CLAIMS

What is claimed is:

1. A rapidly insertable central catheter ("RICC") insertion assembly, comprising:

a RICC;

an introducer including:

an introducer needle including:

a needle shaft including a longitudinal gap extending from a proximal portion of the needle shaft through a needle tip; and

a splittable introducer sheath disposed over the needle shaft, the introducer sheath including:

a splittable sheath body sealing the needle shaft such that a vacuum can be drawn through the introducer needle;

a splittable sheath hub coupled to a proximal portion of the sheath body; and

a splittable valved port in a side of the sheath hub; and

an access guidewire disposed in both the RICC and the introducer, the access guidewire extending along an entirety of a primary lumen of the RICC, through a valve of the port, along a sheath body-covered needle channel of the needle shaft, and to a location in the introducer proximal of the needle tip.

2. The RICC insertion assembly of claim 1, the RICC comprising a catheter tube including:

a first section formed of a first polymeric material having a first durometer, the first section in a distal portion of the catheter tube;

a second section formed of a second polymeric material having a second durometer less than the first durometer, the second section in the distal portion of the catheter tube proximal of the first section of the catheter tube; and

a tapered junction between the first and second sections of the catheter tube, the junction having a length between that of exposed portions of the first and second sections of the catheter tube.

3. The RICC insertion assembly of claim 2, wherein the catheter tube possess a column strength sufficient to prevent buckling of the catheter tube when inserted into a needle tract established by a percutaneous puncture with the introducer and advanced through a vasculature of a patient without dilation of tissue about the needle tract or any blood vessels of the vasculature beforehand with a separate dilator.

4. The RICC insertion assembly of any claim of claims 1-3, wherein the access guidewire includes a non-wound portion and a wound portion, the non-wound portion of the access guidewire extending through the valve of the port.

5. The RICC insertion assembly of any claim of claims 1-4, wherein the valve includes a tearable or split septum compressed in the port, the access guidewire extending through the septum.

6. The RICC insertion assembly of claim 5, wherein the septum lies over a notch in the needle shaft, the longitudinal gap in the needle shaft distally extending from the notch.

7. The RICC insertion assembly of any claim of claims 1-6, wherein the sheath body is configured to split against the access guidewire when the sheath body is pulled away from the access guidewire after splitting the sheath hub.

8. The RICC insertion assembly of any claim of claims 1-7, wherein the sheath hub includes a non-tapered female sheath-hub connector in a proximal portion of the sheath hub.

9. The RICC insertion assembly of claim 8, wherein a needle hub coupled to a proximal portion of the needle shaft includes a non-tapered male needle-hub connector in a distal portion of the needle hub configured to form a fluid-tight connection with the female sheath-hub connector.

10. The RICC insertion assembly of claim 9, wherein the male needle-hub connector includes an ‘O’-ring disposed in a circumferential groove around the male needle-hub connector configured to form the fluid-tight connection.

11. The RICC insertion assembly of either claim 9 or 10, further comprising a syringe including a tapered male syringe tip extending from a distal portion of the syringe, the

syringe tip configured to insert into a tapered female needle-hub connector in a proximal portion of the needle hub.

12. An introducer for a rapidly insertable central catheter ("RICC"), comprising:
an introducer needle including:
a needle shaft including a longitudinal gap;
a needle hub coupled to a proximal portion of the needle shaft; and
a needle tip in a distal portion of the needle shaft, the longitudinal gap extending from the proximal portion of the needle shaft distal of the needle hub through the needle tip; and
a splittable introducer sheath configured to be disposed over the needle shaft in at least a ready-to-operate state of the introducer, the introducer sheath including:
a splittable sheath body configured to seal the needle shaft such that a vacuum can be drawn through the introducer needle in at least the ready-to-operate state of the introducer;
a splittable sheath hub coupled to a proximal portion of the sheath body; and
a splittable valved port in a side of the sheath hub.

13. The introducer of claim 12, wherein the valve includes a tearable or split septum compressed in the port, the septum configured to pass an access guidewire therethrough.

14. The introducer of claim 13, wherein the septum lies over a notch in the needle shaft in at least the ready-to-operate state of the introducer, the longitudinal gap in the needle shaft distally extending from the notch.

15. The introducer of any claim of claims 12-14, wherein the sheath hub further includes a pair of tabs radially extending from the sheath hub configured for splitting the sheath hub by pulling the tabs apart.

16. The introducer of any claim of claims 12-15, wherein the sheath hub includes a pair of longitudinal hub faults including a primary fault along a portion of a primary side of the introducer sheath including the port and a secondary fault along a portion of a secondary side of the introducer sheath opposite the primary side, the sheath hub configured to split along both the primary and secondary hub faults for propagation along the sheath body in the primary and secondary sides of the introducer sheath.

17. The introducer of any claim of claims 12-16, wherein the sheath hub includes a non-tapered female sheath-hub connector in a proximal portion of the sheath hub.

18. The introducer of claim 17, wherein the needle hub includes a non-tapered male needle-hub connector in a distal portion of the needle hub configured to form a fluid-tight connection with the female sheath-hub connector in at least the ready-to-operate state of the introducer.

19. The introducer of claim 18, wherein the male needle-hub connector includes an 'O'-ring disposed in a circumferential groove around the male needle-hub connector configured to form the fluid-tight connection.

20. The introducer of any claim of claims 12-19, wherein a distal portion of the sheath body includes a taper tapering from an outer diameter of a majority of the sheath body down to an outer diameter of the needle shaft, the taper providing a smooth transition from the needle tip to the sheath body in the ready-to-operate state of the introducer.

21. The introducer of claim 20, wherein the taper has a taper angle less than either a tip-bevel angle of a tip bevel or a primary-bevel angle of a primary bevel of a bevel of the needle tip.

22. The introducer of any claim of claims 12-21, further comprising a syringe including a tapered male syringe tip extending from a distal portion of the syringe, the syringe tip configured to insert into a tapered female needle-hub connector in a proximal portion of the needle hub.

23. A rapidly insertable central catheter ("RICC"), comprising:

a catheter tube including:

a first section formed of a first polymeric material having a first durometer, the first section in a distal portion of the catheter tube;

a second section formed of a second polymeric material having a second durometer less than the first durometer, the second section in the distal portion of the catheter tube proximal of the first section of the catheter tube; and

a tapered junction between the first and second sections of the catheter tube, the junction having a length between that of exposed portions of the first and second sections of the catheter tube;

a catheter hub coupled to a proximal portion of the catheter tube; and

one or more extension legs, each extension leg of the one-or-more extension legs coupled to the catheter hub by a distal portion thereof.

24. The RICC of claim 23, wherein a proximal portion of the first section of the catheter tube is disposed in a bore in a distal portion of the junction and bonded thereto.

25. The RICC of either claim 23 or 24, wherein a distal end of the second section of the catheter tube is flush with a proximal end of the junction and bonded thereto.

26. The RICC of any claim of claims 23-25, wherein the catheter tube possess a column strength sufficient to prevent buckling of the catheter tube when inserted into a needle tract established by a percutaneous puncture and advanced through a vasculature of a patient without dilation of tissue about the needle tract or any blood vessels of the vasculature beforehand with a separate dilator.

27. The RICC of any claim of claims 23-26, wherein the RICC includes a set of three lumens including the primary lumen, a secondary lumen, and a tertiary lumen formed of fluidly connected portions of three catheter-tube lumens, three catheter-hub lumens, and three extension-leg lumens.

28. The RICC of claim 27, wherein the primary lumen has a primary-lumen aperture in a distal end of the catheter tube, the secondary lumen has a secondary-lumen aperture in a side of the distal portion of catheter tube, and the tertiary lumen has a tertiary-lumen aperture in the side of the distal portion of the catheter tube proximal of the secondary-lumen aperture.

~~29. A method for inserting a rapidly insertable central catheter ("RICC") into a blood-vessel lumen of a patient, comprising:~~

~~acquiring a RICC insertion assembly including the RICC, an introducer, and an access guidewire in a substantially ready-to-operate state of the RICC insertion assembly, the introducer including an introducer needle disposed in a splittable introducer sheath fluidly connected to a syringe;~~

establishing a needle tract from an area of skin to the blood-vessel lumen with the introducer;

advancing a distal end of the access guidewire from its initial location in the introducer proximal of a needle tip of the introducer needle into the blood-vessel lumen;

withdrawing the introducer needle from the introducer leaving both the introducer sheath and the access guidewire in place in the blood-vessel lumen, the introducer needle including a longitudinal gap extending from a proximal portion of a needle shaft through the needle tip allowing the removing of the introducer needle from the introducer while the access guidewire remains in place in the blood-vessel lumen;

splitting the introducer sheath away from the access guidewire to remove split portions of the introducer sheath from the blood-vessel lumen; and

advancing a catheter tube of the RICC over the access guidewire and into the blood-vessel lumen, thereby inserting the RICC into the blood-vessel lumen.

30. The method of claim 29, wherein establishing the needle tract includes ensuring blood flashes back along the longitudinal gap of the introducer needle, into a needle hub of the introducer needle, into a syringe tip, into a barrel of the syringe, or a combination thereof, thereby confirming the needle tract extends into the blood-vessel lumen.

31. The method of claim 30, wherein establishing the needle tract includes drawing a slight vacuum with the syringe while establishing the needle tract such that the blood flashes back into introducer needle upon establishing the needle tract.

32. The method of any claim of claims 29-31, further comprising confirming with ultrasound imaging the access guidewire is in the blood-vessel lumen.

33. The method of any claim of claims 29-32, further comprising aspirating blood with the syringe coupled to the introducer needle for confirmation the needle tract extends into the blood-vessel lumen before withdrawing the introducer needle from the introducer.

34. The method of claim 33, wherein the sheath body seals the longitudinal gap of the needle shaft for the aspirating of the blood with the syringe.

35. The method of any claim of claims 29-34, wherein the advancing of the access guidewire into the blood-vessel lumen secures blood-vessel access for the inserting of the RICC into the blood-vessel lumen.

36. The method of any claim of claims 29-34, further comprising advancing the introducer sheath over the introducer needle into the blood-vessel lumen before the advancing of the access guidewire into the blood-vessel lumen, the advancing of the introducer sheath into the blood-vessel lumen securing blood-vessel access for the inserting of the RICC into the blood-vessel lumen.

37. The method of any claim of claims 29-36, wherein splitting the introducer sheath includes splitting a sheath hub including the port in the side of the sheath hub by pulling apart a pair of tabs radially extending from the sheath hub and propagating one or more splits resulting from splitting the sheath hub along a sheath body of the introducer sheath.

38. The method of claim 37, wherein propagating the one-or-more splits includes continuing to pull apart the tabs after splitting the sheath hub.

39. The method of claim 37, wherein propagating the one-or-more splits includes pulling the sheath body away from the access guidewire such that the sheath body splits against the access guidewire.

40. The method of any claim of claims 29-39, further comprising withdrawing the access guidewire leaving the catheter tube in place in the blood-vessel lumen.

41. The method of claim 40, further comprising:

advancing a maneuver guidewire into the blood-vessel lumen by way of a primary lumen of the RICC;

advancing a distal portion of the catheter tube farther into the blood-vessel lumen over the maneuver guidewire to a lower ⅓ of a superior vena cava ("SVC") of a heart of the patient; and

withdrawing the maneuver guidewire leaving the catheter tube in place in the lower ⅓ of the SVC.