CLAIMS

We claim:

1. An insert for a catheter system, the insert comprising:

a distal end, comprising a male port;

a proximal end, comprising a female port opposite the male port;

a middle portion disposed between the distal end and the proximal end, wherein the middle portion comprises an elongated tubular portion and a tapered or stepped portion proximal and proximate to the elongated tubular portion, wherein an outer diameter of the elongated tubular portion is uniform, wherein an outer diameter of the tapered or stepped portion increases in a proximal direction; and

a lumen extending through the male port, the middle portion, and the female port.

2. The insert of claim 1, further comprising a septum disposed within the female port.

3. The insert of claim 2, wherein the septum comprises a split septum.

4. The insert of claim 1, wherein the insert is monolithically formed as a single unit.

5. The insert of claim 1, wherein the elongated tubular portion has a greater length than the tapered or stepped portion.

6. A catheter system, comprising:

a catheter assembly, comprising:

a catheter adapter;

a catheter extending distally from the catheter adapter;

an extension tube, comprising a distal end and a proximal end, wherein the distal end is coupled to the catheter adapter;

an adapter coupled to the proximal end of the extension tube; and

a needleless connector coupled to the adapter; and

an insert, comprising:

a distal end, comprising a male port;

a proximal end, comprising a female port opposite the male port;

a middle portion disposed between the distal end and the proximal end, wherein the middle portion comprises an elongated tubular portion and a tapered or stepped portion proximal and proximate to the elongated tubular portion, wherein an outer diameter of the elongated tubular portion is uniform, wherein an outer diameter of the tapered or stepped portion increases in a proximal direction; and

a lumen extending through the male port, the middle portion, and the female port, wherein the insert is inserted through the needleless connector and the adapter such that the male port is disposed within the extension tube and the tapered or stepped portion is proximal to the needleless connector.

7. The catheter system of claim 6, wherein the insert further comprises a septum disposed within the female port.

8. The catheter system of claim 7, wherein the septum comprises a split septum.

9. The catheter system of claim 6, wherein in response to inserting the insert through the needleless connector and adapter of the catheter system, blood is configured to flow through the insert and does not contact the needleless connector or the adapter.

10. The catheter system of claim 6, further comprising a needle assembly and a blood collection tube holder coupled to the needle assembly, wherein the needle assembly comprises a body, comprising a distal end, a proximal end, and a lumen extending through the distal end of the body and the proximal end of the body, wherein the

distal end of the body comprises a male port, wherein the needle assembly further comprises a needle extending from the proximal end of the body and configured to receive an evacuated blood collection tube.

11. The catheter system of claim 6, wherein the insert is monolithically formed as a single unit.

12. The catheter system of claim 6, wherein the elongated tubular portion has a greater length than the tapered or stepped portion.

~~13. A method of sampling blood, comprising:~~

~~inserting an insert through a needleless connector and adapter of a catheter system, wherein the catheter system comprises:~~

~~a catheter adapter;~~

~~a catheter extending distally from the catheter adapter;~~

~~an extension tube, comprising a distal end and a proximal end, wherein the distal end is coupled to the catheter adapter;~~

~~an adapter coupled to the proximal end of the extension tube; and~~

~~a needleless connector coupled to the adapter;~~

~~wherein the insert comprises:~~

~~a distal end, comprising a male port;~~

~~a proximal end, comprising a female port opposite the male port;~~

~~a middle portion disposed between the distal end and the proximal end, wherein the middle portion comprises an elongated tubular portion and a tapered or stepped portion proximal and proximate to the elongated tubular portion, wherein an outer diameter of the~~

elongated tubular portion is uniform, wherein an outer diameter of the tapered or stepped portion increases in a proximal direction; and

a lumen extending through the male port, the middle portion, and the female port, wherein the insert is inserted through the needleless connector and the adapter such that the male port is disposed within the extension tube and the tapered or stepped portion is proximal to the needleless connector; and

inserting a needle assembly into the female port of the insert, wherein the needle assembly comprises a body, wherein the body comprises a distal end, a proximal end, and a lumen extending through the distal end of the body and the proximal end of the body, wherein the distal end of the body comprises a male port, wherein the needle assembly further comprises a needle extending from the proximal end of the body and configured to receive an evacuated blood collection tube; and

after inserting the insert through the needleless connector and the adapter and after inserting the needle assembly into the female port of the insert, inserting the catheter into a vein of a patient.

14. The method of claim 12, further comprising, after inserting the catheter into the vein of the patient, inserting the needle into the evacuated blood collection tube and collecting blood in the evacuated blood collection tube.

15. The method of claim 13, further comprising, removing the needle assembly from the female port of the insert and coupling a syringe to the female port.

16. The method of claim 14, wherein the female port is threaded, wherein coupling the syringe to the female port comprises threading the syringe to the female port.

17. The method of claim 15, further comprising, flushing the catheter by activating the syringe.

~~18. The method of claim 17, further comprising, removing the insert from the catheter system during an indwelling period of the catheter in the vein of the patient.~~

~~19. The method of claim 12, wherein in response to inserting the insert through the needleless connector and adapter of the catheter system, blood is configured to flow through the insert and does not contact the needleless connector or the adapter.~~

~~20. The method of claim 12, wherein the insert further comprises a septum disposed within the female port.~~