Challenging the Status to Improve Patient Outcomes

Carleen Merola, DNP, RN, TCRN, PCCN
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Disclosure

- Dr. Carleen Merola was provided with an honorarium by Magnolia Medical Technologies to participate in this webinar

Carleen Merola, DNP, RN, TCRN, PCCN
Nursing Director | Critical Care & Emergency
Ascension Seton Williamson

- 15 years as Emergency Nurse
  - Level 1 & 2 Trauma
  - Comprehensive/Primary Stroke
  - Mental Health Screening Center
  - Urban & Suburban Settings

- 9 years of progressive leadership
  - Charge Nurse
  - Educator
  - Supervisor
  - Manager
  - Director

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Poll Question

What is your role?

Learning Objectives

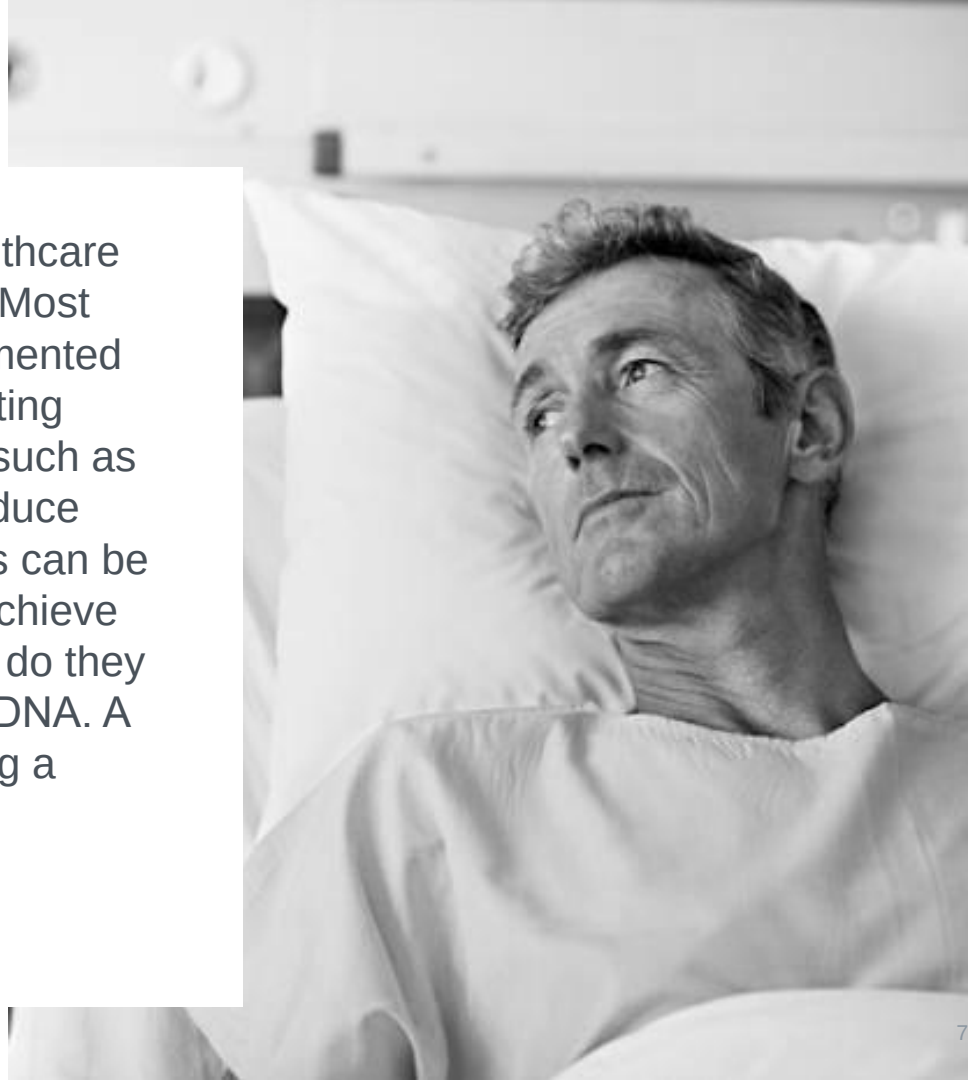
- Identify the principles of a high reliability organization (HRO) and how they can be applied within a hospital to optimize patient outcomes.
- Review the recent national movement toward a 1% or less blood culture contamination goal and the critical step every hospital should make to achieve sustained reductions in blood culture contamination.
- Discuss the importance of a multi-disciplinary, team-based approach along with evidence-based best-practice techniques and technology to realize sustainable improvements in blood culture quality.

High Reliability Organization (HRO)

Safe, Reliable and Effective Care

Institute for Healthcare Improvement

> “When it comes to patient safety, Healthcare organizations have more work to do. Most healthcare organizations have implemented patient safety improvements by adopting standardized ways of providing care such as using checklists and other tools to reduce variation. Yet, even these approaches can be limited as they don’t by themselves achieve educational whole system safety, nor do they embed safety into the organization’s DNA. A more promising approach is becoming a **high reliability organization.”**



What is a **High Reliability Organization** (HRO)

Definition of an HRO

An organization that has maintained high levels of safety, quality, and efficiency over an extended period.

What makes them “different”?

- Developed ways of “managing the unexpected” better than most organizations.
- Prepared to address the growing complexity of operations in healthcare and the risk of significant consequences when failures occur.

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MEDICAL TECHNOLOGIES

Poll Question

What is a realistic goal when it comes to a key performance indicator?

Why 100% Matters Every Time…

Air Traffic Control

In the United States, 45,000 average daily flights handled by the FAA. If 99% was acceptable, then **450 flights would crash each day.**

Postal Service

In the United States, the Postal Service processes and delivers 162.1 million pieces of First-Class Mail each day. If 99% was acceptable, **1,621,000 pieces of mail would go missing each day.**

Operative Services

In the United States, 136,986 major surgeries are performed each day. If 99% was acceptable, there would be **an error in 1,370 of these surgeries.**

What Makes an HRO ?

The Principles of High Reliability Organizations

The 5 Principles of an HRO

Preoccupation with Failure

Identify processes that are not reliable or sustainable and monitor performance.

Reluctance to Simplify

Create an environment that supports and practices continuous learning.

Sensitivity to Operations

Focus on deviation from the expected and on what could fail.

Defer to Expertise

Assign to the person who truly has the needed skill, not the person who has authority.

Commitment to Resilience

Staff continuously learn from errors and near misses and share successful models of care.

The Role of Leaders in a Culture of High Reliability

Becoming an HRO is not simply a matter of completing a series of improvement projects. As with any improvement, it is necessary to change culture, develop a different way to work, maintain constancy of purpose and ensure improved processes are sustained over time.

As a team supporter:

- A leader listens to their team
- A leader connects the team and its work to the bigger picture
- A leader sets clear expectations and reinforces accountability
- A leader follows up and ensures execution
- A leader recognizes and celebrates
- A leader coaches and develops

As a team model:

- A leader lives the high reliability leader behaviors
- A leader applies error prevention and other high reliability techniques
- A leader adheres to best practices
- A leader commits to rounding and daily huddles

“A leader who cultivates relationship and actions to tackle challenges and make the impossible possible"

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High Reliability Organization (HRO)

Why Apply HRO Principles to Blood Culture Contamination

Sepsis is the #1 cause of death, readmissions, and costs in U.S. hospitals[1,2]

… and blood cultures remain the gold standard for diagnosing bacteremia, including sepsis

[1]Liu V, Escobar GJ, Greene JD. Hospital deaths in patients with sepsis from 2 independent cohorts. JAMA. 2014;312(1):90-92. doi:10.1001/jama.2014.5804.
[2]Weiss AJ, Jiang HJ. Overview of clinical conditions with frequent and costly hospital readmissions by payer, 2018. HCUP Statistical Brief #278. July 2021. Agency for Healthcare Research and Quality, Rockville, MD.

Blood cultures are the gold standard test for bacteremia diagnosis, including sepsis

Confirm

the presence of microorganisms in the bloodstream

Identify

the microbial etiology of the bloodstream infection

Help

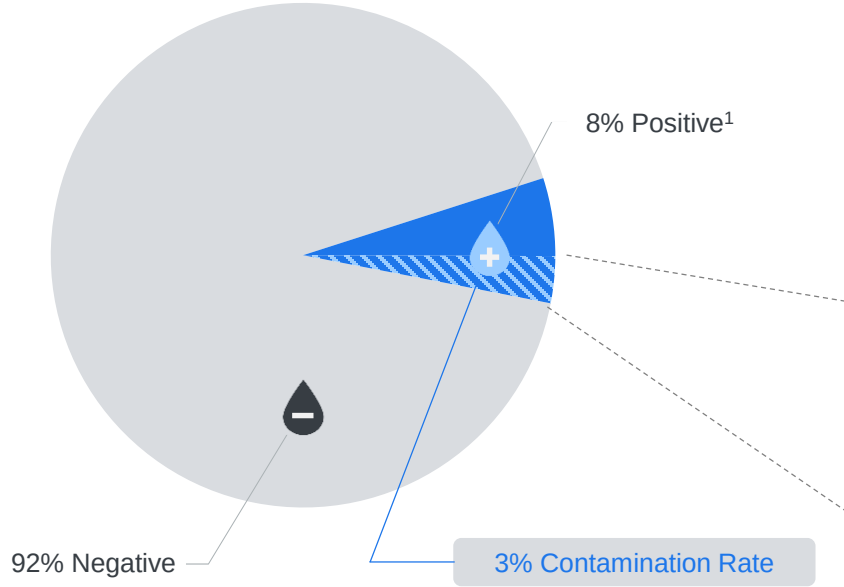
determine the source of infection (e.g., endocarditis)

Provide

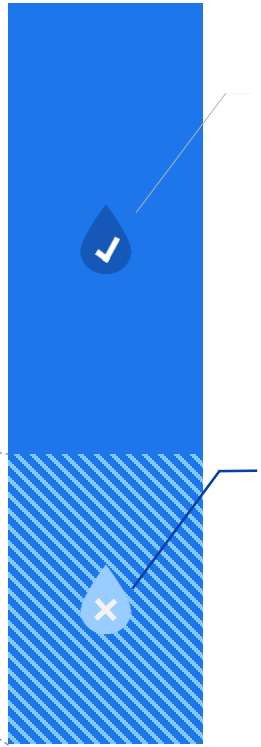
an organism for susceptibility testing and optimization of antimicrobial therapy

Test Results for Sepsis are Frequently Wrong

ALL BLOOD CULTURES



POSITIVE BLOOD CULTURES



Nearly half of all positive blood cultures **are actually *false* positive**

False positives are a **preventable error** and can lead to a misdiagnosis of sepsis

[1]Zwang O, Albert RK. Analysis of strategies to improve cost effectiveness of blood cultures. J Hosp Med. 2006;1(5):272-6. doi:10.1002/jhm.115.

Blood culture contamination can have a devastating impact…

The Impact

~1.4 million

patients impacted by false-positive blood culture results annually in the United States, the MAJORITY of which are treated with antibiotics[1]

$6 billion +

is spent by our healthcare system each year on unnecessary treatment associated with false-positive blood culture results[2]

3 million +

antibiotic-resistant and *C. difficile* infections each year and 48,000 people die based on the CDC's 2019 report[3]

1 in 5 patients

experience adverse drug event (ADE) associated with antibiotic administration in acute care hospital setting[4]

[1]Patton RG. Blood culture contamination definitions can obscure the extent of blood culture contamination: a new standard for satisfactory institution performance Is needed. Infect Control Hosp Epidemiol. 2016;37(6):736-8. doi:10.1017/ice.2016.30. [2]Geisler BP, Jilg N, Patton RG, Pietzsch JB. Model to evaluate the impact of hospital-based interventions targeting false-positive blood cultures on economic and clinical outcomes. J Hosp Infect. 2019;102(4):438-444. doi:10.1016/j.jhin.2019.03.012. [3]CDC. Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2019. doi:http://dx.doi.org/10.15620/cdc:82532. [4]Tamma PD, Avdic E, Li DX, Dzintars K, Cosgrove SE. Association of adverse events with antibiotic use in hospitalized patients. JAMA Intern Med. 2017;177(9):1308–1315. doi:10.1001/jamainternmed.2017.1938.

The Clinical Decision Dilemma

Patient tests positive…

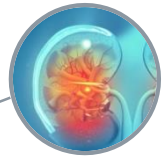
Clinical Dilemma:
Continue Antibiotics *OR* De-escalate?

Continue Antibiotics

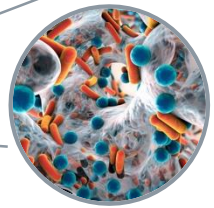
Probable/Possible Contaminant:

- *CoNS*
- *Aerobic Diphtheroids*
- *Anaerobic Diphtheroids*
- *Bacillus Species*

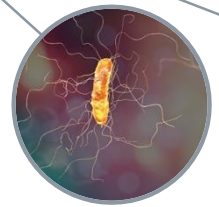
Unnecessary Antibiotics



Acute Kidney Injury (AKI)



Antibiotic-Resistant Infections



Risk of *C. difficile*

False-Positive CLABSIs

Extended Length of Stay

Additional Blood Cultures

University of Arkansas BCC Publication (2022)

Peer-Reviewed Publication

Risk factors and clinical outcomes associated with blood culture contamination

Risk of **In-Patient Mortality increased 74%** due to blood culture contamination

“

Significant, near doubling (8% vs 4.6%) of in-patient mortality rate for patients that had contaminated blood cultures vs. the true negative blood culture control group”

Conclusion:

- “Blood-culture contamination increased length of stay, length of antibiotic treatment, hospital costs, acute kidney injury, and **in-patient mortality**”
- This study highlights the “**devastating clinical outcomes for patients** with contaminated blood cultures”

Klucher J, Davis K, Lakkad M, Painter JT, Dare RK. Risk factors and clinical outcomes associated with blood culture contamination. Infect Control Hosp Epidemiol. 2022;43(3):291-297. doi:10.1017/ice.2021.111.

Old National ‘Standard’

for blood culture contamination

Old CLSI standard for blood culture contamination rates in the U.S.[1]

BUT WAS THIS ‘STANDARD’ GOOD FOR PATIENTS?

[1]CLSI M47 Principles and Procedures for Blood Cultures; Approved Guidelines. CLSI document M47-A. Wayne, PA: Clinical and Laboratory Standards Institute; 2007.

What this means at a typical hospital

The Impact

3.0% blood culture contamination rate in an **Emergency Department**

Patient Safety

Cultures / month:	833
Contamination Rate:	3.0%
Patients impacted by false positives / month:	**25**

Hospital Economics

Patients impacted / year:	**300**
Average cost per incident[1,2,3]	$4,162
Avoidable costs:	**$1,248,600**

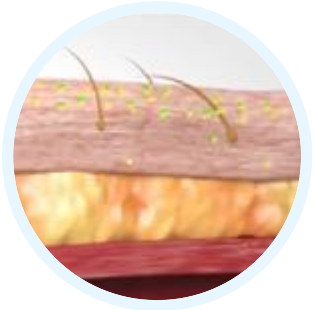
[1]Skoglund E, Dempsey CJ, Chen H, Garey KW. Estimated clinical and economic impact through use of a novel blood collection device to reduce blood culture contamination in the emergency department: a cost-benefit analysis. J Clin Microbiol. 2019;57(1):e01015-18. doi:10.1128/JCM.01015-18.
[2]Geisler BP, Jilg N, Patton RG, Pietzsch JB. Model to evaluate the impact of hospital-based interventions targeting false-positive blood cultures on economic and clinical outcomes. J Hosp Infect. 2019;102(4):438-444. doi:10.1016/j.jhin.2019.03.012.
[3]Data on file.

Training and Education on “Best Practices” Alone Will Not Solve the Problem

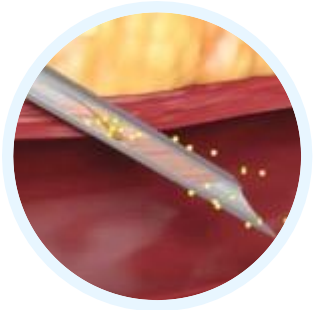
Controllable

Human Factor(s)
Risk of contamination during assembly, preparation of supplies and skin prep

Uncontrollable



Skin Flora
You can disinfect but not sterilize the skin. Up to 20% of skin flora remains viable in the keratin layer of the skin even after skin prep[1]



Skin Plug and Fragments
(uncontrollable factors)
will enter the culture specimen bottle and commonly will contain viable microorganisms (when present)

[1]Anjanappa T, Arjun A. Preparative skin preparation and surgical wound infection. J Evid Based Med. 2015;2(2):131-154. doi:https://doi.org/10.18410/jebmh/19. [2]Rupp ME, Cavalieri RJ, Marolf C, Lyden E. Reduction in blood culture contamination through use of Initial Specimen Diversion Device. Clin Infect Dis. 2017;65(2):201-205. doi:10.1093/cid/cix304. [3]Bell M, Bogar C, Plante J, Rasmussen K, Winters S. Effectiveness of a novel specimen collection system in reducing blood culture contamination rates. J Emerg Nurs. 2018;44(6):570-575. doi:10.1016/j.jen.2018.03.007.

Manual Diversion (waste tube) Will Not Solve The Problem

Manual diversion of the initial volume of blood

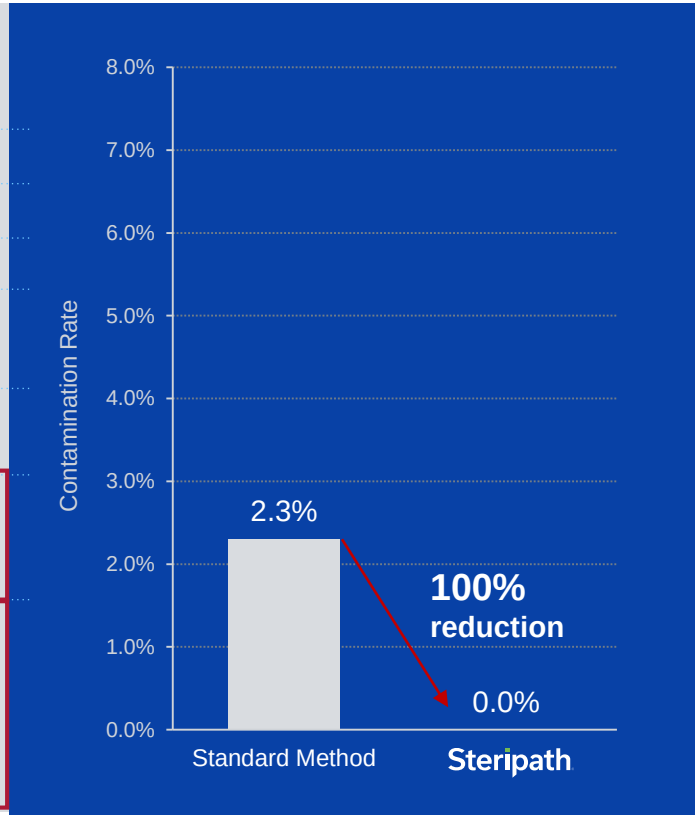
- Peer-reviewed published data has shown only modest unsustainable reductions in contamination
- Lowest published contamination rate achieved is 2.0%[1] (best case controlled clinical study scenario)

(Example for illustration purposes only)

[1]Zimmerman FS, Karameh H, Ben-Chetrit E, Zalut T, Assous M, Levin PD. Modification of blood test draw order to reduce blood culture contamination: a randomized clinical trial. Clin Infect Dis. 2020;71(5):1215-1220. doi:10.1093/cid/ciz971.

Peer-Reviewed Publication

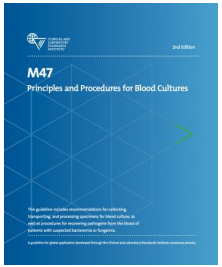
TITLE:	Getting to Zero: Impact of a Device (Steripath) to Reduce Blood Culture Contamination and False-Positive Central Line-Associated Bloodstream Infections
CONFERENCE	***Infection Control & Hospital Epidemiology (2022)***
INSTITUTE:	**Stanford Health Care**
AUTHORS:	Lucy Tompkins, MD, PhD, et al
DESIGN:	Single-center, prospective, controlled study March 2019–January 2020 (10-months)
METHOD:	Blood cultures were obtained **hospital-wide** by **Phlebotomy team** using the Steripath compared to standard method.
RESULTS:	**100%** reduction in blood culture contamination Steripath ISDD: **0.0% (0/11,202)** contamination rate Standard method: **2.3% (111/4,759)** contamination rate
	12-Fold decrease in NHSN/CMS reportable **False-Positive CLABSIs** Steripath ISDD: **1,** Standard method: **12** **SIR** fell by **33-57%** when contaminants were removed During the study period Stanford achieved a top-10 ranking from Vizient, a consortium of 101 academic medical centers that each member on HAI rates and many other factors



Tompkins LS, et al. Getting to zero: impact of a device to reduce blood culture contamination and false-positive central line-associated blood stream infections. ICHE 2022; 1-5. doi:10.1017/ice.2022.284

New National ‘Goal’

for blood culture contamination

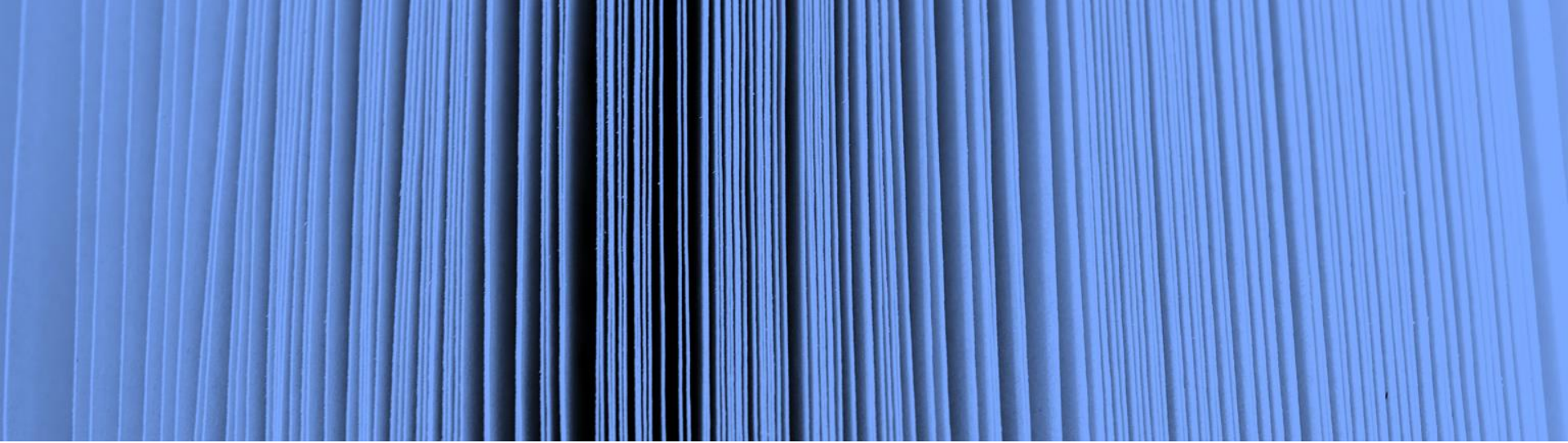


CLSI M47 2022 and CDC’s new goal with best practices for blood culture contamination rates[1]

*All six cited studies examined the clinical efficacy of **Steripath** and/or referenced **Steripath-specific** datasets, and reported a sustained **1% or lower** contamination rate*

THE RIGHT ‘STANDARD’ FOR PATIENTS

[1]CLSI. M47 2nd Edition Principles and Procedures for Blood Cultures; 2022.



The Results of an HRO and Steripath® Initial Specimen Diversion Device®

Applying the HRO Principles to Blood Culture Contamination

The 5 Principles of an HRO

Preoccupation with Failure

Identify processes that are not reliable or sustainable and monitor performance.

Reluctance to Simplify

Create an environment that supports and practices continuous learning.

Sensitivity to Operations

Focus on deviation from the expected and on what could fail.

Defer to Expertise

Assign to the person who truly has the needed skill, not the person who has authority.

Commitment to Resilience

Staff continuously learn from errors and near misses and share successful models of care.

Preoccupation with Failure

Identify processes that are not reliable or sustainable and monitor performance.

HRO Questions

- When changes are made to processes, are all of the possible downstream effects considered?
- Are near-misses brushed off and forgotten?

Our Findings

- We've tried training and education with standard method and had no significant or sustainable impact.
- Our blood culture contamination rates are consistently above 3% each month.

Reluctance to Simplify

Create an environment that supports and practices continuous learning.

HRO Questions

- Is what we are doing working?
- What is the root cause of the problem?
- Are there any resources to help optimize the process?

Our Findings

- There are controllable and uncontrollable factors to blood culture contamination
- Achieving sustained reductions in blood culture contamination rates requires tackling both
  - Controllable: Reinforce evidence-based techniques
  - Uncontrollable: Employ an evidence-based technology that has already been validated through evidence and guidelines to address this issue

Clinical Practice Guidelines

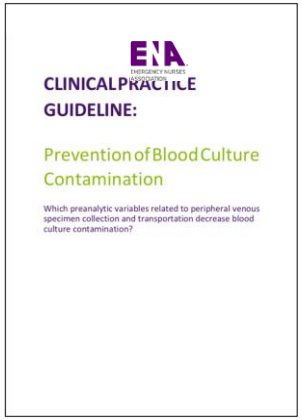
Steripath
Initial Specimen Diversion Device®

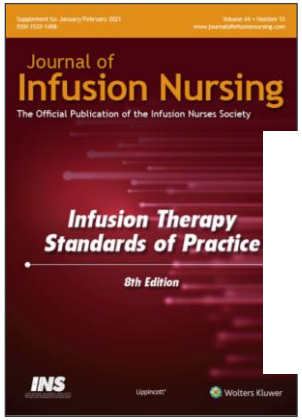
ENA
EMERGENCY NURSES ASSOCIATION

INS
INFUSION NURSES SOCIETY
SETTING THE STANDARD FOR INFUSION CARE®

CDC

CLSI





The ***only*** device clinically proven to meet all evidence-based guidelines

1.0–2.0 mL diversion volume

1.5 mL or greater diversion volume

1% goal for blood culture contamination

1% goal for blood culture contamination

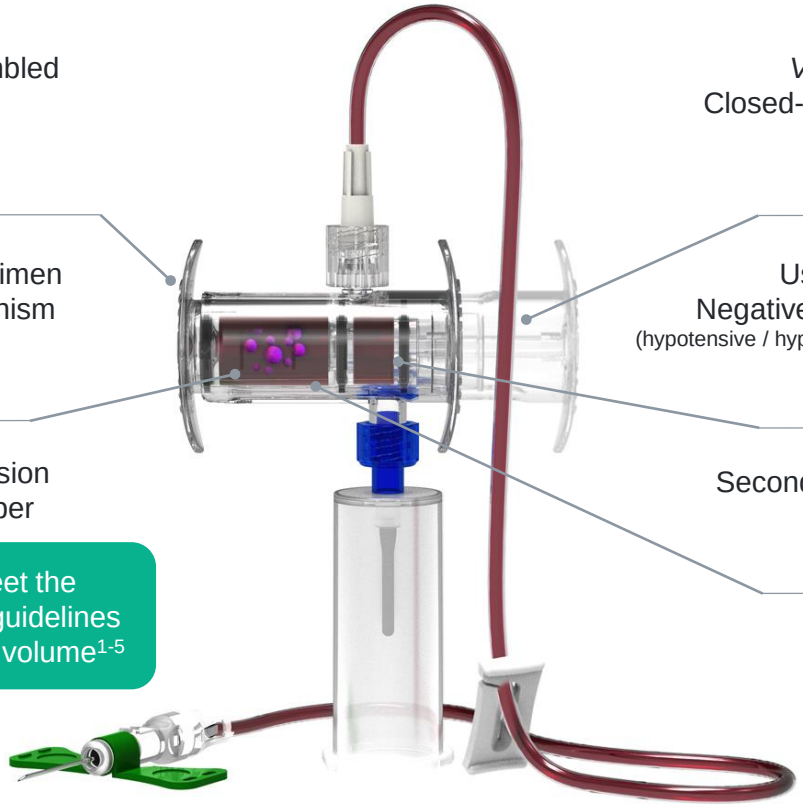
(M47 ED2 2022)

Steripath
Initial Specimen Diversion Device®

Engineering Out Human Factors

Only FDA 510(k)-cleared device indicated to reduce blood culture contamination

- Comes Preassembled & Sterile
- *Vein-to-Bottle,* Closed-System Technology
- Active Initial Specimen Diversion Mechanism
- User-Controlled Negative-Pressure Diversion (hypotensive / hypovolemic patients and vein finder)
- 1.5-2.0 mL Diversion Isolation Chamber
- Second Blood Flow Path



Only device to meet the ENA, INS and CLSI guidelines for >1.0 mL diversion volume[1-5]

Prevents diverted blood from mixing with culture specimen and bypassing diversion

[1]Vanhoy MA, Horigan A, Kaiser J, et al. Emergency Nurses Association (ENA). Clinical practice guideline: prevention of blood culture contamination. 2020.
[2]Gorski LA, Hadaway L, Hagle ME, et al. Infusion therapy standards of practice, 8th edition. J Infus Nurs. 2021 Jan-Feb 01;44(1S Suppl 1): S1-S224.doi: 10.1097/NAN.0000000000000396
[3]CDC National Email Update to Clinicians. Clinicians: Use this guide to decrease blood culture contamination rates. July 22, 2022
[4]CDC Blood Culture Contamination Prevention Actions: An Overview of Infection Control and Antibiotic Stewardship Programs Working with the Clinical Laboratory. 2022
[5]CLSI. Collection of Diagnostic Venous Blood Specimens. 7th Ed. CLSI Guideline GP41. Clinical and Laboratory Standards Institute; 2017.

Steripath Initial Specimen Diversion Device

Peer-Reviewed Published Studies and Clinical Study Presentations at Major Medical Conferences

#	Institution	Publication or Conference Presentation	Date	Duration	Baseline or Control Rate	Steripath® Rate	BCC Reduction	Ann. Savings
1	**Stanford Health Care**	IDSA – IDWeek / PACCARB	2020/21	10 months	2.3%	**0.0%**	**100%**	NR
2	**Central Texas VA Medical Center**	Journal of Emergency Nursing	2021	5 months	2.2%	**0.0%**	**100%**	NR
3	**Univ. of Nebraska Medical Center**	Clinical Infectious Diseases	2017	12 months	1.8%	**0.2%**	**88%**	$1,800,000
4	**Baylor Scott & White Med Ctr.**	Emergency Nurses Association (ENA)	2021	4 months	3.2%	**0.2%**	**93%**	NR
5	**Kern Medical Center**	APIC - Submitted for publication	2021	18 months	2.4%	**0.4%**	**83%**	NR
6	**Lee Health System (4 sites)**	Journal of Emergency Nursing	2018	7 months	3.5%	**0.6%**	**83%**	$1,100,000
7	**Brooke Army Medical Center**	Journal of Hospital Infection	2021	6 months	6.6%	**0.7%**	**90%**	NR
8	**Medical Univ. of South Carolina**	Institute for Healthcare Improvement (IHI)	2016	8 months	4.2%	**0.6%**	**86%**	NR
9	**Rush University Medical Center**	IDSA - IDWeek	2017	3 months	4.3%	**0.6%**	**86%**	NR
10	**Inova Fairfax Hospital**	Emergency Nurses Association (ENA)	2019	12 months	4.4%	**0.8%**	**82%**	$932,000
11	**WVU United Hospital Center**	American Journal for Medical Quality	2021	8 months	4.1%	**0.8%**	**81%**	NR
12	**SCL St. Mary's Medical Center**	American Organization for Nursing Leadership (AONL)	2020	6 months	3.3%	**0.8%**	**76%**	NR
13	**Beebe Healthcare**	American Society for Microbiology (ASM)	2018	4 months	3.0%	**0.8%**	**75%**	NR
14	**Medical Univ. of South Carolina**	Institute for Healthcare Improvement (IHI)	2017	20 months	4.6%	**0.9%**	**80%**	$447,000
15	**Ascension Via Christi (3 sites)**	Society of Hospital Epidemiology of America (SHEA)	2021	3 months	4.3%	**0.9%**	**79%**	NR
16	**VA Houston**	Emergency Nurses Association (ENA)	2018	7 months	5.5%	**0.9%**	**83%**	NR
17	**Shaare Zedek Medical Center**	American Journal of Infection Control	2019	6 months	5.2%	**1.0%**	**81%**	NR
18	**Brooke Army Medical Center**	Journal of Hospital Infection	2021	14 months		**31% reduction in vancomycin DOT**		
19	**University of Houston**	Journal of Clinical Microbiology	2019	Steripath ISDD can save the hospital **2.0 bed days** and **$4,739 per false-positive** blood culture event				
20	**Mass General/ Harvard/ WingTech**	Journal of Hospital Infection	2019	Steripath ISDD can save the hospital **2.4 bed days**, **$4,817 per false-positive** blood culture event and **$1.9M annually and prevent 34 HACs including 3 C.*diff***				

National Peer-Reviewed Publication Best Evidence-Based Project Peripheral IV Start

Sensitivity to Operation

Focus on deviation from the expected and on what could fail.

HRO Questions

- How do we know that the correct work is being done?
- Where are the possible failure points and how will be proactively mitigate that while being sensitive to every step of the process?

Our Findings

- Effective daily huddles and rounding to influence and reinforce safety measures and practice change
- Ensure Ease of Use
- Tracking Product Utilization and Compliance

Commitment to Resistance

Staff continuously learn from errors and near misses and share successful models of care.

HRO Questions

- How does your hospital respond in the face of failure?
- How are broken processes fixed so that failures are not repeated?
- How do you support the ‘just culture’ dialogue and practice?

Our Findings

- Continuously sharing successes
- Hardwiring change through expectations and accountability:
  - Pre-collection
  - During collection
  - Post-collection
  - And a defined escalation plan escalation plan
- Containing errors effectively is critical to long-term success

Deference to Expertise

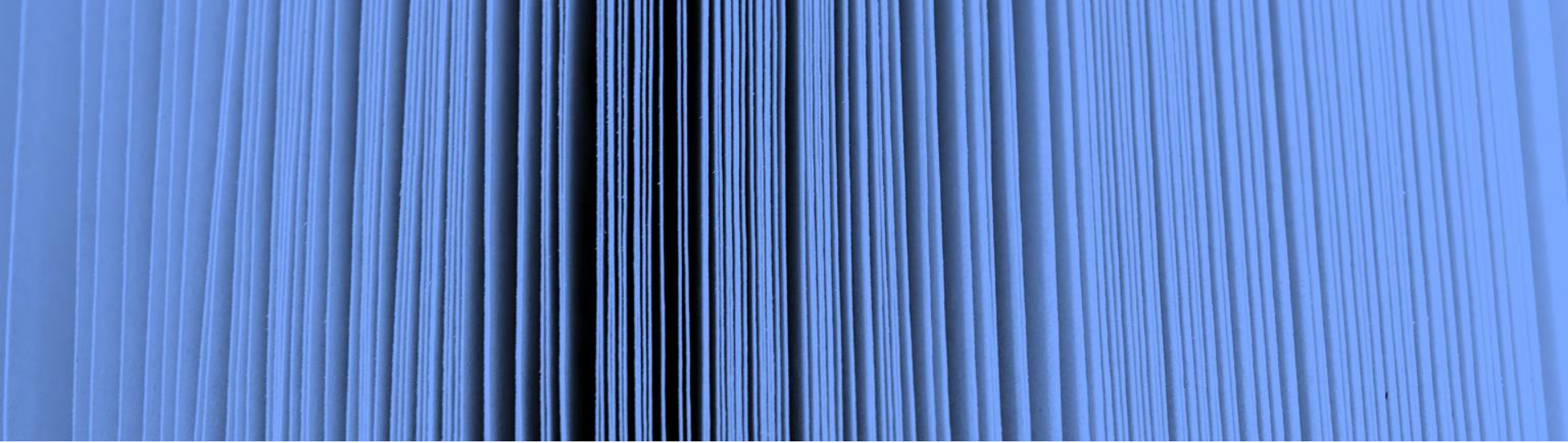
Assign to the person who truly has the needed skill, not the person who has authority.

HRO Questions

- Do you have the right stakeholders to support this change?
- Are the end users included in the planning process?
- How does this process change impact other departments?

Our Findings

- Anyone can ask questions, provide feedback, and suggest new ideas
- Listen to input from the end-users
- Transparent communication is critical when creating a culture of HRO



HRO and Steripath® Initial Specimen Diversion Device ®

The Results

Initial Specimen Diversion Device Associated with a 94% Lower Blood Culture Contamination Rate

CARLEEN MEROLA, DNP, RN, TCRN, PCCN

Published Abstract

PURPOSE

Up to half of all positive blood cultures are falsely positive due to sample contamination,[1,2] an unacceptable failure rate in a technique widely utilized to direct therapeutic outcomes for patients suspected of having a bloodstream infection.[3] Standard methods of sample collection fail to prevent common skin flora (which remain viable in the keratin layer after antiseptic application) from entering the blood culture bottle.[3-5] The Initial Specimen Diversion Device (ISDD®) can sequester these contaminants in a closed process, without introducing the additional opportunities for touchpoint contamination associated with manually diverting the sample, but are not yet standard practice.[3-5] We incorporated this emerging technology into our practice with the objective of assessing the efficacy of the technology at reducing blood culture contamination relative to standard methodology.

DESIGN

This was a quality improvement study designed to evaluate a potential process improvement for reducing blood culture contamination.

SETTING

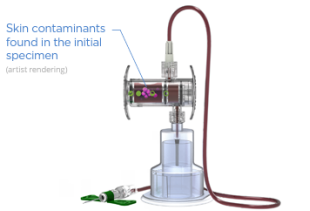
This study took place in a 118-bed, multi-specialty community hospital and Level III trauma center at Baylor Scott & White Medical Center - Centennial.

SUBJECTS

All subjects were adult emergency department patients suspected of bloodstream infection.

METHODS

Over a four-month period, 527 blood culture sets were drawn using standard methodology and 448 blood culture sets were drawn using the Initial Specimen Diversion Device.



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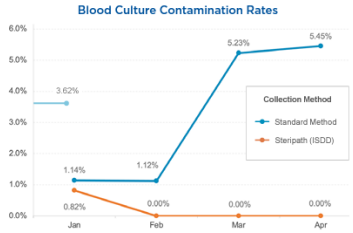
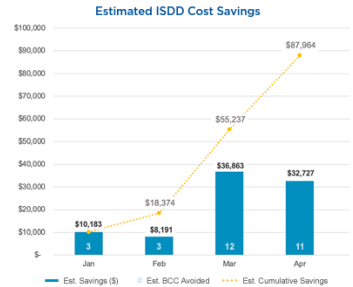
All samples were collected via fresh venipuncture with or without intravenous catheter start. Alcohol pads were used to disinfect all blood culture bottle tops and a chlorhexidine gluconate solution was applied to the skin for 30 seconds before venipuncture. Contamination events were recorded, and Fisher's exact test was utilized, with $p < 0.05$ considered significant.

RESULTS

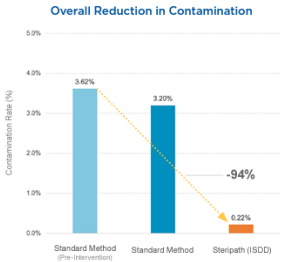
During this period, 17 contamination events were associated with using standard methodology (3.2% contamination rate) and 1 contamination event was associated with use of the Initial Specimen Diversion Device (0.22% contamination rate). Use of the ISDD was associated with a significant 94% reduction in blood culture contamination, relative to standard methodology *(p = 0.0002)*.





IMPLICATIONS

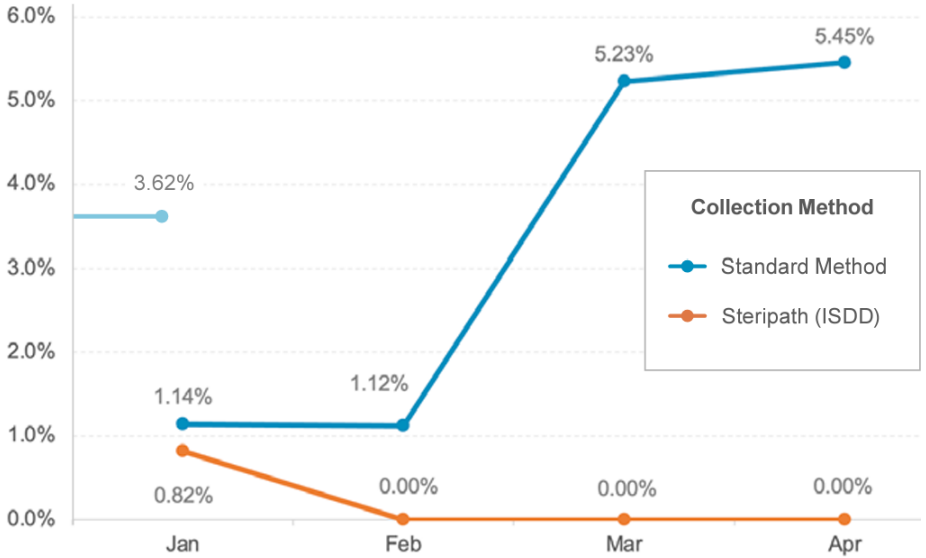
The extreme reduction in blood culture contamination observed when utilizing the Initial Specimen Diversion Device supports the hypothesis that this technology mitigates an unaddressed and costly source of clinical frustration.[6] Blood culture contamination contributes to hospital bed shortages as patients find their length of stay extended, and the unnecessary broad-spectrum antibiotics administered to these patients can prove harmful.[3-6] The prevalence of adverse reactions, such as acute kidney injury, and the threat posed by multi-drug resistant organisms necessitate improvements to nationwide antibiotic stewardship.[3,4,6,7] If the dramatic results observed during the study are sustainable, future studies might investigate the reduction of antibiotic use associated with lowering blood culture contamination rates. Based on the observed results, we strongly advocate consideration of the ISDD technology by nursing leaders and quality control personnel, as a means of improving patient outcomes.



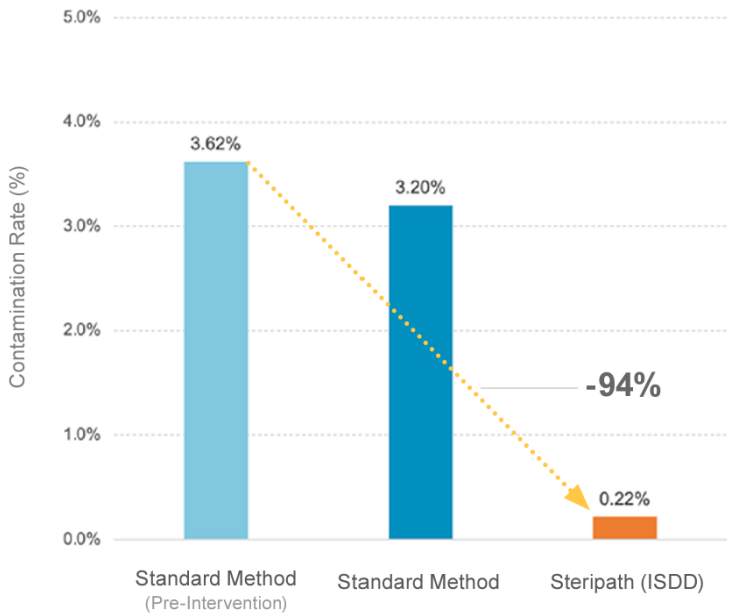
References: 1. Snyder SR, Favoretto AM, Baetz RA, Derzon JH, Madison BM, Mass D, et al. Effectiveness of Practices to Reduce Blood Culture Contamination: A Laboratory Medicine Best Practices Systematic Review and Meta-Analysis. Clin Biochem 2012;45:999-1011 2. Bates DW, Goldman l, Lee TH. Contaminant Blood Culture and Resource Utilization; The True Consequences of False-Positive Results. JAMA 1991;265:365-9. 3. Rupp, Mark E., et al. Reduction in Blood culture Contamination Through Use of Initial Specimen Diversion Device. Clinical Infectious Diseases 65.2 (2017): 201-205. 4. Bell, Mary, et al. Effectiveness of a Novel Specimen Collection System in Reducing Blood Culture Contamination Rates. Journal of Emergency Nursing 44.6 (2018): 570-575. 5. Zimmerman, Frederic S., et al. Reducing Blood Culture Contamination Using an Initial Specimen Diversion Device. American Journal of Infection

Clinical Results at 90 Days

Blood Culture Contamination Rates



Overall Reduction in Contamination



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Using the foundations on HRO and putting them into action.

My Questions

- Is there an HRO philosophy within my current organization?
- What and when is the needed data available to me?
- What resources at the hospital do I have?
- Do you have the right stakeholders to support this change?
- Will the same process work again?
- What roadblocks do I envision encountering in this process and how will use the 5 principles of HRO to lower the blood culture contamination rate to below 1%?

Tools of HRO

1. **SBAR (S**ituation, **B**ackground, **A**ssessment, **R**ecommendation**)**
2. **Brief and Debrief**
3. **ARCC (A**sk a question, **R**equest a change, voice a **C**oncern, **C**hain of command**)**
    - Clarify what is happening, encourage the room to consider events and alternatives
    - Everyone receives the ARCC with an open mind
4. **Read-Back/Repeat-Back**
    - Never assume you heard everything correctly the first time
5. **200 Percent Accountability**
6. **STAR (S**top, **T**hink, **A**ct, **R**eview**)**
    - It is very common that after a safety event, those involved agree that they could have seen it coming if they had slowed down to consider

Continuous Learning and Improvement

- Most problems do not stay solved permanently. As the world turns, good processes slowly become less effective.
- It is important to review processes periodically to see if they still apply
- Available data sets will often tell us what is coming using leading indicator metrics
- The best processes make doing the right thing easy, while making the wrong thing hard to do

Summary

- The goal is zero harm to patients and the only way to do that is to follow the example of a High Reliability Organization (HRO).

- Establish clear lines of communication to the staff, accept the challenges that you are facing and continuously be seeking ways to improve the process.

- Change is hard; be a champion for change and challenge the status quo of how things are done in your hospital.

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[1] Rupp ME, Cavalieri RJ, Marolf C, Lyden E. Reduction in blood culture contamination through use of Initial Specimen Diversion Device. Clin Infect Dis. 2017;65(2):201-205. doi:10.1093/cid/cix304.