CLAIMS

We claim:

1. A catheter system, comprising:

a catheter assembly, comprising:

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

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

a needle assembly, comprising:

a needle hub proximate and proximal to the catheter adapter;

an introducer needle extending distally from the needle hub, wherein the introducer needle comprises a sharp distal tip;

an extension tube, comprising a distal end and a proximal end, wherein the distal end is integrated with the needle hub;

a cannula hub, wherein a proximal end of the extension tube is integrated with the cannula hub;

a cannula extending proximally from the cannula hub; and

an elastomeric sheath coupled to the cannula hub, wherein a proximal end of the cannula is enveloped within the elastomeric sheath, wherein the elastomeric sheath comprises an open distal end and a closed proximal end.

2. The catheter system of claim 1, wherein the cannula is configured to insert into a blood collection tube, wherein in response to the blood collection tube pushing the elastomeric sheath distally, the cannula pierces the elastomeric sheath.

3. The catheter system of claim 1, wherein the catheter adapter comprises a side port, wherein the catheter system further comprises another extension tube, wherein the other extension tube comprises a distal end and a proximal end, wherein the distal end of the other extension tube is integrated with the side port, wherein the proximal end of the other extension tube is integrated with an adapter.

4. The catheter system of claim 1, wherein the catheter comprises a flashback notch.

5. The catheter system of claim 1, further comprising a needle shield at least partially disposed within the catheter adapter, wherein in response to removing the introducer needle from the catheter adapter, the needle shield covers the sharp distal tip.

~~6. A method of collecting blood from a patient, comprising:~~

~~inserting a catheter system into a vasculature of a patient, wherein the catheter system comprises:~~

~~a catheter assembly, comprising:~~

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

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

~~a metal wedge, wherein the wedge secures the catheter within the catheter adapter;~~

~~a needle assembly, comprising:~~

~~a needle hub proximate and proximal to the catheter adapter;~~

~~an introducer needle extending distally from the needle hub, wherein the introducer needle comprises a sharp distal tip;~~

an extension tube, comprising a distal end and a proximal end, wherein the distal end is integrated with the needle hub;

a cannula hub, wherein a proximal end of the extension tube is integrated with the cannula hub;

a cannula extending proximally from the cannula hub; and

an elastomeric sheath coupled to the cannula hub, wherein a proximal end of the cannula is enveloped within the elastomeric sheath, wherein the elastomeric sheath comprises an open distal end and a closed proximal end;

separating the needle hub from the catheter adapter such that a distal end of the introducer needle is disposed within the metal wedge; and

collecting blood within the blood collection tube when the distal end of the introducer needle disposed within the metal wedge.

7. The method of claim 6, wherein collecting blood within the blood collection tube when the distal end of the introducer needle disposed within the metal wedge comprises pushing the blood collection tube distally against the elastomeric sheath such that the cannula pierces the elastomeric sheath and a fluid pathway is formed between the cannula and the blood collection tube.

8. The method of claim 6, further comprising removing the introducer needle from the catheter adapter, wherein in response to removing the introducer needle from the catheter adapter, the needle shield covers the sharp distal tip.

9. The method of claim 6, wherein the catheter adapter comprises a side port, wherein the catheter system further comprises another extension tube, wherein the other extension tube comprises a distal end and a proximal end, wherein the distal end of

~~the other extension tube is integrated with the side port, wherein the proximal end of the other extension tube is integrated with an adapter.~~

~~10. The method of claim 9, further comprising flushing the catheter via the other extension tube after collecting blood within the blood collection tube.~~

~~11.~~6. A catheter system, comprising:

a catheter assembly, comprising:

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

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

a needle assembly, comprising:

a needle hub proximate and proximal to the catheter adapter;

an introducer needle extending distally from the needle hub;

a cannula extending proximally from the needle hub; and

an elastomeric sheath coupled to the needle hub, wherein a proximal end of the cannula is enveloped within the elastomeric sheath, wherein the elastomeric sheath comprises an open distal end and a closed proximal end.

~~12.~~7. The catheter system of claim ~~6~~11, wherein the catheter comprises a flashback notch.

~~13.~~8. The catheter system of claim ~~6~~11, wherein the cannula is configured to insert into a blood collection tube, wherein in response to the blood collection tube pushing the elastomeric sheath distally, the cannula pierces the elastomeric sheath.

~~14.~~9. The catheter system of claim ~~6~~11, wherein the catheter adapter comprises a side port, wherein the catheter system further comprises another extension tube, wherein the other extension tube comprises a distal end and a proximal end, wherein the

distal end of the other extension tube is integrated with the side port, wherein the proximal end of the other extension tube is integrated with an adapter.

~~15.~~10. The catheter system of claim 6~~11~~, wherein the catheter comprises a flashback notch.

~~16.~~11. The catheter system of claim 6~~11~~, further comprising a needle shield at least partially disposed within the catheter adapter, wherein in response to removing the introducer needle from the catheter adapter, the needle shield covers the sharp distal tip.

~~17.~~12. The catheter system of claim 6~~11~~, wherein the proximal end of the catheter adapter comprises an opening, wherein the catheter assembly further comprises a clip disposed within the catheter adapter distal to the opening, wherein the clip comprises a first arm having a first hole and second arm having a second hole, wherein in response to the introducer needle being in an insertion position, the introducer needle extends through the first hole and the second hole and the arms are biased inwardly, wherein in response to the introducer needle being proximally withdrawn from the first hole and the second hole, the first arm and the second arm move resiliently outward such that the first hole and the second hole move away from each other and the clip blocks the opening.

~~18.~~13. The catheter system of claim 12~~17~~, wherein the first arm and the second arm are joined at a first bend.

~~19.~~14. The catheter system of claim 13~~18~~, wherein the first arm comprises a second bend and the second arm comprises a third bend, wherein the first hole is disposed inward to the second bend, wherein the second hole is disposed inward to the third bend.

~~20.~~15. The catheter system of claim 14~~19~~, wherein the first arm comprises a first end, wherein the second arm comprises a second end, wherein in response to the introducer needle being proximally withdrawn from the first hole and the second hole, the first end and the second end overlap.