



**TargetBSI.com Webinar
Frequently Asked Questions**

**Ask the Experts Sharing Best Practices to Prevent Healthcare
Associated Bloodstream Infections**

Hosted on July 11, 2013

Answers to Selected Webinar Questions Prepared by:

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1. What effect do airborne contaminants have on BSI rates? Has anyone studied or compared BSI rates in a HEPA-filtered versus non-HEPA environment?

Dr. Rupp: I remember attending a meeting some years ago where somebody had installed some UV irradiation in the ductwork. And they saw a decrease in overall healthcare-associated infections just in general. I don't remember specifically if they related a decrease in CLABSIs. So this is an interesting question and there's not a whole lot of data on this.

It kind of comes back to the whole question of "What is the role of the environment in HAIs?" How many HAIs are due to possible airborne contamination? I think these are still areas that we don't know enough about.

I can't specifically answer this question of whether people have seen a decrease in CLA-BSI when they've installed HEPA air filters. I'm not aware of any well-done studies prospectively evaluating this issue.

Until there are more data indicating that airborne organisms cause CLA-BSI, I suggest that we concentrate on evidence-based procedures such as how to best insert and care for CVCs.

2. Do you recommend changing the needleless connector before drawing a blood culture, or is it best to draw blood from the hub?

Dr. Rupp: We certainly recommend that you take precautions to make sure that you're getting a good blood culture. I recommend taking off an old connector and prepping the site, and either drawing the blood culture directly from the hub of the catheter or putting on a new sterile connector and drawing blood cultures through that new sterile connector. Obviously, if you do the latter mechanism of getting the blood, then you have to make sure that you flush out that blood from the connector valve when you're finished.

It's an important and oftentimes overlooked issue and may explain some of the contamination that people get with their blood cultures. It's not a trivial issue. When a blood culture is contaminated, oftentimes it results in antibiotics being started. Additional blood cultures are often done to try to rule out whether it's a contaminant or not. And in the worst cases, patients have their catheters taken out unnecessarily. So there are down sides to not doing blood cultures correctly.

Ruth: I completely agree. This is a practice that we changed probably within the last two years. We changed to the process of replacing the needleless connector prior to drawing the blood cultures. This was based on information that was available in some studies.

3. Dr. Rupp, do you feel that disinfectant caps may aid in better disinfection of access valves versus scrub the hub?

Dr. Rupp: The questioner is asking about the passive disinfection caps that have a sponge in them that is soaked with alcohol. The cap is attached onto the hub or the connector valve, and it passively bathes the diaphragm of that connector valve in alcohol.

These devices intuitively seem to be a good idea. Unfortunately, there are not a whole lot of data on them. I've seen some abstracts and there is at least one paper from the group in Evanston that showed a decreased rate of bloodstream infections associated with the use of the alcohol caps. I think that there's going to be increasing data in the next year or two that will add some strength to the current evidence.

A study that we did with our simple split septum connector valves indicated that if people spent just a minimum amount of time (5 seconds) doing the scrub-the-hub disinfection, that it was effective. So I think it depends upon your institution, what your rates are, and what you want to do to try to attack those rates. The passive protection cap is one of the options. Again, there are not a whole lot of data, but I think that these caps probably do work in certain populations, under certain circumstances.

4. Do you have an idea of occlusion rates for peripheral catheters?

Ruth: It really varies. But it's estimated as many as about one in four. So upwards to maybe about 25 percent of complications that are associated with your peripheral catheters are due to occlusion.

To me, that really emphasizes the importance of making sure that your flushes are adequate, as well as to make sure that assessment is good.

Dr. Rupp: The questioner didn't ask about infection risk with peripheral IVs. I think that this is an underappreciated problem. I'm becoming increasingly concerned as there is more and more data suggesting that peripheral IVs can be left in indefinitely until they are not needed or the site becomes inflamed or the catheter becomes clotted. Then you take it out. These studies show that that it is okay compared to changing the peripheral IVs every three or four days.

What I'm concerned about is if people go towards leaving peripheral IVs in indefinitely, it's incumbent upon us to make sure that we insert those peripheral IVs very carefully and care for them appropriately. Again, I think the peripheral IV is an unrecognized source of infection. Unfortunately, many healthcare providers approach them with a cavalier attitude. We need to pay more attention to peripheral IVs than we currently do.

5. What's your opinion of the effects of heparin flush in terms of its overall impact on occlusions and CLABSIs?

Ruth: It's not really clear whether a heparin or a saline flush is the best direction. The recommendations, the guidelines have moved towards a low-dose heparin flush. But I think the key here is making sure that we can prevent occlusions because of the relationship between an occlusion and the development of a CLABSI.

Our institution is evaluating the use of heparin. We have maintained, up to this point, the use of saline flushes, and have been able to do very well preventing occlusions and thereby keeping an extremely low CLABSI rate within our organization. So to me, it really is all about what flush solution you're using, and are you using it appropriately.

I'm not sure that we really have the evidence to say that heparin is the best direction to go, because there is risk associated with that. Is saline alone adequate? In certain populations, saline alone is not adequate. So I do think that this issue has to be evaluated.

6. What about the possibility of heparin-induced thrombocytopenia, or HIT, with use of routine heparin flushing?

Ruth: Well, one of the potential concerns is the development of HIT. With the recommendation with the low dose, the 10 units per mL, the risk of developing heparin-induced thrombocytopenia is low. But it is not absent. I think that that's part of that evaluation of the risk/benefit ratio that does have to be looked at.

Dr. Rupp: Yes Ruth, within our institution, we've moved away completely from heparinized flush solutions, and we're just using saline. But that is in the setting of an acute-care hospital where the catheters are being used very frequently. And obviously, whether you want to use an antithrombotic in the flush solution depends somewhat upon your frequency of the use of the catheter. And that's a really different equation when you move out of the hospital and you have a much more infrequently accessed catheter.

7. You have not mentioned anti-reflux devices. How do they factor in?

Ruth: I am assuming that the reference is to the needleless connectors when we talk about anti reflux. When you look at the different types of needleless connectors, many of them do refer to themselves as being anti reflux. And whether it's positive, negative, or neutral pressure, the goal is to help prevent the reflux of the blood into the catheter.

I have not found, in any of the research that I have done, that any of them truly prevent reflux. They can minimize it. But again, we must make sure that the connector is flushed adequately and that the flushing technique is appropriate for the type of the mechanism, whether it's positive, negative, or neutral pressure.

8. Can you please describe the procedure of the positive flushing technique, as opposed to the negative-pressure flushing technique?

Ruth: It has to do with when the clamping is done. With a positive flushing technique, you flush, disconnect the syringe, and then clamp. And then with the negative pressure flushing technique, you flush, clamp, and then disconnect the syringe. So it's a difference in the disconnection of the syringe in comparison with the clamping of the catheter -- of the extension tubing.

9. Are there manufacturer's instructions for use for each type of hub as it relates to flushing?

Ruth: Well, there are. But the manufacturer's recommendations are not so much as it relates to flushing, but whether it is a positive-pressure, negative-pressure, or neutral-pressure cap.

And then the recommendations as far as how that flushing is done are what we previously reviewed.. These recommendations are from a couple of the articles that I included in the webinar references. These are:

- Hadaway L. Reopen the pipeline. *Nursing*. 2005;35:54-61
- Chernecky C, Macklin D, Casella L, Jarvis E. Caring for patients with cancer through nursing knowledge of IV connectors. *Clin J Oncol Nurs*. 2009;13:630-633.

10. What is the best practice for blood-culture collection from central lines?

Dr. Rupp: First of all, try not to do blood cultures through lines unless you think the line is the source of the bacteremia. If you draw routinely all your blood cultures through lines, you're going to, unfortunately, have a bit of an increased contamination rate--and we already related that that's a problem.

The best practice for obtaining a blood culture via the CVC is to remove the old connector valve and either put on a fresh valve and draw through it, or draw the blood directly from the disinfected catheter hub. Once you finish, you have to flush out the blood from the connector valve.

Some other things to point out are you need to make sure that you draw the right amount of blood. So you want to have 10 mLs for each bottle. If you sample an inadequate amount of blood, you're going to radically decrease your ability to recover microbes.

It's also important to precisely document where the blood was obtained (CVC or peripheral) and what time the blood was drawn. This information allows for clinicians to use the differential time-to positivity assay for determining whether a line is infected. This also requires use of a continuously monitored blood culture system that records the time when a blood culture bottle flags positive. Those are just a few important things that I would emphasize with regard to drawing blood cultures.

Resource from the Nebraska Medical Center

Standardizing Central Venous Catheter Care: Home to Hospital

These guidelines were developed by a variety of home-healthcare organizations that put together a consensus guideline on how to take care of catheters in the out-of-hospital setting. They are available at http://www.nebraskamed.com/App_Files/pdf/careers/education-programs/asp/SCORCH-guidelines.pdf (Accessed October 16, 2013)