

A microscopic view of numerous red blood cells (erythrocytes) in a dark red, slightly hazy environment. The cells are biconcave discs, some appearing in sharp focus while others are blurred in the background, creating a sense of depth. The lighting highlights the texture and color of the cells.

BLOOD CULTURE CONTAMINATIONS: WHY AND HOW DO WE COMBAT THEM

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OUTLINE

- Introduction
- Review of indication
- How do we define
- Why does this occurs-source of contamination
- Why is this important- impact to lab practice, clinical practice, patient outcome, associated cost
- How to minimize—solutions

#Sample rejection rate

INTRODUCTION

- One of the crucial lab test, and most common samples sent
- 16850 samples, 3444 (20.4%)
- frequently contaminated
- Good blood culture sampling leads to proper lab finding and help in diagnosis and good patient management.

INDICATIONS OF BLOOD CULTURE

- Symptoms of bacteremia or sepsis :
 - Fever, chills
 - Rapid breathing and heart rate
 - Confusion
 - Severe hypotension
 - Decreased urine output

DEFINITIONS

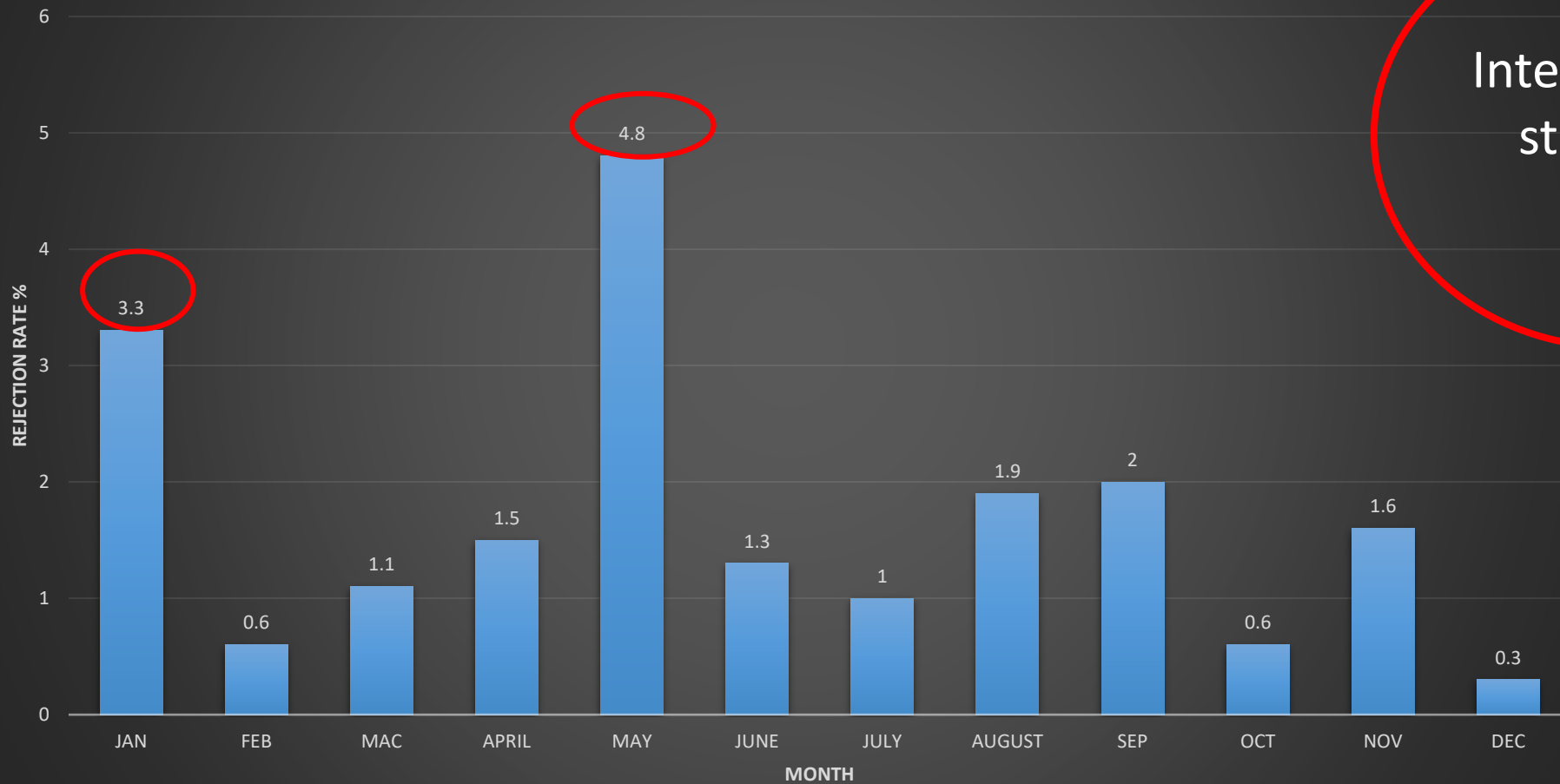
- A contaminant is defined as a microorganism that is supposed to be introduced into the culture during either **specimen collection** or **processing** and that **is not pathogenic** for the patient.
- Suspect contamination if
 - only one of several cultures is positive
 - if detection of bacterial growth is delayed
 - if multiple organisms are isolated from one culture.

COMMON CONTAMINANTS

- Staphylococcus epidermidis
- Bacillus species
- Propionibacterium acnes
- Corynebacterium species
- Clostridium perfringens
- Viridans Streptococci
- Candida tropicalis

#considered contaminants unless recovered from multiple blood cultures obtained in sequence

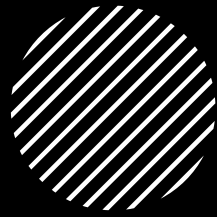
BLOOD CONTAMINATION RATE MMP UNIT 2021



International
standard
<3%

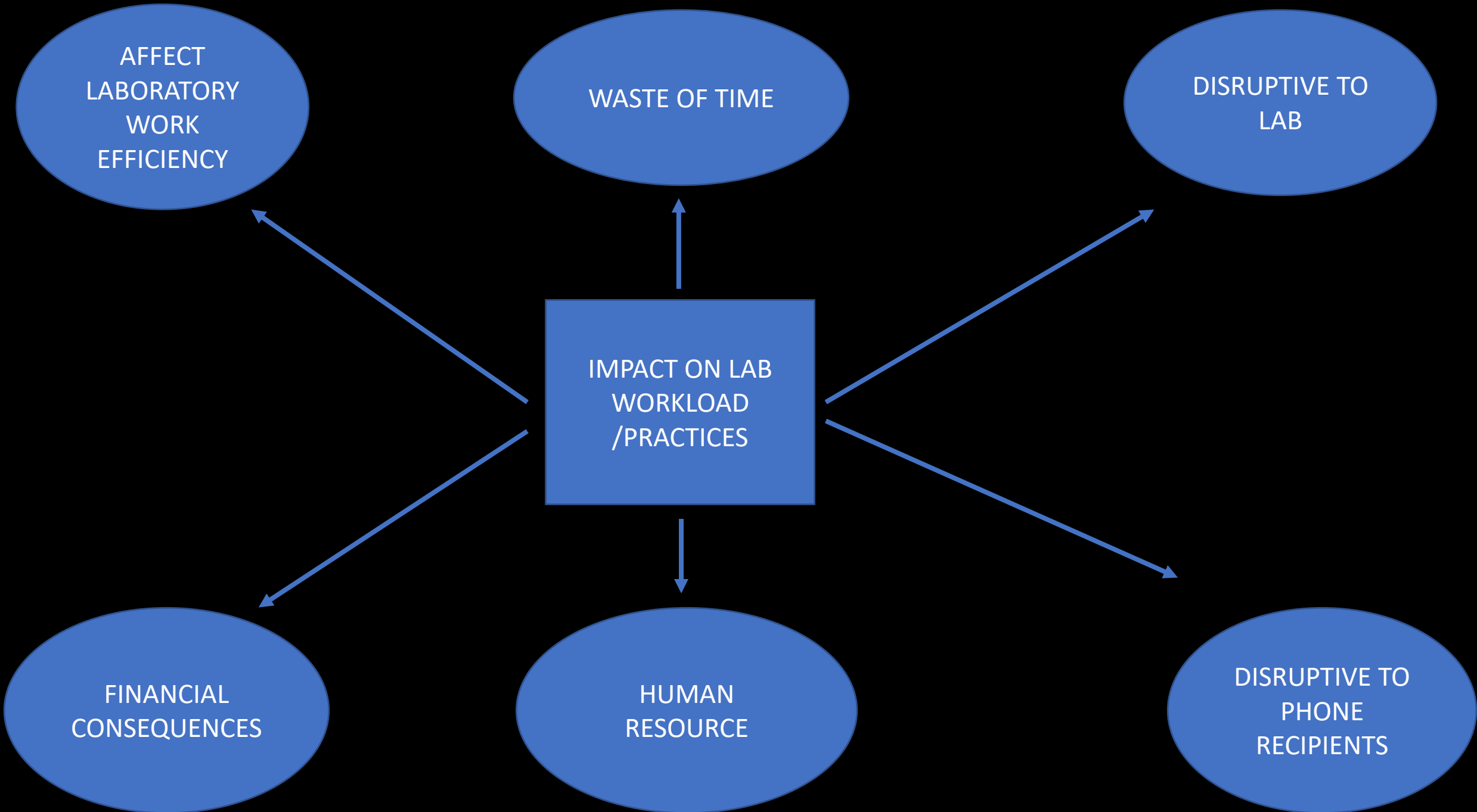


SOURCES OF CONTAMINATIONS



- Poor technique
- Insufficient disinfection of the skin
- Collection of blood through indwelling vascular catheters





FINANCIAL IMPACT TO LAB

•
Cost of isolation, identification antimicrobial susceptibility testing rm
100

7 X rm 100= rm 700

14 X rm 100 = rm1400

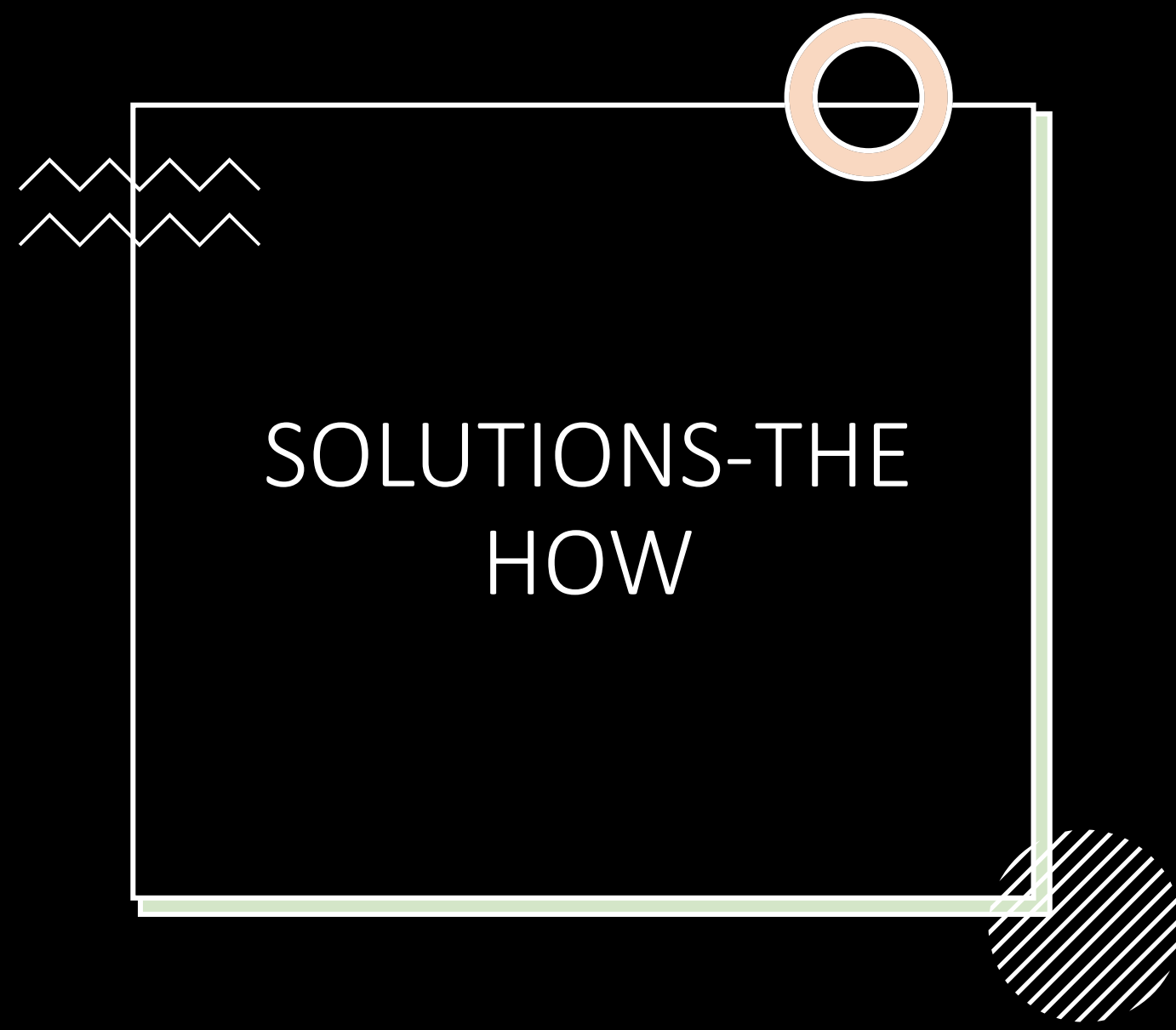
= 7 MULTIPLEX PCR

IMPACT ON PATIENT OUTCOME AND ASSOCIATED COST

- increased antibiotic exposure
 - Lee et al. showed that 41% of 178 patients with contaminants received unneeded intravenous antibiotics
 - Souvenir et al. demonstrated that 41% of blood culture contaminant episodes due to CoNS were treated with antibiotics (with 34% receiving vancomycin unnecessarily)
- adverse events
 - thromboembolic disease, and infection
 - allergic reactions, drug-drug interactions,
 - antibiotic resistance emergence,
 - disruption of the host microbiome
- delay in obtaining the correct diagnosis and a delay in initiating appropriate therapy.

IMPACT ON PATIENT OUTCOME AND ASSOCIATED COST

- Unnecessary antibiotics are prescribed in 40% to 50% of cases, leading to a 39% increase in charges
- the length of hospital stay was increased
- Bates et al. found that intravenous antibiotic charges were 39% higher for contaminant blood culture episodes than among culture-negative patients
- Unnecessary additional laboratory or other diagnostic testing



SOLUTIONS-THE HOW

- Key elements for optimization of blood cultures that may impact contamination, reduction of contamination and optimization of blood cultures

Element	Comment
Preanalytical ^b	
Body site for specimen collection	Peripheral venipuncture preferred
Preparation of the venipuncture site	Use of alcoholic chlorhexidine gluconate and/or tincture of iodine with 70% alcohol; iodophors (povidone iodine) are not recommended
Specimen procurement	
Hand hygiene	Adherence to aseptic practices
Sterile gloves/well fitted gloves	Adherence to aseptic practices
No. of bottles	A minimum of two separate draws; usually one aerobic and anaerobic bottle per draw
Vol of blood (in adults)	8–10 ml of blood per bottle; 20–30 ml per venipuncture
Transport to the laboratory	Transport time should be as rapid as possible at room temperature; follow manufacturers' guidelines.

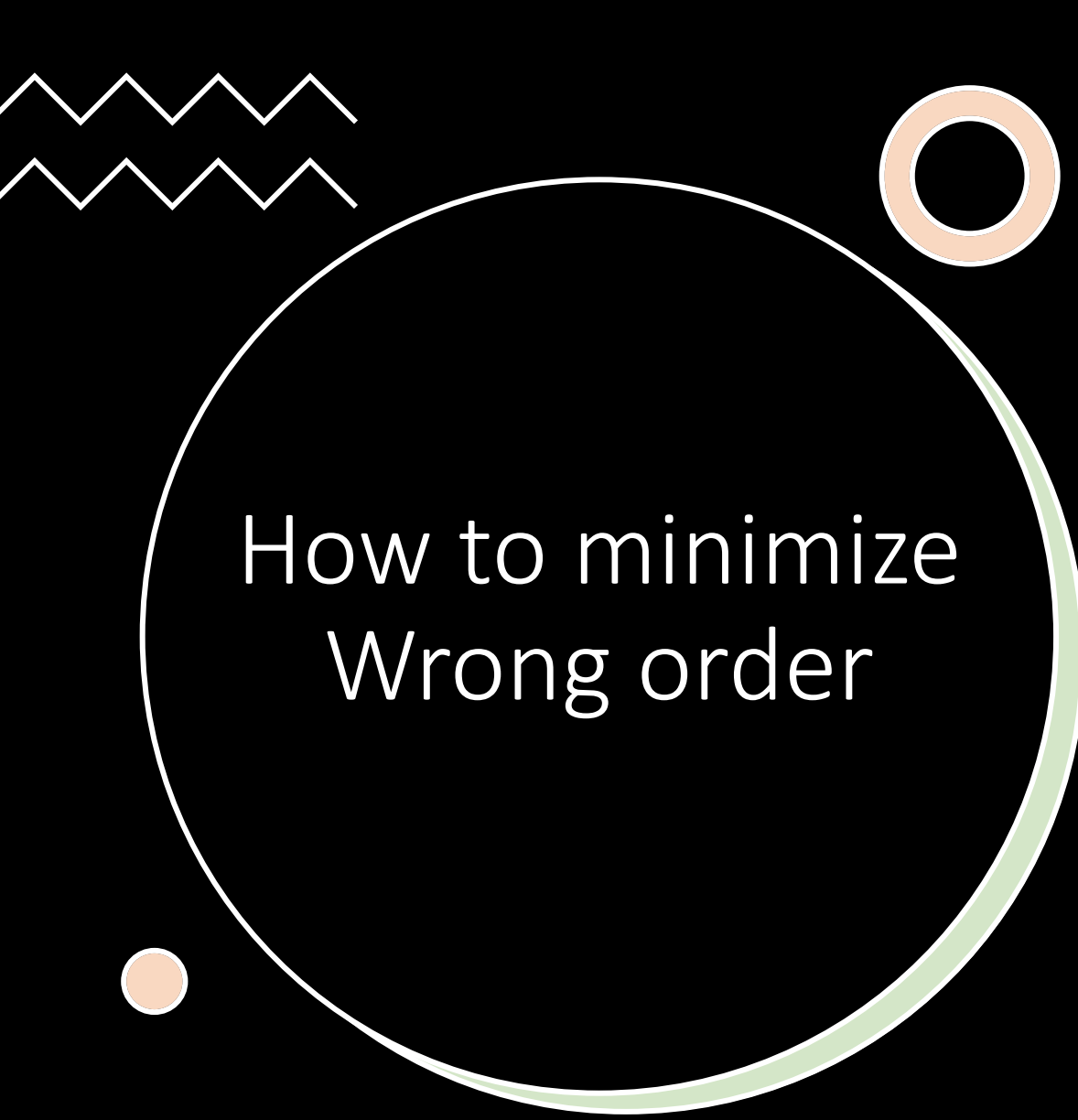
REFERENCES

- Doern, G. V., Carroll, K. C., Diekema, D. J., Garey, K. W., Rupp, M. E., Weinstein, M. P., & Sextong, D. J. (2020). A comprehensive update on the problem of blood culture contamination and a discussion of methods for addressing the problem. *Clinical Microbiology Reviews*, 33(1), [e00009-19]. <https://doi.org/10.1128/CMR.00009-19>
- Medscape


REJECTION RATE MICROBIOLOGY LAB

July to December 2021			
Rejection Rate	286 from 20138 (1.4%) MSQH target < 1%		
	1	2	3
Top 3 Reasons of Rejection (with % rejection)	Wrong Order 20.3	Test not indicated 13.6	Duplicate order 11.9%

January to June 2022			
Rejection Rate	381 from 19132 (1.99%) MSQH target < 1%		
	1	2	3
Top 3 Reasons of Rejection (with % rejection)	Wrong Order 32	Test Cancelled 26.5	Wrong Collection Container 10.2



How to minimize Wrong order

- Know indications of tests – discuss with team, lab/ microbiologist
 - Give relevant history to the laboratory
- 



How to minimize Duplicate order

- Know when to repeat test if necessary
- Trace previous result
- Discuss with team /lab/microbiologist
- Know TAT-refer handbook



THANK YOU

1.	The following are the good practice(s) when obtaining blood culture sample except	
	A.	Wearing glove
	B.	Disinfecting the blood bottle cap
	C.	Withdraw sample from catheter when a CRBSI is suspected
	D.	None of the above