UWTASP

tele-antimicrobial stewardship program

June 18, 2019

Agenda

- Empiric Antibiotic Therapy
- Case Discussions
- Open Discussion

UWTASP

tele-antimicrobial stewardship program

Empiric Antibiotics: *Beyond Our Best Guess*

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Empiric Antibiotics

- **Definition:**
  - Based on observation or experience rather than theory
  - Best educated guess

- **Principles:**
  - Broad coverage upfront
  - Provide sufficient coverage for all likely pathogens before a causative organism can be identified
- **Answer:**
  - **<u>NOT</u>** always piperacillin/tazobactam plus vancomycin

GET SMART
Know When Antibiotics Work
www.cdc.gov/getsmart

citations

Why get it RIGHT?

- Ineffective antibiotic is essentially equivalent to starting no antibiotic at all

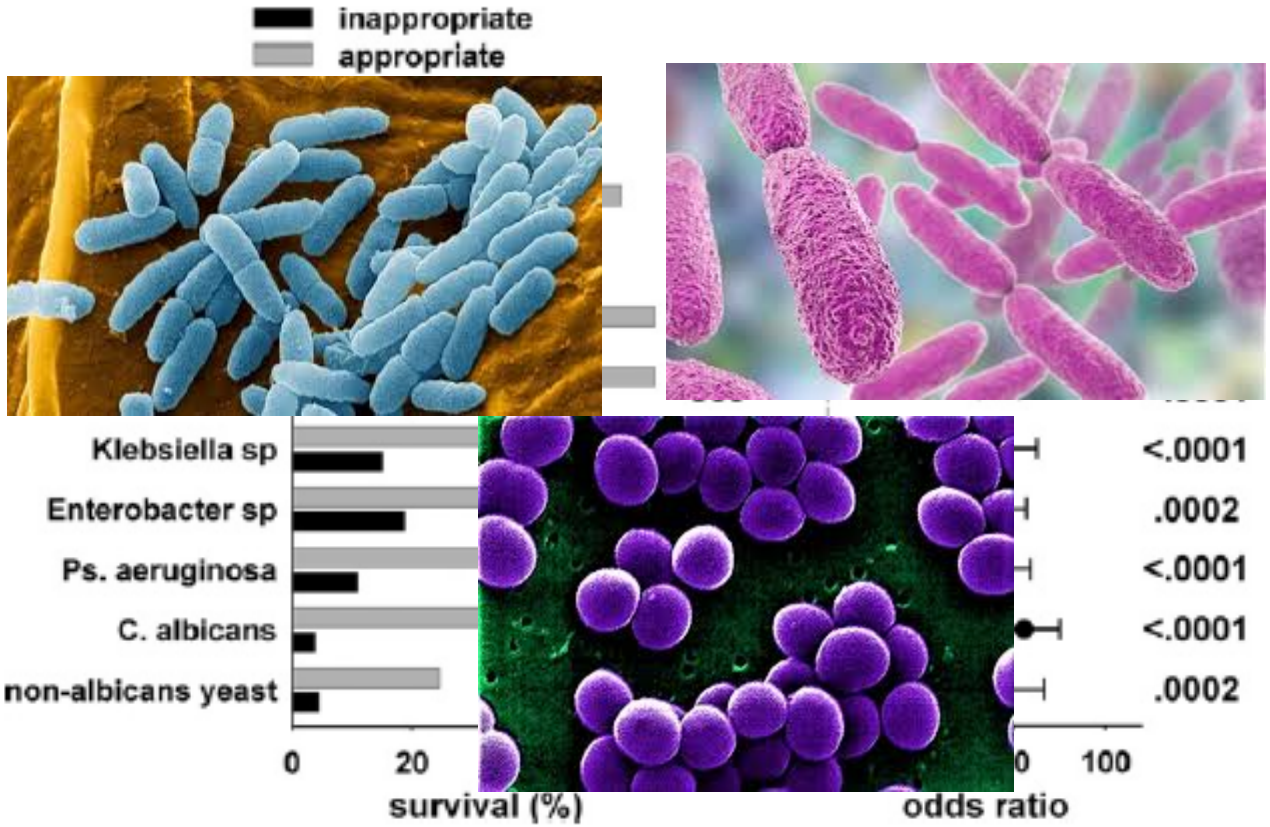
- Timely appropriate antibiotics are associated with a lower risk of hospital mortality

- Inappropriate empiric antibiotic therapy was associated with a 5-fold reduction in survival from 52% to 10% in septic shock

Kumar A, et al. CHEST 2009;1237-48.

citations

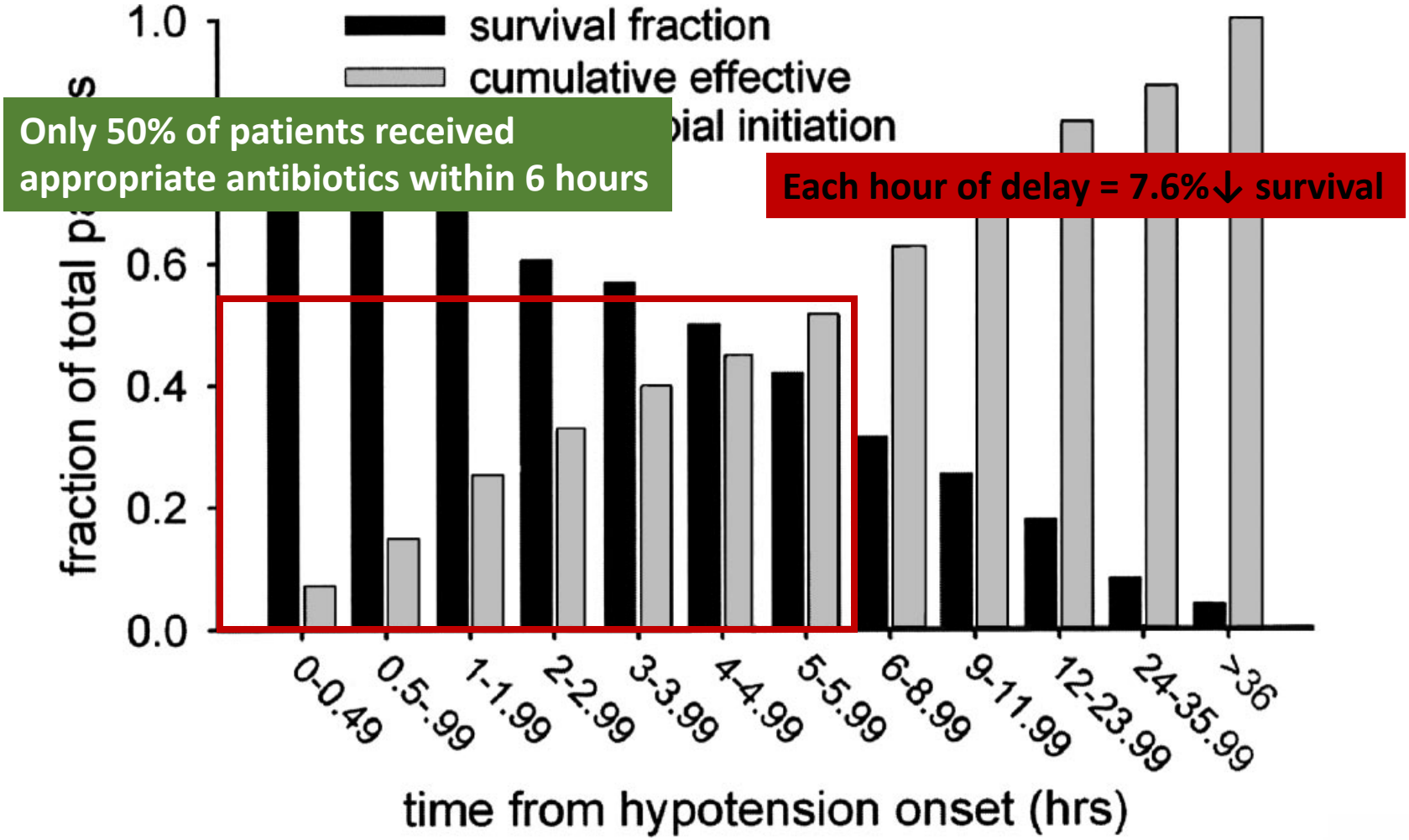
Inappropriate empiric antibiotic and survival



citations

Kumar A, et al. CHEST 2009;1237-48.

Delay in appropriate antibiotics and survival



citations

Kumar et al. Crit Care Med 2006;34:1589-96.

Considerations

- Identification of suspected source of infection
- Likely pathogens
- Host factors, comorbidities
  - DM, HIV, splenectomy, neutropenia
- Concern for resistant organisms
  - community vs. nosocomial, nursing homes, previous hospitalization, colonization (MRSA, MDRO), previous antibiotics
  - Use your antibiogram!

citations

Use your antibiogram

Hospital XXX Antibiogram										
		% of n isolates susceptible to each antibiotic listed								
Bacteria	Number of isolates tested (n)	TOB	CFP	CTZ	PTZ	IMI	CIP	OXA	VAN	DAP
E. cloacae	192	65	77	66	79	96	85			
E. coli	1462	86	94	90	90	99	65			
K. pneumoniae	379*	78	80	79	86	97	81			
A. baumannii	117	63	61	57	69	73	66			
P. aeruginosa	928	65	73	71	88	76	44			
S. aureus	1178						44	41	100¥	100
E. faecalis	572								99	100
E. faecium	206								43	96

*20% of isolates are ESBL-positive
¥23% of isolates have vancomycin MIC = 2mcg/mL
TOB = tobramycin; CFP = cefepime; CTZ = ceftazidime; PTZ = piperacillin/tazobactam; IMI = imipenem; CIP = ciprofloxacin; OXA = oxacillin; VAN = vancomycin; DAP = daptomycin
Example adapted from Utilization of the Antibiogram in Clinical Practice accessed at http://www.bugsvsdrugs.com

citations

Penicillin Allergies

Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

citations

Five Facts of PCN allergy

Is it Really a Penicillin Allergy?

Evaluation and Diagnosis of Penicillin Allergy for Healthcare Professionals

Did You Know?

5 Facts About Penicillin Allergy (Type 1, Immunoglobulin E (IgE)-mediated)

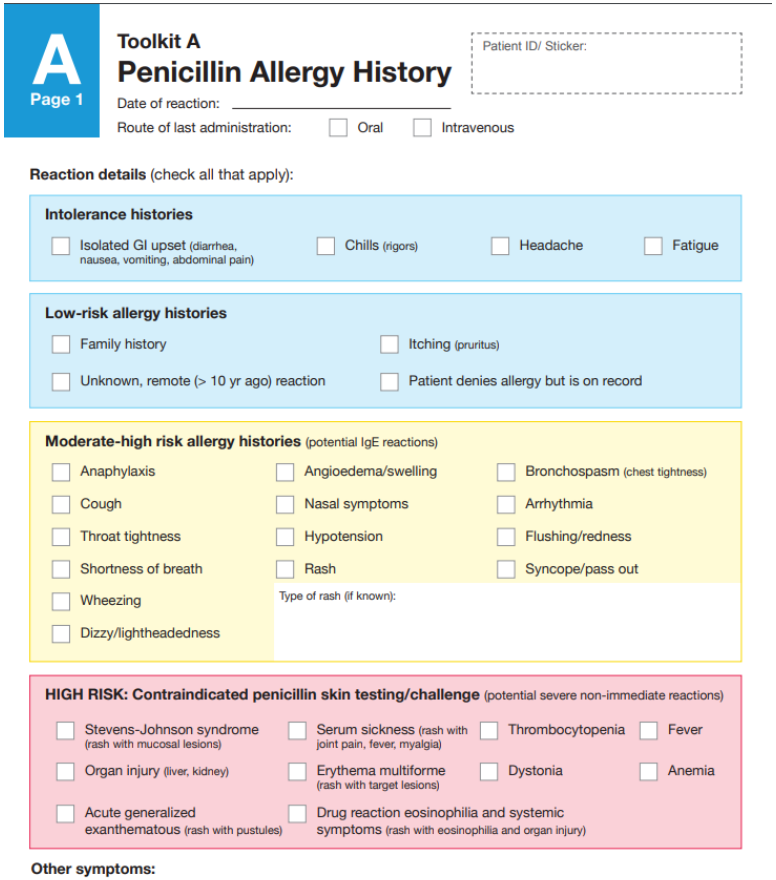
1. Approximately 10% of all U.S. patients report having an allergic reaction to a penicillin class antibiotic in their past.
2. However, many patients who report penicillin allergies do not have true IgE-mediated reactions. When evaluated, fewer than 1% of the population are truly allergic to penicillins.[1]
3. Approximately 80% of patients with IgE-mediated penicillin allergy lose their sensitivity after 10 years.[1]
4. Broad-spectrum antibiotics are often used as an alternative to penicillins. The use of broad-spectrum antibiotics in patients labeled "penicillin-allergic" is associated with higher healthcare costs, increased risk for antibiotic resistance, and suboptimal antibiotic therapy.[1]
5. Correctly identifying those who are not truly penicillin-allergic can decrease unnecessary use of broad-spectrum antibiotics.[1]

www.cdc.gov/antibiotic-use

citations

Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

Penicillin Allergy Assessment Toolkit



A Page 1

Toolkit A

Penicillin Allergy History

Patient ID/ Sticker:

Date of reaction: _____

Route of last administration: ☐ Oral ☐ Intravenous

Reaction details (check all that apply):

Intolerance histories

- ☐ Isolated GI upset (diarrhea, nausea, vomiting, abdominal pain)
- ☐ Chills (rigors)
- ☐ Headache
- ☐ Fatigue

Low-risk allergy histories

- ☐ Family history
- ☐ Itching (pruritus)
- ☐ Unknown, remote (> 10 yr ago) reaction
- ☐ Patient denies allergy but is on record

Moderate-high risk allergy histories (potential IgE reactions)

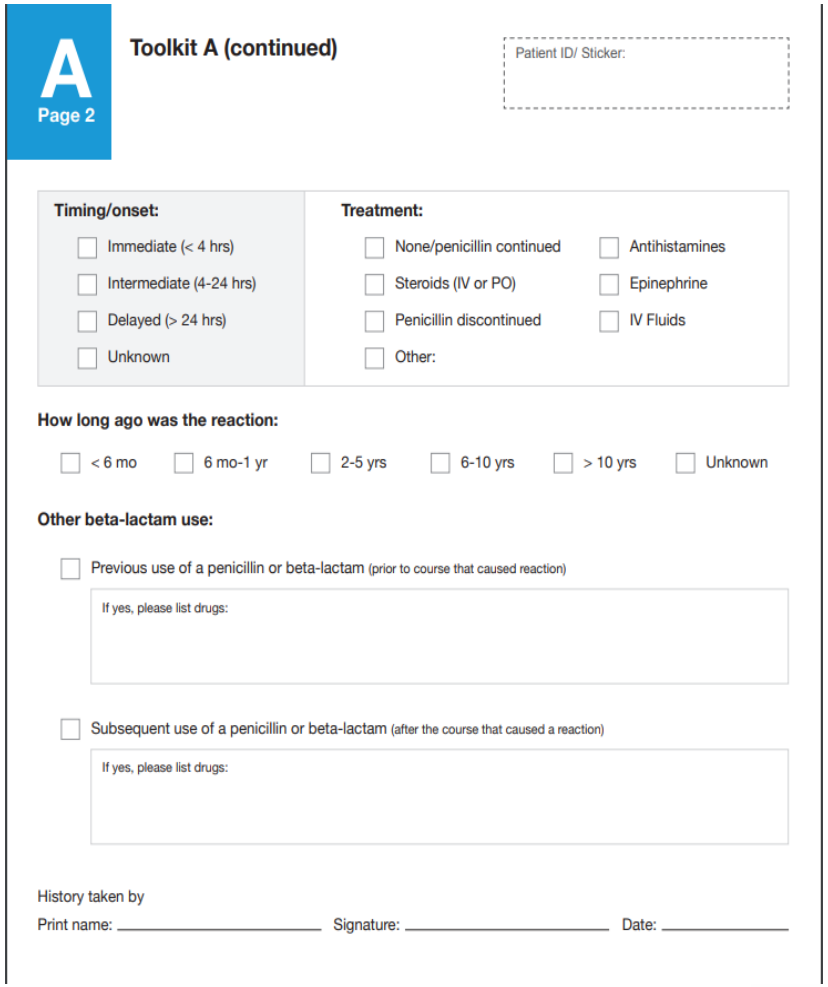
- ☐ Anaphylaxis
- ☐ Angioedema/swelling
- ☐ Bronchospasm (chest tightness)
- ☐ Cough
- ☐ Nasal symptoms
- ☐ Arrhythmia
- ☐ Throat tightness
- ☐ Hypotension
- ☐ Flushing/redness
- ☐ Shortness of breath
- ☐ Rash
- ☐ Syncope/pass out
- ☐ Wheezing
- ☐ Dizzy/lightheadedness

Type of rash (if known):

HIGH RISK: Contraindicated penicillin skin testing/challenge (potential severe non-immediate reactions)

- ☐ Stevens-Johnson syndrome (rash with mucosal lesions)
- ☐ Serum sickness (rash with joint pain, fever, myalgia)
- ☐ Thrombocytopenia
- ☐ Fever
- ☐ Organ injury (liver, kidney)
- ☐ Erythema multiforme (rash with target lesions)
- ☐ Dystonia
- ☐ Anemia
- ☐ Acute generalized exanthematous (rash with pustules)
- ☐ Drug reaction eosinophilia and systemic symptoms (rash with eosinophilia and organ injury)

Other symptoms:



A Page 2

Toolkit A (continued)

Patient ID/ Sticker:

Timing/onset:

- ☐ Immediate (< 4 hrs)
- ☐ Intermediate (4-24 hrs)
- ☐ Delayed (> 24 hrs)
- ☐ Unknown

Treatment:

- ☐ None/penicillin continued
- ☐ Antihistamines
- ☐ Steroids (IV or PO)
- ☐ Epinephrine
- ☐ Penicillin discontinued
- ☐ IV Fluids
- ☐ Other:

How long ago was the reaction:

☐ < 6 mo ☐ 6 mo-1 yr ☐ 2-5 yrs ☐ 6-10 yrs ☐ > 10 yrs ☐ Unknown

Other beta-lactam use:

☐ Previous use of a penicillin or beta-lactam (prior to course that caused reaction)

If yes, please list drugs:

☐ Subsequent use of a penicillin or beta-lactam (after the course that caused a reaction)

If yes, please list drugs:

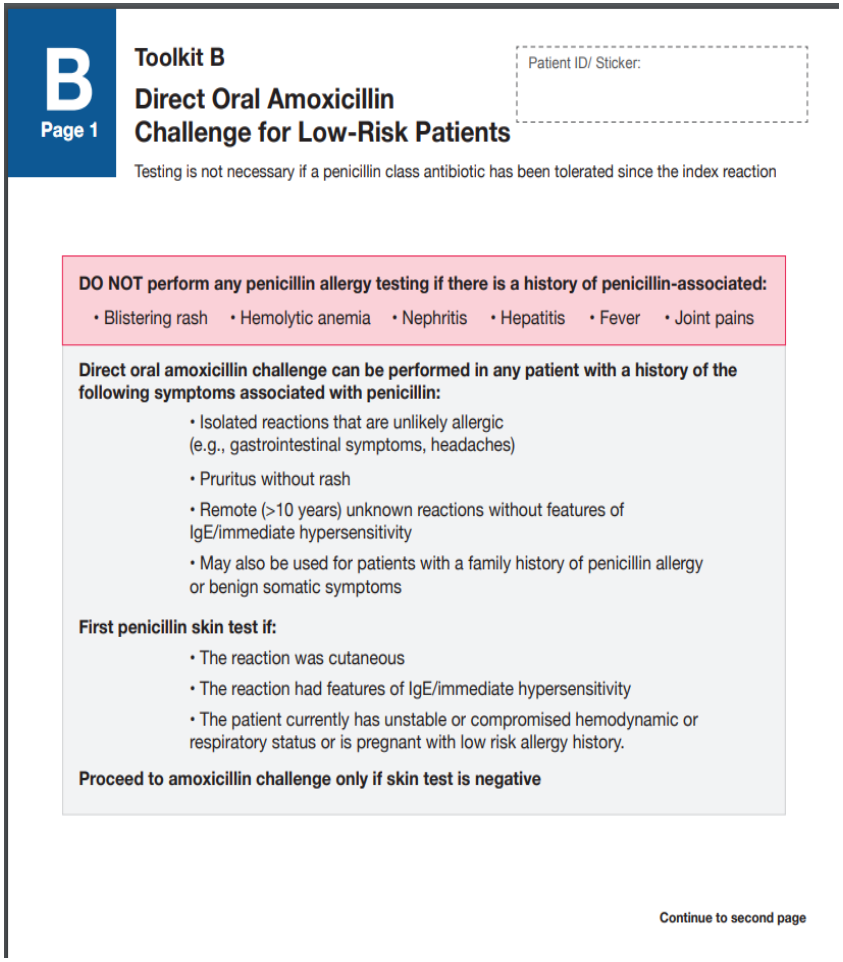
History taken by

Print name: _____ Signature: _____ Date: _____

Shenoy, et al. *JAMA*. 2019;321(2):188-199. doi:10.1001/jama.2018.19283

citations

Oral Amoxicillin Challenge



B
Page 1

Toolkit B

Direct Oral Amoxicillin Challenge for Low-Risk Patients

Patient ID/ Sticker:

Testing is not necessary if a penicillin class antibiotic has been tolerated since the index reaction

DO NOT perform any penicillin allergy testing if there is a history of penicillin-associated:

• Blistering rash • Hemolytic anemia • Nephritis • Hepatitis • Fever • Joint pains

Direct oral amoxicillin challenge can be performed in any patient with a history of the following symptoms associated with penicillin:

- Isolated reactions that are unlikely allergic (e.g., gastrointestinal symptoms, headaches)
- Pruritus without rash
- Remote (>10 years) unknown reactions without features of IgE/immediate hypersensitivity
- May also be used for patients with a family history of penicillin allergy or benign somatic symptoms

First penicillin skin test if:

- The reaction was cutaneous
- The reaction had features of IgE/immediate hypersensitivity
- The patient currently has unstable or compromised hemodynamic or respiratory status or is pregnant with low risk allergy history.

Proceed to amoxicillin challenge only if skin test is negative

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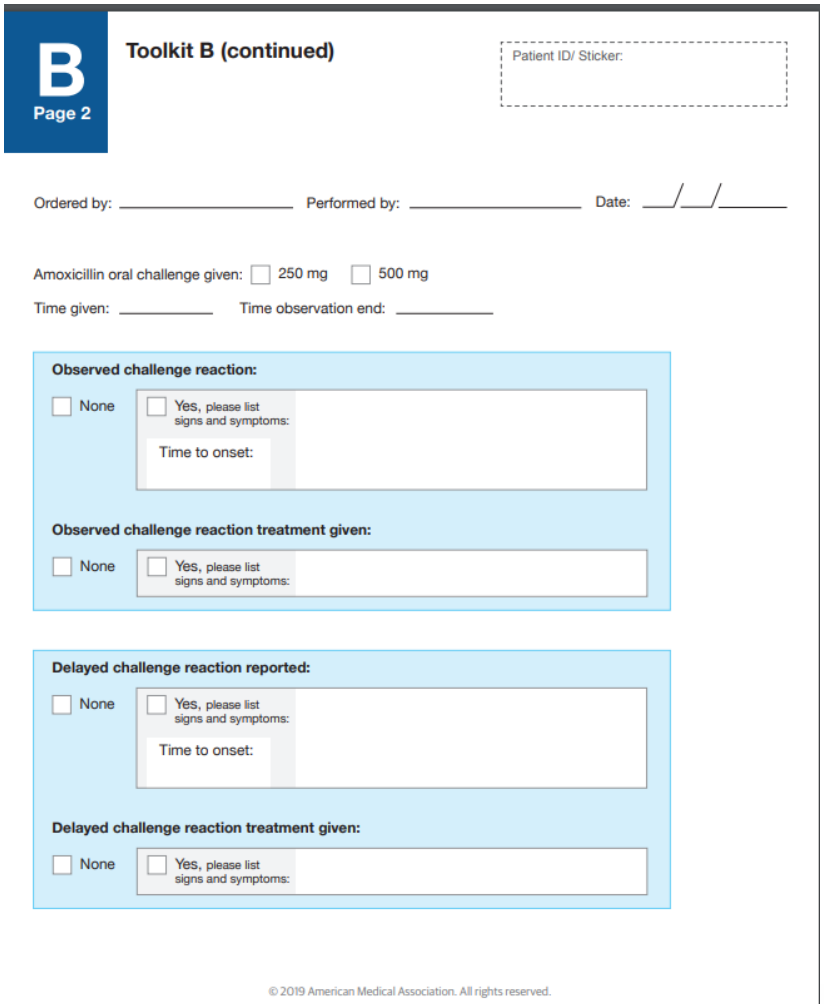


B
Page 2

Toolkit B (continued)

Patient ID/ Sticker:

Ordered by: _____ Performed by: _____ Date: ___/___/_____

Amoxicillin oral challenge given: ☐ 250 mg ☐ 500 mg

Time given: _____ Time observation end: _____

Observed challenge reaction:

☐ None ☐ Yes, please list signs and symptoms:

Time to onset:

Observed challenge reaction treatment given:

☐ None ☐ Yes, please list signs and symptoms:

Delayed challenge reaction reported:

☐ None ☐ Yes, please list signs and symptoms:

Time to onset:

Delayed challenge reaction treatment given:

☐ None ☐ Yes, please list signs and symptoms:

Shenoy, et al. *JAMA.* 2019;321(2):188-199. doi:10.1001/jama.2018.19283

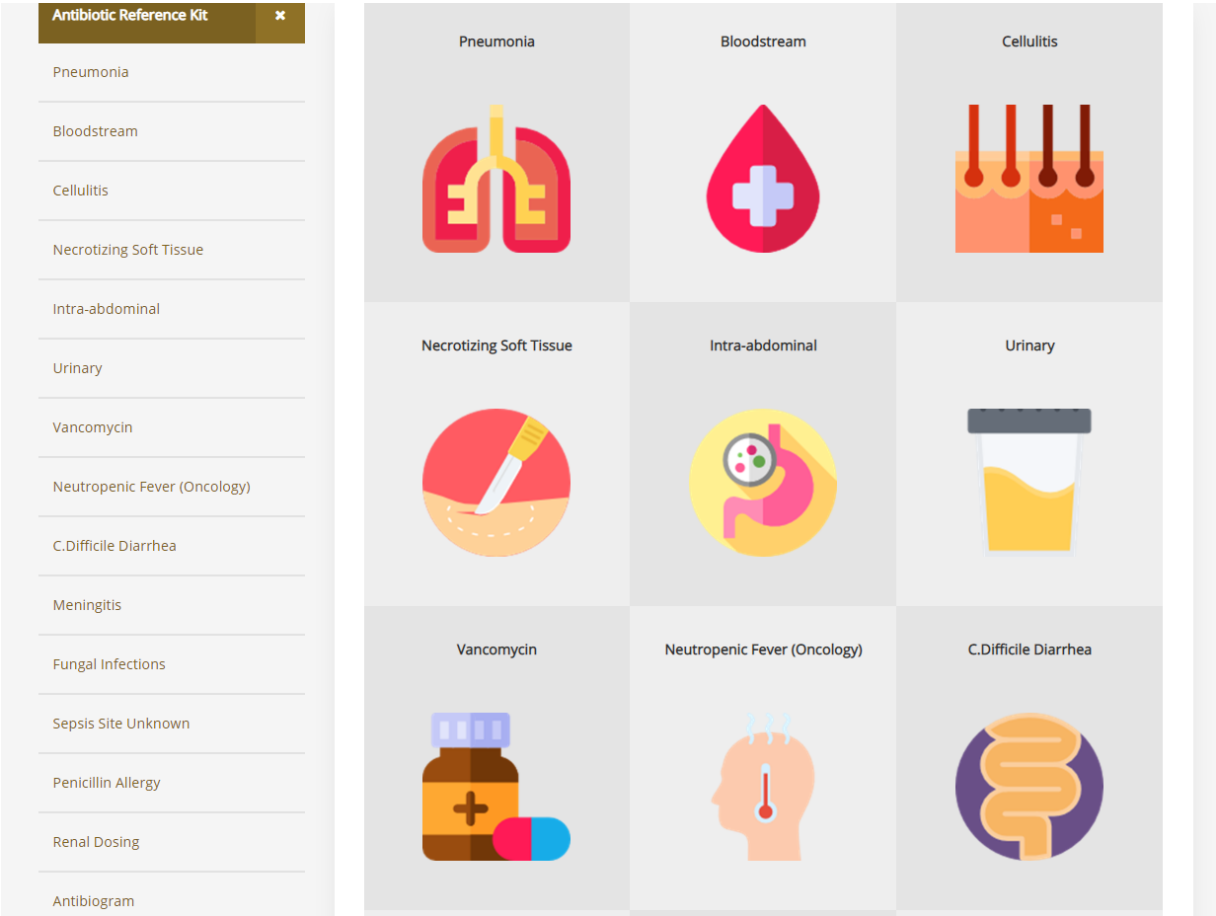
citations

Decision Support

- Clinical Pathways
  - National guidelines
  - Local epidemiology and microbiology
  - Consensus building with stakeholders
- Order Sets
  - Facilitate clinical decisions
  - Standardization of care

citations

Antibiotic Reference Kit



citations

Community-acquired pneumonia

Community-acquired pneumonia [non-aspiration risk] (S. pneumoniae, atypicals)

Diagnosis: Send sputum gram stain & culture, CXR, urinary pneumococcal antigen, urinary legionella antigen, and blood cultures. During flu season, send nasal swab for rapid influenza testing.

FIRST LINE:

- Ceftriaxone 1 gm IV q24 hours **PLUS**
- Azithromycin 500 mg PO/IV q24 hours

SECOND LINE for Severe beta-lactam allergy:

- Levofloxacin 750mg PO/IV q24 hours

Consider adding vancomycin if post-influenza pneumonia or necrotizing pneumonia.

On Day 2/3: De-escalate therapy

- If started on broad-spectrum empiric therapy, de-escalate to first-line therapy based on patient's condition and laboratory data.
- If evidence of pneumococcal infection (including bacteremia), use amoxicillin 1g PO TID and discontinue azithromycin. Typical treatment duration is 5 days, though if bacteremic, 7 days is recommended.
- If no positive cultures, then use both amoxicillin 1g PO TID + azithromycin 500mg PO q day.
- Discontinue vancomycin if MRSA nares swab is negative or sputum without growth of MRSA.

Typical Duration: 5 days

citations

Intra-abdominal infection

Community-acquired intra-abdominal

Typical Organisms: (Enteric Gram-negative rods, anaerobes)

- HMC and UWMC:
  A. Ceftriaxone 2g IV q24h PLUS metronidazole 500mg PO/IV q8h

- For uncomplicated biliary infections (acute cholecystitis of mild-moderate severity in an immunocompetent patient), anaerobic coverage usually not necessary;
  A. use ceftriaxone alone

- For reported severe penicillin allergy (e.g. anaphylaxis or angioedema):
  A. Consult allergy, if possible. Levofloxacin 750mg IV daily + Metronidazole 500mg IV/PO Q8H

- For IV to PO conversion: based on microbiology and susceptibilities:
  A. amoxicillin-clavulanate 875mg BID

- For reported severe penicillin allergy (e.g. anaphylaxis or angioedema):
  A. Consult allergy, if possible. Levofloxacin 750mg PO daily PLUS metronidazole 500mg PO q8h

Typical Duration: 4 days following source control

citations

De-escalation

- Antibiotic timeout
- Once culture and susceptibility results are available, consider targeting/narrowing
- IV to PO switch
- Duration of therapy

citations