

CLAIMS

1. A catheter system, comprising:

a catheter adapter, comprising a distal end, a proximal end, and an internal wall forming a lumen extending through the distal end of the catheter adapter and the proximal end of the catheter adapter, the internal wall comprising a plurality of grooves, the catheter adapter further comprising a septum disposed within the lumen of the catheter adapter, wherein the septum comprises a distal end, a proximal end, and a barrier disposed between the distal end of the septum and the proximal end of the septum, wherein the septum includes a substantially H-shaped cross-section; and

a needle shield device coupled to the catheter adapter, the needle shield device comprising:

a needle housing, comprising:

an elongated body having a distal end, a proximal end, and a slot disposed between the distal end of the elongated body and the proximal end of the elongated body; and

a nose portion coupled to the distal end of the elongated body, wherein the nose portion comprises a plurality of protrusions, a plate, and an extension extending distally from the plate, wherein the extension comprises the plurality of protrusions, and wherein each of the plurality of protrusions contacts the internal wall of the catheter adapter and contacts an inner surface of the septum, wherein a portion of the inner surface of the septum proximal to the barrier comprises another plurality of protrusions disposed proximal to the plurality of protrusions, wherein each of the other plurality of protrusions contact the extension, and wherein the other plurality of protrusions are disposed proximal to the plurality of protrusions;

a needle assembly ~~slideably~~slidably coupled to the needle housing, comprising:

an introducer needle comprising a sharp distal tip and a proximal end;

a needle grip; and

a needle hub having a protuberance, wherein the proximal end of the introducer needle is secured within the needle hub, wherein the protuberance is coupled to the needle grip, wherein the protuberance ~~slideably~~slidably fits within the slot, wherein the needle assembly is moveable between a distal position and a proximal position with respect to the needle housing, wherein in response to movement of the needle assembly to the proximal position, the sharp distal tip is disposed within the needle housing.

~~2. — The catheter system of claim 1, wherein the nose portion comprises a plate and an extension extending distally from the plate, wherein the extension comprises the plurality of protrusions.~~

~~3.2. — The catheter system of claim 21, wherein a maximum outer diameter of the extension is greater than an inner diameter of the internal wall of the catheter adapter.~~

~~4.3. — The catheter system of claim 21, wherein the internal wall of the catheter adapter comprises another plurality of protrusions, wherein each of the other plurality of protrusions contact the extension of the nose portion.~~

~~5.4. — The catheter system of claim 43, wherein the other plurality of protrusions are disposed proximal to the plurality of protrusions.~~

~~6. — The catheter system of claim 2, wherein the catheter adapter further comprises a septum disposed within the lumen of the catheter adapter, wherein each of the plurality of protrusions contacts an inner surface of the septum.~~

~~7.5. — The catheter system of claim 61, wherein an inner surface of the septum comprises another plurality of protrusions, wherein the other plurality of protrusions contact the extension, wherein the other plurality of protrusions are disposed proximal to the plurality of protrusions.~~

~~8. — The catheter system of claim 6, wherein the septum comprises a distal end, a proximal end, and a barrier disposed between the distal end of the septum and the proximal end of the septum, wherein the septum includes a substantially H-shaped cross-section, wherein a portion of an inner surface of the septum proximal to the barrier comprises another plurality of protrusions, wherein each of the other plurality of protrusions contact the extension,~~

~~wherein the other plurality of protrusions are disposed proximal to the plurality of protrusions.~~

9.6. The catheter system of claim 21, wherein the internal wall of the catheter adapter comprises a plurality of grooves, wherein the plurality of protrusions are disposed within the plurality of grooves, wherein in response to withdrawal of the introducer needle proximally beyond the plurality of grooves, the plurality of protrusions are removed from the plurality of grooves to facilitate removal of the needle assembly from the catheter adapter.

~~10.7.~~ The catheter system of claim 1, wherein the nose portion comprises a plurality of capillary tubes, wherein each of the capillary tubes comprises a distal opening proximate a distal opening of a needle port extending through the nose portion such that blood that exits the distal end of the needle port is collected within the capillary tubes to thereby prevent the blood from exiting the nose portion.

~~11.8.~~ The catheter system of claim 1, wherein the nose portion comprises a plurality of distally-extending arms, wherein the distally-extending arms and the proximal end of the catheter adapter are engaged in an interference fit.

~~12. — A catheter system, comprising:~~

~~a catheter adapter, comprising a distal end, a proximal end, and an internal wall forming a lumen extending through the distal end of the catheter adapter and the proximal end of the catheter adapter; and~~

~~a needle shield device coupled to the catheter adapter, the needle shield device comprising:~~

~~a needle housing, comprising:~~

~~an elongated body having a distal end, a proximal end, and a slot disposed between the distal end of the elongated body and the proximal end of the elongated body; and~~

~~a nose portion coupled to the distal end of the elongated body and extending into the lumen of the catheter adapter;~~

~~a needle assembly slideably coupled to the needle housing, comprising:—~~

~~an introducer needle comprising a sharp distal tip and a proximal end;~~

~~a needle grip; and~~

~~a needle hub having a protuberance, wherein the proximal end of the introducer needle is secured within the needle hub, wherein the protuberance is coupled to the needle grip, wherein the protuberance slideably fits within the slot, wherein the needle assembly is moveable between a distal position and a proximal position with respect to the needle housing, wherein in response to movement of the needle assembly to the proximal position, the sharp distal tip is disposed within the needle housing,~~

~~wherein the needle shield device comprises a flexible arm coupled to the proximal end of the catheter adapter.~~

~~13.— The catheter system of claim 12, wherein the flexible arm extends from the needle grip, wherein the nose portion comprises a tab, wherein in response to depression of the tab, the flexible arm is configured to release from the proximal end of the catheter adapter.~~

~~14.— The catheter system of claim 13, wherein the tab extends further from a longitudinal axis of the catheter system than a distal end of the needle grip and the proximal end of the catheter adapter to facilitate access of the tab by a user.~~

15. ~~The catheter system of claim 12, wherein the flexible arm extends from the elongated body, wherein a proximal portion of the flexible arm is disposed between the elongated body and the needle grip, wherein the flexible arm is biased toward the catheter adapter, wherein in response to movement of the needle assembly to the proximal position, the flexible arm moves away from the catheter adapter to an unbiased position and releases the proximal end of the catheter adapter.~~

16.9. A needle shield device, comprising:

a needle housing configured to couple to a proximal end of a catheter adapter, the needle housing comprising:

an elongated body having a distal end, a proximal end, and a slot disposed between the distal end of the elongated body and the proximal end of the elongated body; and

a nose portion coupled to the distal end of the elongated body, wherein the nose portion comprises a plurality of protrusions, a plate, and an extension extending distally from the plate, wherein the extension comprises at the plurality of protrusions, and wherein each of the plurality of protrusions are configured to contact an internal wall of the catheter adapter and contact an inner surface of a septum of the catheter adapter, wherein the septum includes a substantially H-shaped cross-section, wherein a portion of the inner surface of the septum proximal to a barrier of the septum comprises another plurality of protrusion disposed proximal to the plurality of protrusions, wherein each of the other plurality of protrusions contact the extension, and wherein the other plurality of protrusions are disposed proximal to the plurality of protrusions;

a needle assembly ~~slidably~~slidably coupled to the needle housing, comprising:

an introducer needle comprising a sharp distal tip and a proximal end;

a needle grip; and

a needle hub having a protuberance, wherein the proximal end of the introducer needle is secured within the needle hub, wherein the protuberance is coupled to the needle grip, wherein the protuberance ~~slideably~~slidably fits within the slot, wherein the needle assembly is moveable between a distal position and a proximal position with respect to the needle

housing, wherein in response to movement of the needle assembly to the proximal position, the sharp distal tip is disposed within the needle housing.

17.10. The needle shield device of claim ~~16~~9, wherein the nose portion comprises a plurality of capillary tubes, wherein each of the capillary tubes comprises a distal opening proximate a distal opening of a needle port extending through the nose portion such that blood that exits the distal end of the needle port is collected within the capillary tubes to thereby prevent the blood from exiting the nose portion.

18.11. The needle shield device of claim ~~16~~9, wherein the nose portion comprises a plurality of distally-extending arms, wherein the distally-extending arms are configured to engage in an interference fit with the proximal end of the catheter adapter.

19.12. The needle shield device of claim ~~16~~9, ~~wherein the nose portion comprises a plate and an extension extending distally from the plate, wherein the extension comprises the plurality of protrusions,~~ wherein the nose portion comprises a tab extending outwardly from the plate, wherein the tab is generally perpendicular to the extension.