58, wherein the sensor mount is removably connected to one of the straps.~~

~~60.—The nasal cannula interface of any of claims 50 to 55, further comprising a sensor mount connected to one the gases inlet conduit, wherein the sensor arm projects from the sensor mount.~~

~~61.—The nasal cannula interface of claim 60, wherein the sensor mount is moveably connected to the gases inlet conduit.~~

~~62.—The nasal cannula interface of claim 61, wherein the sensor mount is slidably connected to the gases inlet conduit.~~

~~63.—The nasal cannula interface of any of claims 60 to 62, wherein the sensor mount is removably connected to the gases inlet conduit.~~

~~64.—The nasal cannula interface of any of claims 56 to 63, wherein the sensor arm is moveable relative to the sensor mount.~~

~~65.—The nasal cannula interface of claim 64, wherein the sensor arm is slidably mounted to the sensor mount.~~

~~66.—The nasal cannula interface of claim 65, wherein the sensor arm is slidably mounted to the sensor mount so as to be able to slide in a direction parallel to the length of the strap or gases inlet conduit to which the sensor mount is connected.~~

~~67.—The nasal cannula interface of claim 66, wherein the sensor arm is slidably mounted to the sensor mount so as to be able to slide in a direction transverse to the length of the strap or gases inlet conduit which the sensor mount is connected to.~~

~~68.—The nasal cannula interface of any of claims 64 to 67, wherein the sensor arm is configured to rotate about an axis at which it connects to the sensor mount.~~

~~69.—The nasal cannula interface of any of claims 35 to 49, further comprising a sensor clip configured to clip onto the patient, wherein the one or more sensors are located on the sensor clip.~~

~~70.—The nasal cannula interface of any of claims 69, wherein the sensor clip is configured to clip onto the patient's ear.~~

~~71.—The nasal cannula interface of any of claims 35 to 70, wherein the gases inlet conduit is substantially rigid.~~

~~72.—The nasal cannula interface of any of claims 35 to 70, wherein the gases inlet conduit is substantially flexible.~~

~~73.—The nasal cannula interface of any of claims 35 to 72, wherein the gases inlet conduit is integrally formed with the nasal cannula.~~

~~74.—The nasal cannula interface of any of claims 35 to 72, wherein the gases inlet conduit is releasably connected to the nasal cannula.~~

~~75.—The nasal cannula interface of any of claims 35 to 74, wherein the set of electrical contacts of the interface inlet comprises a planar surface, and
the planar surface is substantially perpendicular to a longitudinal axis of a lumen of the interface inlet.~~

~~76.—The nasal cannula interface of any of claims 35 to 74, wherein the set of electrical contacts of the interface inlet comprises a pin and/or a socket of a pin and socket electrical connector, and
a longitudinal axis of the pin and/or socket is substantially parallel to a longitudinal axis of a lumen of the interface inlet.~~

~~77.—The nasal cannula interface of any of claims 35 to 76, wherein the set of electrical contacts of the interface inlet are in fixed position relative to the remainder of the interface inlet.~~

~~78.—The nasal cannula interface of any of claims 35 to 76, further comprising a mesh layer surrounding the outer surface of at least a portion of the nasal cannula or the gases inlet conduit,
wherein the mesh comprises a plurality of interwoven filaments, and
at least a portion of the first set of wires of the nasal cannula interface are interwoven with the filaments of the mesh layer.~~

~~79.—The nasal cannula interface of any of claims 35 to 78, wherein at least a portion of the first set of wires of the nasal cannula interface are embedded into at least a portion of the body of the nasal cannula, the interface connector of the nasal cannula, or the gases inlet conduit.~~

~~80.—The nasal cannula interface of any of claims 35 to 79, wherein at least a portion of the first set of wires of the nasal cannula interface are located on an outer surface of at least a portion of the body of the nasal cannula, the interface connector of the nasal cannula, or the gases inlet conduit.~~

~~81.—The nasal cannula interface of any of claims 35 to 80, wherein at least a portion of the first set of wires of the nasal cannula interface are located on an inner surface of at least a portion of the body of the nasal cannula, the interface connector of the nasal cannula, or the gases inlet conduit.~~

~~82.—The nasal cannula interface of any of claims 35 to 81, further comprising:
a wire coil, and
a second set of wires extending from the sensor to the wire coil, wherein
the second set of wires can be retracted into the wire coil,
the wire coil is connected to the first set of wires, and
at least one of the one or more sensors or the sensor is located at the end of the second set of wires.~~

~~83.—The nasal cannula interface of claim 82, wherein the second set of wires retracts into the wire coil automatically.~~

~~84.—The nasal cannula interface of claim 82, wherein the second set of wires retracts into the wire coil upon user actuation of a button, switch, or lever.~~

~~85.—The nasal cannula interface of any of claims 82 to 84, wherein the wire coil is mounted to one of the straps.~~

~~86.—The nasal cannula interface of any of claims 82 to 85, wherein the wire coil is removably mounted to one of the straps.~~

~~87.—The nasal cannula interface of any of claims 82 to 85, wherein the wire coil is mounted to the gas inlet conduit.~~

~~88.—The nasal cannula interface of claim 87, wherein the wire coil is removably mounted to the gas inlet conduit.~~

~~89.—A headgear for a patient interface comprising~~

~~a strap forming a part of the headgear for assisting in retaining or stabilising of a patient interface upon a user;~~

~~a first connector at a first end portion of the strap for connecting the strap to the patient interface;~~
~~and~~

~~a first cheek engaging member adapted to encapsulate the first connector and having a surface region adapted to locate between the user's cheek and the connector to minimise direct contact of the connector with the user's skin in use;~~

~~wherein one or more sensors are configured to be placed on or adjacent the patient's skin and configured to measure at least one parameter; the one or more sensors being mounted on the first cheek engaging member.~~

~~90.—A headgear as claimed in claim 89 further comprising a second connector at a second opposing end portion of the strap for connecting the strap to the patient interface, and a second cheek engaging member configured to encapsulate the second connector and having a surface region adapted to locate between the user's other cheek to minimise direct contact of the connector with the user's skin in use.~~

~~91.—A headgear as claimed in either one of claim 89 or claim 90 wherein each cheek engaging member is configured to removably couple about the respective connector.~~

~~92.—A headgear as claimed in any one of claims 89 to 91 wherein the surface region of each cheek engaging member comprises a material that is substantially softer than a material of the respective connector.~~

~~93.—A headgear as claimed in any one of claim 89 to claim 92 wherein the surface region of each cheek engaging member comprises a relatively higher frictional surface material than the respective connector, to assist with retaining or stabilising of a patient interface upon the face of a user.~~

~~94.—A headgear as claimed in either claim 92 or claim 93 wherein the material is a thermoplastic elastomer.~~

~~95.—A headgear as claimed in any one of claim 89 to claim 94 wherein the surface region of each cheek engaging member is a surface of wider surface area at an end of the respective cheek engaging member more adjacent to the patient interface than a surface area of an opposing end of the cheek member more distant from the patient interface.~~

~~96.—A headgear as claimed in claim 95 wherein the surface region of each cheek engaging members tapers from a relatively wider end to a relatively lesser end.~~

~~97.—A headgear as claimed in any one of claims 89 to claim 96 wherein each cheek engaging member is a sleeve configured to receivably retain the respective connector therein.~~

~~98.—A headgear as claimed in claim 97 wherein the sleeve is configured to removably couple about the respective connector.~~

~~99.—A headgear as claimed in either one of claim 97 or claim 98 wherein the connector is adapted to extend through a passage in the sleeve.~~

~~100.—A headgear gear as claimed in claim 99 wherein the sensor is connected to one or more sensor wires, the one or more sensor wires extending through the passage in the sleeve.~~

~~101.—A headgear as claimed in any one of claim 97 to claim 100 wherein each connector is substantially housed by the respective sleeve in a region adapted to locate adjacent the user's cheek in use.~~

~~102.—A headgear as claimed in any one of claim 97 to claim 101 wherein each sleeve is curved along at least a portion of the length of the sleeve to complement the contour of the respective cheek.~~

~~103.—A headgear as claimed in any one of claim 97 to claim 102 wherein each connector is curved along at least a portion of the length of the connector adapted to locate adjacent the respective cheek.~~

~~104.—A headgear as claimed in claim 103 wherein the connector is pre-formed with a curved profile.~~

~~105.—A headgear as claimed in any one of claim 102 to claim 104 wherein each sleeve is pre-formed with a curved profile.~~

~~106.—A headgear as claimed in any one of claim 102 to claim 105 wherein each sleeve is curved upon encapsulating the respective connector.~~

~~107.—A headgear as claimed in any one of claim 89 to claim 106 wherein the connector comprises a clip for releasably connecting with the patient interface.~~

~~108.—A headgear as claimed in any one of claim 89 to claim 107 wherein each connector is frictionally or mechanically engaged with the respective cheek engaging member once in situ.~~

~~109.—A headgear as claimed in any one of claims 97 to 108 wherein the one or more sensor(s) is mounted on the sleeve.~~

~~110.—A headgear as claimed in any one of claims 97 to 109 wherein the one or more sensor(s) is removably mounted on the cheek member.~~

~~111.—A headgear as claimed in any one of claims 89 to 110 wherein an outer surface of the one or more sensors is flush with the surface region of the cheek member.~~

~~112.—A nasal cannula interface for supplying a gases flow to a patient comprising:~~

~~a nasal cannula defining at least a portion of a gases flow path and comprising a body having a base portion and at least one prong extending from the base portion, the at least one prong being configured to direct the gases flow to an orifice of the patient, the body comprising a lateral mount; and~~

~~headgear according to any one of claims 89 to 111; wherein the first connector of the headgear is connected to the lateral mount of the body.~~

~~113.—The nasal cannula interface of claim 112 wherein the body comprises a recess positioned between a pair of prongs, wherein the prongs extend from the body.~~

~~114.—The nasal cannula interface of claim 113 wherein the sensor is located in the recess between the prongs.~~

~~115.—The nasal cannula interface of any one of claims 112 to 114 comprising a manifold part received within an opening in the body (i.e. face mount part), wherein the manifold part comprises a dip, wherein the dip in the manifold portion aligns with the recessed in the body when the manifold is inserted into the body.~~

~~116.—A nasal cannula interface for supplying a gases flow to a patient comprising a nasal cannula defining at least a portion of a gases flow path and comprising:~~

~~—— a body having a base portion and pair of prongs extending from the base portion, the prongs being configured to direct the gases flow to an orifice of the patient;~~

~~a gases flow manifold part comprising a gases inlet for receiving a flow of gas from a gas source, and a gases outlet for delivering the flow of gas to the prongs of the body;~~

~~the nasal cannula interface comprising a patient sensor configured to measure a parameter; the patient sensor being positioned between the prongs, the body comprising a recess adjacent the face of the patient.~~

~~117.—The nasal cannula interface of claim 116 wherein the patient sensor comprises a pulse oximeter.~~

~~118.—The nasal cannula interface of claim 116 or 117 comprising a plurality of patient sensors.~~

~~119.—The nasal cannula interface of any one of claims 116 to 118 wherein the gases flow manifold part comprises a recessed portion between the prongs and the sensor positioned in the recess, and~~

~~the nasal cannula further comprising a manifold part received within an opening in the body (i.e. face mount part), wherein the manifold part comprises a dip, wherein the dip in the manifold portion aligns with the recessed in the body when the manifold is inserted into the body.~~