The Team

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• Facilitator Dr. Amruta Parekh
What We Are Trying to Accomplish?

OUR AIM STATEMENT

The aim of our project is to reduce the blood culture contamination rate to less than 2% by August, 2009, on the 8th floor of the University Hospital.
Project Milestones

- Team Created: Mar 2009
- AIM statement created: Apr 2009
- Weekly Team Meetings: Started Apr 2009
- Background Data, Brainstorm: Jan to Apr 2009
- Workflow and Fishbone Analyses: 
- Interventions Implemented: May 2009
- Data Analysis: Jun ’08 to Aug ‘09
- CS&E Presentation: August 28, 2009
Blood Culture contaminants lead to:
- Increased length of stay
- Increased costs of patient care
- Unnecessary use of antibiotics (with resultant adverse effects)

Recommended Benchmark for contamination rates is in the range of 2–3%.
Background

In five different patient care areas of our hospital, the average rate of contaminated blood cultures was 6.2% during the time period from 11/2007 to 11/2008.
How Will We Know That a Change is an Improvement?

- Types of measures: Number of contaminated blood cultures expressed as a rate.
- How we will measure: Data reported from the lab in 2 week intervals.
- Specific targets for change: Contamination rate less than 2%.
Mean blood culture contamination rate on 8th floor from 6/2008 to 5/2009 was 4.38%
Selected Process Analysis Tools

Fishbone – This helped organize brainstorming sessions to analyze what areas could be improved to decrease the contamination rates of blood cultures.

Flowchart – This helped to break down the process to isolate individual points in the process that needed improvement.
Contaminated Blood Cultures on the 8th floor

Data
- Lack of real-time data
- Compromised accuracy of contamination rates
- Limited access to supplies
- Too much trouble to get additional supplies if needed
- Lack of feedback to staff

Environment
- Time Pressure
- Lack of understanding the impact of contaminants

Education/Process
- Lack of knowledge concerning appropriate use of products, and mechanism of action
- Lack of education concerning blood culture collection
- Knowledge deficit of sterile field
- Use of wrong products to clean skin and bottles

Patient
- Base line Personality
- Uncooperative
- Medical Condition
  - Disease Process
- Poor Vein access
  - Dialysis
  - IVDA
  - Diabetes
  - Multiple Hospitalizations
  - PVD

Nurse
- Not trained
- Lack of experience
- New Graduate
- Poor Technique
  - Culture bottle not cleaned
  - Inadequate sterilization of the skin
  - Time pressure
  - Compromised sterile field
  - Re-palpat ing site
  - Removing glove tip
- May have been taught incorrectly
- Too many priority focus areas
- More experienced nurses
- Bad "stick"
- Drawing sample from existing line
Pre-Intervention Process for Drawing Blood Cultures

Start
- MD order for blood culture

Nurse obtains supplies, verifies pt ID, explains procedure

Is there a Central line?

No
- Peripheral Blood Draw Process
  - Lay out equipment
    - Prep top of bottle with alcohol (some do, some don’t)
  - Put on gloves
  - Put tourniquet on
  - Palpate for vein
  - Prep the skin (some use alcohol, some use chlorhexidine)
  - Allow time to dry (some fan or blow dry, some allow to air dry)
  - Open and prep bottles, put needle on syringe (though bottles are not consistently prepved)
  - Palpate for the vein again (some use alcohol on glove tip, some cut finger tip off of glove to palpate)

Yes
- Central Line Blood Draw Process
  - Nurse puts on gloves
    - Clean ports and bottles with either chlorhexidine or alcohol, none of this is consistently done
  - Attach sterile syringe to withdraw 3-5 ml, then toss syringe
  - Attach 20ml sterile syringe and drawback full 20ml
  - Remove syringe
  - Place 10 cc in each bottle

End (1 of 2 sets)

Stick vein
- if difficult stick, utilize peripheral IV
  - Aspirate the blood (20 ml)
  - Release the tourniquet
  - Remove needle from patient
  - Apply dressing over puncture site
  - Put 10 cc of blood in each bottle
  - Repeat peripheral stick for 2nd blood culture set if possible, vs use central line for other set.

End
What Changes Can We Make That Will Result in an Improvement?

- Standardize sterilization of skin with chlorhexidine.
- Avoid contamination of sterilized site prior to blood draw.
- Sterilize claves with chlorhexidene, switch claves on central lines.
- Avoid use of peripheral IV lines for blood culture draws.
- Use standardized kits that have all supplies ready for the nurses.
- Feedback to nurses regarding their contaminated blood cultures.
Post-Intervention Process for Drawing Blood Cultures

Start

MD order for blood culture

Nurse obtains supplies, verifies pt ID, explains procedure

Peripheral Blood Draw Process

Set up equipment on sterile field
Prep top of bottles with alcohol

Put on non-sterile gloves

Put tourniquet on

Palpate for vein

Prep the skin with chlorhexidine sponge touching handles only

Put on sterile gloves while allowing site to air dry

Maintain sterility of intended puncture site. Palpate for the vein if needed using sterile glove.

Stick vein

Aspirate the blood (20 ml)

Release the tourniquet

Remove needle from patient

Apply dressing over puncture site

Put 10 cc of blood in each bottle

Repeat peripheral stick for 2nd blood culture set if possible, vs use central line for other set.

Central Line Blood Draw Process

Hand hygiene, put on gloves

Set up equipment on sterile field
Prep top of bottles with alcohol

Sterilize clave and 2 inches of catheter with chibraprep sponge

Remove old clave and then with sterile 2x2 gauze attach new sterile clave

Attach sterile syringe to withdraw 3-5 ml, then toss syringe

Attach 20ml sterile syringe and draw back full 20ml

Place 10 cc in each bottle

End

(1 of 2 sets)

Is there a Central line and either (a) concern for possible line infection or (b) inability to obtain peripheral blood draws?

Yes

If 2 RNs unable to obtain culture, call PICC nurse to obtain, also can discuss use of central line if present
We worked with nurses on the 8th floor of the University Hospital to establish sterile technique and to standardize the process.

We held brainstorm sessions with nursing to develop a viable process using equipment and a model arm.
Implementing the Change

Do

- Nursing champions carried out training sessions with a check-list using an arm and a sample kit. They started this in May ‘09. This involved the education of 55 nurses on both day and night shifts.
- Nursing developed a kit that stream-lined their process so all of the supplies were readily available.
Contaminated Blood Cultures on 8th Floor of UH

Two week intervals

% of Blood Cultures Contaminated

Preintervention

Postintervention

CL

UCL

0.0%

2.0%

4.0%

6.0%

8.0%

10.0%

12.0%

14.0%

16.0%
Expansion of Our Implementation

Act

- We are working to roll out the intervention to other patient care areas. The ER has started work on this project.
- We are working at expanding availability of the PICC team to 24/7 coverage, and they may ultimately serve as a phlebotomy service for blood cultures.
- We are working with IT to streamline the work of obtaining data to monitor for sustained improvement. IT will also work to provide individual feedback to nurses regarding contamination rates.
Decreasing our rate of blood culture contaminants in five patient care areas from 6.2% to 2% could lead to savings of as much as $535,000 to $2.3 million, and save from 535 to 2400 days of unnecessary length of stay.
Conclusion/What’s Next

- We have successfully decreased the blood culture contamination rate on 8th floor of UH to an average of 2.08% from the prior average rate of 4.38%.
- We will need to follow the data over time to determine if this impact is sustained.
- The process improvement will be implemented in other patient care areas of University Hospital.
- The impact of this change can significantly improve the quality and safety of our patient care as well as lead to significant economic savings for our healthcare system.
References:

Thank you!