



## ABSTRACTS IN URGENT CARE

- Accurate Sample Types for STIs
- Further evidence for the PEN-FAST Tool
- Artificial Intelligence in Making Clinical Diagnoses
- Effects of Antibiotics and Children's Teeth
- VTE Risk Assessment of Immobilized Limb Injuries
- Predicting Occult Scaphoid Fractures

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### Which Sample is More Accurate for STIs: Vaginal or Urine?

**Take Home Point:** Vaginal swabs are the optimal sample type for women being evaluated for chlamydia, gonorrhea, and/or trichomoniasis.

**Citation:** Aaron K, Griner S, Footman A, et. al. Vaginal Swab vs Urine for Detection of Chlamydia trachomatis, Neisseria gonorrhoeae, and Trichomonas vaginalis: A Meta-Analysis *Ann Fam Med.* 2023 Mar-Apr;21(2):172-179. doi: 10.1370/afm.2942

**Relevance:** Many sexually transmitted infections (STI) are asymptomatic in women and can have serious consequences for morbidity and future fertility. Identifying the best method to accurately screen for and diagnose these infections enables earlier treatment and can curb the public health burden of these infections.

**Study Summary:** This was a systematic review of the evidence on the diagnostic assay sensitivity for female vaginal swabs compared to urine samples among commercial assays for Chlamydia trachomatis (CT), Neisseria gonorrhoeae (NG), and Trichomonas vaginalis (TV).

The authors identified 28 studies suitable for analysis. They found that vaginal swabs were more sensitive than urine for CT and NG. Pooled sensitivity estimates from the studies were 94.1% for vaginal swabs and 86.9% for urine specimens ( $P < .001$ ) for CT detection. For NG, pooled sensitivity estimates were 96.5% for vaginal swabs and 90.7% for urine specimens ( $P < .001$ ). The difference in sensitivity

for the two sample types for TV detection was not statistically significant. The findings of this systematic review are in agreement with the present Centers for Disease Control and Prevention recommendations favoring vaginal swabs over urine as the optimal specimen type for both CT and NG detection.

**Editor's Comments:** The quality of the data of the meta-analysis, as with all systematic reviews, is reliant on the quality of the original publications. There was a lack of data regarding asymptomatic women in the analysis. The authors acknowledge that self-collected vaginal swabs are an appropriate, or even preferable, alternative to provider collected swabs especially if this decreases patient reluctance to testing. ■

### Is this Penicillin Allergy Real? Further evidence for the PEN-FAST Tool

**Take Home Point:** The PEN-FAST tool has been previously proposed as a simple clinical decision rule that can identify patients with very low-risk of true penicillin allergy and who are reasonable candidates for oral penicillin challenge.

**Citation:** Su C, Belmont A, Liao J, et. al. Evaluating the PEN-FAST Clinical Decision-making Tool to Enhance Penicillin Allergy Delabeling. *JAMA Intern Med.* 2023 Jun 20; e231572. doi: 10.1001/jamainternmed.2023.1572

**Relevance:** Penicillin allergy is the most commonly reported allergy, but 90% of penicillin allergies are spurious. Prior studies have shown that penicillin allergy puts patient at risk for increased healthcare spending and complications from antibiotics. PEN-FAST has been previously shown to be a useful tool for identifying low risk patients for true penicillin allergy.

**Study Summary:** This was a retrospective medical record



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“How AI may be incorporated most safely and effectively into diagnosing illness remains undetermined.”

review of patients with reported penicillin allergies who underwent penicillin allergy testing in allergy and immunology outpatient clinics in a large U.S. tertiary referral healthcare system. Allergy testing consisted of skin prick and intradermal testing with oral challenge after skin testing or direct oral challenge (DC) without skin testing. Scores from PEN-FAST, a clinical decision-making tool, were compared with outcomes based on positive penicillin allergy test results. Sensitivity, specificity, negative predictive value (NPV), and positive likelihood ratio were calculated for each PEN-FAST score in predicting penicillin allergy, and the area under the receiver operating characteristic curve was calculated to assess overall diagnostic performance.

The authors reviewed 120 patient charts. They found that among patients who received oral penicillin challenge, all had PEN-FAST scores of 0 or 1. None of the patients with a score of 0 or 1 had immune- or non-immune mediated reactions. Some 73.3% of patients with PEN-FAST scores of 2 or less and all patients with scores <3 had negative test results. PEN-FAST had an NPV of 100% in identifying patients with a low-risk penicillin allergy history who could safely proceed to DC and penicillin allergy de-labeling.

**Editor’s Comments:** Limitations of this study include its retrospective design, referral bias, and single study site, which may limit generalizability. However, the findings of this study support the previous and growing evidence validating that the PEN-FAST tool can identify patients at very low risk for true penicillin allergy and does offer an option for use particularly for urgent care providers with limited access to allergists. ■

#### Artificial Intelligence in Making Clinical Diagnoses

**Take Home Point:** Generative artificial intelligence (AI) is a promising complement to human cognition and may soon prove to be a useful adjunct for clinical diagnosis.

**Citation:** Kenjee Z, Crowe B, Rodman A. Accuracy of a Generative Artificial Intelligence Model in a Complex Diagnostic Challenge. *JAMA*. 2023 Jul 3;330(1):78-80. doi: 10.1001/jama.2023.8288.

**Relevance:** AI has been shown to score highly on standardized medical examinations, but less is known about its ability to perform complex medical reasoning.

**Study Summary:** This was an experimental study by the authors to assess the accuracy of one such model (Generative Pre-trained Transformer 4 [GPT-4]) in a series of diagnostically difficult cases. They used the *New England Journal of Medicine* clinicopathologic conferences, which are challenging medical cases that conclude with a final pathological diagnosis and are used for educational purposes in the journal. The primary outcome of interest was whether the model’s top diagnosis matched the final case diagnosis. Prespecified secondary outcomes investigated were the presence of the final diagnosis in the model’s differential, differential length, and quality of the potential diagnosis list scored using an ordinal 5-point rating system. The authors found the AI model’s proposed most likely diagnosis agreed with the final diagnosis in 39% (27/70) of cases. However, in only 64% of cases (45/70) did the model even include the final diagnosis in its differential. GPT-4 did provide a superior mean differential quality score compared with prior versions of similar AI (4.2 vs 3.8).

**Editor’s Comments:** There was subjectivity in the scoring system due to the reliance on the authors scoring. There were also instances where important diagnostic information was not included in the AI prompt due to protocol limitations, likely leading to an underestimation of the model’s capabilities. This is a promising start. However, how AI may be incorporated most safely and effectively into diagnosing illness remains undetermined. ■

#### Effects of Antibiotics and Children’s Teeth

**Take Home Point:** In this study, there was no evidence that newer tetracycline formulations (doxycycline and minocycline) at currently recommended dosages led to adverse effects on dental health.

**Citation:** Ravindra D, Huang G, Hallett K, et. al. Antibiotic Exposure and Dental Health: A Systematic Review. *Pediatrics*. 2023 Jul 1;152(1): e2023061350. doi: 10.1542/peds.2023-061350.

**Relevance:** Tetracycline and related antibiotics have long been cautioned against in pediatric patients due to concern over effects on dentition. However, this is a useful class of antibiotics, and it is not clear all tetracyclines have similar effects.

**Study Summary:** This was a systematic review to evaluate

the evidence regarding the effect of early childhood antibiotic exposure on dental caries, developmental defects of enamel, and tooth staining. The study followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) reporting guidelines.

The authors identified 34 retrospective studies eligible for analysis. 18 of these studies investigated tetracyclines and/or tetracycline derived antibiotics, 7 investigated amoxicillin only, and 9 did not specify the antibiotic class prescribed. The authors found tetracyclines at higher dosages (20 mg/kg per day) did, in fact, have an association with dental staining; these doses are not recommended. There was no evidence that newer tetracycline-related formulations (specifically doxycycline and minocycline), nor other antibiotic classes, were associated with adverse dental outcomes, however.

**Editor's Comments:** There was a lack of standardized and validated outcome measures—for tooth staining in particular—which limits the ability to compare studies within the identified literature. All studies were retrospective in design. With these caveats in mind, it does appear safe and reasonable to use a short course of doxycycline when it is the preferred/first line choice for treating a potentially significant infection in younger children (eg Lyme disease). ■

#### VTE Risk Assessment of Immobilized Limb Injuries

**Take Home Point:** Incorporation of the Aberdeen venous thromboembolism (VTE) risk tool may help identify patients with lower limb immobilization that benefit from thromboprophylaxis.

**Citation:** Almoosawy S, Ofosu-Asiedu A, Hanna J, et. al. Venous thromboembolism risk following temporary immobilisation after injury: evaluation of the Aberdeen VTE risk tool. *Emerg Med J.* 2023; 40:361–368. doi:10.1136/emmermed-2022-212723

**Relevance:** Lower extremity immobilization is known to increase the risk of VTE. Present guidance for risk assessment of VTE in patients with lower limb immobilization does not consider the mechanism of injury nor identify which patients would benefit from thromboprophylaxis.

**Study Summary:** This was a prospective single-center cohort design study based in the ED and fracture clinic in a large tertiary center in Scotland. The aim of the study was to evaluate the Aberdeen VTE risk tool's performance in routine clinical practice. The secondary aim was to compare the diagnostic properties of published risk assessment methods (RAMs). Adult patients (≥16 years) managed with

*“This data is an important reminder that lower extremity immobilization confers a risk of VTE.”*

temporary lower limb immobilization (rigid cast or removable semirigid splints of the ankle or knee but excluding plaster slippers or foot immobilizing shoes) were included.

During the study period, the Aberdeen VTE tool was applied in 2,194 instances. 1,763 patients (mean age = 46 years; 51% women) were included. The authors found the Aberdeen VTE risk tool identified roughly 60% patients as high risk. Symptomatic VTE occurred in nearly 1 in 100 patients, about half the baseline incidence with no thromboprophylaxis but similar to administering thromboprophylaxis to all casted patients regardless of risk. Twelve patients identified as high risk and who received LMWH thromboprophylaxis still developed symptomatic or fatal VTE. None of 392 patients immobilized for a foot fracture, a grade 1 or 2 knee or ankle sprain, or to protect a knee wound, developed VTE. The diagnostic performance of five RAMs in a secondary analysis of 1,695 patients. TriP(cast) score ≥7 and a Plymouth score ≥3 recommended only 1 in 3 and 1 in 4 patients, respectively, for thromboprophylaxis. Overall comparison suggested that the TriP(cast) score was the best RAM for the study population.

**Editor's Comments:** Many patients were managed in removable semirigid knee or ankle splints, which confer less VTE risk than rigid casting. Presence of VTE was ascertained from medical record rather than standardized clinical follow-up assessment. This data is an important reminder that lower extremity immobilization confers a risk of VTE (approximately 1% in this population), and higher risk patients benefit from thromboprophylaxis. Yet not all incidence of VTE is preventable even with these measures. ■

#### Predicting Occult Scaphoid Fractures

**Take Home Point:** There is no single feature that satisfactorily excludes an occult scaphoid fracture, however, pain with passive supination was the most sensitive exam technique.

**Citation:** Coventry L, Oldrini I, Dean B, et. al. Which clinical features best predict occult scaphoid fractures? A systematic review of diagnostic test accuracy studies. *Emerg Med J.* 2023;0:1–7. doi:10.1136/emmermed-2023-213119

**Relevance:** Missed scaphoid fracture can result in permanent osteoarthritis of the wrist. Diagnosing scaphoid fractures, particularly those which are subtle or occult on plain radiography, can be tricky. This study examines the clinical features that are most sensitive for excluding an occult fracture.

**Study Summary:** This was a systematic review of physical exam maneuver test characteristics on studies undertaken and reported according to the Preferred Reporting Items for Systematic Review and Meta-Analysis of Diagnostic Test Accuracy studies guidelines. Studies were included if they reported the accuracy of clinical findings for an occult scaphoid fracture among patients with normal initial radiographs but ongoing clinical suspicion of scaphoid fracture. Occult fractures were defined as any breach of the scaphoid cortex that was not visible on the initial radiographs. Eight articles were included in final analysis with reporting data on 1,685 wrist injuries and 123 occult scaphoid fractures. The most common tests were the scaphoid compression test in which pain occurs in the anatomical snuffbox (ASB) on longitudinal compression of the thumb (four studies, 1,321 participants), anatomical snuffbox tenderness (ASBT)

(four studies, 1,309 participants), and scaphoid tubercle tenderness (three studies, 1,256 participants).

The authors found pooled prevalence of occult scaphoid fractures among patients with a clinical suspicion, but normal initial radiographs were 9% (95% CI 5% to 13%), with high heterogeneity ( $I^2=91.4\%$ ). There was no evidence that clinical examination could safely confirm or exclude an occult scaphoid fracture. Only pain on supination by the examiner was sufficiently useful to inform clinical decision making (100% sensitive). However, this finding should be interpreted with caution as this clinical sign was only evaluated by a single study of 53 patients with 8 total fractures.

**Editor's Comments:** There was variability in defining occult scaphoid fractures within the papers reviewed. There was a long study span (34 years) of the papers reviewed during which time, there have been marked technological advancements made within plain radiography which need to be considered. Regardless, this lends further support for the practice of immobilizing patients with any concern for scaphoid fracture after wrist injury until occult fracture can be firmly excluded—usually through repeat x-rays or advanced imaging (eg MRI). ■

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