

Emergency Medicine/ Acute Care Medical Literature Update
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Learning Objectives:

At the end of this activity, the attendee will be able to:

1. Discuss the pros/cons of 0/2 and 0/1 hour troponin protocols
2. Recognize the dangers associated with insulin bolus delivery in DKA
3. Understand that “back-up” strep cultures are not worthwhile
4. Determine whether topical NSAID’s or corticosteroids are worthwhile in the management of acute musculoskeletal back pain
5. Compare sensitivities of urine vs swab specimens in evaluating patients with potential STI’s.
6. Properly employ clinician gestalt, lactate levels and BC’s in patients presenting with symptoms suggestive of an underlying infection and /or sepsis
7. Understand the role of CT-Angiography of the head and neck in patients with suspicious neurologic complaints
8. Identify children with fractures that may be the victims of abuse
9. Discuss the pros/cons of providing patients with topical anesthetics at discharge for simple acute corneal abrasions
10. Recognize the potential strain on patients and the health care system will endure with increasing heat emergencies.

Article #1a: Health and Economic Benefits of Routine Childhood Immunizations in the Era of Vaccines for Children Program – United States, 1994-2023. Zhou F, et al. MMWR Aug 8, 2024; 73: 682-5.

Background: This study reports the health and economic benefits of the Vaccines for Children (VFC) program. Established in 1994 by Congress to provide vaccines at no cost to eligible children. The vaccines included are:

- DTP, Hib, IPV, HepB, VAR, Hep A, PCV-20, influenza, rotavirus, Covid-19, RSV

Methods: Net savings and benefit-cost ratios were calculated for 9 vaccines (Covid and RSV not included).

Result: 117 million children born between 1994-2023; 54% eligible for VFC program

- Estimated to prevent 508 million lifetime illnesses
- Estimated to prevent 32 million hospitalizations
- Estimated to prevent 1,129,000 premature deaths from vaccine preventable illness
- Estimated to save \$780 billion in direct costs; \$2.9 trillion in societal costs.

Conclusion: Routine childhood immunizations continue to provide substantial health and economic benefits.

Article # 1b: Trust in Physicians and Hospitals During the COVID-19 Pandemic in a 50-State Survey of US Adults. Perlis RH et al. JAMA Network Open July 31, 2024; e2424984

Background: Previous surveys have reported that US adults had greater trust in physicians and nurses than any other institution. Early in the pandemic, belief that physicians had high or very high ethical standards increased from 65% in 2019 to 77% in 2020. But something changed. This study attempted to characterize the change in physician trust and hospitals over the course of the pandemic.

Methods: A survey was developed by a consortium of academic institutions and the COVID States Project and given to adults in all 50 states every 1-2 months from April 1, 2020 – Jan 31, 2024.

Results: 582,634 responses in 24 waves of surveys. In each wave, the level of trust decreased.

- ***In April 2020: high level of trust in physicians and hospitals = 71.5%***
- ***In Jan 2024: high level of trust in physicians and hospitals = 40.1%***

Decreased level of trust was statistically associated with: age 25-64, female gender, lower educational level, lower income, Black race and living a rural area.

** Political affiliation was not associated with this change.

*** Higher levels of trust were associated with receipt of Covid and influenza vaccines

Conclusion: The erosion of trust in physicians could have long lasting public health implications.

Troponin.... Can I do just one?

Article #2: High-sensitivity Point-of-care Whole blood cardiac troponin I measurement to rule out acute Myocardial infarction at low risk. Apple FS, et al. Circulation 2022; 146: 1918-29.

Background: High-sensitivity (hs) cardiac troponin has led to protocols for rapid “rule out” of acute myocardial infarction in involving repeat measurement within 1 to 3 hours. Point of care tests, performed at bedside, have the potential to substantially decrease turnaround times. These authors attempt to derive and validate a hs-troponin cutoff value that identifies patients with acute chest pain who can potentially be discharged early from the ED with a single hs-troponin POC test.

Methods: 1086 patients were enrolled in the derivation cohort and 1486 patients were enrolled in the validation cohort. Patients with < 2 hours of chest pain were considered “early presenters”.

Results: Using a threshold of <4 ng/L Siemens POC assay as a cutoff (to “rule out”)... “Rule out” included: MI, all-cause death, unplanned revascularization at 30 days.

Derivation set: sensitivity 98.9% (95% CI: 94-100%) early presenters (n=210): 94% (71-99%)

Validation set: sensitivity 98.8% (95% CI: 93-100%) early presenters (n=363): 95% (77-99%)

Conclusion: A single-measurement utilizing a POC hs-troponin appears to successfully rule out AMI in low-risk patients.

** the authors do caution that there appears to potentially be lower sensitivity in “early presenters” and they suggest a second troponin value in these patients.

Article #3: Safety of an Initial Insulin Bolus in the treatment of diabetic ketoacidosis. Fischer DP, et al. Jour of Pharm Practice 2024; 37: 690-95.

Background: The ADA recommends in patients with DKA to initiate therapy with insulin starting dose of either: a) 0.1 unit/kg bolus followed by 0.1units/kg/hr or b) 0.14 units/kg/hr

Previous studies failed to demonstrate benefit a more rapid resolution of DKA or shorter LOS with bolus infusion. The authors of this study attempt to evaluate the safety of initial bolus dosing vs insulin drip (no bolus).

Methods: Retrospective chart review at a single center (Univ Chicago). The primary outcome measure was a composite of: a) hypoglycemia + b) hypokalemia + c) need to interrupt insulin infusion.

Results:

Safety (within 8 hours)	Bolus (n = 59)	No insulin Bolus (n = 108)	P-value
Composite Outcome ^a	28 (47.4%)	27 (25%)	.003
Hypoglycemia (BG <70 mg/dL)	4 (6.7%)	6 (5.6%)	.743
Interruption in Insulin Infusion	13 (22%)	14 (12.9%)	.128
Hypokalemia (K ⁺ ≤3.3 mEq/L)	13 (22%)	13 (12%)	.088
Efficacy ^b			
Time to AG closure hr:min (IQR)	6:39 (4:41 – 9:06)	9:00 (4:59 – 12:50)	.063
Time to stopping insulin hr:min (IQR)	13:45 (10:35 – 21:23)	14:18 (10:12 – 21:25)	.905
Time to transfer out of ICU hr:min (IQR)	25:06 (19:45 – 36:16)	27:20 (20:30 – 43:44)	.350
Time to discharge hr:min (IQR)	87:01 (52:40 – 161:47)	89:44 (58:14 – 137:12)	.888

Conclusion: This study adds to the body of literature questioning the practice of an initial insulin bolus in the treatment of DKA, noting the potential risks associated with the use of bolus loading with insulin.

Sore Throats and the “Strep swab”:

Article #4: Negative RADT and bacterial growth on throat culture. Hrabowy K, et al. J Urgent Care Med 2023; 17: 27-32.

Background: The CDC, IDSA and AAP recommend obtaining a throat culture for all children and adolescents after a negative result on a rapid antigen test (RADT). However, because rheumatic fever is extraordinarily rare in high-income countries (0.5 episodes/100,000), modeling has suggested this practice is not cost-effective (Ehrlich JE, et al. Prev Med 2002). The authors of this study present the sensitivity of RADT at their institution where “reflex” throat cultures are performed on all negative RADT’s.

Methods: Retrospective study, conducted at a rural community hospital ED, 11/5/17-12/31/18. Mean age: 26.4

Results: 3,836 RADT’s performed. (+) 662 (17.2%)
3,173 (-) negative results
Throat culture → 37 (+) Group A strep (1.16%)

Conclusion: This study adds to the previous literature demonstrating the low yield of “back up” throat cultures in cases of negative RADT’s.

Editor Notes: There is an excellent updated review on the topic of Streptococcal Pharyngitis (Am Fam Physician, April 2024 109: 343-49) along with a strong editorial (Ebell MH, et al. Am Fam Physician, 109: 301-2) that notes:

- children are often carriers – only 2/3 of (+) tests cause symptoms
- Current RADT’s are more sensitive than older tests
- Testing everyone with a sore throat “medicalizes” a self-limiting condition
- Do not test patients (esp. adults) with low-risk clinical scores (modified Centor)
- Penicillin or amoxicillin are recommended 1st line treatment; there are no advantages to broad-spectrum antibiotics
- Steroids decrease pain by approx. 1 day in cases of “exudative” pharyngitis

Back Pain updates...

Article #5A : Topical Diclofenac versus oral ibuprofen versus Diclofenac + Ibuprofen for Emergency Department patients with acute low back pain: A randomized trial. Khankkel N, et al. Ann Emerg Med 2024; 83: 542-551.

Background: NSAID’s are the backbone (no pun intended) in the management of acute low pain. Despite this, some patients have unremitting pain. Addition of muscle relaxants or benzodiazepines do not provide any additional pain relief (but do increase sedation). The authors of this study ask 2 questions: How does a topical NSAID measure up – when compared against an oral NSAID? And does it provide additional pain relief when combined with an oral NSAID?

Methods: 198 ED patients with acute nontraumatic, non-radicular back pain, randomized to:

Results:	ibuprofen 400mg q6h+ placebo gel (n=60)	diclofenac gel + placebo capsule (n=60)	diclofenac gel + oral ibuprofen (n=60)
Decrease RMDQ score			
At baseline	19	17	19
At 48 hours	8.9	10.6	10.3
Mean decrease =>	10.1 (95%CI: 7.5-12.7)	6.4 (4.0-8.8)	8.7 (6.3-11.1)

0 = no impairment
24 = max impairment

Conclusion: Topical diclofenac was probably not as efficacious as oral ibuprofen and offered no additive benefit when added to oral ibuprofen in patients with acute, nontraumatic, nonradicular low back pain.

Article #5B: What is the role of systemic corticosteroids for radicular and nonradicular low back pain. Gottlieb M, et al. Ann Emerg Med 2023; 82: 164-66.

This is a clinical synopsis of the Cochrane Review published in 2022 (Chou R, et al. Cochrane Database Syst Rev. 2022; 10: CD012450).

The review included 13 studies: 9 with radicular low back pain, 2 trials with non-radicular back pain and 2 trials with spinal stenosis. 5 were acute pain, 2 were chronic, 2 trials mixed, 4 not reported.

Results:

- 1) In 5 acute radicular pain trials, steroids decreased pain by 0.56 (0-10 pain scale) vs. placebo
- 2) In acute radicular pain trials, steroids had an insignificant improvement in short-term functional improvement
- 3) For non-radicular pain, no evidence to suggest a decrease in pain scores or functional improvement
- 4) For spinal stenosis, limited evidence suggests no improvement with steroids.

Article #6: Vaginal swab vs Urine for detection of Chlamydia trachomatis, Neisseria gonorrhoeae, and Trichomonas vaginalis: A meta-analysis. Aaron KJ, et al. Ann Fam Med 2023; 21: 172-79.

Background: Worldwide, there are more than 1 million STI's acquired every day. Since 2009, the CDC has recommended use of vaginal swabs as ideal. However, screening often relies on urine specimens. This meta-analysis attempts to synthesize the evidence on the diagnostic sensitivity of female vaginal swabs vs. urine samples among commercial assays for Chlamydia (CT), Gonorrhea (NG) and trichomonas (TV).

Methods: Systematic search performed to allow meta-analysis to be performed

Results: 28 studies: 30 comparisons for CT, 16 comparisons for NG, 9 comparisons for TV

Bottom-line: sensitivity is greater for vaginal swabs vs urine samples

Chlamydia:	94.1%.	86.9%
Gonorrhea:	96.5%	90.7%
Trichomonas:	98.0%	95.1%

Discussion/Conclusion: Based on CDC estimates, using urine in place of vaginal swabs could result in 169,000 missed cases of Chlamydia, 50,000 missed cases of gonorrhea and 102,000 cases of Trichomonas in the US.

Article #7: Poison Ivy dermatitis treatment patterns and Utilization: A retrospective Claims-based analysis. Butt M, et al . West J Emerg Med 2022; 23: 481-88.

Background: The immunologic response to urushiol can take up to 14 days to present in sensitized patients with exposure. Thus, shorter courses of oral corticosteroids may result in patients experiencing rebound dermatitis. A small RCT of 49 patients comparing 5-day vs 15 days of treatment demonstrated longer courses resulted in earlier resolution of symptoms and fewer supplemental medications and repeat steroid courses (*Curtis, G. et al. J Clin Med Res 2014; 6 (6): 429-434.*)

The authors of this study used healthcare claims data to attempt to identify provider corticosteroid prescribing patterns and its effects on return visits.

Methods: Retrospective analysis of healthcare claims, 2017-8, in adult patients, < 65 yrs of age.

Results: 108,111 visits, 7,774 return visits (6.7%). 56.1% received no oral corticosteroids.
34.7% received 1-13 days oral steroids
9.2% received > 13 days oral steroids

* Rx for 1-13 days had a significantly higher likelihood of a return visit (OR 1.30 [1.17-1.44])

Conclusion: When oral corticosteroids are warranted*, adhering to the recommendations for 14-21 days of treatment is recommended.

*Note: milder symptoms would not require oral corticosteroids.

Article #8: Effectiveness of nail bed repair in children with or without replacing the fingernail: NINJA multicentre randomized clinical trial. Jain A, et al. BJS 2023; 110: 432-38

Background: Textbooks and hand surgeons have endlessly preached the after a nail bed repair, the eponychial fold needs to be splinted, typically with the nail plate if available, to avoid synechiae and facilitate growth of the new nail plate. This study assesses the clinical effectiveness and cost-effectiveness of replacing the nail plate versus no replacement.

Methods: At 20 UK hospitals → after nail bed repair, all children age <16, randomized, non-blinded, to:

Results:	Nail replacement	No nail replacement
Primary outcomes	(n=224)	(n=227)
Infection @ 7-10 days	5 (2.2%)	2 (0.9%)
Cosmetic appearance @ 4-12 months (0-5 scale, 5= best appearance)	5	5
Secondary outcome: pain at dressing change:	47.8%	40.5% (p = NS)

Conclusion: Well-done RCT that demonstrates no benefit to replacing nail into nail fold at the end of nail bed repair.

Controversy #1: Transfusion Recommendations: Restrictive or liberal?

Article #9A: Red Blood Cell Transfusion: 2023 AABB International Guidelines: Carson JL, et al JAMA 2023; 330: 1892-1902.

Background: RCTs assessing outcomes of different transfusion thresholds typically compare higher hemoglobin thresholds (liberal transfusion strategy) with lower ones (restrictive transfusion strategy) for RBC transfusions. In 2012 there were 19 RCT's incorporated in the guideline. This guideline now evaluates the 45 available trials to date comparing the 2 strategies.

Methods: Review of 45 RCT's comparing restrictive (<7-8g/dl) vs liberal (9-10g/dl) transfusion thresholds.

Results: Recommendations from panel:

#1: A restrictive RBC transfusion strategy (< 7 g/dL) in stable hospitalized adult patients (strong recommendation, moderate certainty evidence).

#2: A restrictive RBC transfusion strategy (< 7g/dL) in hematology/oncology inpatients (conditional, low certainty of evidence)

#3: A restrictive RBC transfusion strategy (<7g/dL) in hemodynamically stable with critical illness in children without cyanotic heard conditions or severe hypoxia (strong recommendation, moderate certainty evidence).

“One size (may not) fit all”: What about patients with AMI?

Article 9B: Restrictive or liberal transfusion strategy in Myocardial Infarction and anemia. Carson JL, et al. NEJM 2023; 389: 2446-56.

Background: Three small RCTs that have compared transfusion thresholds with a total 820 patients with AMI have shown inconsistent results. The objective of this study was to compare 30-day outcomes in patients with AMI randomized to a restrictive or liberal transfusion strategy if they were anemic.

Methods: International, multi-site study, open-label of patients with AMI and anemia documented within the first 24 hours. Patients were randomized to:

Results:	<u>Restrictive (<8g/dL)</u>	<u>Liberal (< 10g/dL)</u>
Composite: death or AMI @ 30 days:	295/1747 (16.9%)	255/1755 (14.5%)
	Risk Ratio: 1.16 (95%CI, 1.00-1.35)	
- Death	173/1747 (9.9%)	146/1755 (8.3%)
	Risk Ratio: 1.19 (95%CI, 0.96-1.47)	
Total number of units of blood➔	1,237	vs. 4,325

Conclusion: While the results were NOT statistically significant, liberal transfusion consistently favored in point estimates for death, recurrent AMI and composite outcome. The cost of >3x more blood transfusions was not calculated.

Healthcare Provider Well-being and burnout

Article # 10: *Vacation Days taken, Work during Vacation, and Burnout among US Physicians*
Sinsky CA, et al. JAMA Network Open 2024; 7(1): e2351635.

Background: Vacation...ahhh. Rest, relaxation, recuperation, yes? Fully detaching from work while on vacation has been shown to improve productivity and reduce emotional exhaustion, whereas working on vacation has negative impacts on health and well-being. This study attempts to characterize US physicians time spent on vacation and to analyze the association of vacation characteristics with rates of burnout and professional fulfillment.

Methods: 3,024 US physicians completed 96.7% of a vacation survey (part of a larger survey).

- 59% took \leq 15 days (3 weeks) of vacation/yr
- 39% took 6-15 days of vacation/yr
- 20% took < 5 days of vacation/yr
- 49% noted they had full coverage of their EHR “in-box”
- 70.4% report performing some type of work on a typical vacation day

Specialty reporting with 3 or more weeks' vacation:

anesthesiology 75.6%, radiology 74.8%, radiation oncology 62.5%, pathology 56.2%

VS.

family medicine 34.4%, physical medicine and rehabilitation 32.8%, general IM 27.2%,
emergency medicine 23.8%

Barriers to taking vacation: finding coverage for clinical responsibilities, \$ impact of taking vacation, volume of EHR inbox workload upon return.

**** Factors associated with low risk of burnout:**

- > 3 weeks vacation (OR, 0.66), 16-20 days vacation (OR, 0.59),
- Having a full EHR in-box coverage on vacation (OR, 0.74)

***** Factors associated with high risk of burnout:**

- Spending > 30 min on work while on vacation (OR, 1.58)
- Spending 30-60 min on work while on vacation (OR, 1.97)
- Spending 60-90 min on work while on vacation (OR, 1.92)

Conclusion: Taking less vacation and performing work while on vacation was associated with higher mean emotional exhaustion and depersonalization scores and lower professional fulfillment scores.

END OF DAY 1