UWTASP tele-antimicrobial stewardship program | echo

October 24th, 2023

IDWeek 2023 Highlights

- Whitney Hartlage, PharmD
- Zahra Kassamali Escobar, PharmD

Project ECHO

Clinical Trials that may change your practice

JAMA Internal Medicine | Original Investigation

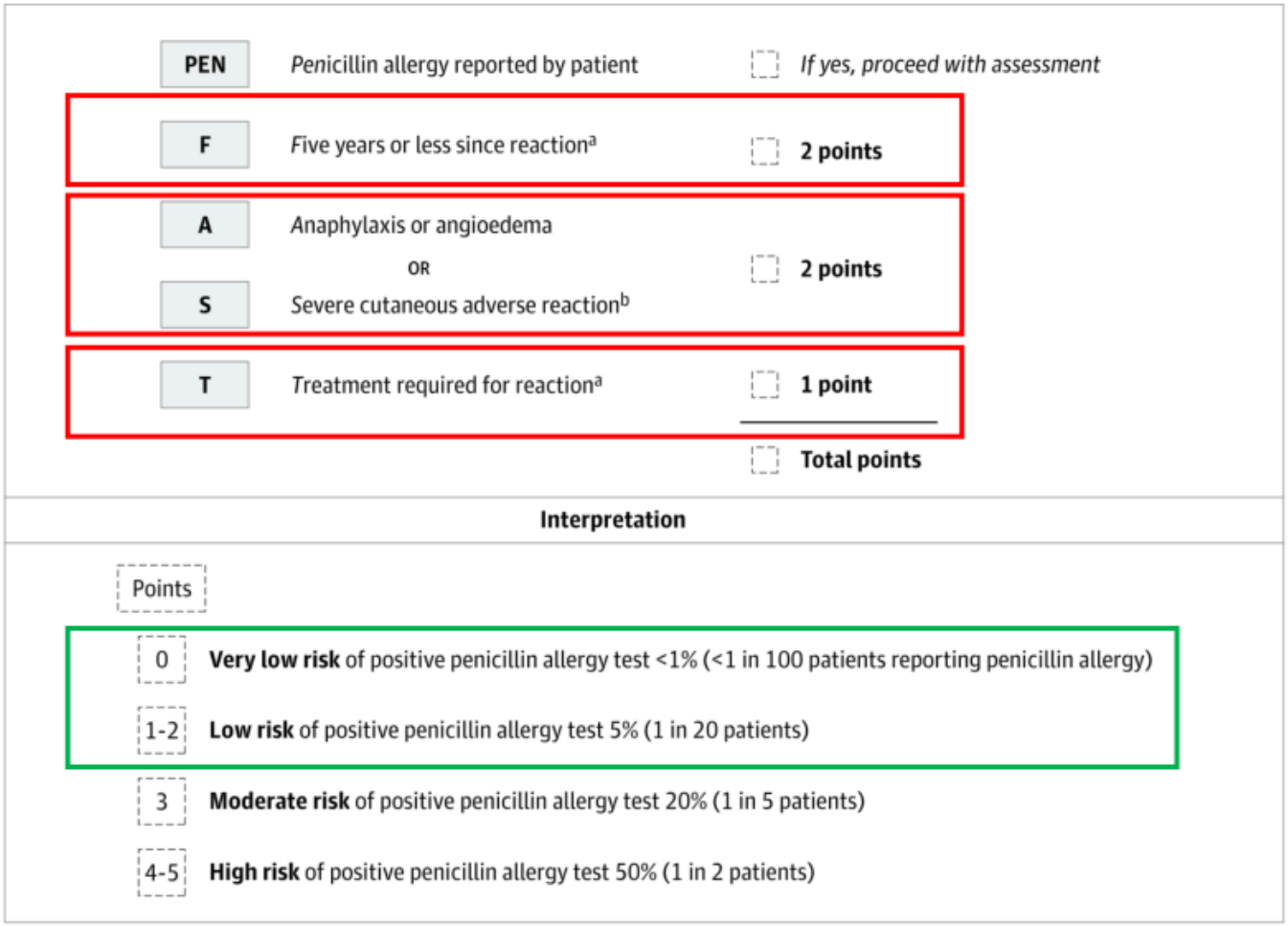
Efficacy of a Clinical Decision Rule to Enable Direct Oral Challenge in Patients With Low-Risk Penicillin Allergy
The PALACE Randomized Clinical Trial

- Open-label RCT, noninferiority margin 5%
- Patients with low-penicillin allergy (PEN-FAST score 0-2)
- Direct oral challenge with penicillin (n=187) vs skin testing followed by oral challenge with penicillin (n=190)
- Primary outcome: positive oral challenge within 1-hour postintervention; consistent with immune-mediated reaction
  - Occurred in 1/187 in direct oral challenge group (0.5%) and 1/190 in oral challenge (0.5%). Risk difference, 0.0084 (90% CI, -1.22 to 1.24).
- No difference between immediate or delayed adverse events reported by day 5
- Delabeling in 186 of 187 patients in direct oral challenge group

IDWeek 2023. *Slide credit*: Thomas Holland, MD.

Copaescu AM, et al. JAMA IM 2023;183(9):944-952.

PEN-FAST penicillin allergy clinical decision rule



PEN	*Penicillin allergy reported by patient*	☐ *If yes, proceed with assessment*
F	*Five years or less since reaction*[a]	☐ **2 points**
A	*Anaphylaxis or angioedema*	
	OR	☐ **2 points**
S	*Severe cutaneous adverse reaction*[b]	
T	*Treatment required for reaction*[a]	☐ **1 point**
		☐ **Total points**

Interpretation

Points	
0	**Very low risk** of positive penicillin allergy test <1% (<1 in 100 patients reporting penicillin allergy)
1-2	**Low risk** of positive penicillin allergy test 5% (1 in 20 patients)
3	**Moderate risk** of positive penicillin allergy test 20% (1 in 5 patients)
4-5	**High risk** of positive penicillin allergy test 50% (1 in 2 patients)

IDWeek 2023. *Slide credit*: Thomas Holland, MD.

Trubiano, et al. JAMA IM 2020;180(5):745-752.

Clinical Trials that may change your practice

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Ceftobiprole for Treatment of Complicated *Staphylococcus aureus* Bacteremia

- RCT, noninferiority margin 15%
- Ceftobiprole 500 mg IV q6h x 8 days, then q8h after (n=189) vs daptomycin 6-10 mg/kg IV q24h +/- aztreonam (n=198) for complicated *S. aureus* bacteremia
- Primary outcome: overall treatment success at 70 days
  - Occurred in 132/189 ceftrobiprole group (69.8%) and 136/198 in daptomycin group (68.7%). Adjusted difference, 2% (95% CI, -7.1 to 11.1).
- Below noninferiority margin
- Considerations: main source soft-tissue infection (61%), MRSA 24.3%, dapto dose >7mg/kg in 11.1%, median DOT 21 days
- Where to use? FDA decision is pending. Likely utilized for MRSA, in those for whom vanco/dapto is problematic.

IDWeek 2023. *Slide credit*: Thomas Holland, MD.

Holland, et al. NEJM 2023;389:1390-1401.

Spoiler alert! Preview of clinical practice guideline updates

- Clinical practice guidelines for the:

1) Treatment of complicated urinary tract infections (cUTI)

2) Diagnosis and management of intravascular catheter-related infections

3) Community-acquired pneumonia (CAP) in infants and children

New cUTI guidelines summary

- **New definitions of uUTI and cUTI**

OLD definition
Uncomplicated UTI Acute cystitis in healthy, nonpregnant, afebrile women with no diabetes and no urologic abnormalities
Acute pyelonephritis
Complicated UTI

→

NEW definition
Complicated UTI (infection beyond bladder) Pyelonephritis CAUTI Febrile or bacteremic UTI
Uncomplicated UTI (not extending bladder) Everything else (in women OR MEN)

- **Duration of antibiotic therapy**: 7 days
- **Route of antibiotic therapy**: oral switch recommended versus continuing IV

Treatment Conundrums: Not Always Black and White

Clinical Infectious Diseases

MAJOR ARTICLE

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Antibiotic Myths for the Infectious Diseases Clinician

Erin K. McCreary,[1] Melissa D. Johnson,[2] Travis M. Jones,[2] S. Shaefer Spires,[2] Angelina E. Davis,[2] April P. Dyer,[2] Elizabeth Dodds Ashley,[2] and Jason C. Gallagher[3]

[1]Division of Infectious Diseases, Department of Medicine, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, USA; [2]Duke Antimicrobial Stewardship Outreach Network, Duke University Medical Center, Durham, North Carolina, USA; and [3]School of Pharmacy, Temple University, Philadelphia, Pennsylvania, USA

- Clinicians are presented with:
  - Medical statements that are based on opinion > robust evidence
  - Evidence that has evolved yet perception remains unchanged
- Highlights the need for vigilance as evidence bases evolve

McCreary, et al. Clin Infect Dis 2023;77(8):1120-1125.

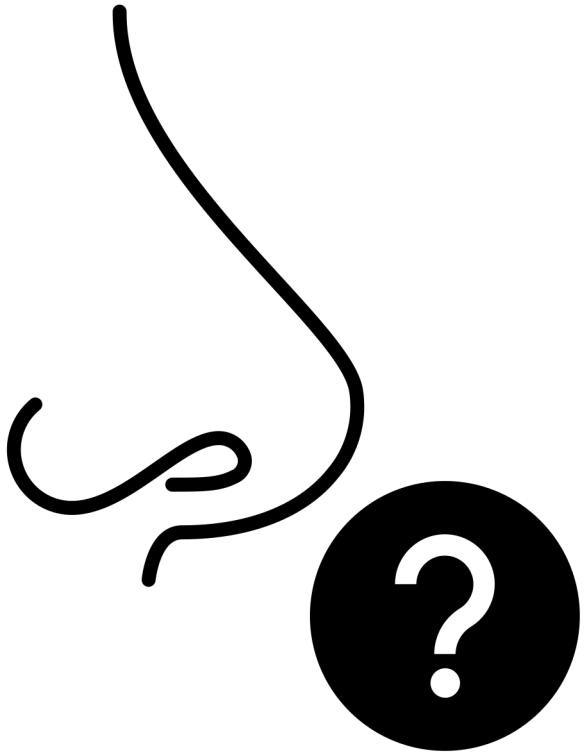
Inspiring quote about diagnostic stewardship

- "Remember, ordering a diagnostic test is like picking your nose in public. You must first consider what you will do if you find something."

Dr. Catherine DeAngelis, 1994

First woman Editor of JAMA

Speaking of diagnostic stewardship...



182 - Diagnostic Errors & Diagnostic Stewardship in Infectious Disease

Friday, October 13, 2023 3:15 PM – 4:30 PM US ET Location: 205 ABC

Defining Diagnostic Error

Prathit Kulkarni, MD (he/him/his)
Assistant Professor / Assistant Chief
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Baylor College of Medicine

Original Investigation | Health Care Reform

November 9, 2009

Diagnostic Error in Medicine

Analysis of 583 Physician-Reported Errors

Gordon D. Schiff, MD; Omar Hasan, MD; Seijeoung Kim, RN, PhD; Richard Abrams, MD; Karen Cosby, MD; Bruce L. Lambert, PhD; Arthur S. Elstein, PhD; Scott Hasler, MD; Martin L. Kabongo, MD; Nela Krosnjar; Richard Odwazny, MBA; Mary F. Wisniewski, RN; Robert A. McNutt, MD

» Author Affiliations | Article Information

- **Established the concept of diagnostic errors being broken down into:**
  - **Misdiagnosis (wrong diagnosis)**
  - **Missed diagnosis (a patient's medical concerns which are never explained)**
  - **Delayed diagnosis (diagnosis should have been made earlier)**
    - **Leading example in this category is cancer diagnosis**

How Common is the problem? ~7%

Baylor College of Medicine

IDWeek

Estimates of frequency of diagnostic errors in hospitalized patients using medical records

- **Harvard Medical Practice Study (1991): 17% of adverse events in hospitalized patients**
- **Subsequent study of inpatient-record review of patients from Utah and Colorado (2000): 7% of adverse events**
- **Study from the Netherlands (2010):**
  - **6.4% of all adverse events**
  - **0.4% of all hospital admissions**

Refs: Leape LL et al. *N Engl J Med*. 1991.
Thomas EJ et al. *Med Care*. 2000.
Zwaan L et al. *Arch Intern Med*. 2010.

Diagnostic delays for ID are common

Philip Polgreen, MD (he/him/his)
Professor
Internal Medicine
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Classic signs and symptoms of an infection are not always present

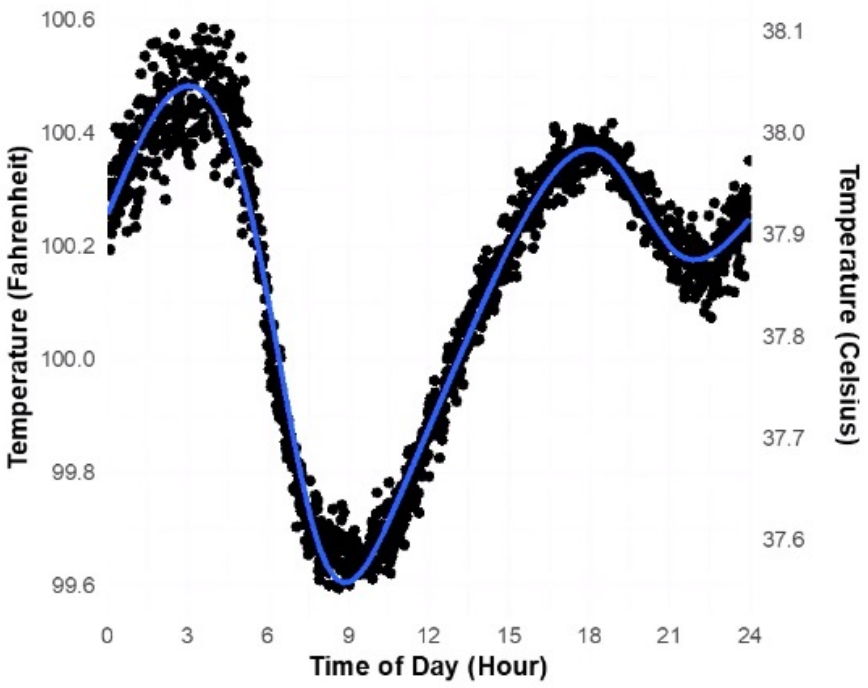
Fevers (and other symptoms) may also be a symptom of non-infectious diseases

Test results may not be available until days after the test is performed

Diurnal temperature variation

Data collated from 10 million thermometer readings around the US

Temperatures during a febrile episode vary throughout the day



Miller AC, Koeneman SH, Suneja M, Cavanaugh JE, Polgreen PM. Diurnal temperature variation and the implications for diagnosis and infectious disease screening: a population-based study. Diagnosis (Berl). 2023 Sep 13.

Depending on the time of day the patient presents, you may have a higher or lower probability of catching the fever

The probability of detecting a fever during a febrile episode varies substantially

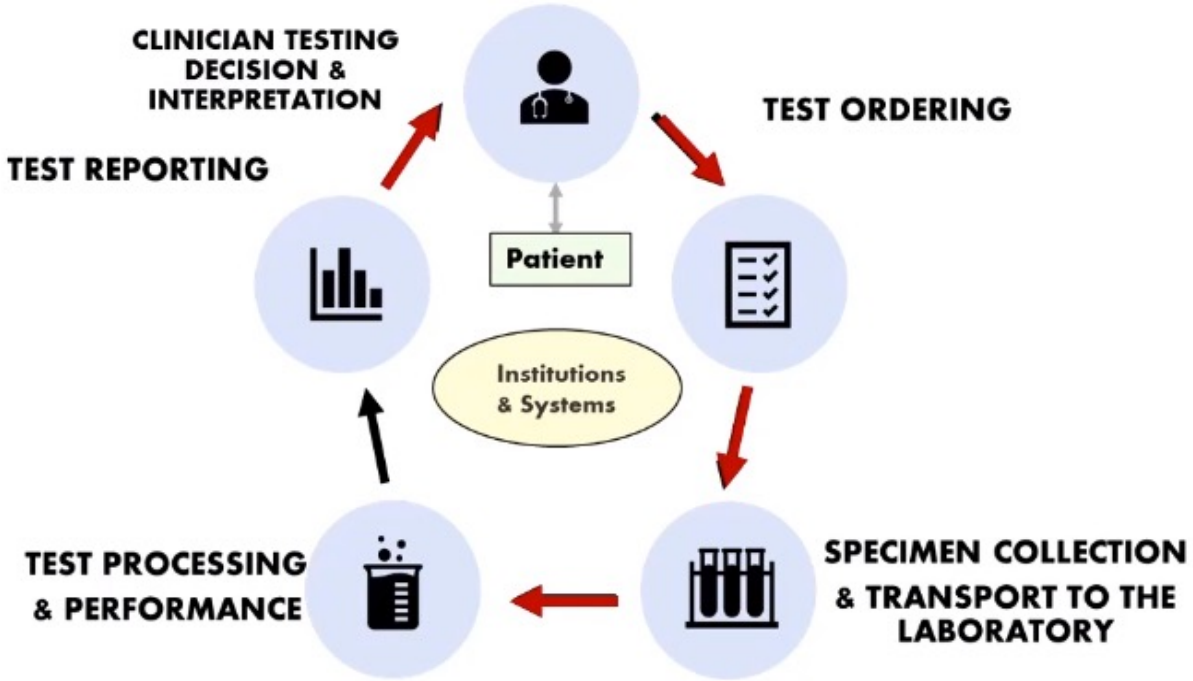
Miller AC, Koeneman SH, Suneja M, Cavanaugh JE, Polgreen PM. Diurnal temperature variation and the implications for diagnosis and infectious disease screening: a population-based study. Diagnosis (Berl). 2023 Sep 13.

Diagnostic Stewardship in Infectious Diseases

Valeria Fabre, MD

Associate Professor of Medicine
Johns Hopkins University School of Medicine
Baltimore, MD, United States

The right test for the right patient to prompt the right action



Fabre V, et al. Principles of diagnostic stewardship: A practical guide from the Society for Healthcare Epidemiology of America Diagnostic Stewardship Task Force. Infect Control Hosp Epidemiol. 2023

JOHNS HOPKINS MEDICINE

How to steward diagnostics

	Strategy	Description
Education	Improving knowledge and decreasing cognitive bias	Strengthen understanding of testing principles as well as result interpretation across roles and disciplines
Electronic interventions that impact ordering (behavior)	Diagnostic/risk assessment tools	Clinical decision support tools or algorithms for selection of patients to be tested. Best if available at point of care (eg, criteria for ordering urine cultures or criteria to defer)
	Nudges (comments)	Behavioral interventions to guide decision making in a predictable way without forbidding options (eg, "respiratory flora, no MRSA" for respiratory cultures to encourage stopping anti-MRSA antibiotics)
	Framing	Intervention to guide decision making by highlighting information in a positive or a negative way (eg, 75% of *Pseudomonas* spp are susceptible to ciprofloxacin and 25% of *Pseudomonas* spp are resistant to ciprofloxacin).
	Best practice alerts	Reminders that a test is likely not indicated (eg, an alert to evaluate for symptoms of UTI when ordering urine cultures)
	Ease of ordering	Changing ease of access to specific tests in the electronic health record to encourage or discourage use (eg removing urine cultures from preoperative order sets or requiring expert consultation for complex diagnostic tests)
	Removal of test	Removing a low-value test from routine use in the electronic health record (eg, West Nile virus nucleic acid amplification test in cerebrospinal fluid,)
	Inclusion of test	Including a test in an order set (eg, blood cultures in sepsis order sets)
	Stops	Not allowing testing (eg, stopping *Clostridioides difficile* test for patients on laxatives). Can be soft stops (allow clinician override) or hard stops (do not allow)
Interventions targeting testing and reporting	Reflex testing	Strategy in which tests are only performed after prespecified criteria are met. For example, urine cultures are only performed if urinalysis indicates the presence of pyuria or bacteriuria.
	Selective testing	Antimicrobial susceptibility for a particular bug-drug combination is not tested on bacteria suspected of being contaminant, eg, "mixed flora, no further work-up" in urine cultures.
	Selective reporting	Only reporting some part of results (eg, suppressing daptomycin susceptibility for respiratory culture).
	Cascade reporting	Antibiotic susceptibility is reported in a stepwise fashion; antibiotic susceptibility results for a particular pathogen–drug combination are obtained but suppressed for broader-spectrum agents (eg, meropenem) unless the bug is resistant to narrow-spectrum agents (eg, ceftriaxone).
	Results suppression	Strategies of reporting only some (or none) of the available result information. For example, not releasing organism identification if multiple organisms present in a urine culture
Behavior	Monitoring adherence to best practices	Monitor utilization rates, quality indicators (eg, blood culture contamination rates)
	Provide feedback	Report utilization rates to clinicians either as aggregate unit or individual performance.

Fabre V, et al. Principles of diagnostic stewardship: A practical guide from the Society for Healthcare Epidemiology of America Diagnostic Stewardship Task Force. Infect Control Hosp Epidemiol. 2023
CLSI. Performance Standards for Antimicrobial Susceptibility Testing. 33rd Ed. CLSI supplement M100. Clinical and Laboratory Standards Institute; 2023.

The most effective intervention depends on what you're trying to accomplish

- 15 hospitals (academic and community) in the US implemented a variety of best practice alerts including hard stop, soft stop, ASP-based discussion with team after test ordered ("human BPA") to optimize C. *diff* testing.

- All interventions resulted in a significant **reduction in test ordering** compared to no intervention.
  - **The hard stop was the most effective** (33% reduction) vs. the soft stop or the human BPA.
- All interventions resulted in a **reduction in *C diff*-antibiotic use** compared to no intervention.
  - The **"human BPA" was the most effective** (20% reduction) vs. soft stop or hard stop.

Rock C, et al. Clinical Decision Support Systems to Reduce Unnecessary *Clostridioides difficile* Testing Across Multiple Hospitals. Clin Infect Dis. 2022

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Targets for diagnostic stewardship in ID

Impact (lack of) on patient management

Testing volume

Cost of test/financial implications

Fabre V, et al. Principles of diagnostic stewardship: A practical guide from the Society for Healthcare Epidemiology of America Diagnostic Stewardship Task Force. Infect Control Hosp Epidemiol. 2023

QUESTIONS?