Pittsburgh Regional Healthcare Initiative

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Steps for eliminating central-line associated bloodstream infections in 90 days

Get Real!

The debate is over: hospital-acquired infections cause or hasten the deaths of as many as 100,000 Americans each year. Central line-associated bloodstream infections (CLABs) are among the most deadly, since central lines are generally inserted in the sickest patients.

The financial cost of hospital-acquired infections may be in the billions, but the human cost is incalculable. Progress in combating these infections has been painfully slow.

What if it were possible to wipe out CLABs in 90 days? In two units at Allegheny General Hospital (AGH), rapid process changes over a 3-month period have reduced CLABs to near-zero in their Medical and Cardiac Care Units (MICU and CCU).

How? A group led by Richard Shannon, MD, Chairman, Department of Medicine at AGH, first identified the common misconceptions that create inertia. Then they outlined and executed clear steps that led to rapid change and immediate results in reducing CLABS. Their work can be replicated in any hospital unit with the will to change.

Step One: Leave old assumptions behind

Test your assumptions with this true-false quiz:

1. CLABS are unavoidable consequences of complex critical care. You just have to accept a certain number of them.

False. Hospital-acquired infections are preventable. Once you accept infections as inevitable, the motivation to work on them vanishes.

2. To attack central line infection in a scientific way, you must first have an unambiguous definition of what constitutes a CLAB.

False. Bacteria don't care which agency defines them, or what kind of line they ride in to the patient. It is easier to broaden the definition to include ALL infections, and go after them one by one as they occur.

3. Tracking the infection rate is a job for the Quality Committee.

False. The work of infection prevention cannot be delegated to a few people on a committee who are not at the front line of care. Preventing infection must be everyone's business.

4. We can learn a lot from retrospective data.

False. With every passing moment, information is lost. As soon as a blood test is positive, practitioners need to go to the front line to examine the situation. Real-time data is the key to learning and putting measures into place to combat future problems. A notch on a chart three months hence is not useful.

5. Benchmarking is paramount. It's important to know how we compare regionally and nationally.

False. Our experience at AGH suggests that the infatuation with benchmarking must end. Once we accept that nobody who comes to our hospital for care should contract a CLAB, the only acceptable goal is zero.

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When zero is the goal, benchmarking becomes a way to find where the progress is, and where to go to learn.

6. To proceed in a scientific way means progress will be slow.

False. The scientific method can be applied quickly and continuously each time an infection is revealed. The new approach itself can be put into place quickly.

*When the focus is on the data**

Mrs. E, a 54-year-old woman, was admitted with pneumonia. She was transferred from another hospital with a central line in place. Within three days, Mrs. E's blood test revealed that she had contracted a bloodstream infection. She received IV antibiotics, necessitating that she remain in the hospital for an additional 5 days. When she was released, Mrs. E was very weak. Although the pneumonia and the bloodstream infection had resolved, it was over a month before she was well enough to return to work.

The hospital reported Mrs. E's infection as required. Three months later, the Quality Committee tallied the number of central line infections. They did not tally bloodstream infections that resulted from femoral lines, but only from subclavian lines. The Quality Committee informed the CEO that the hospital had achieved a level of infection that was lower than the local competing hospital, which they were using as a benchmark.

Step Two: Create a timeline for developing a different approach

1. Cultivate a champion. (3-4 days)

Identify a unit where the effort will begin. Engage the unit's medical and nursing leadership and house staff in the understanding that, "Things will be different."

2. Establish the current condition. (Week 1)

Thoroughly review 10 cases of documented CLABS that have occurred over the last 3-6 months. Tell the complete story…the good the bad and the ugly. Look for clues and common threads in the stories.

3. Investigate in real time the root cause of a CLAB as soon as it occurs. (First1-2 weeks)

Start as soon as you receive a positive blood culture on a patient with an indwelling intravenous catheter. Go and see the patient immediately. As you observe, consider:

- ✧ The location of the line
- ✧ The conditions under which the line was placed (emergent or with sterile technique or from an outside hospital)
- ✧ Whether the line has been manipulated (rewired).

4. Observe line placement techniques and dressing changes. (First 1-2 weeks)

PRHI can help teach staff members the techniques for this kind of close observation. There is no substitute for this on-the-ground, real-time learning.

5. Generate improvements based upon what the observations reveal. (Week 3)

PRHI can help you design these improvements. Here are some examples:

- ✧Use the subclavian approach whenever possible.
- ✧Remove femoral lines within 24 hours.
- ✧Avoid rewiring existing lines.
- ✧Remove all existing lines on patients transferred.

*The "case studies" in the gray boxes in the left and right margins are hypothetical, and included only to illustrate *why* the patient must be at the center of care.

✧Find ways to communicate every change in process to the entire staff immediately.

Every improvement is likely to uncover a string of other questions and problems. Each one can be dealt with as an opportunity to learn, using the same real-time observations and techniques.

6. Standardize the process of line placement and dressings, and communicate it to staff immediately. (Week 4)

7. Commission each health care provider as patient guardian. (Week 4)

Each one is responsible for safeguarding their patients against a CLAB.

8. Monitor for CLABs daily. (Next 4 weeks)

Investigate any CLAB immediately. Look for new things to learn, as well as making sure new processes are followed. Use every circumstance as an opportunity to reinforce learning.

9. Celebrate and share the success each month. (Next 4 weeks)

Use posters and visuals to chronicle the progress.

Step 3: Share learning and progress with the community

Within 90 days of instituting these changes in the MICU and CCU in July at AGH, central-line associated bloodstream infections fell from an average of four to six per month to zero. Since then, the units have recorded two infections.

But here's the difference: each infection was investigated as soon as it occurred. In each case, the staff learned that infections occurred when a guideline was missed. In both cases the patients recovered. In both cases, the staff used what they learned to reinforce the importance of adhering to standardized practice. Everyone continues to learn.

Inevitably, the results have led to more questions. Why doesn't every ICU participate? Why doesn't the staff go after all infections, not just CLABs? At AGH, efforts are now under way to implement the 90-day program in all ICUs. They expect dramatic reductions in infections quickly, because they no longer accept infections as "inevitable," and they have put in place the mechanism for real-time learning.

Clearly, starting a small experiment in a unit or two can quickly create opportunities to take these initiatives institution-wide.

Dr. Shannon states, "Don't fear failure. Learn as you go. The only failure is in not trying."

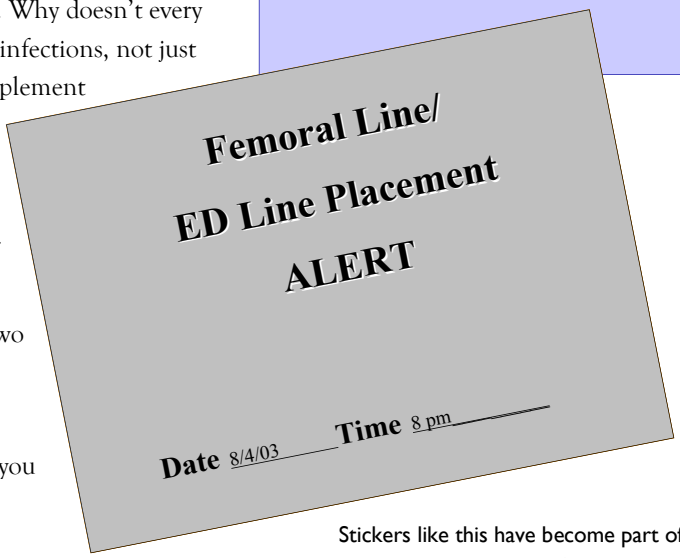
When the focus is on the patient*

Mr. S, a 68-year-old man, was admitted with respiratory failure. He was incubated and ventilated. A right femoral line was placed to administer volume and antibiotics. Five days later, Mr. S became febrile and hypotensive and grew gram negative rods (*E. Coli*) from his blood and femoral line tip. The line was removed and notification went out immediately to the attending physician, the family, and the requisite reporting authority.

Within an hour, the physician was at Mr. S's bedside to examine him and survey the entire situation. She determined that the infection occurred because the femoral line had been left in longer than the recommended 96 hours. She ordered the appropriate antibiotics for Mr. S, who recovered.

As soon as the cause of Mr. S's infection was determined, the physician began working together with the nurses to devise a sticker system, so that when a femoral line is placed, it is sure to be removed within the appropriate time frame. Looking at prior data, they also discovered that femoral lines were being inserted often, when other types of lines might be just as effective and less prone to infection. At the next medical Grand Rounds, the issue was discussed with the entire hospital staff.

In the 6 months since the institution of the sticker system and Grand Rounds discussion, no patient on that unit has contracted a bloodstream infection caused by a femoral line.



Stickers like this have become part of AGH's low-cost, low-tech approach to infection control in ICUs. They give an unmistakable signal to other caregivers when the line must be removed.