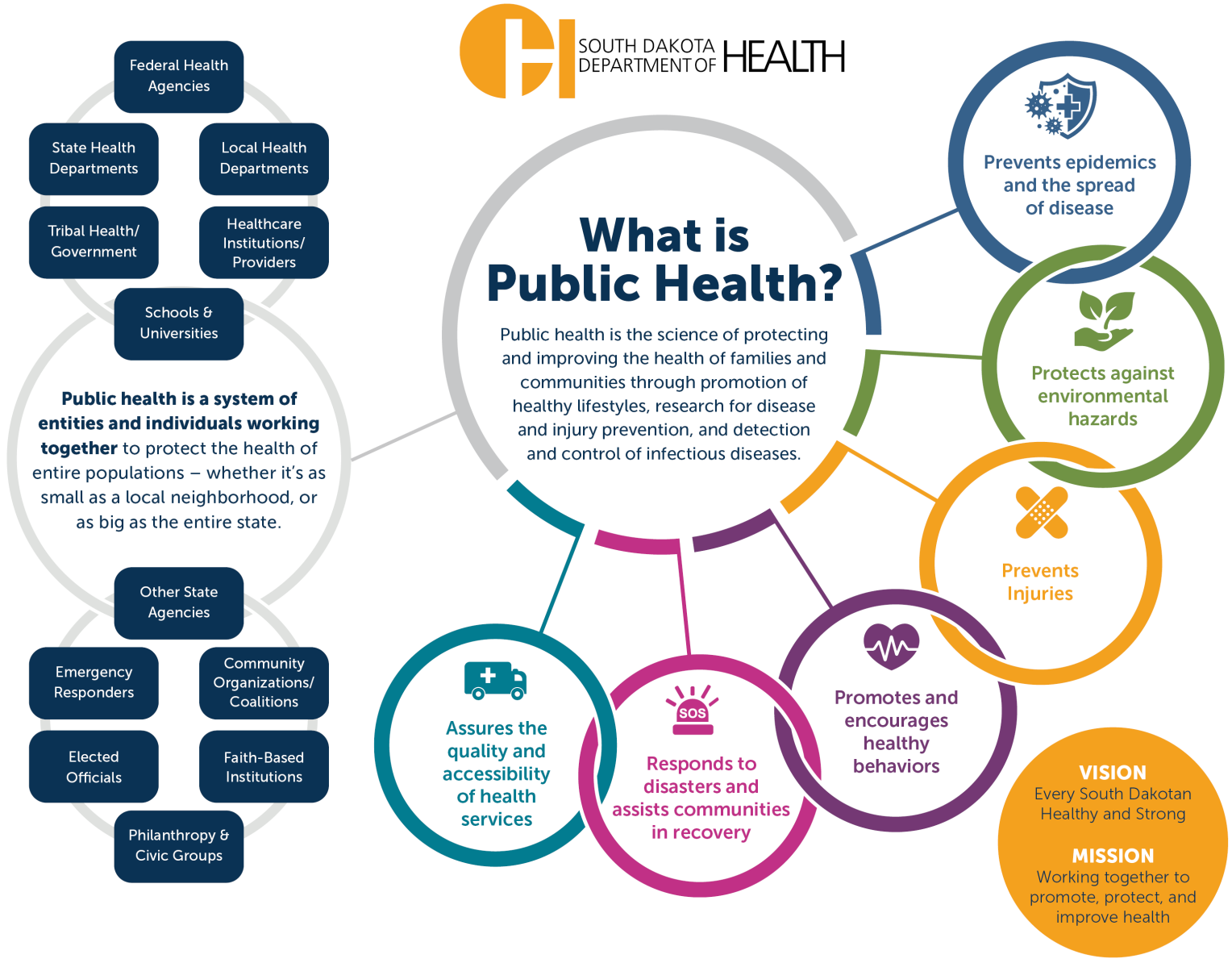
South Dakota Department of Health

Targeted Antibiotic Selection Strategies for Common Infections

Fighting Antimicrobial Resistance Takes All of Us

November 18, 2025


SOUTH DAKOTA DEPARTMENT OF HEALTH
Federal Health Agencies
State Health Departments
Local Health Departments
Tribal Health/ Government
Healthcare Institutions/ Providers
Schools & Universities
Public health is a system of entities and individuals working together to protect the health of entire populations – whether it's as small as a local neighborhood, or as big as the entire state.
Other State Agencies
Emergency Responders
Community Organizations/ Coalitions
Elected Officials
Faith-Based Institutions
Philanthropy & Civic Groups
What is Public Health?
Public health is the science of protecting and improving the health of families and communities through promotion of healthy lifestyles, research for disease and injury prevention, and detection and control of infectious diseases.
Prevents epidemics and the spread of disease
Protects against environmental hazards
Prevents Injuries
Promotes and encourages healthy behaviors
Responds to disasters and assists communities in recovery
SOS
Assures the quality and accessibility of health services
VISION
Every South Dakotan Healthy and Strong
MISSION
Working together to promote, protect, and improve health

Antibiotic Awareness Week
November 18-24, 2025

U.S. ANTIBIOTIC AWARENESS WEEK

Fighting Antimicrobial Resistance Takes All of Us

SOUTH DAKOTA DEPARTMENT OF HEALTH
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Objectives

1. Describe the role of the human microbiome in protecting against infection.

2. Differentiate key characteristics and resistance mechanisms of Gram-positive and Gram-negative bacteria commonly associated with healthcare and community infections.

3. Interpret current literature and clinical guidelines related to antibiotic stewardship interventions.

4. Apply strategies through case studies.

Our Presenters:
Keegan Mason & Associates

JAMES M. KEEGAN, MD

RANDEE MASON, RN, BSN, CPHQ

Disclaimer

The following information is designed to assist the practitioner in making safe choices of antibiotic selection where appropriate. An effective Antibiotic Stewardship Program should defer to the clinical judgement of the practitioner caring for the patient.

General Guidelines

Targeted antibiotic approach designed to help protect the patient's protective Microbiome

Ideally, a pathogen should be identified and if bacterial, an antibiotic chosen that is highly specific for this bacterium and not others (or as few other bacteria as possible). This in turn avoids destroying the patient's protective normal bacteria (microbiome)

Key components of recommendations are based off the regional antibiogram

1 in 10 people think they are allergic to penicillin, and only 1 in 100 or less truly are allergic to penicillin

Current Literature

Clinical Infectious Diseases

MAJOR ARTICLE

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Association Between Delayed Broad-Spectrum Gram-negative Antibiotics and Clinical Outcomes: How Much Does Getting It Right With Empiric Antibiotics Matter?

Jonathan D. Baghdadi,[1,2,©] Katherine E. Goodman,[1,2,©] Laurence S. Magder,[1] Kimberly C. Claeys,[3,©] Mark E. Sutherland,[4,©] and Anthony D. Harris[1,2]

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Current Literature

Correspondence: M. G. Thompson, Influenza Division, Centers for Disease Control and Prevention, Atlanta, GA 30333 (isq8@cdc.gov).

Clinical Infectious Diseases® **2019;69(6):1085–6**
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The Importance of Cumulative Antibiograms in Diagnostic Stewardship

Cumulative AST data can give added value to rapid precise diagnostic techniques in clinical microbiology and can help to establish prompt semitargeted antimicrobial therapy reducing the empiricism with which bacterial infections are treated initially (Figure 1). For this

Current Literature

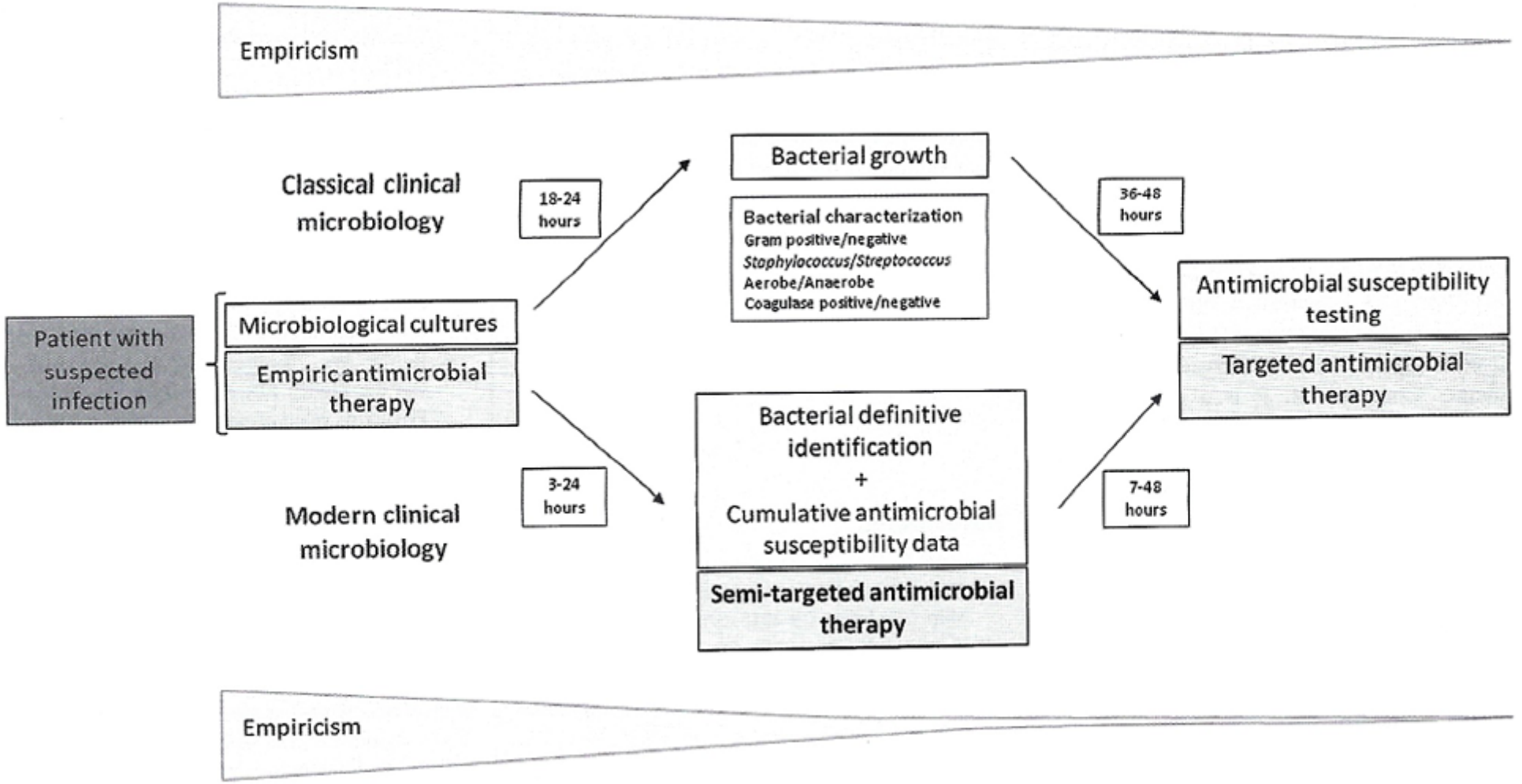
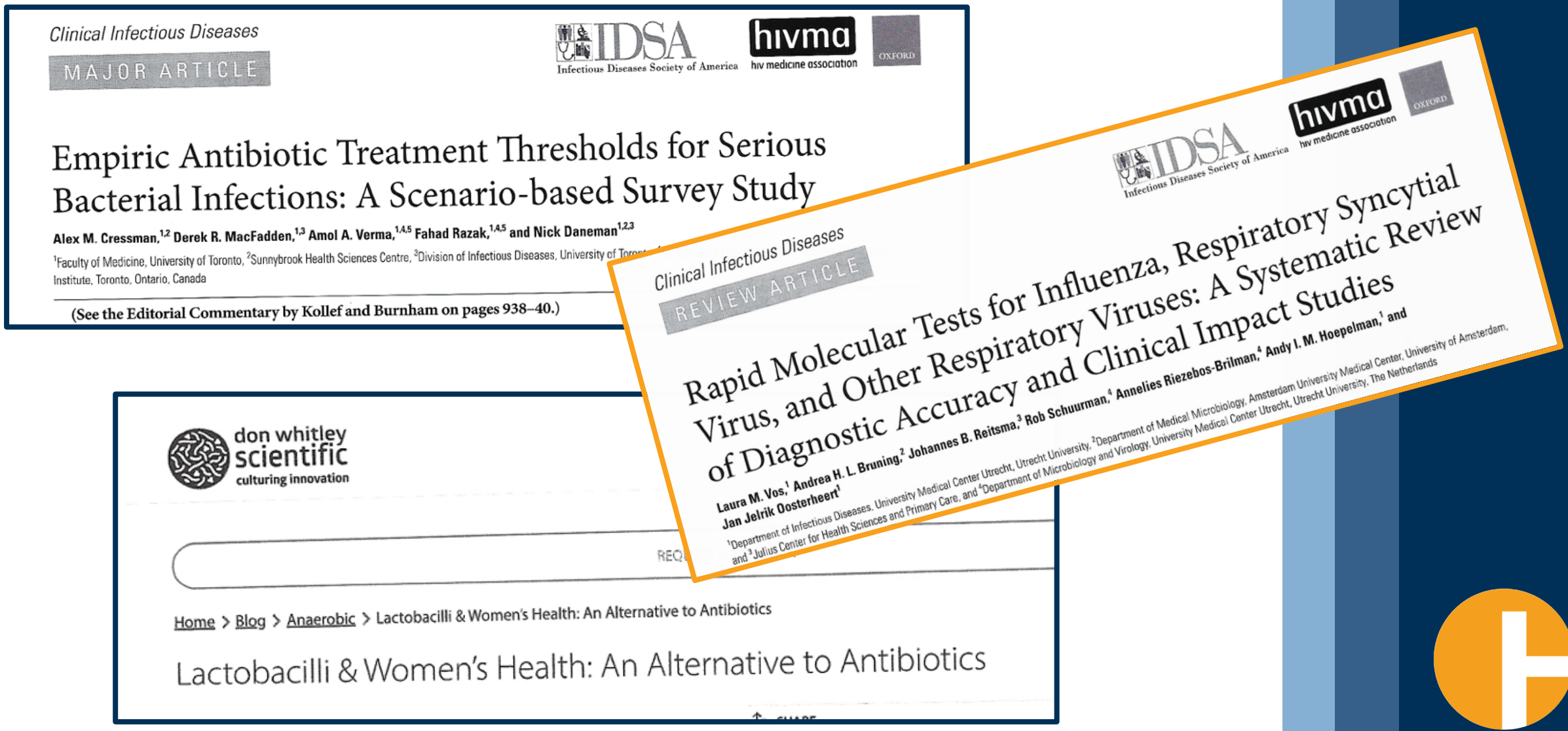


Figure 1. Integration of cumulative antimicrobial susceptibility data in the diagnostic stewardship.

Current Literature



Clinical Infectious Diseases

MAJOR ARTICLE

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Empiric Antibiotic Treatment Thresholds for Serious Bacterial Infections: A Scenario-based Survey Study

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(See the Editorial Commentary by Kollef and Burnham on pages 938–40.)

Clinical Infectious Diseases

REVIEW ARTICLE

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Rapid Molecular Tests for Influenza, Respiratory Syncytial Virus, and Other Respiratory Viruses: A Systematic Review of Diagnostic Accuracy and Clinical Impact Studies

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Lactobacilli & Women's Health: An Alternative to Antibiotics

Staph aureus

- Sensitive = 69% of isolates
  - IV – Nafcillin, an alternative antibiotic is Cefazolin (Ancef)
    - History to anaphylaxis to penicillin – Vancomycin
  - Orally - Dicloxacillin, Cephalexin (Keflex)

- MRSA
  - IV – Vancomycin
  - PO – TMP/SMX (Bactrim), Doxycycline, Clindamycin

Typical Staph Skin Lesions

Gram Positive Bacteria

- **Streptococcus**
  - Group A, B, C and streptococcus pneumoniae
  - IV Penicillin
    - If Anaphylactic history to PCN for Group A,B,C, then Azithromycin (Zithromax) or Vancomycin – depending on clinical scenario
    - Anaphylactic history to Penicillin for Streptococcus pneumoniae– Vancomycin
  - PO Penicillin
    - If anaphylactic history to Penicillin, Azithromycin (Zithromax)
  - Group D Streptococcus (enterococcus)
    - Enterococcus faecalis – Ampicillin IV or orally
    - If anaphylactic history to Penicillin – Vancomycin
  - Enterococcus faecium – use Ampicillin (higher rate of resistance to Ampicillin), Vancomycin
    - If anaphylactic history to penicillin – use Vancomycin

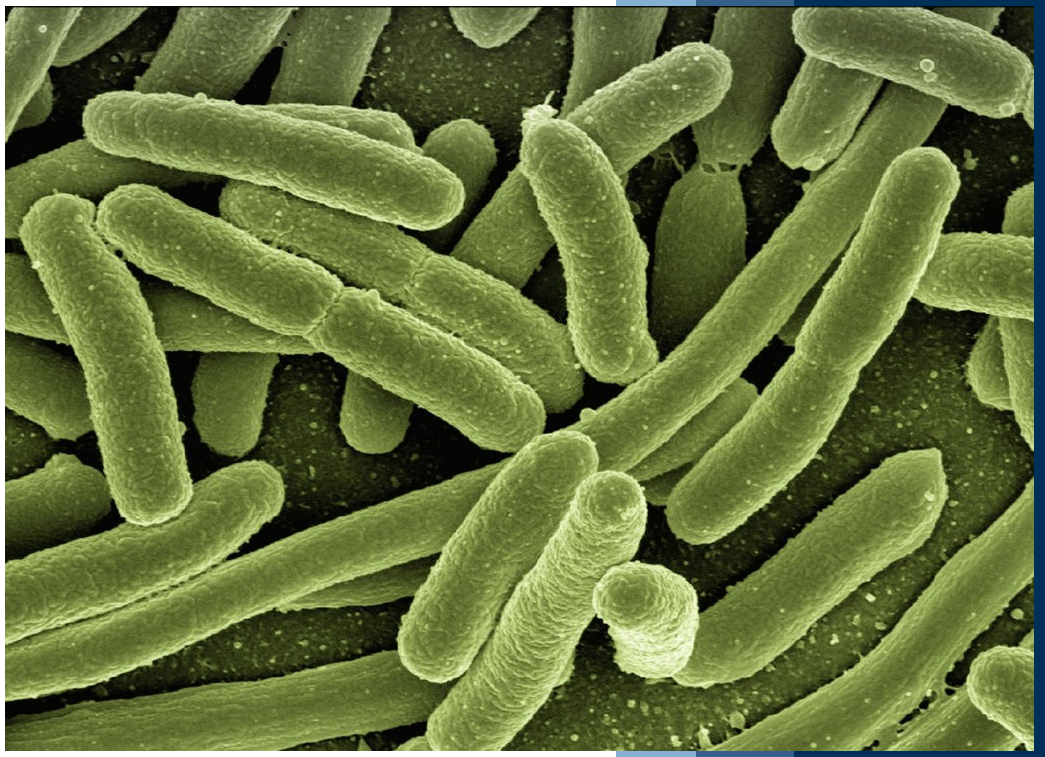
Anaerobes

Metronidazole (Flagyl) – (may miss some anaerobic streptococci)

Clindamycin (Cleocin) – also activity for gram positive organisms

Ampicillin Sulbactam (Unasyn) – activity for gram pos and some gram neg organisms

Piperacillin Tazobactam (Zosyn) – also activity for enterococcus and most gram negatives including pseudomonas



Gram Negatives

Enteric Gram Negatives (E. Coli, Klebsiella, Proteus for example)	Enterobacter (species)	Pseudomonas Aeruginosa
• IV – Gentamycin, Ceftriaxone, and Cephazolin • PO – Cephalexin (Keflex), TMPSMX (Bactrim), Nitrofurantoin (Macrobid)	• IV – Gentamicin plus Ceftazidime • PO – TMPSMX (Bactrim) or Cipro	• IV – Gentamicin and Ceftazidime (Fortaz) • PO – Cipro

Clinical Scenerio

- **Cellulitis** (Skin and soft tissue infection is a continuum from severe gangrenous wounds to cellulitis)
  - Etiology – generally group A streptococcus (Streptococcus pyogenes) or Staphylococcus aureus
  - If low risk for MRSA, or mild to moderate presentation, consider Cefazolin (Ancef)
  - For penicillin anaphylaxis history, use Vancomycin

Clinical Scenario- Intraabdominal Infections

- Etiology – enteric gram-negative rods (ie. E. coli, Klebsiella, Proteus), anaerobes, Group D streptococcus (enterococcus)

- Treatment options – Ampicillin Sulbactam (Unasyn) and Ceftriaxone (Rocephin)
  - Alternatives: Ampicillin and Ceftazidime (Fortaz) and Metronidazole (Flagyl)
  - Alternative – Ampicillin and Ceftazidime (Fortaz) and Clindamycin (Cleocin)
  - Alternative when pseudomonas is strongly suspected - Pipercillin Tazobactam (Zosyn) and Ciprofloxacin (Cipro)

Clinical Scenerio

- **Urinary Tract Infections**
  - **Cystitis**
    - Etiology – large preponderance secondary to E. coli
    - Options – Cephalexin (Keflex), TMP/SMX (Bactrim), Nitrofurantoin (Macrodantin)
    - If pseudomonas is cultured, use Ciprofloxacin
  - **Pyelonephritis**
    - Etiology – E. coli most often
    - Options - Gentamicin (in appropriate patients without renal compromise), Ceftriaxone (Rocephin)
    - For severe pyelonephritis or where Pseudomonas is suspected, use gentamicin and ceftazidime (Fortaz)
    - Anaphylactic hx to penicillin – use Gentamicin and Ciprofloxacin (Cipro)

Clinical Scenario: Pneumonia

- Recommend aggressive diagnostic workup to limit empiric antibiotic over treatment
  - Diagnostics would include Rapid Molecular Respiratory pathogen identification, rapid viral diagnostics when seasonably appropriate, Streptococcus pneumoniae urinary antigen, Legionella Urinary Antigen, a well obtained sputum gram stain and culture
  - If suspicious for typical bacterial pneumonia (lobar infiltrate on chest x-ray, fever, leukocytosis (often with left shift)), Ceftriaxone (Rocephin)
- If Streptococcus pneumoniae proven – use Penicillin
- If Hemophilus influenzae proven – use Ampicillin sulbactam (Unasyn) or Ceftriaxone (Rocephin)
- If beta lactamase negative - use Ampicillin
  - If anaphylactic history - use Cipro
- If PCN anaphylactic history - contact ID

Clinical Scenario- Atypical Pneumonia

Recent medical literature suggest as many as 30% are of viral etiology.

- Atypical pattern presentation: diffuse interstitial changes on chest x-ray, low grade fever, mild leukocytosis (generally without a left shift)
- For this category of pathogens, need an extensive epidemiologic exposure history – i.e. Travel exposure, animal exposure, bird exposure, mouse exposure, flea exposure etc. therefor, very important to complete rapid molecular diagnostic testing
- Consider using azithromycin (Zithromax) or Doxycycline, pending diagnostic workup
- **“Watch and wait strategy”** - Strongly suspect viral etiology so to avoid risk associated with antibiotics will continue diagnostic work up with close ongoing oversight

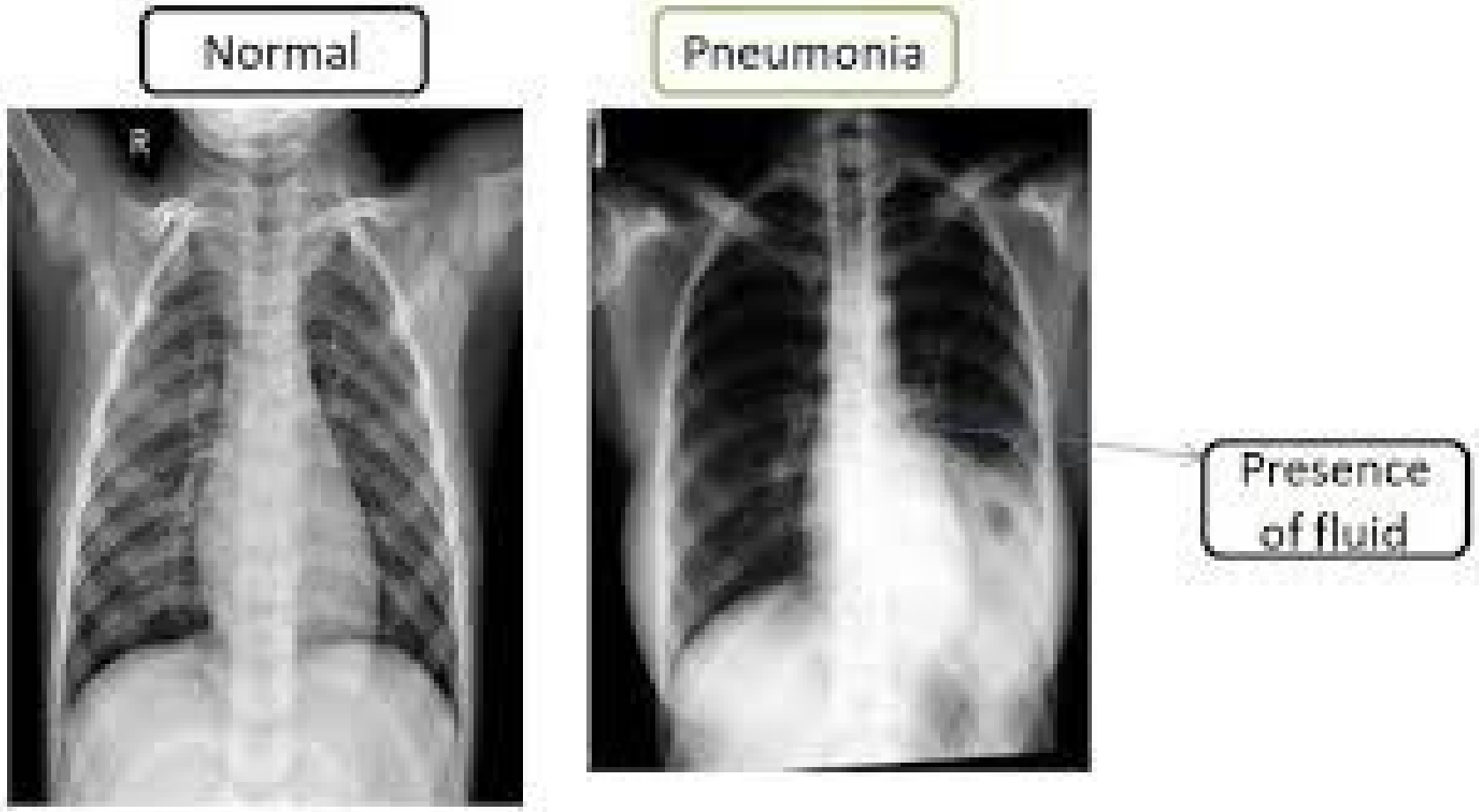
Case Examples

- 54 y/o male, previously healthy except smoking history. Presented with severe bilateral interstitial pneumonia and respiratory failure.

- 19 y/o male, presented with fever, cough, anorexia, fatigue, and weight loss.

Case Examples

"Aggressive Diagnostics, Conservative Therapeutics"



Diagnostic Stewardship

70% of patient treatment decisions come from lab tests

Consider restricting targets based on prevalence/ epidemiology

Ex. GI panel, C. diff., plus 3 most common isolates

By avoiding unnecessary testing, you avoid unnecessary antibiotics

“Aggressive diagnostics, conservative therapeutics”

Take Home Messages

Primum non nocere

Microbiome protection

Antibiotic efficacy preservation

Critical Thinking

(5 Whys)

Questions and Discussion

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Evaluation

Antibiotic Stewardship

https://forms.office.com/g/itscbaX940

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