UWTASP

tele-antimicrobial stewardship program

June 11, 2019 noon

Agenda

- Clinical Microbiology Lab in AS
- Case Discussions
- Open Discussion

UWTASP

tele-antimicrobial stewardship program

Clinical Microbiology Lab in AS

-blood cx contamination

-gram stain

-susceptibility testing

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Does my patient have an infection?

- Is my patient's illness caused by a microbe?
- If so, what is it?
- What is the susceptibility profile of the organism so therapy can be targeted?

Clinical Infectious Diseases, Volume 67, Issue 6,
31 August 2018, Pages e1–e94

Obtaining blood cultures in suspected infection

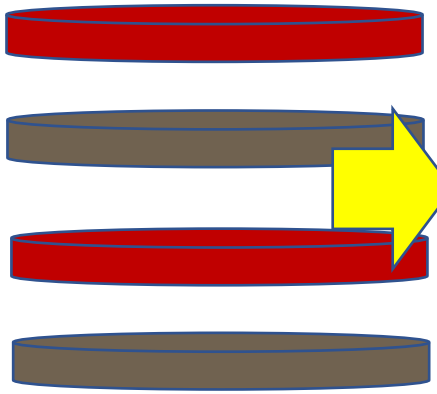
Adults: 2-4 blood culture sets per septic episode

- 20-30mL of blood per culture set injected into 2 bottles

Set 1

Set 2

Historically, plated onto solid media and monitored



Organism Identification

- Biochemical tests
- BACTEC
- Rapid diagnostic tests
- Mass Spectrometry

CASE

54 yo F presents with fevers, chills, left flank pain and hypotension. Orders:

Blood cultures x 2

UA/urine culture

Empiric ceftriaxone

On day 2 of hospitalization, she is much improved.

- Blood cultures: 1/2 sets growing GPCs in clusters
- Urine Culture: 100,000 CFU E.coli

Question

What do these GPCs represent?

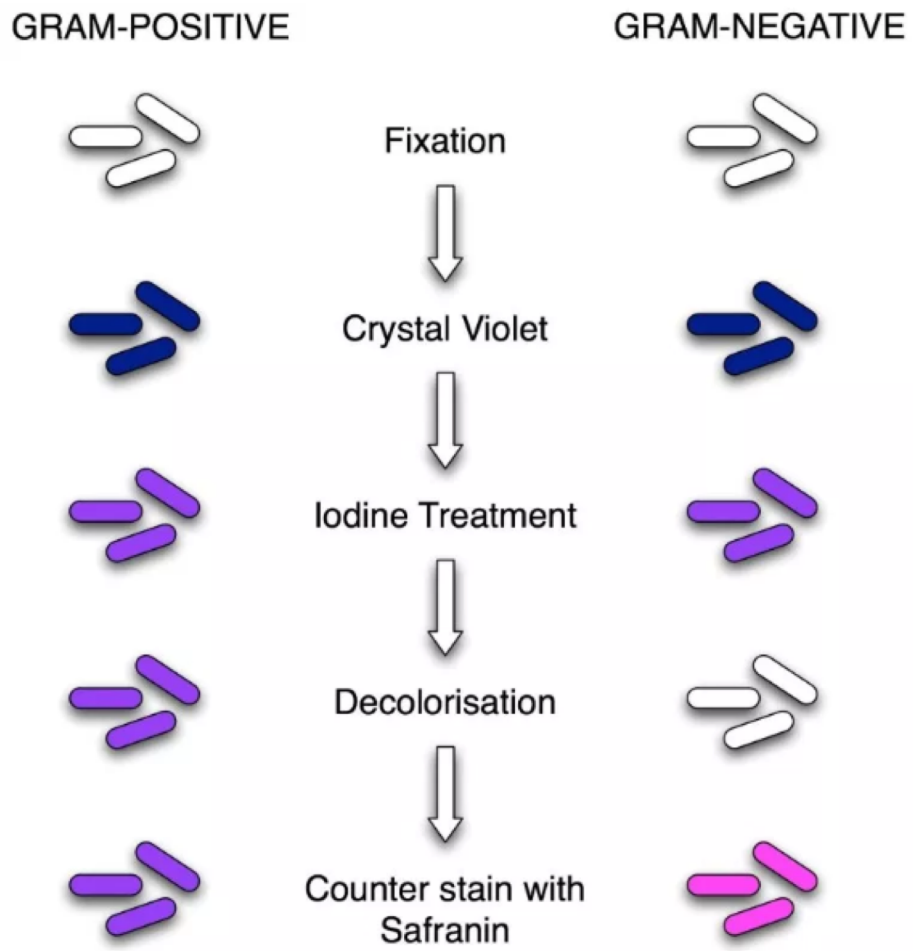
A) Same E.coli as the urine

B) Skin contaminant

C) Staph aureus

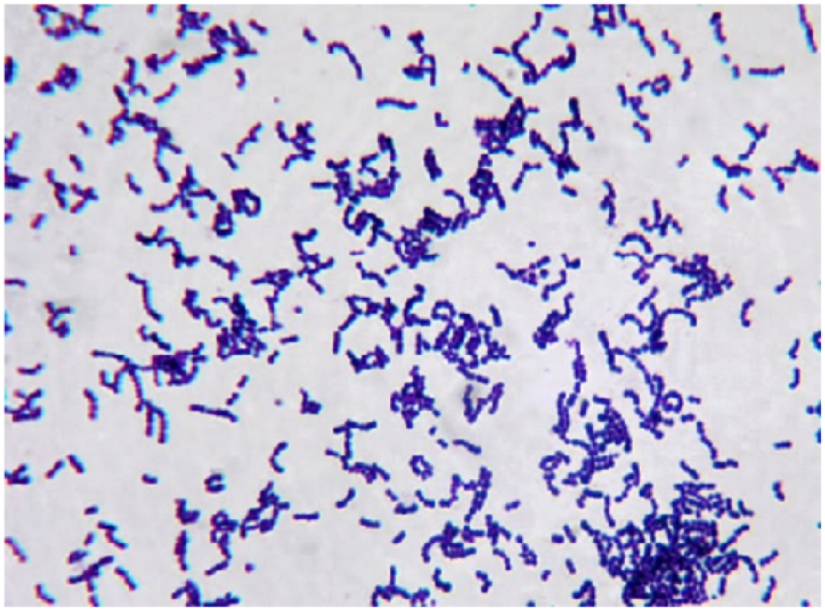
D) Do I need to care?

Brief Gram Stain Interlude



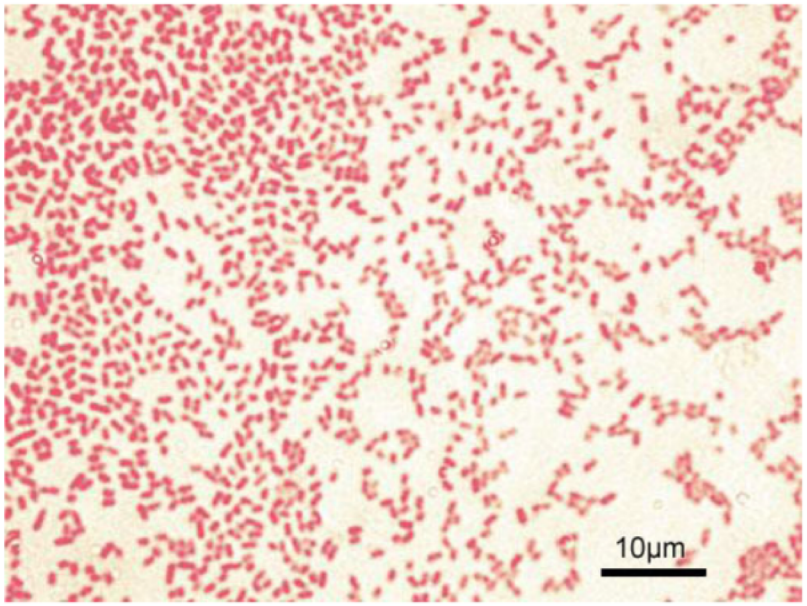
https://laboratoryinfo.com/gram-staining-principle-procedure-interpretation-and-animation/

Gram Stain



Gram Positive Bacteria

Staphylococcus
Streptococcus
Enterococcus
Clostridium
Corynebacterium, Propi, Bacillus



Gram Negative Bacteria

E. coli
Klebsiella
Enterobacter
Pseudomonas

https://laboratoryinfo.com/gram-staining-principle-procedure-interpretation-and-animation/

back to our CASE

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- **Blood cultures: 1/2 sets growing GPCs in clusters**
- **Urine Culture: 100,000 CFU E.coli**

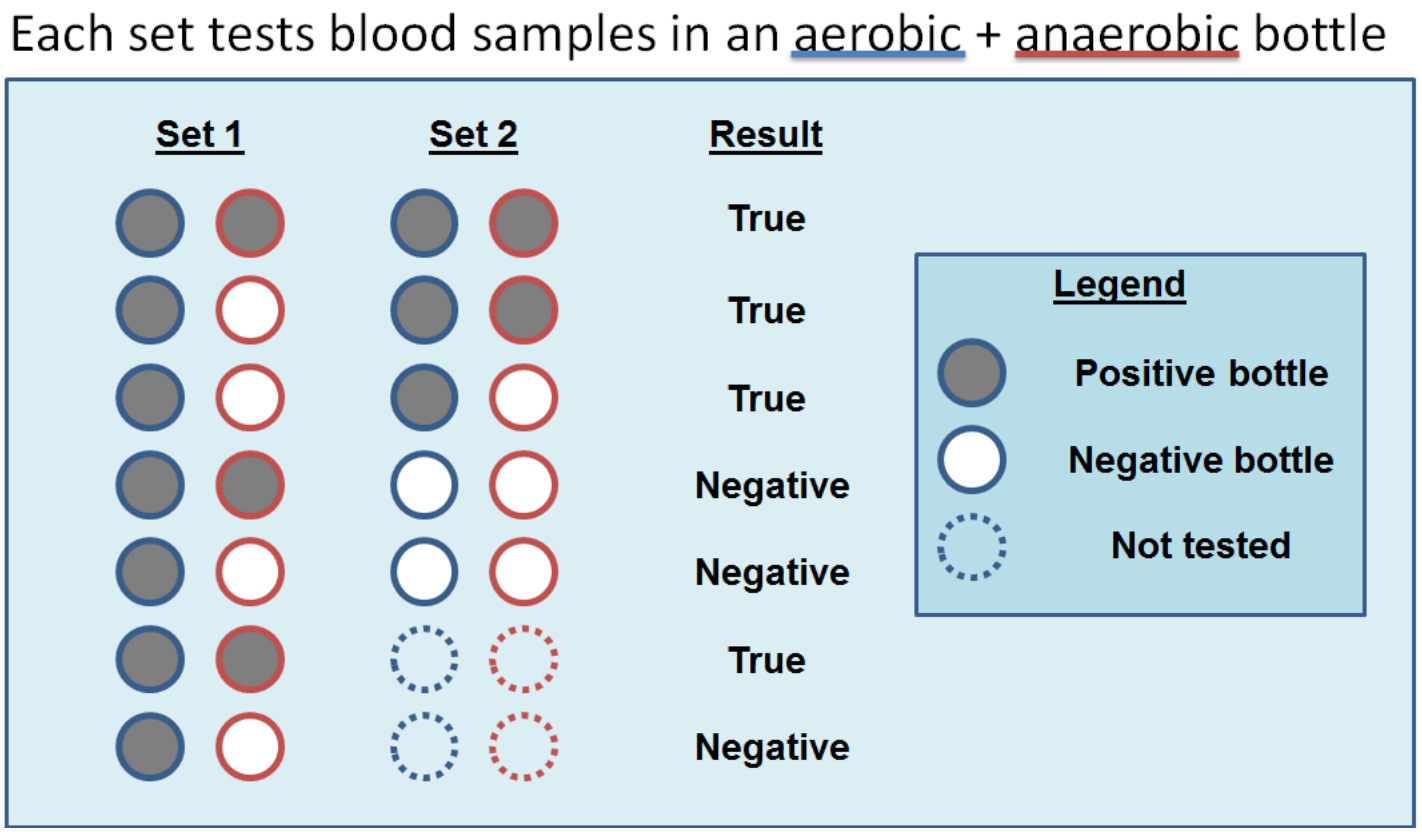
Skin Contamination

- Skin contamination of blood culture bottles
  - Very common
  - Very costly
  - Frequently confusing to clinicians
  - Common bacteria:
    - *Staphylococcus* spp (coagulase-negative staph)
    - *Streptococcus* spp
    - *Corynebacterium* spp
    - *Propionibacterium* spp
    - *Bacillus* spp

- Certain bacteria should never be considered a contaminant
  - *Staph aureus*
  - *Candida*

Contaminant vs Infection?

Common skin or environmental flora



Susceptibility Testing

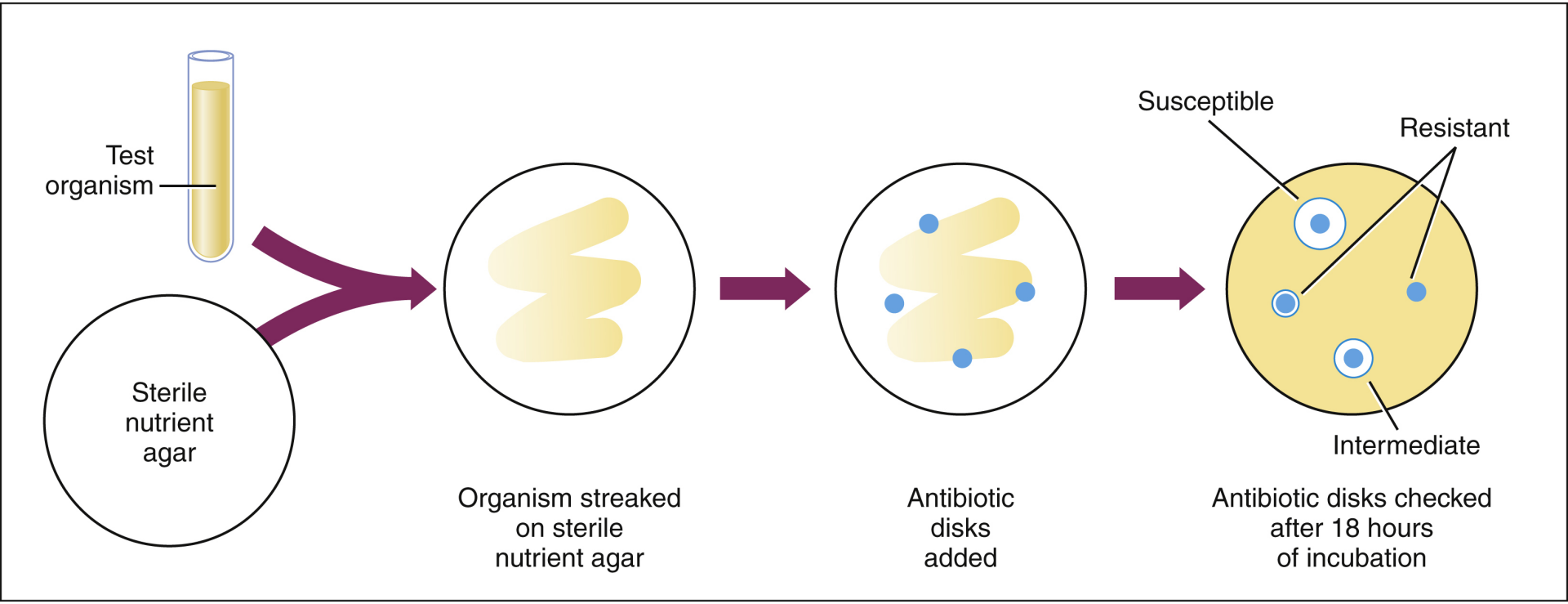
Blood culture: *E.coli*

Drug	Interpretation	MIC value
Ceftriaxone	S	0.25
Cefazolin	S	0.5
Levofloxacin	R	8
Ertapenem	S	0.25
Gentamicin	S	2.0
Tobramycin	S	0.5
Piperacillin/tazobactam	S	4.0
Meropenem	S	0.5

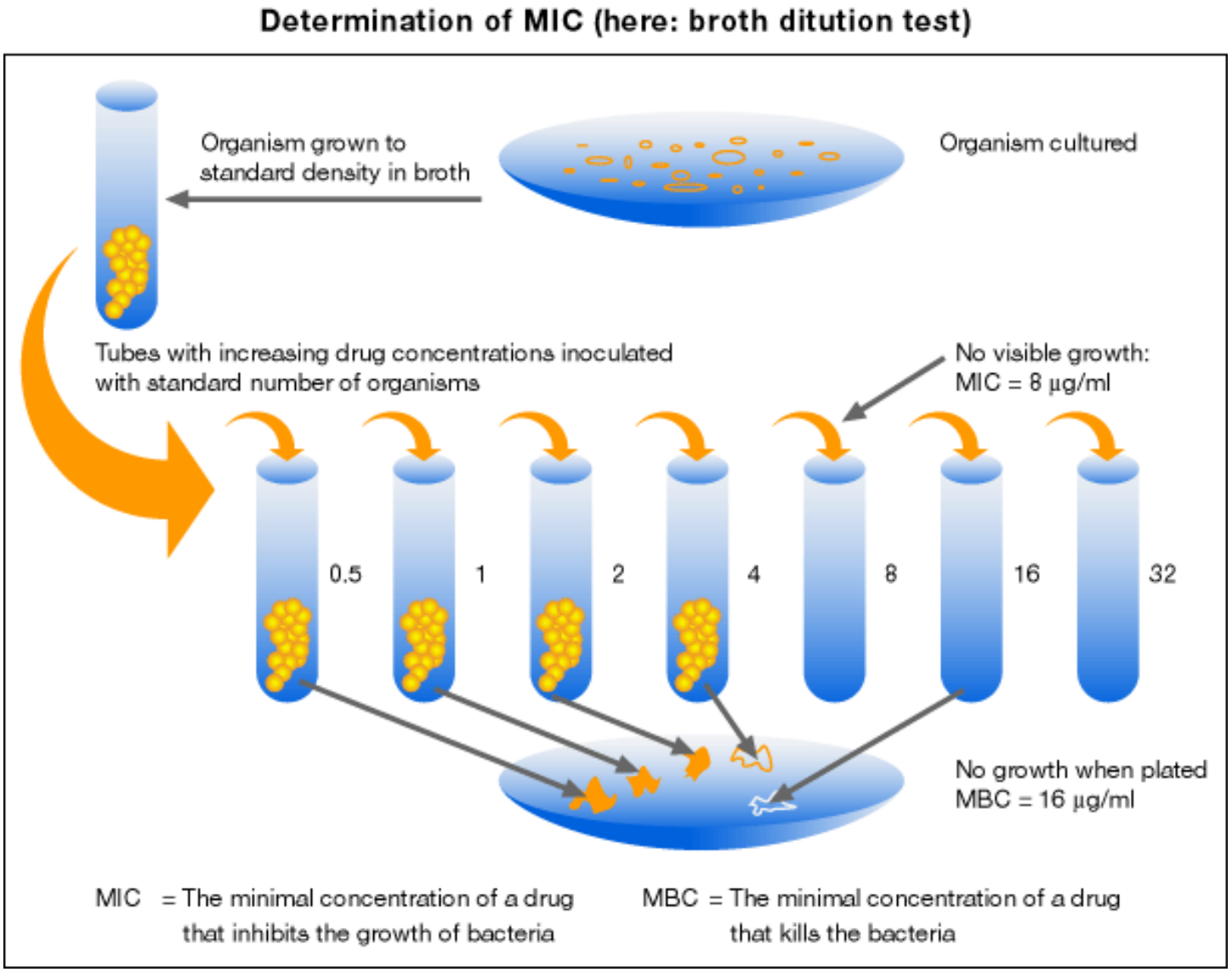
- ✓ Use Interpretation column first to determine which antibiotic will be appropriate.
- ✓ If you don't see the antibiotic, don't assume susceptibility!

Disk Diffusion (Qualitative)

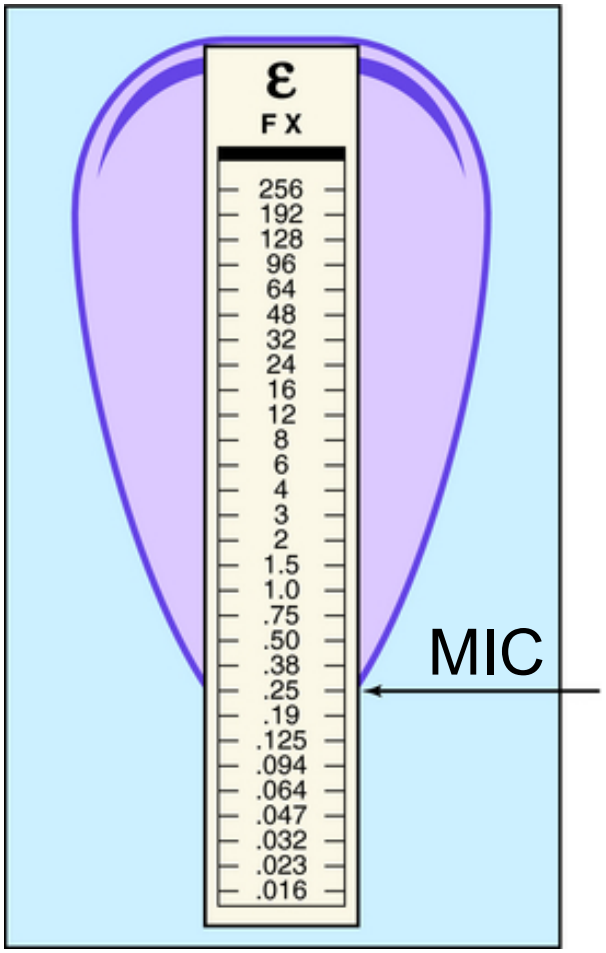
- "Kirby-Bauer-Turck" method.



Broth Dilution (Quantitative)



E-test (Quantitative)



Susceptibility Testing

- MIC = Minimum Inhibitory Concentration
  - ✓ A lower MIC means smaller amounts of drug are necessary to inhibit growth
  - ✓ But… Lowest MIC does not necessarily mean that is the most effective drug *in vivo*
  - ✓ PK/PD properties of drug?
  - ✓ Drug toxicity… interactions… collateral damage… cost?

Summary

- Blood culture contamination
  - Lab QI
  - Unnecessary abx
- Susceptibility testing – MIC more to come
- Make friends with the Lab!