Laboratory Testing

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Understanding Pre-Analytic and Analytic Methods for Biologic Cultures, Serologic Testing and Confirmatory Testing

Pre – Analytic Methods

Sample collection is the key to quality results
The higher the quality of the sample – the higher the quality of the results

- Examples:
- Blood Cultures
- Wound Cultures
- Sputum
- Stool
- NP Swabs

For Example, Only type 6 or 7 should be tested for C. diff

Other types of stool could yield false positive results and lead to unnecessary treatment.

Bristol Stool Scale		
Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped, lumpy
Type 3		Sausage-shaped, cracks on surface
Type 4		Sausage or snake-like, smooth and soft
Type 5		Soft blobs with clear-cut edges (easy to pass)
Type 6		Fluffy pieces with ragged edges, mushy
Type 7		Watery, no solid pieces (entirely liquid)

Analytic Methods

Biological Methods

Cultures:

Traditional Method for identifying pathogens

Cost effective

Time consuming

Manual

Molecular Methods:

New Technology

Becoming rapidly available in Hospital Setting

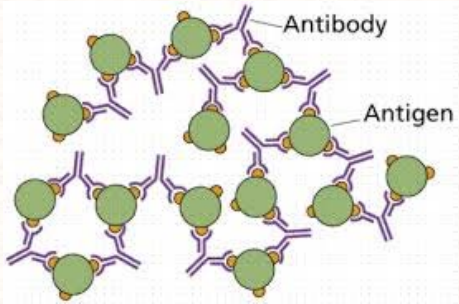
More expensive than traditional methods

Faster

Requires less hands-on time

Serological Methods

Helpful in the detection of Antibodies or Antigens in patient samples, especially virus.
Quick Turn around Time
Great for Screening tests
May require confirmatory testing
Cost effective
Sample quality issues



Confirmatory Testing

- Confirmatory testing is usually performed in Reference Labs
  - Cost
  - Labor intensive
- New Molecular technology is allowing Hospital Labs to perform some of this in house.

Confirmatory Testing

- Performed on tests with low sensitivity and/or specificity
- Tests not routinely performed (Sensitivities on commensal organisms)
- Performed on Tests with significant clinical impact (CRE)


The Microbiology Process
From Order Through Results

1. Order

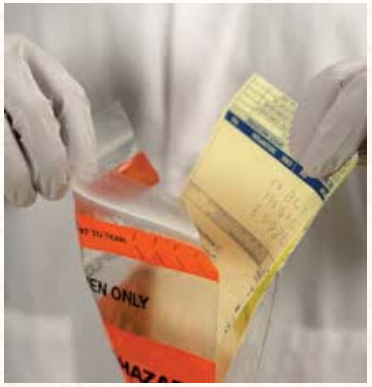
- The physician will place the order
- The order is verified
- The order is sent to the Laboratory electronically or faxed
- The order will be verified again by the Laboratory when the sample or the patient presents to the Lab

2. Sample Collection and preservation

- Ideally, the physician or nurse will collect the sample if a wound.
- The patient will be sent to lab, or lab called to collect if a Blood Culture
- The patient will be instructed on proper collection and given supplies for stool, sputum or urine culture
- Proper identification is crucial
- Place samples in appropriate media
- Keep at appropriate temperature

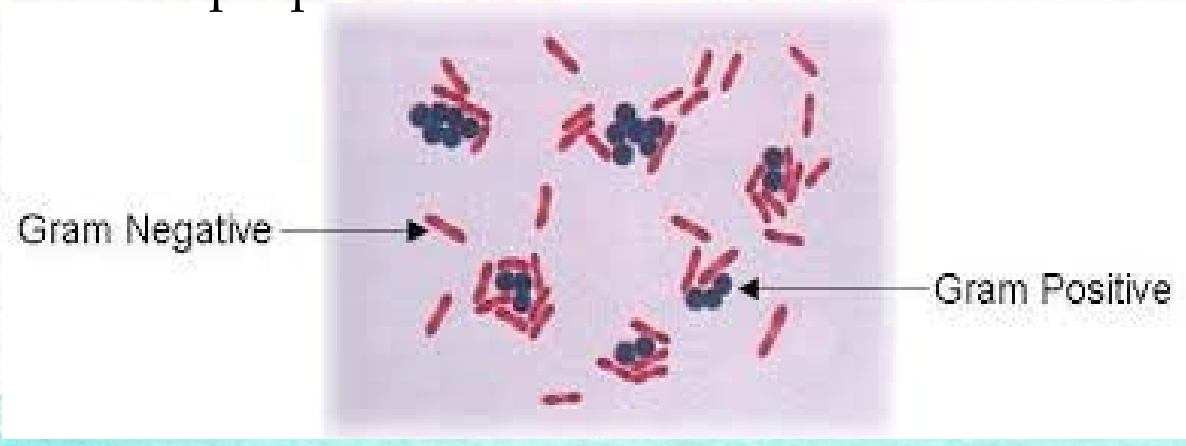
3. Sample Transport

- Transport to Laboratory immediately
- If delay, call Laboratory for instructions on storage
- Sample deterioration can cause poor recovery of pathogens



4. Sample Processing

- The sample is verified against the order again to ensure proper sample type and patient identity.
- The sample is inspected for proper storage and transport requirements
- The sample is inspected for proper labeling
- The sample is Gram stained (except urines)
- The sample is inoculated onto proper media and incubated according to source



5. Culture Workup

- Bacterial cultures are read at 24, 48 and sometimes 72 hours
- They are examined for presence of pathogens and presence/absence of normal flora
- Pathogens are isolated for identification and sensitivity testing
- MDROs should be reviewed to ensure resistance patterns match the organism identified
  - i.e. ESBL – 3rd Generation Cephalosporins show true resistance, CRE – confirm KPC

6. Result Reporting

- Pathogens will be resulted through the LIS (Laboratory Information System)
- Sensitivities will accompany the ID if appropriate
- CLSI dictates what Organism/Drug combinations are reported
- Only certain antibiotics are reported with certain organisms depending on source
- Limiting the antibiotics reported on sensitivity reports is done to help decrease resistance patterns
- When done in conjunction with Antibiotic Stewardship Programs, we can start to fight the epidemic of resistance!

Thank you