

## Defend Against the 'Ninjas' of Infectious Disease

Recently, ECRI Institute's James Davis, BSN, RN, CCRN, CIC, presented a PSO webinar on biofilms. Davis explained how biofilms are the ninjas of infectious disease; they are extremely difficult to detect, and with current technology, they are extremely difficult to kill.

A biofilm, said Davis, is a structural matrix created by bacteria that adheres so strongly to its ideal surface that it is virtually impossible to remove. When the surface to which the biofilm adheres is that of a catheter, artificial joint, or other implanted device, potential complications abound. The bacteria continue to develop the structure until it is unsustainable, at which time it ruptures, resulting in noticeable infection. This stage of infection is the first one that is detectable via culturing.

That's right: Until this point, it's probable that the infection has gone undetected. The patient may be symptomatic, but blood cultures will most likely not detect an infection in the absence of any planktonic (free-floating) cells in the bloodstream.

How common are biofilms? Look in a mirror and smile; dental plaque is ubiquitous, and can only be removed mechanically (by thorough brushing or by professional cleaning).

The biofilm is a survival mechanism; the organism secures itself behind a structure that is virtually impenetrable to aggressors (i.e., antibiotics). When managing a patient with an implanted device suspected of biofilm contamination, most often, the only way to remove the biofilm is to explant the device.

That begs the question of how to protect against biofilm infiltration in the first place.

### How You Can Protect Against Infiltration

Devices that are commonly associated with infection include urinary catheters, endotracheal tubes, vascular catheters (see the June 2011 PSO Monthly Brief), heart valves, grafts, and implants. Bacteremia may be present in cases involving vascular lines, grafts, or artificial valves; however, most other device-related infections may not be identifiable upon culturing. However, even if biofilm contamination is suspected, antibiotics will have limited effect.

Therefore, prevention is the key. Infection can occur if bacterial cells contact a device before implantation, if there is a lapse in sterile technique (e.g., sub-standard sterilization procedures), if the patient is not prepped properly, if the device is otherwise contaminated before or during implantation, or during regular maintenance of the device.

Steps that can be taken include the following:

- ▶ Proper hand hygiene
- ▶ Environmental cleaning and protection

- ▶ Regular, thorough care of the device
- ▶ Strict adherence to sterile technique
- ▶ Device removal as soon as it's not needed

Another important step, stressed Davis, is to base your infection prevention program on data. Both the insertion of the device and its maintenance deserve equal attention regarding infection prevention procedures. Study findings can be used to implement or review procedures, such as individual care bundles, that reduce the risk of breach in sterile technique during both insertion and maintenance of a device or line.

ECRI Institute PSO offers additional resources to its PSO Plus members, such as toolkits on CAUTI and CLABSI, and guidance articles on aseptic technique, hand hygiene, and invasive lines.

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### **How Can We Help You?**

Whether you have questions about the final rule or want to learn more about ECRI Institute PSO and/or support for other PSOs, we would be happy to hear from you. Please contact ECRI Institute at [psa@ecri.org](mailto:psa@ecri.org) or call (610) 825-6000, ext. 5558.