CLAIMS

1. An antimicrobial system, comprising:

a catheter adapter having a proximal end, a distal end, an interior lumen disposed between the proximal end of the catheter adapter and the distal end of the catheter adapter, and a catheter extending from the distal end of the catheter adapter;

a connector comprising a side port coupled to the catheter adapter, the connector having an upper aperture, a bottom proximate the interior lumen of the catheter adapter, and an internal volume between the upper aperture and the bottom, the side port being disposed between the proximal and distal ends of the catheter adapter; and

an antimicrobial cap device comprising:

a first end configured to secure the antimicrobial cap device to the connector, the first end having an opening sized to receive at least the upper aperture of the connector;

a base;

one or more sidewalls connecting the base to the first end, one or more inner surfaces of the one or more sidewalls defining a volume sufficient to receive at least the upper aperture of the connector, wherein while the antimicrobial cap device is secured to the connector, the antimicrobial cap device and a portion of the connector form a closed volume comprising the internal volume of the connector; and

an antimicrobial plug having a proximal end attached to the base and a distal end disposed outwardly therefrom, wherein the distal end of the antimicrobial plug comprises a disc having a diameter that is greater than a diameter of the antimicrobial plug along a length of the antimicrobial plug between the proximal end of the antimicrobial plug and the distal end of the antimicrobial plug, wherein the disc and the proximal end of the antimicrobial plug are monolithically formed as a single unit;

wherein the catheter adapter comprises a port valve disposed within the interior lumen of the catheter adapter and the port valve forming a seal between the side port and the interior lumen of the catheter adapter, wherein the port valve selectively blocks fluid communication between the catheter adapter and the side port through the bottom of the connector, wherein

upon injecting a fluid into the side port, the port valve is temporarily defeated to permit the fluid to bypass the port valve and enter the interior lumen of the catheter adapter; and

the distal end of the antimicrobial plug extends through the bottom to abut the port valve when the antimicrobial cap device is secured to the connector.

2. The device of claim 1, further comprising a hole in the base of the antimicrobial cap device, wherein the distal end of the antimicrobial plug is inserted through the hole and the proximal end of the antimicrobial plug seals the hole.

3. The device of claim 1, wherein the distal end of the antimicrobial plug comprises a three-dimensional shape having a same internal geometry as a portion of the connector.

4. The device of claim 1, wherein the antimicrobial plug comprises at least one of a rod and a tube.

5. The device of claim 1, wherein the antimicrobial plug comprises an antimicrobial material.

6. The device of claim 1, wherein the antimicrobial plug comprises a polymer matrix in which is evenly dispersed an antimicrobial agent.

7. The device of claim 6, wherein the antimicrobial agent is eluted from the polymer matrix when the antimicrobial plug is contacted by the fluid.

8. The device of claim 1, wherein cross-sectional shapes of the antimicrobial plug are different one from another at the proximal end of the antimicrobial plug, at the distal end of the antimicrobial plug, and along the length thereof between the proximal end of the antimicrobial plug and the distal end of the antimicrobial plug.

9. An antimicrobial cap device for a connector in fluid communication with a medical device, the connector having an upper aperture, a bottom, and an internal volume, the antimicrobial cap device comprising:

a first end configured to secure the antimicrobial cap device to the connector, the first end having an opening sized to receive at least the upper aperture of the connector;

a base;

one or more sidewalls connecting the base to the first end, one or more inner surfaces of the one or more sidewalls defining a volume sufficient to receive at least the upper aperture of the connector, wherein while the antimicrobial cap device is secured to the connector, the antimicrobial cap device and a portion of the connector form a closed volume comprising the internal volume of the connector; and

an antimicrobial plug having a proximal end attached to the base and a distal end disposed outwardly therefrom, the antimicrobial plug comprising a curved shape along a length thereof from the proximal end of the antimicrobial plug to the distal end of the antimicrobial plug wherein a distal end of the curved shape is laterally offset from the proximal end of the antimicrobial plug such that the distal end of the curved shape is curved towards the one or more sidewalls when the antimicrobial cap device is freestanding, wherein the distal end of the curved shape is the distal end of the antimicrobial plug.

10. The device of claim 1, wherein the disc, the one or more sidewalls, and the proximal end of the antimicrobial plug are monolithically formed as a single unit.