Implementation and Optimization of Antibiotic Stewardship in Acute Care Hospitals:

A Clinical Microbiology Laboratory Perspective

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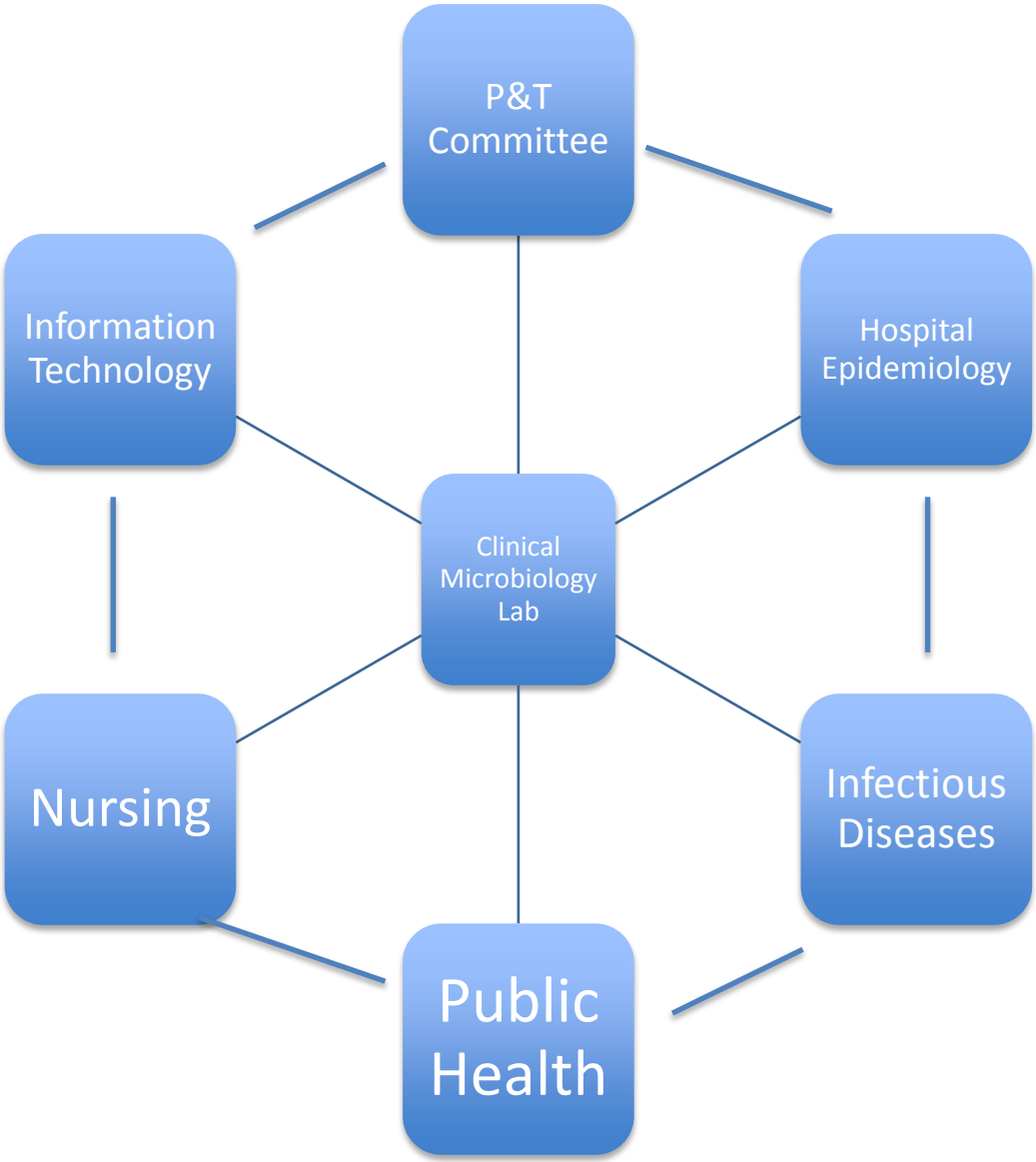
P&T Committee
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Data, Relevance, Communication

Data

Performance characteristics of tesing.
Reliable? Informative?

Relevance

Does it address needs of antimicrobial stewardship program?

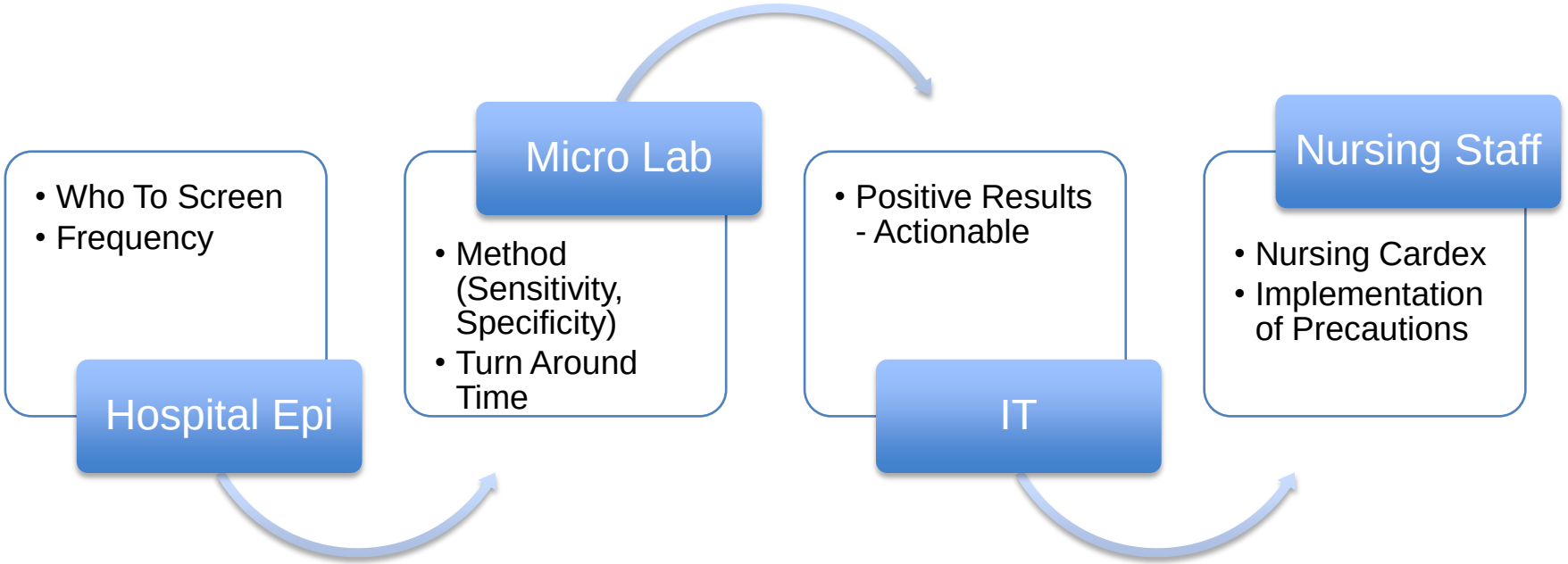
Communication

Does it get to the right people and influence behavior?

Roles of Micro Lab in Stewardship Team

Some examples

Interconnections: MRSA Screening



Data and Relevance

Communication

How good is our microbiology data?

- Sensitivity
  - Are we confident that a susceptible result can be trusted and that narrower spectrum antimicrobial can be used?
  - Example: Are we reliably detecting KPC's through use of appropriate methodology?
- Have we shown that methods work appropriately in our laboratory through appropriate QA and QC activities?

How good is our microbiology data?

- Specificity and PPD
  - Are we using best practices?
  - Example: Are we for example following older CLSI interpretative guidelines and thereby overcalling in some occasions resistance to some poorly hydrolyzed third generation cephalosporins, and thereby inappropriately changing an otherwise susceptible result to resistant, based on extended spectrum beta-lactamase phenotype.

How good is our microbiology data?

- Negative Predictive Value of our tests
  - e.g., C. difficile: are we satisfied with 60-80% sensitivity of EIA's vs. 95% sensitivity of NAAT tests? Or would a test with intermediate sensitivity and potentially lower specificity that costs much less be appropriate? Will use of test with a high NPV lead to decreased use of antibiotics and other clinical benefits?
  - Do we need an answer in two hours or once a day and at what cost?

How good and relevant is our microbiology data

- Turn around Time – new molecular methods speed up identification of positive blood culture isolates (Coag vs. CoNS) and lead to decreased use of antibiotics. Many innovative techniques on the horizon. We will have to weight cost/benefits within the context of antimicrobial stewardship and our health care systems.

How do we influence behavior through selective and persuasive provision of information?

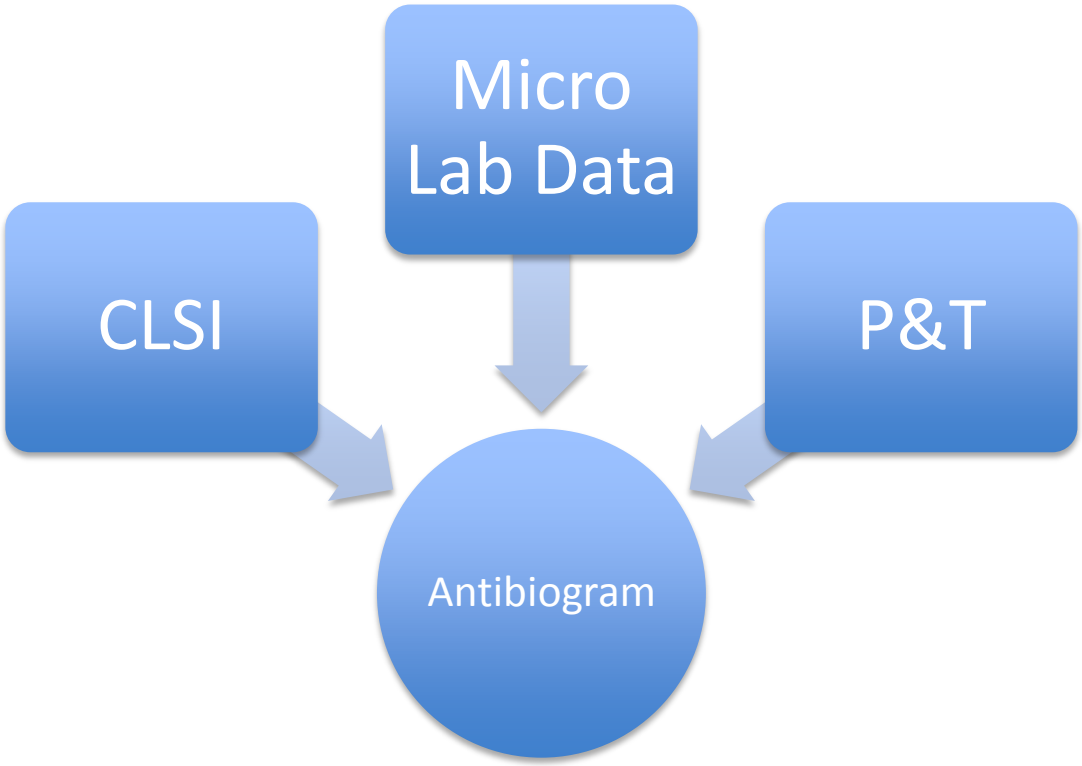
Cascading
(what to provide and to whom)

- Cascading – triggered release of information
- Report narrow spectrum agents first
- Only report broad spectrum agents if resistant to narrow spectrum agents); e.g., not reporting vancomycin results for methicillin **susceptible** *Staphylococcus aureus*
- *CLSI guidelines: M100-S21. Cascading suggestions, groups A, B, C (narrow spectrum, primary reporting by organism group → broad spectrum), selective reporting for resistant organisms*

Turn around time and Stewardship

- Rapid results – empiric to selective coverage
- Preliminary blood culture sensitivities
- Rapid speciation of organisms in positive blood cultures (various options now available)
- Evolving technologies: e.g. molecular and mass spectrometry -- rapid ID and potentially resistance testing directly from specimens or from culture.

Hospital Antibiogram



CLSI: Analysis and Presentation of Cumulative Antimicrobial Susceptibility Test Data; Approved Guideline; Third Edition, M39-A3

Collection and Display of Data to Guide Empiric Therapy

What to Display? Where to Display?

CLSI Recommendations

- Frequency: Yearly
- Reflect practice setting, multi-institutional health care conglomerates may want to report separately for different health care settings
- Lump or Split organisms – (e.g., split out MRSA vs. MSSA)

Organism	No. Strains	% Susceptible								
		CLI	DOX	ERY	GEN	OXA	PEN	RIF	SXT	VAN
All *S. aureus*	1317	80	98	50	93	68	13	98	96	100
Oxacillin-resistant *S. aureus* (MRSA)	449	44	96	4	79	0	0	95	94	100
Oxacillin-susceptible *S. aureus* (MSSA)	904	97	99	72	99	100	18	99	97	100

Table from CLSI M39-A3

Integrated Decision Support Software

- Connect micro data with pharmacy and/or other clinical parameters → antimicrobial management, drug-bug mismatch alerts, MDR epi alerts