

# AMPLIFY

I Got A Fever, and the Only Cure...  
Is a Pediatric Fever Algorithm!

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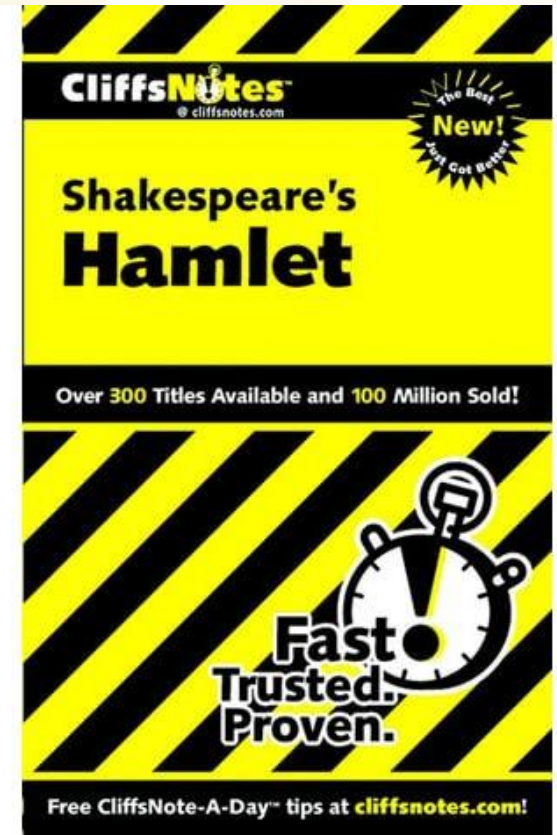
# Disclosures

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I have no financial disclosures or other conflicts of interest

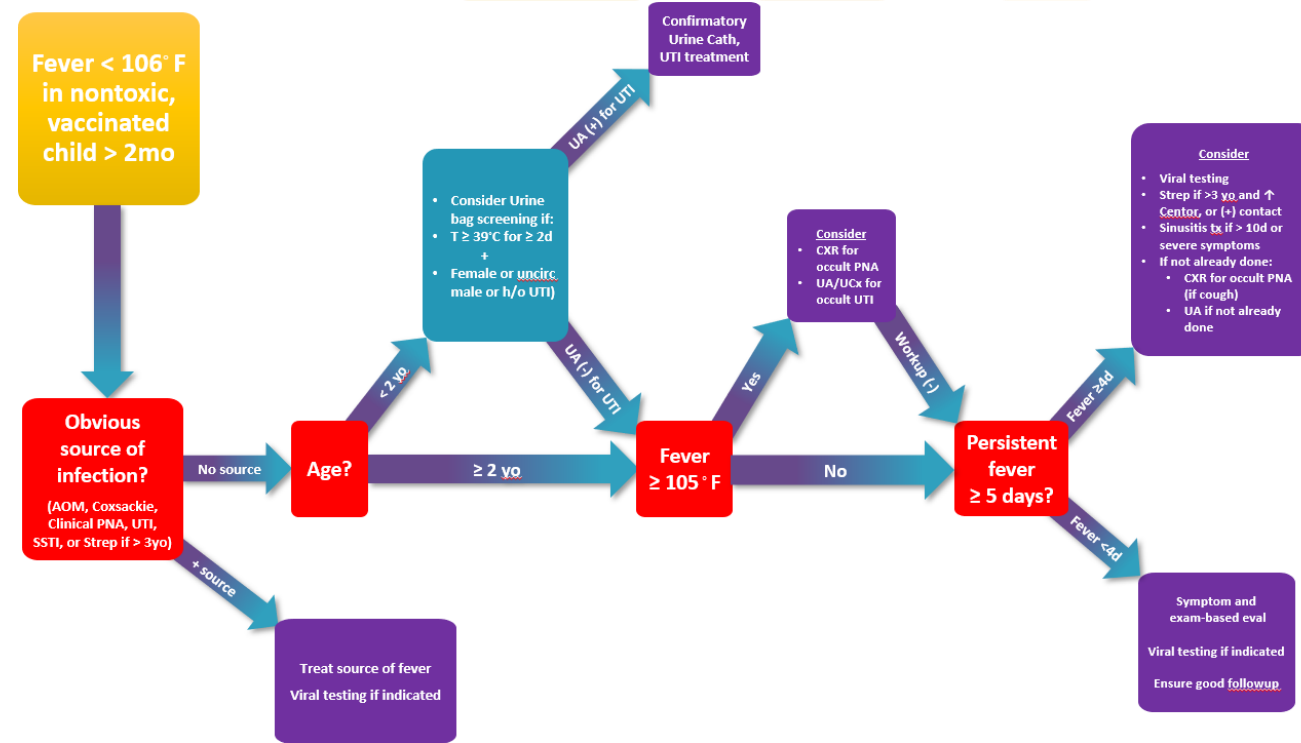
I have other disclosures...

- I love TV/movie quotes
- I hate textbooks (weird right?)
- I used to love Cliff's Notes



# Cliff's Notes for Pediatric Fever

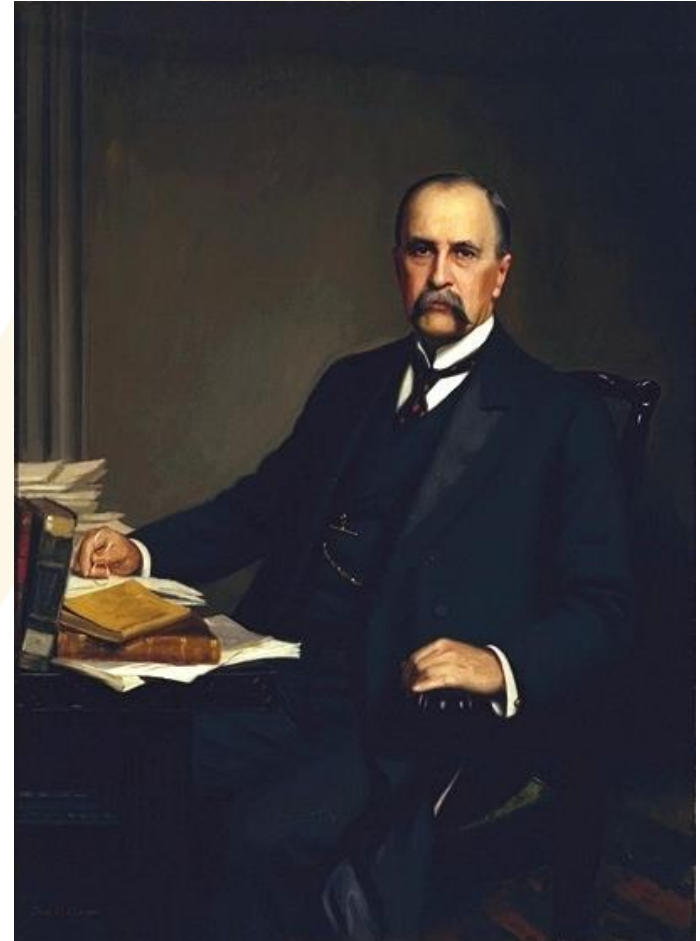
- Created my own system for Pediatric Fever
- Derived from many studies of pediatric fever, >10,000 hours in PEM and Peds UC, conversations with colleagues/experts
- Shrank it down to 1 page!



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“Humanity has but 3 great enemies: fever, famine and war, of these the greatest by far the most terrible is fever”

Sir William Osler  
(1849-1919)



# Why Are We Talking About Fever?

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- 20% of all Ped ED/UC visits are for fever
- Most pediatric fevers are viral, but...
  - **Must know when/where to look for bacterial infections**
- Viral testing is now front and center (COVID, Flu, Respiratory Panels, etc.)



# Objectives

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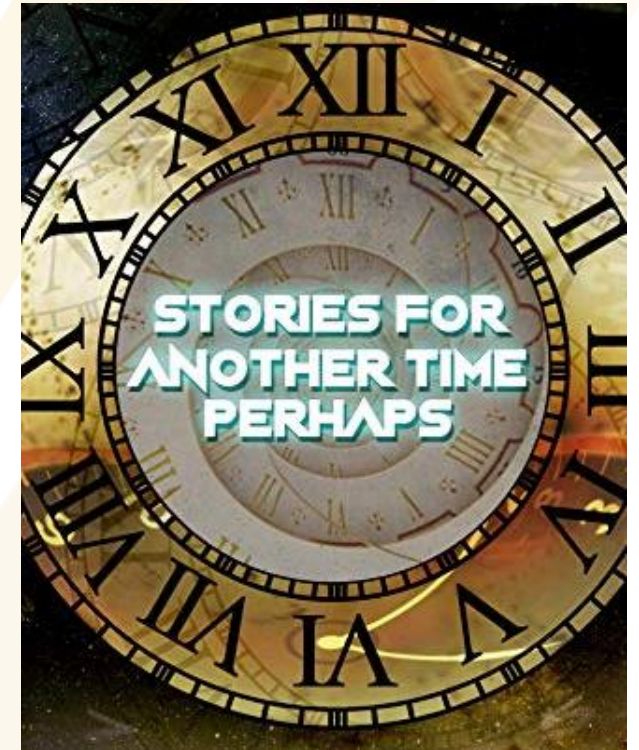
- Pediatric Fever Mythbusting
- Structured Approach to Pediatric Fever in Well-Appearing Patient
  - Review sites for occult bacterial infections (especially in 2m.o. - 2yo)
  - Viral testing
  - Persistent fever without a source workup
    - When to initiate
- Bringing it all together - Pediatric Fever Algorithms



# What we will NOT talk about today

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- Fever in < 2 month old
- Fever and immunocompromised
- Fever and toxic appearing
- Fever of Unknown Origin (FUO)
  
- Not discussing antibiotic treatment of infections




# AMPLIFY

## Pediatric Fever Mythbusting



# Audience Q1: Fever that does not respond to an antipyretic is a concerning sign for possible bacterial infection

- A. True
-  B. False

CID 2000;31 (Suppl 5)

Consequences of Antipyretic Therapy

S231

**Table 1.** Studies, in children, of the oral temperature response of bacteremic versus nonbacteremic infections to antipyretic agents.

Reference, year	Study design	Antipyretic agent	Age of subjects, years	Patients with bacteremic infection			Patients with nonbacteremic infection			P <sup>a</sup>
				n	T <sub>i</sub> , °C	T <sub>d</sub> , °C	n	T <sub>i</sub> , °C	T <sub>d</sub> , °C	
[7] (1985)	Prospective/observational	Acetaminophen/aspirin	≤2	16	40.1	1.3	239	39.9	1.05	.1
[8] (1987)	Prospective/observational	Acetaminophen	≤6	10	40.1	1.5	225	39.6	1.0	NG
[9] (1987)	Prospective/observational	Acetaminophen	≤2	17	40.5	1.6	216	40.4	1.6	.85
[10] (1987)	Prospective/observational	Acetaminophen	≤17	11	NG	1.4	16	NG	1.2	.3
[11] (1989)	Prospective/observational	Acetaminophen	≤2	19	40.1	1.7	135	40.0	1.6	>.05
[12] (1989)	Retrospective/case control	Acetaminophen	≤6	34	39.8	1.0	68	39.8	1.5	.0005


NOTE. NG, not given; T<sub>d</sub>, mean decrease in temperature 60–120 min after treatment with the antipyretic agent; T<sub>i</sub>, mean initial temperature (i.e., temperature just prior to administration of antipyretic agent). Reprinted with permission from Plaisance and Mackowiak [13]. Arch Intern Med 1999.

<sup>a</sup> Comparison of T<sub>d</sub> in subjects with bacteremia versus that in subjects without bacteremia, by use of the Student *t* test.

Philip Mackowiak, *Clinical Infect Dis* 2000

# Audience Q2: A fever of 104.6° F in a 6 y.o. male is a concerning sign for serious bacterial infection

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- A. True
-  B. False

- Cutoff for SBI in children  $\geq 106^{\circ}$  F
- Landmark study
- N=103 children < 18 y.o. w fever  $\geq 106^{\circ}$  F
  - Median age 17mo
  - 20 with serious bacterial infection
    - 11 bacteremic
    - 8 UTI
    - 1 epidural abscess
    - 1 + stool cx

*Trautner et al, Pediatrics 2006*

# What about fever $\geq 105^\circ\text{F}$ ?

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- Retrospective review of infants 3m-3yo presenting to Pediatric ED (N=247)
  - 30 (12%) pneumonia
  - 16 (7%) UTI
  - 2 (0.8%) Bacteremia
    - Had  $\uparrow$ WBC & CRP



**Take Home – If fever  $\geq 106^\circ\text{F}$ , strongly consider bloodwork (CBC, CRP, BCx) and UTI screening**  
**If  $> 105^\circ\text{F}$  and  $\leq 3\text{yo}$ , consider CXR and UTI screening**

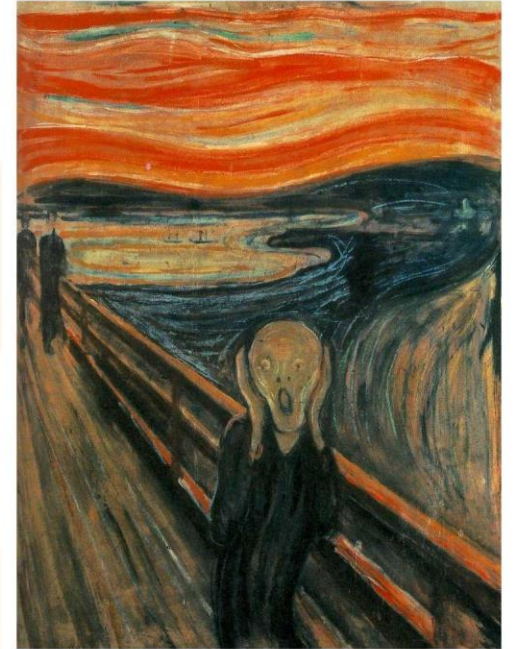
*Be'er et al. PEC 2024*

# We may not be worried about fever...but parents are!

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## “Fever Phobia” is real

- Survey of 340 parents of children in pediatric practice
- 56% very worried about harm from fever
- 21% worried about brain damage
- *14% worried about death*



*Crocetti et al., Pediatrics 2001*

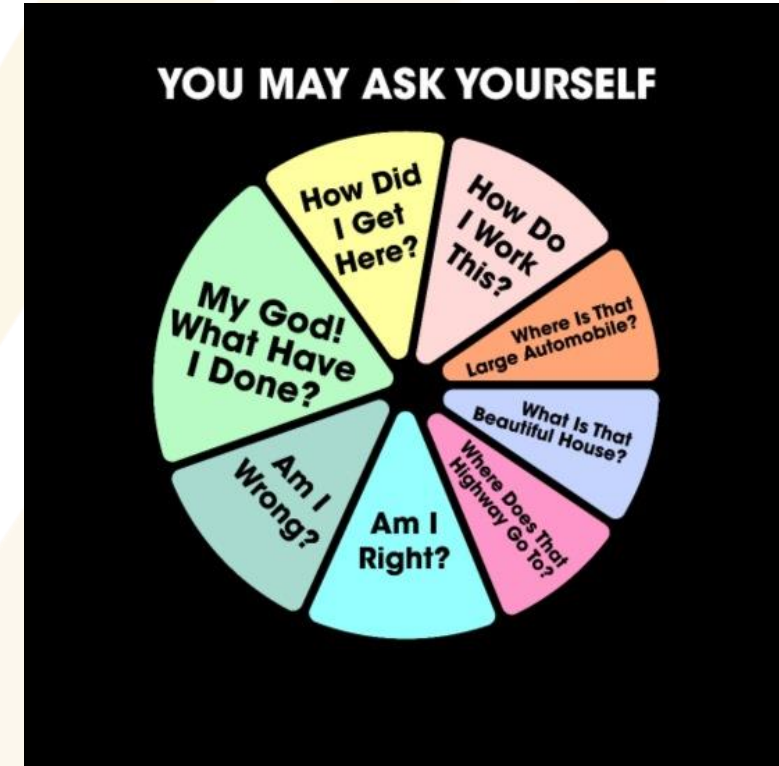
# AMPLIFY

## Structured Approach to Pediatric Fever



# Structured Approach

- Always start by asking yourself several questions
    - Helps to risk stratify patient, and guides workup
1. Are they high risk?
  2. Obvious source?
  3. Preverbal/potty trained (< 2yo)?
  4. Is fever persistent ( $\geq 5$  days)?
  5. Viral Testing indicated?



# Question 1 – What Constitutes High Risk?

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## 1. < 2 months

- Essentially immunocompromised (unvaccinated, immature immune system)
- Higher risk for sbi (UTI, sepsis, bacteremia, meningitis)
- AAP now has robust guideline for this age group (Pediatrics 2021)
  - Dependent on lab workup (Inflammatory markers with low turnaround time), +/- LP, **best achieved in ED setting**

## 2. Unvaccinated

## 3. Toxic appearing

## 4. Immunocompromised

## 5. Fever $\geq 106^\circ$ F

**Any of these 5 factors, strongly consider additional workup or transfer**

*Pantell et al., Pediatrics 2021*

# What if patient is between 2-3 months?

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- Management was variable – until September 2025!
- PECARN study of 5000 Febrile Infants 61-90 days
- **If Temp <39°C and nontoxic**
  - **Perform UA/UCx**
  - **If (-), can safely discharge!**
  - Extremely low risk for Invasive Bacterial Infection
- If temp ≥ 39°C, or toxic appearing/abnl vitals
  - Transfer for further eval (STAT bloodwork to risk stratify)
- Can also consider viral testing

**EVIDENCE-BASED  
PRACTICE**

*Aronson et al. Pediatrics 2025*

# What about unvaccinated febrile patients?

- Unfortunately more common
- No recent guidance
- Gotta go back to pre-Prevnar/H Flu vaccine guidance
- If temp  $\geq 39^{\circ}\text{C}$ ,
  - UA/UCx, CBC + Inflammatory Markers
  - Viral testing
  - Can followup as outpatient
- Many of us just do urine + viral testing if early in course



# Question 2 – Is There an Obvious Source For Fever?

## What counts as a definitive source for fever?

- < 3 yo
  - AOM
  - Coxsackie (vesicles posterior palate, HFM)
  - SSTI
  - Clinical PNA
- ≥ 3 yo
  - Can add on strep (if clinical signs) and UTI

## What DOESN'T count as a definitive source?

- URI sxs, viral testing (+/-)
  - Can have bacterial co-infection
    - UTI co-infection 2% in those who are Flu+ or RSV+
  - + Viral test REDUCES BUT DOES NOT ELIMINATE risk of bacterial infection
  - Can help by *delaying* workup for bacterial infection

*Pediatrics 2019;144(2)  
Pediatrics 2005;115(3):710-718*

# Question 3 – How old is the child?

Pediatricians often use **Age < 2 yo** as cutoff.  
WHY?

- Two things happen around 2 years
  - Potty training
    - Risk of UTI much higher before potty training (short urethra, sit in poop)
  - Complex Language
    - < 2 yo cannot tell you what hurts (have to look harder)



# Question 3 – If child is < 2 yo, then...

## IT'S ALL ABOUT THE URINE

- Always think about occult UTI in fever without definitive source in < 2yo
- Why?
  - Risk of UTI ~4% female, ~8% uncircumcised male (<2 yo)
    - Higher if >1-2 days fever
    - Higher if no source for fever



*Hoberman et al, J Peds 1993  
Shaw et al, Pediatrics 1998  
AAP Guidelines Pediatrics, 2011*

# So...when should we screen for UTI?

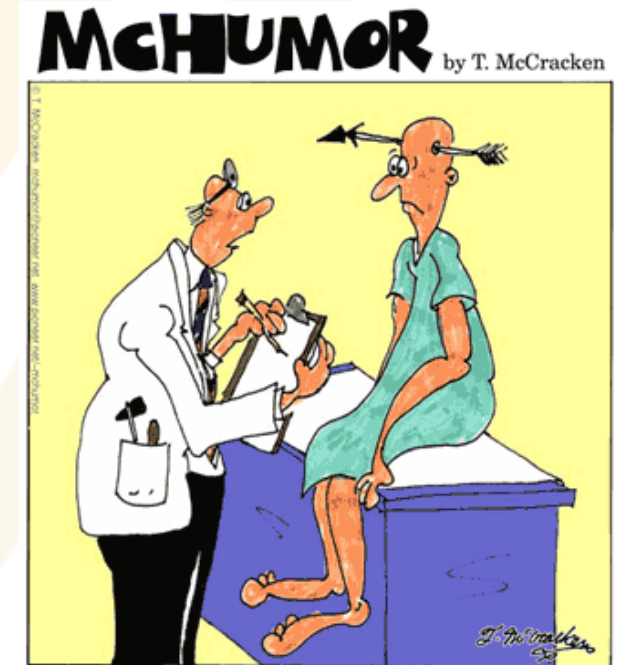
- Consider if female or uncircumcised male, especially if:
  - >2 days of fever
  - No obvious viral source
  - h/o UTI
- Can use MDCalc to guide decision to screen for UTI
  - <https://uticalc.pitt.edu/>
- **Urine bag** now recommended as initial screening (instead of cath)
  - Sensitive and much less invasive
  - No urine culture needed unless high pretest probability (e.g., h/o UTI)
  - If positive, then perform cath and send for confirmatory testing

*Hoberman et al, J Peds 1993  
Shaw et al, Pediatrics 1998  
AAP Guidelines Pediatrics, 2011  
European Association of Urology 2015  
McGillivray et al. J Peds 2005*

# If child is < 2 yo, and no source, how come we don't normally check bloodwork?

- Vaccines (esp Prevnar and H.Flu) have ↓↓ Risk of bacteremia
  - Bacteremia rate = 0.25-0.5%
    - Note - risk of false positive 3%
  - So...if vaccinated, the risk of a false positive is greater than the risk of a true positive!
    - Note - risk if unvaccinated 2.4%

**Take home: If vaccinated, nontoxic, nl exam, and fever is not persistent, bloodwork is not indicated**



"Off hand, I'd say you're suffering from an arrow through your head, but just to play it safe, I'm ordering a bunch of tests."

*Sard et al, Ped Emer Care 2006  
Carstairs et al, Ann Emer Med 2007  
Ribitzky-Eisner Et al, Pediat Neo 2015  
Avner, Baker Acad Emerg Med 2009*

# Question 4 – Is the fever persistent $\geq 5$ days?

## Why 5 days?

- Often viral, but should start thinking about other causes of fever



Prospective review of (N = 35,000 febrile pts 0-18 yo, multicenter European study)

- 3700 patient with fever  $\geq 5$  days, **319 (8%) with SBI**
  - 172 (5%) PNA
  - 111 (3%) UTI
  - 18 (0.5%) Bacteremia
  - Other 53 (1.4%) – 28 inflammatory, 21 Kawasaki, 4 Neoplasm

*Nijman et al. Arch Dis Child 2023*

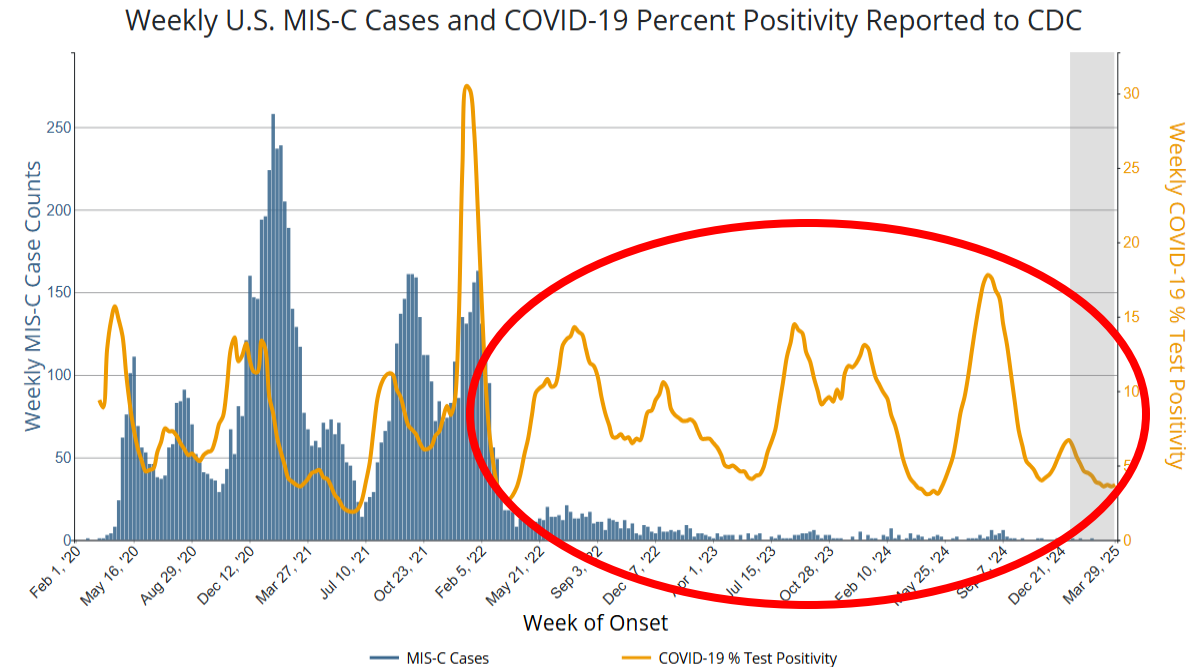
# If fever $\geq$ 5 days, *consider* the following workup/diagnoses

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- CXR for occult pneumonia (if cough)
- UA/UCx if not already done
- Strep if  $>3$  y.o and high Modified Centor Score (or  $<3$  yo with (+) contact)
- Sinusitis treatment if meets criteria
- Viral testing
- Watch for Kawasaki/MIS-C (rash, cracked lips, LAD, extremity changes, abdominal pain)
- Good followup critical!

# Multi-system Inflammatory Disorder (MIS-C)

- Inflammatory/autoimmune response, 3-6 weeks after infection
  - >9700 cases, 80 pediatric deaths in US
  - Incidence is decreasing!
  - Vaccination efficacy at preventing MIS-C >90% (10/21, 6/22)
- Clinical Presentation varies:
  - Persistent fever (usually  $\geq 4$  days but can present earlier)
  - Can mimic Kawasaki (LAD, peeling skin, cracked lips)
  - GI symptoms common (PAIN, vomiting, diarrhea)
  - Myocarditis (poor perfusion, tachycardia)
- Often results in ICU admission for pressor support
- With treatment, long-term outcomes are favorable



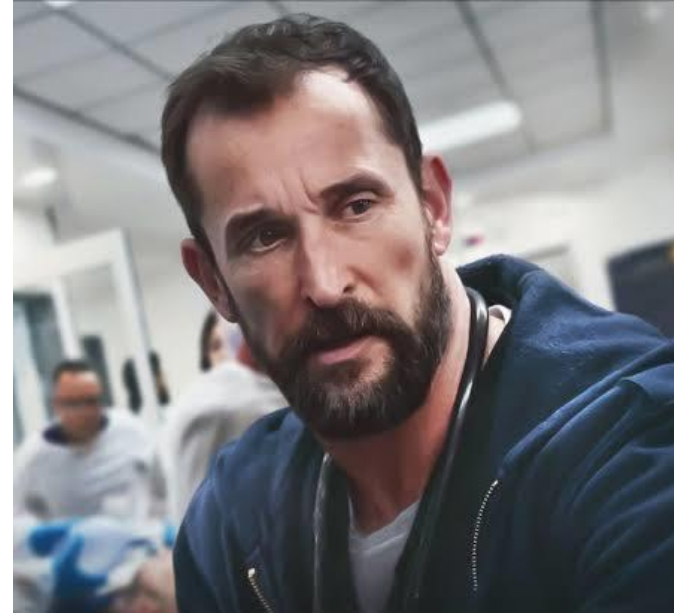
# Multi-system Inflammatory Disorder - New Approach

- 2020-2023
  - Complex MIS-C guidelines with recommendations for lab screening
- 2023 - CDC guidelines
  - Recommend any suspected patient with MIS-C **have workup performed in ED setting (labs, echo, etc)**



# Occult Pneumonia workup

- Incidence ~5-7% in children with persistent fever + cough
- Clinical presentation
  - Often **persistent fever and cough  $\geq 5$  days**
  - Often **borderline O<sub>2</sub>Sat 95%**
  - **Sometimes fever  $>105^{\circ}\text{F}$**
  - **Clear lungs, no distress**
- $\uparrow$  WBC is predictive, but likely unnecessary
- Can perform CXR with just clinical suspicion



*Murphy et al, Acad Emerg Medicine 2007*

# Fever $\geq$ 5 days...Other Diagnoses

- Strep infection
  - Can often be occult, may present with just fever + abdominal pain or fever+rash
  - Consider for persistent fever if  $\geq$  3yo and  $\uparrow$  Modified Centor Score – always check the throat!
  - If < 3yo, Strep/ARF rare, only test if strep contact
  - Don't be fooled by carriers
- Sinusitis
  - AAP and IDSA define sinusitis in 1-18 y.o. as 1 of following criteria:
    - Persistent URI  $\geq$ 10 days *without improvement* OR
    - “Double sickening” OR
    - Severe symptoms (Fever  $>39^{\circ}\text{C}$  + purulent nasal discharge +/- facial pain  $>3$  days)
      - Consider sinusitis in older patients w severe facial pain, even without fever

# What about Viral Testing?

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- Flu/COVID/RSV
- Viral panels
  - Helpful for persistent fever



# Viral Testing: RSV/Flu/COVID-19

- Usually unnecessary as they usually *do not change management*
  - No proven outpatient treatment for RSV (albuterol/steroids ineffective)
  - Tamiflu/Baloxavir:
    - Do NOT prevent complications (other than maybe AOM)
    - Only decrease sxs by 1 day if started in 1<sup>st</sup> 48 hours of illness
    - Tamiflu is poorly tolerated, esp in younger patients (vomiting)
  - Paxlovid rarely indicated in pediatrics
- Creates burden for providers, front desk, and costs \$\$\$

## Flu Testing

- Consider if
  - Flu surge + High risk + < 48 hours of fever
  - Patient/parent request despite education
  - \*Persistent unexplained fever\*

## COVID Testing

- Consider if:
  - Vulnerable family member
  - Institution required

## RSV Testing

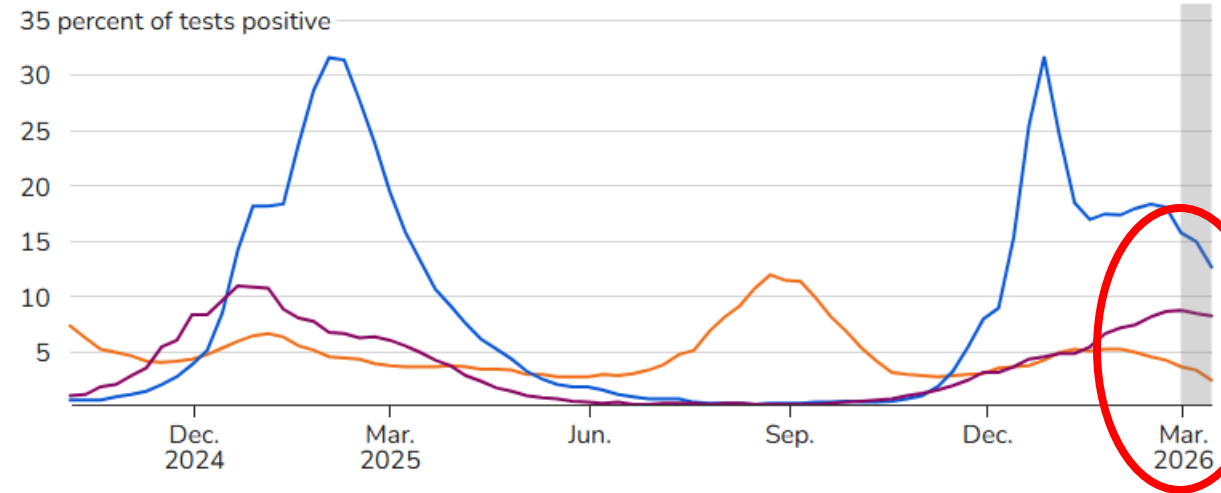
- Consider if:
  - <1m.o - increased risk of apnea
  - Vulnerable sibling at home
  - Persistent unexplained fever

# Viral Testing: Monitor viral levels to determine testing behavior

- Once levels drop low enough, viral testing not routinely indicated (higher risk for false +)

Percent of Tests Positive for Respiratory Viruses

● COVID-19 ● Influenza ● RSV



Data last updated on March 19, 2026 and presented through March 14, 2026. [View this dataset](#) on data.cdc.gov.

# AMPLIFY

## Putting It All Together



**Fever < 106° F  
in nontoxic,  
vaccinated  
child > 3mo**

**Obvious  
source of  
infection?**  
(AOM, Coxsackie,  
Clinical PNA, UTI,  
SSTI, or Strep if > 3yo)

Treat source of fever  
Viral testing if indicated

**Age?**

Consider Urine bag  
screening if:  
• T ≥ 39°C for ≥ 2d  
+  
• Female or uncirc  
male or h/o UTI

**Fever  
≥ 105° F  
In ≤ 3 yo**

Consider  
• CXR for  
occult PNA  
• UA/UCx for  
occult UTI

**Persistent  
fever  
≥ 5 days?**

Consider

- Viral testing
- Strep if >3 yo and  
↑ Centor, or (+) contact
- Sinusitis tx if meet criteria
- Watch for Kawasaki/MIS-C
- If not already done:
  - CXR for occult PNA (if  
cough)
  - UA if not already done

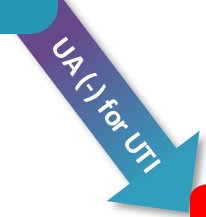
**\*\*Ensure good f/u\*\***

Symptom and  
exam-based eval

Viral testing if indicated

Ensure good followup

Confirmatory  
Urine Cath,  
UTI treatment



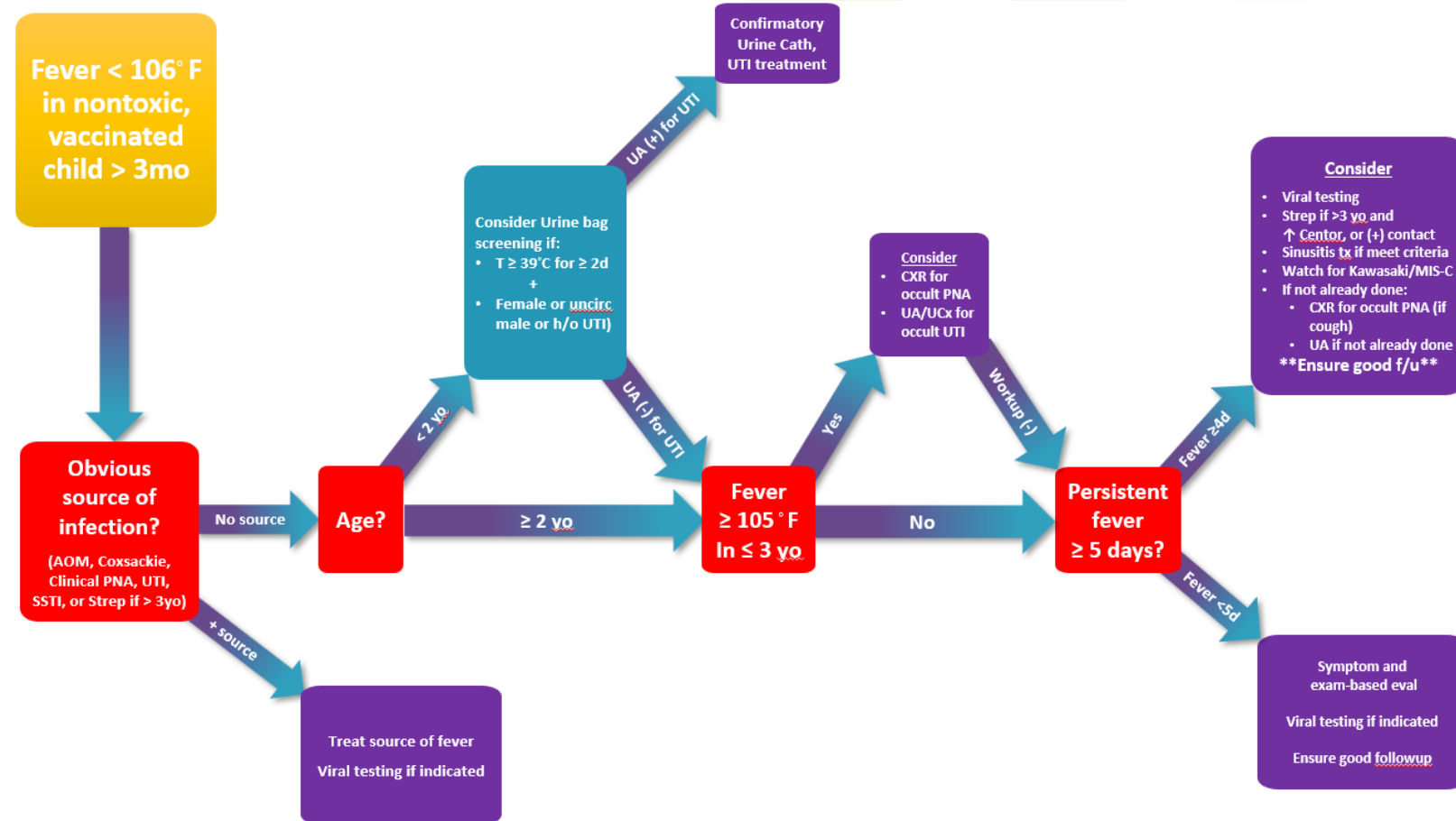
# AMPLIFY

Let's do some scenarios!



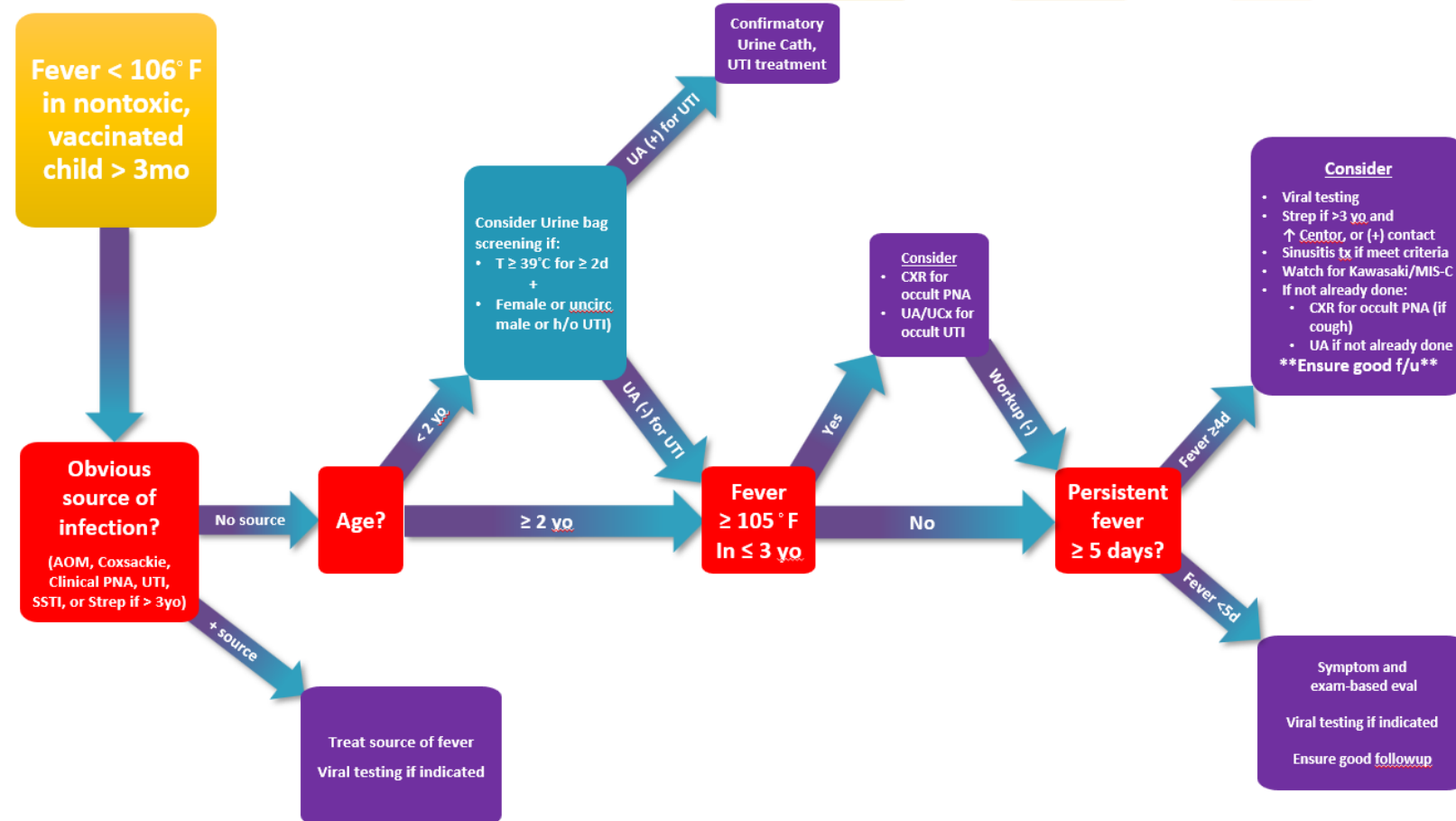
Audience Q3: 6 m.o. female presents with fever x 3 days tm 103. Mild cough and congestion. Vacc UTD.  
Exam: Vitals nl, nontoxic, no source for infection identified.  
Of the following, what is the best test to elucidate a diagnosis for this patient?

- A. CXR
- B. Bloodwork
- ✓ C. Screening bag UA
- D. No test, f/u PMD



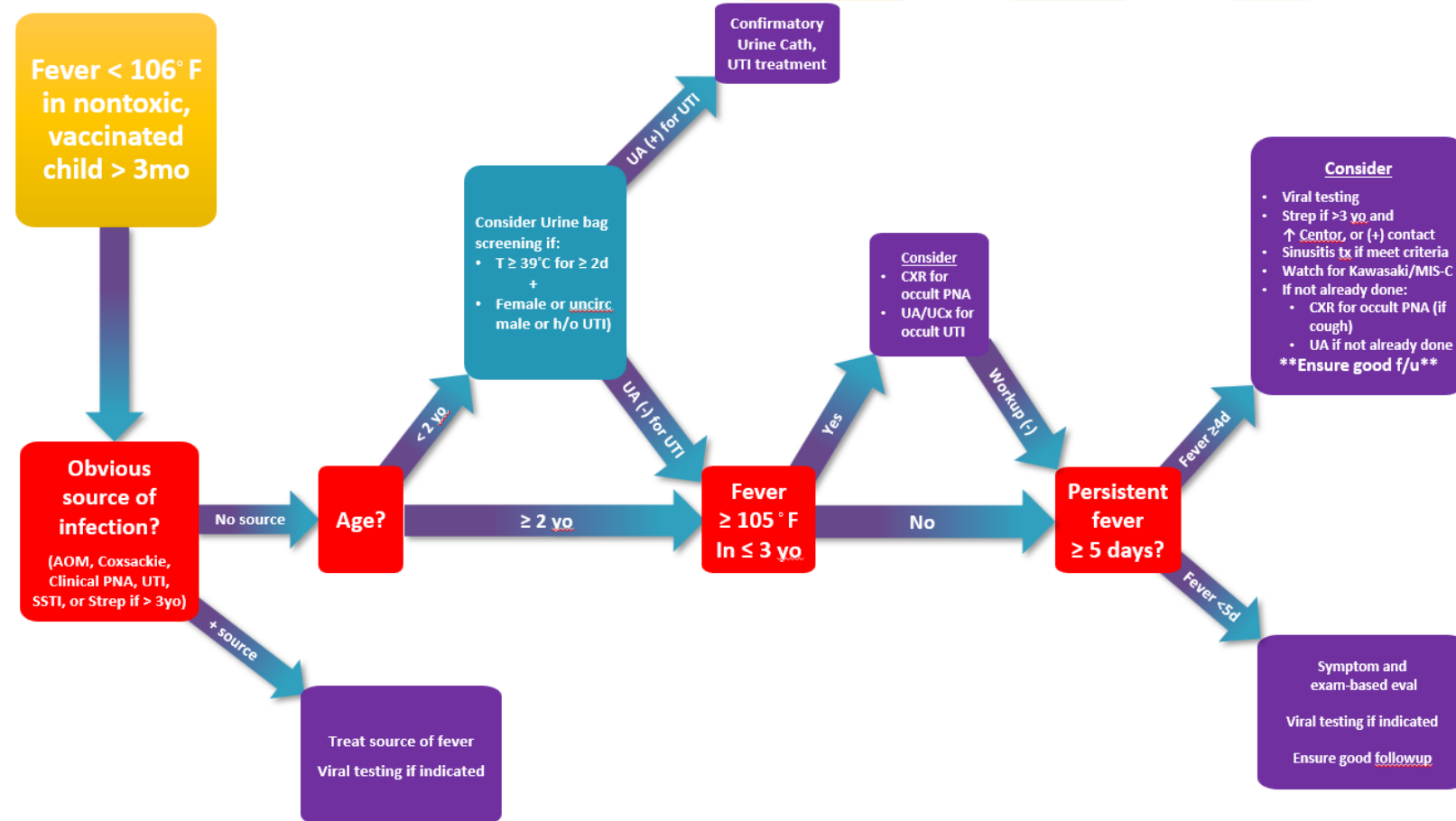
Audience Q4: 3 y.o. female presents with cough and fever x 5 days. Vacc UTD. No dysuria. No h/o asthma. Exam: HR 120, RR 22, T 101, Sat 95, Lungs clear, no respiratory distress, otherwise nl exam. Of the following, what is the best test to elucidate a diagnosis for this patient?

- ✓ A. CXR
- B. Bloodwork
- C. Screening bag UA
- D. No test, f/u PMD



Audience Q5: 7 y.o. male presents with fever for 5 days, tm 102. Vacc UTD. No cough. No vomiting or diarrhea, + lymphadenopathy, no rash, no dysuria. Mild congestion, no purulent nasal discharge. Mild headache and abdominal pain. Exam: HR 100, T 38.2, RR 22 sat100, nontoxic, nl exam other than mildly erythematous posterior pharynx  
Of the following, what is the best test to elucidate a diagnosis for this patient?

- A. CXR
- ✓ B. Urine, strep, viral testing
- C. Screening bag UA
- D. CBC, CRP, BCx

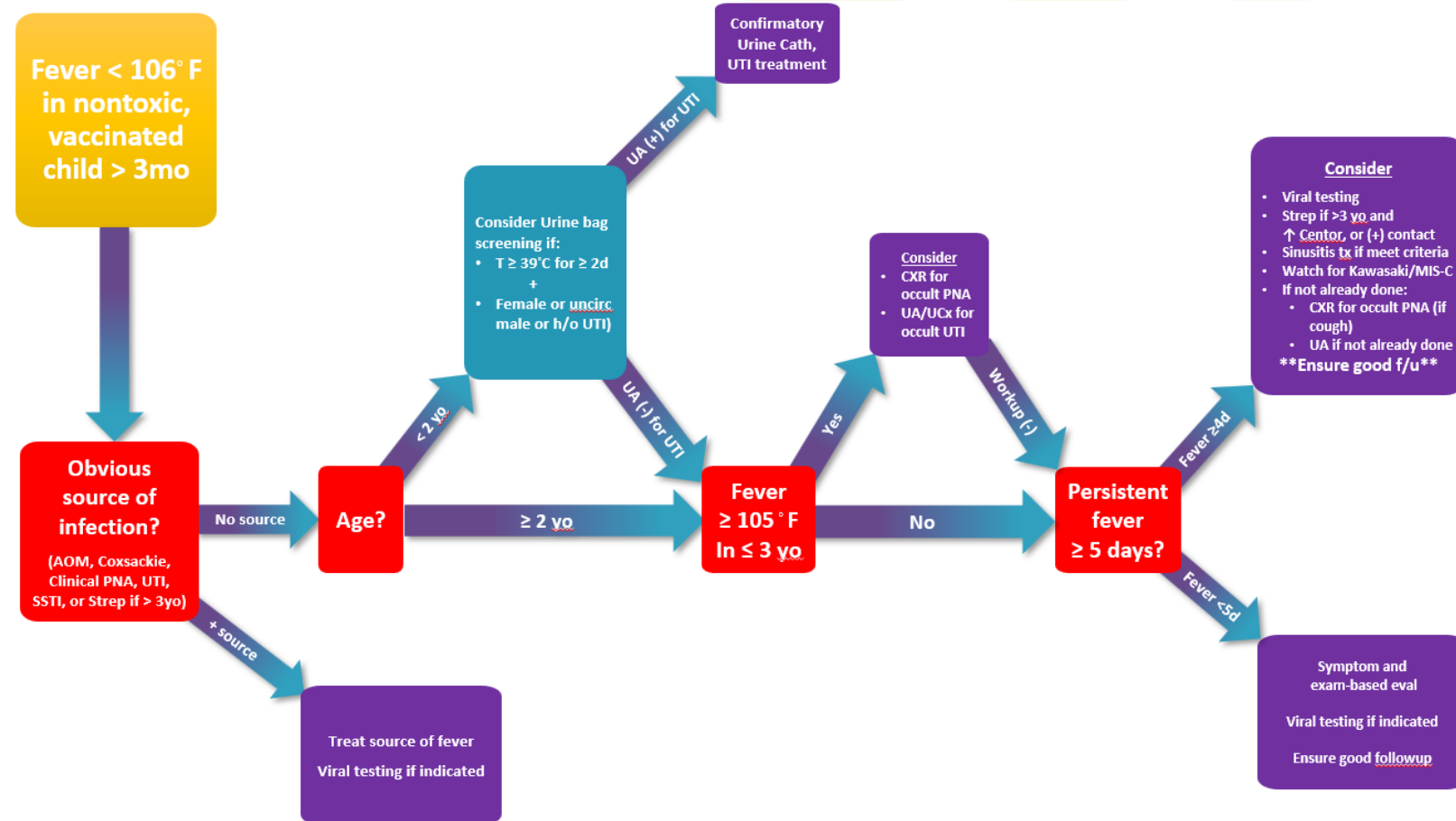


Audience Q6: 4 y.o. male presents with fever for 3 days, tm 104. Vacc UTD. Mild URI sx. Vomited x2 after cough. No dysuria.

Exam: Vitals nl, nontoxic, otherwise nl exam.

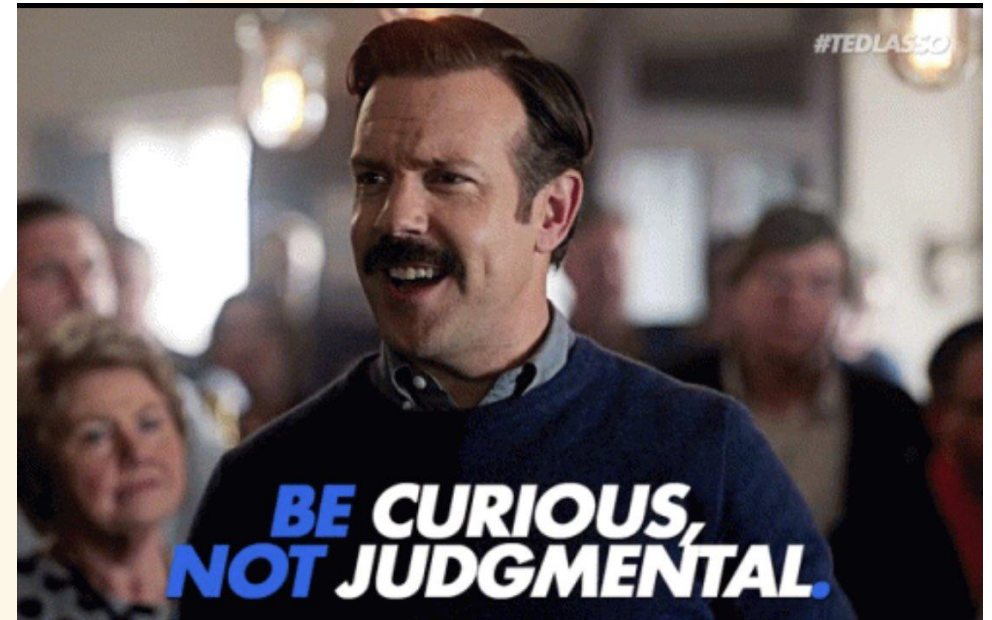
Of the following, what is the best approach to this patient?

- A. CXR
- B. Bloodwork
- C. Screening bag UA
- ✓ D. No test, f/u PMD



# Take Home Points

- Fever phobia is real, understand parental fear
- Most nontoxic vaccinated pediatric patients with fever need no workup
- Structured approach is best – **5 Questions!**
  - High risk?
  - Source for fever?
  - Age < 2 yo (think urine)?
  - Fever  $\geq$  5 days?
  - Viral testing needed?
- Can use our algorithmic approach to fever



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# Thank you!

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# Now...I Need Your Feedback

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