CLAIMS

1. A catheter system, comprising:

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

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

a connector coupled to the catheter adapter and comprising a septum; and

a blood collection set, comprising a needle assembly and a housing, wherein the housing is coupled to the connector, wherein the housing is configured to create a fluid path through the connector.

2. The catheter system of claim 1, wherein the housing is directly and removably coupled to the needle assembly or is integrated with the needle assembly.

~~3. The catheter system of claim 1, wherein the housing is integrated with the needle assembly.~~

3. ~~4.~~ The catheter system of claim 1, further comprising:

a side port disposed between the distal end of the catheter adapter and the proximal end of the catheter adapter;

an extension tube, comprising a distal end integrated with the side port of the catheter adapter and a proximal end integrated with the distal end of the adapter; and

an adapter, comprising a distal end and a port, wherein the connector is coupled to the port of the adapter, the adapter comprising a Y-adapter or a straight adapter.

~~5. The catheter system of claim 4, wherein the adapter comprises a Y-adapter or a straight adapter.~~

4~~6~~. The catheter system of claim 1, wherein the connector is a needleless connector.

5~~7~~. The catheter system of claim 4~~6~~, wherein the housing is disposed in a proximal position, wherein the housing comprises a male luer, wherein the male luer is configured to activate

the septum and create the fluid path through the connector in response to the housing being moved from the proximal position to a distal position, wherein the housing is threaded from the proximal position to the distal position or pushed from the proximal position to the distal position.

6~~8~~. The catheter system of claim 4~~6~~, wherein the housing comprises a distal piece and a proximal piece movable distally towards the distal piece, wherein the distal piece of the housing comprises a male luer, wherein the male luer is configured to activate the septum and create the fluid path through the connector in response to the proximal piece moving distally towards the distal piece.

7~~9~~. The catheter system of claim 1, wherein the housing comprises a cannula configured to penetrate the septum of the connector to create the fluid path through the connector.

8~~10~~. The catheter system of claim 7~~9~~, wherein the cannula comprises a side hole in fluid communication with a lumen of the cannula.

9~~11~~. The catheter system of claim 7~~9~~, wherein the housing is movable from a proximal position to a distal position, wherein in response to the housing moving from the proximal position to the distal position, the cannula extends through the septum and the fluid path through the connector is created.

10~~12~~. The catheter system of claim 7~~9~~, wherein the cannula extends through the septum.

11~~13~~. The catheter system of claim 1, further comprising an extension set, wherein the extension set comprises a distal end coupled to the proximal end of the catheter adapter and a proximal end coupled to the connector, wherein the connector is a needleless connector.

12~~14~~. A system, comprising:

an extension set, wherein the extension set comprises:

a distal end configured to couple to a proximal end of the catheter adapter; and

a proximal end; and

a needle assembly coupled to the proximal end of the extension set, wherein the needle assembly comprises a body, a sharp needle extending proximally from the body, and a sheath covering a proximal tip of the sharp needle.

13~~15~~. The system of claim 12~~14~~, wherein the needle assembly is directly coupled to the proximal end of the extension set.

14~~16~~. The system of claim 12~~14~~, further comprising:

a needleless connector directly coupled to the proximal end of the extension set, wherein the needleless connector comprises a septum; and

a housing directly coupled to the needleless connector and the needle assembly, wherein the housing is configured to create a fluid path through the needleless connector.

15~~17~~. The system of claim 12~~14~~, further comprising:

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

a catheter extending distally from the distal end of the catheter adapter.

16~~18~~. A blood collection set to couple to a catheter system, comprising:

a needle assembly, comprising a body, a sharp needle extending proximally from the body, and a sheath covering a proximal tip of the sharp needle; and

a housing coupled to a distal end of the needle assembly, wherein the housing is configured to create a fluid path through a connector.

17~~19~~. The blood collection set of claim 16~~18~~, wherein the housing is directly and removably coupled to the needle assembly or is integrated with the needle assembly.

~~20. The blood collection set of claim 18, wherein the housing is integrated with the needle assembly.~~

18~~21~~. The blood collection set of claim 16~~18~~, wherein a distal end of the housing comprises a male luer, wherein the male luer comprises threading or is configured for a slip fit.

19~~22~~. The blood collection set of claim 16~~18~~, wherein the housing comprises a distal piece and a proximal piece movable distally towards the distal piece, wherein the distal piece of the housing comprises a male luer, wherein the male luer is configured to activate a septum of the connector and create the fluid path through the connector in response to the proximal piece moving distally towards the distal piece.

20~~23~~. A method of connecting a blood collection set to a catheter system, comprising:

coupling a blood collection set to a catheter system, wherein the catheter system comprises:

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

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

a connector coupled to the catheter adapter and comprising a septum;

wherein the blood collection set comprises a needle assembly and a housing, wherein the housing is coupled to the connector, wherein the housing is configured to create a fluid path through the connector.

~~24. The method of claim 23, wherein the housing is directly and removably coupled to the needle assembly.~~

~~25. The method of claim 23, wherein the housing is integrated with the needle assembly.~~

~~26. The method of claim 23, wherein the catheter system further comprises: a side port disposed between the distal end of the catheter adapter and the proximal end of the catheter adapter; an extension tube, comprising a distal end integrated with the side port of the catheter adapter and a proximal end integrated with the distal end of the adapter; and an adapter, comprising a distal end and a port, wherein the connector is coupled to the port of the adapter.~~

~~27. The method of claim 23, wherein the connector is a needleless connector.~~

28. The method of claim 27, wherein the housing is disposed in a proximal position, wherein the housing comprises a male luer, further comprising moving the housing from the proximal position to a distal position, wherein the male luer activates the septum and creates the fluid path through the connector in response to the housing being moved from the proximal position to the distal position, wherein the housing is threaded from the proximal position to the distal position or pushed from the proximal position to the distal position, further comprising collecting blood from a patient after moving the housing from the proximal position to the distal position.

29. The method of claim 27, wherein the housing comprises a distal piece and a proximal piece movable distally towards the distal piece, wherein the distal piece of the housing comprises a male luer, further comprising moving the proximal piece distally towards the distal piece, wherein the male luer activates the septum and create the fluid path through the connector in response to the proximal piece moving distally towards the distal piece, further comprising collecting blood from a patient after moving the proximal piece distally towards the distal piece.

30. The method of claim 23, wherein the housing comprises a cannula, further comprising moving the housing from a proximal position to a distal position, wherein in response to the housing moving from the proximal position to the distal position, the cannula extends through the septum and the fluid path through the connector is created, further comprising collecting blood from a patient after moving the housing from the proximal position to the distal position.

31. The method of claim 23, wherein the cannula extends through the septum in response to coupling the blood collection set to the catheter system, further comprising collecting blood from a patient through the blood collection set.

32. The method of claim 23, further comprising an extension set, wherein the extension set comprises a distal end coupled to the proximal end of the catheter adapter and a proximal end coupled to the connector, wherein the connector is a needleless connector, further comprising collecting blood through the extension set.

~~33. The method of claim 28, 29, 30, or 31, further comprising removing a needle assembly from the blood collection set coupled to the catheter system and after removing the needle assembly from the blood collection set, flushing the catheter system or infusing fluid through the catheter system.~~