

CLAIMS

We claim:

1. A catheter assembly, comprising:

a catheter adapter, comprising a distal end, a proximal end, a lumen extending through the distal end and the proximal end, and a side port between the distal end of the catheter adapter and the proximal end of the catheter adapter;

a catheter extending from the distal end of the catheter adapter; and

a septum disposed within the lumen at a distal position aligned with the side port, wherein in response to the septum being in the distal position, the septum provides a seal between the side port and the catheter, wherein the septum is configured to slide from the distal position to a proximal position proximal to the side port, wherein in response to the septum being in the proximal position, the side port is in fluid communication with the catheter.

2. The catheter assembly of claim 1, further comprising a puller element disposed within the lumen, wherein the puller element comprises a distal end coupled to the septum and a proximal end configured to couple to a blood collection set.

3. The catheter assembly of claim 2, wherein the catheter adapter further comprises a slot, wherein a proximal end of the slot comprises a stop, wherein the puller element further comprises an extension extending through the slot and configured to contact the stop in response to the septum sliding from the distal position to the proximal position.

4. The catheter assembly of claim 3, wherein the extension is coupled to a push tab.
5. The catheter assembly of claim 1, wherein the catheter adapter comprises an air vent, wherein an outer surface of the septum comprises an annular groove, wherein in response to the septum being in the distal position, the side port is in fluid communication with the annular groove and the air vent.
6. A catheter system, comprising:
 - a catheter assembly, comprising:
 - a catheter adapter, comprising a distal end, a proximal end, a lumen extending through the distal end and the proximal end, and a side port between the distal end of the catheter adapter and the proximal end of the catheter adapter;
 - a catheter extending from the distal end of the catheter adapter;
 - a stop within the lumen; and
 - a septum disposed within the lumen at a distal position aligned with the side port, wherein in response to the septum being in the distal position, the septum provides a seal between the side port and the catheter; and
 - a needle assembly, comprising:
 - a needle hub coupled to the proximal end of the catheter adapter;
 - an introducer needle, comprising a sharp distal tip, a proximal end, and a needle feature disposed between the sharp distal tip and the proximal end, wherein the proximal end of the introducer needle is secured within the needle hub, wherein in response to withdrawal of the introducer needle in a proximal direction a first amount,

the needle feature is configured to contact the septum and slide the septum from the distal position to a proximal position, wherein in response to the septum being in the proximal position, the side port is in fluid communication with the catheter and the stop contacts the septum, wherein in response to withdrawal of the introducer needle in the proximal direction more than the first amount, the needle feature is configured to move proximally with respect to the septum.

7. The catheter assembly of claim 6, wherein the needle feature comprises a bump.

8. The catheter assembly of claim 1, wherein the catheter adapter comprises an air vent, wherein an outer surface of the septum comprises an annular groove, wherein in response to the septum being in the distal position, the side port is in fluid communication with the annular groove and the air vent.

9. The catheter assembly of claim 8, wherein the air vent forms the stop.

~~10. A method, comprising:~~

~~priming a catheter system with a priming solution, wherein the catheter system comprises:~~

~~a catheter assembly, comprising:~~

~~a catheter adapter, comprising a distal end, a proximal end, a lumen extending through the distal end and the proximal end, a side port between the distal end of the catheter adapter and the proximal end of the catheter adapter, and an air vent extending through a wall of the catheter adapter;~~

~~a catheter extending from the distal end of the catheter adapter; and~~

~~a septum disposed within the lumen at a distal position aligned with the side port, wherein in response to the septum being in the distal position, the septum provides a seal between the side port and the catheter, wherein an outer surface of the septum comprises an annular groove, wherein in response to the septum being in the distal position, the side port is in fluid communication with the annular groove and the air vent, wherein the septum is configured to slide from the distal position to a proximal position proximal to the side port, wherein in response to the septum being in the proximal position, the side port is in fluid communication with the catheter; and~~

~~————— a needle assembly, comprising:~~

~~a needle hub coupled to the proximal end of the catheter adapter; and~~

~~an introducer needle, comprising a sharp distal tip, a proximal end, and a notch, wherein the proximal end of the introducer needle is secured within the needle hub; and~~

~~after priming the catheter system, inserting the introducer needle and the catheter into vasculature, wherein in response to the introducer needle being inserted into the vasculature, blood flows into the sharp distal tip of the introducer needle, through the notch into a space between the introducer needle and the catheter, and proximate the septum, wherein the blood is not in fluid communication with the priming solution.~~

11. The method of claim 10, wherein the introducer needle further comprises a needle feature disposed between the sharp distal tip and the proximal end of the introducer

needle, further comprising after inserting the introducer needle and the catheter into the vasculature, withdrawing the introducer needle in a proximal direction a first amount, wherein in response to withdrawing the introducer needle in the proximal direction the first amount, the needle feature contacts the septum and slides the septum from the distal position to the proximal position.

12. The method of claim 11, further comprising after withdrawing the introducer needle in the proximal direction the first amount, withdrawing the introducer needle in the proximal direction more than the first amount, wherein in response to withdrawal of the introducer needle more than the first amount, the needle feature moves proximally with respect to the septum.

13. The catheter assembly of claim 11, wherein the needle feature comprises a bump.

14. The method of claim 10, wherein the catheter assembly further comprises a puller element disposed within the lumen, wherein the puller element comprises a distal end coupled to the septum and a proximal end configured to couple to a blood collection set.

15. The method of claim 14, wherein the catheter adapter further comprises a slot, wherein a proximal end of the slot comprises a stop, wherein the puller element further comprises an extension extending through the slot and configured to contact

~~the stop in response to the septum sliding from the distal position to the proximal position.~~

~~16. The method of claim 15, further comprising:~~

~~removing the needle assembly from the catheter system;~~

~~coupling a distal end of a housing of a blood collection set to the proximal end of the puller element, wherein the blood collection set comprises:~~

~~the housing, comprising a distal end, a proximal end, and a slot;~~

~~a cannula hub, comprising a wing extending through the slot, wherein the cannula hub is slidable with respect to the housing between a retracted position and an advanced position;~~

~~a cannula extending distally from the cannula hub;~~

~~an extension tube, comprising a distal end coupled to the proximal end of the cannula hub; and~~

~~a blood collection device coupled to a proximal end of the extension tube; and~~

~~after coupling the distal end of the housing of the blood collection set to the proximal end of the puller element, gripping the wing to slide the cannula hub from the retracted position to the advanced position, wherein the cannula is disposed within the housing in response to the cannula hub being in the retracted position, wherein in response to the cannula hub being in the advanced position, the cannula extends through the distal end of the housing, the puller element, and the septum.~~

- ~~17. The method of claim 16, further comprising after gripping the wing to slide the cannula hub from the retracted position to the advanced position, collecting a blood sample within the blood collection set.~~
- ~~18. The method of claim 17, further comprising after collecting the blood sample within the blood collection set, gripping the wing to slide the cannula hub from the advanced position to the retracted position.~~
- ~~19. The method of claim 17, further comprising after collecting the blood sample within the blood collection set, moving the housing proximally until the extension contacts the stop, wherein in response to moving the housing proximally, the septum slides from the distal position to the proximal position, wherein in response to the extension contacting the stop, the housing is uncoupled from the puller element.~~
- ~~20. The method of claim 18, wherein the extension is coupled to a tab, wherein moving the housing proximally until the extension contacts the stop comprises gripping the housing and the tab.~~