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THE URGENT CARE CONVENTION

‘KISS’ing the Fever Away: A Simplified Approach to Pediatric Fever

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Disclosures

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I have no financial disclosures or other conflicts of interest

Thank you to Drs. Elliott Friedman and Eric Weinberg!

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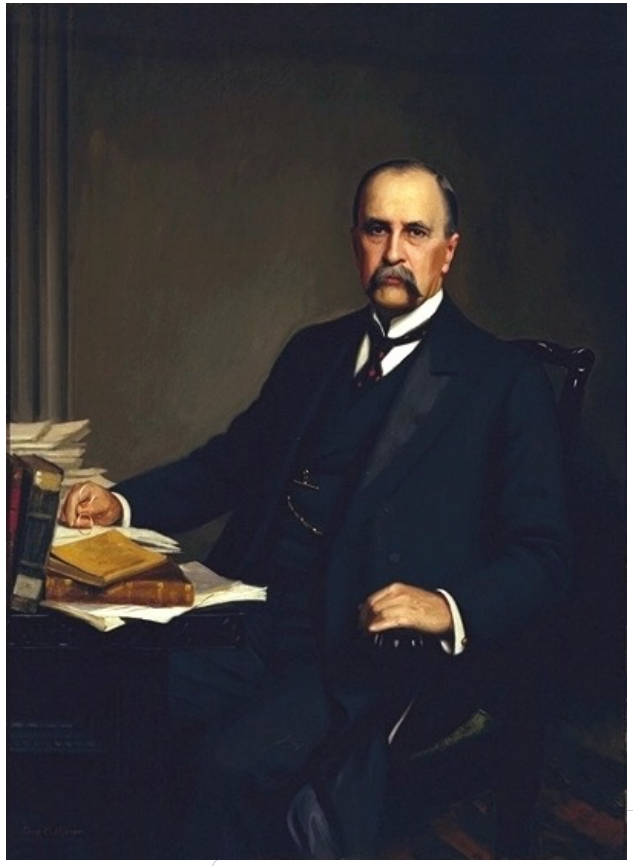
"Humanity has but 3 great enemies: fever, famine and war, of these the greatest by far the most terrible is fever"

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/RSV etc)

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Objectives

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- Pediatric Fever Mythbusting
- Structured Approach to Pediatric Fever in Well-Appearing Patient
  - Review locations for occult bacterial infections
  - COVID and Flu testing
  - Persistent fever without a source workup
    - MIS-C, when to initiate workup
- Bringing it all together - Pediatric Fever Algorithm

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What we will **NOT** talk about today

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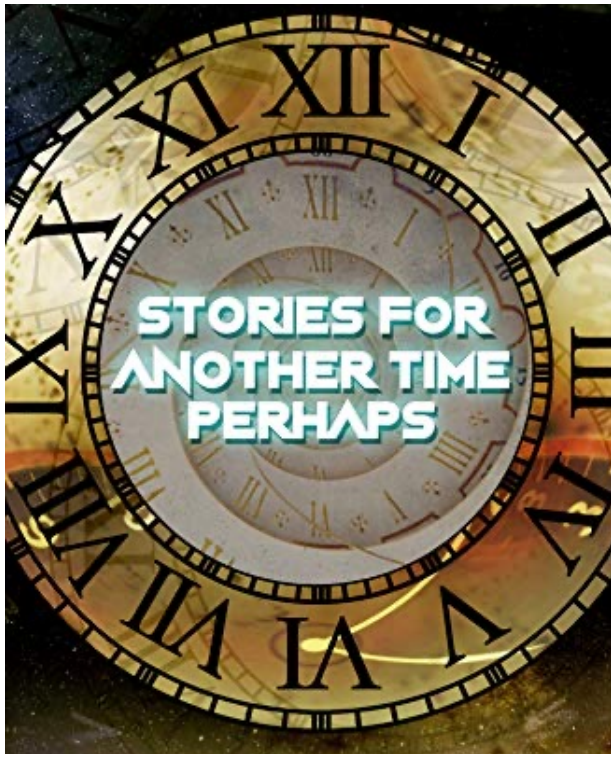
- Fever in < 2 month old
- Fever in Immunocompromised
- Fever in Toxic Appearing
- Fever of Unknown Origin (FUO)



- Not discussing antibiotic treatment of infections

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

A. True

B. ✓ False

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			
				n	T_i, °C	T_d, °C	*n*	T_i, °C	T_d, °C	P^a
[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_d, mean decrease in temperature 60–120 min after treatment with the antipyretic agent; T_i, 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.

[a] Comparison of T_d in subjects with bacteremia versus that in subjects without bacteremia, by use of the Student *t* test.

Philip Mackowiak, Clinical Infect Dis 2000

A fever of 105° F in a 6 y.o. male is a concerning sign for serious bacterial infection

A. True

B. ✓ False

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

Trautner et al, Pediatrics 2006

We may not be worried about fever…but parents are!

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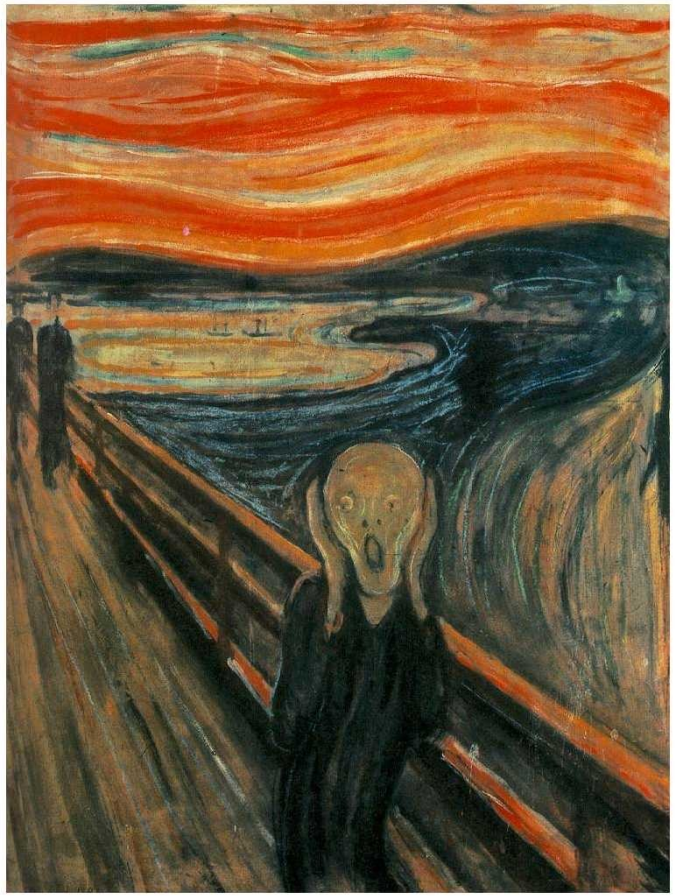
"Fever Phobia" is real

- 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



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Structured Approach

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- 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 (≥ 4 days)?
5. Viral Testing indicated?

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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), +/- LP, best achieved in ED setting
2. Unvaccinated
3. Toxic appearing
4. Immunocompromised
5. Fever ≥ 106° F

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

Pantell et al., Pediatrics 2021

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What if patient is between 2-3 months?

- Management is controversial
- Do not have to transfer if *well appearing*, *normal exam and vitals*, *and reliable parent/good follow-up*:
  - UA/UCX
  - Rapid Viral testing
  - Consider bloodwork (CBC, BCx, CRP) if unreliable follow-up or unvaccinated

Smitherman H, Macias C; UpToDate 2023

Question 2 – Is There an Obvious Source For Fever?

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What counts as a source for fever?

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

What DOESN'T count as a source?

- URI symptoms
- 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

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

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Question 3 – How old is the child?

Pediatricians often use **Age < 2 years old** as cutoff

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

Question 3 – If child is < 2 year old, then…

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IT'S ALL ABOUT THE URINE!!!

- Screen for occult UTI (UA and UCx) if
  - H/o UTI or urinary tract anomaly OR
  - Fever > 102.2 for > 48 hours AND female or uncircumcised male
- Why?
  - Risk of UTI ~4% female, ~8% uncircumcised male (<2 yo)
    - Higher if >1-2 days fever
    - Higher if non-black female (16%!)
    - Higher if no source for fever

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

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

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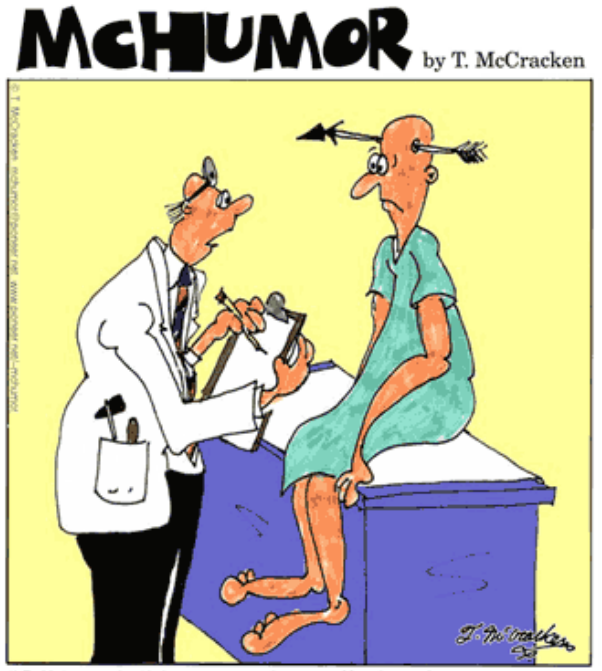
- Vaccines (esp Prevnar and H.Flu) have ↓↓ Risk of bacteremia
  - Post-vaccine Bacteremia rate = 0.25-0.5%
  - Bacteremia risk if unvaccinated 2.4%
  - Risk of false positive 3%

"We have likely reached the point where the risks and costs of testing well-appearing febrile children for the presence of bacteremia exceed the potential for benefits."

Take home: If vaccinated, nontoxic, 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

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Question 4 – Is the fever persistent ≥ 4 days?

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Why 4 days?

- Common cutoff to start thinking about Multi-System Inflammatory Disorder (MIS-C)
- Common duration of fever & cough to cause occult PNA

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If fever ≥ 4 days, *consider* the following workup/diagnoses

- MIS-C screening bloodwork
- CXR for occult pneumonia (if cough)
- UA/UCx if not already done
- Strep if >3 y.o (or <3 yo with (+) contact)
- Sinusitis treatment if meets criteria
- Viral testing

Multi-system Inflammatory Disorder (MIS-C)

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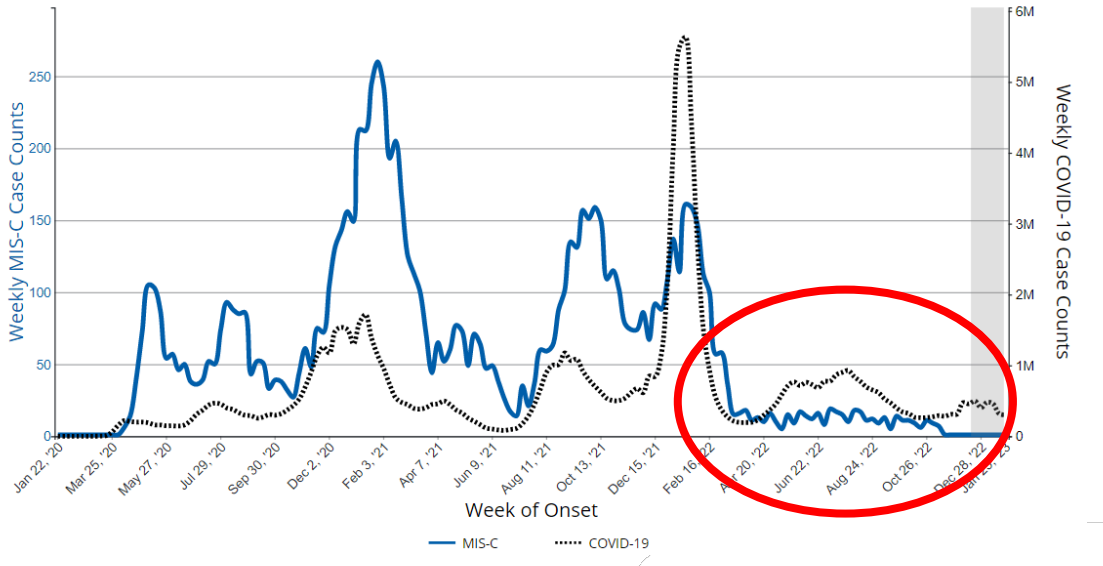
- Inflammatory/autoimmune response, 3-6 weeks after infection

- Affects ~ 1/1000 pediatric COVID+ patients
  - >9300 cases, 76 pediatric deaths in US
  - Incidence is decreasing!
    - Only 5 deaths in U.S. over past year
    - Likely due to vaccination and previous infection exposure

_____ = MIS-C
---------- = COVID-19 cases



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Multi-system Inflammatory Disorder (MIS-C)

- Clinical Presentation varies:
  - Persistent fever (usually ≥4days 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 prompt treatment, long-term outcomes are favorable
- Vaccination efficacy at preventing MIS-C >90%

Multi-system Inflammatory Disorder Diagnosis

- Evidence of recent COVID infection PLUS all the following 4 criteria:
  1. Fever of *any duration*
  2. Severity requiring hospitalization
  3. CRP >3.0
  4. 2 organ systems involved
     - Cardiac
       - ECHO changes or Troponin elevation
     - Mucocutaneous involvement
       - Kawasaki-like symptoms (rash, cracked lips, extremity changes)
     - Shock
     - Gastrointestinal
       - Abdominal pain, vomiting, or diarrhea
     - Hematologic
       - Absolute lymphocyte count <1000
       - Platelets < 150k

Occult Pneumonia workup

- Incidence ~5-7% in children with persistent fever and cough
- Clinical presentation
  - Often persistent fever and cough ≥4 days
  - Often O_2Sat 95%
  - Clear lungs, no distress
- ↑ WBC is predictive, but likely not performed
- Can perform CXR with just clinical suspicion

Murphy et al, Acad Emerg Medicine 2007

Fever ≥4 days…Other Diagnoses

- Strep infection
  - Can often be occult
  - May present with just fever + abdominal pain or fever + rash
  - Consider for persistent fever if ≥ 3yo – always check the throat!
  - If < 3yo, Strep/ARF rare, only test if strep contact

- Sinusitis
  - AAP and IDSA define sinusitis in 1-18 y.o. as 1 of following criteria:
    - Persistent URI ≥10 days *without improvement* OR
    - "Double sickening" OR
    - Severe symptoms (Fever>39°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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- COVID-19
- Influenza
- RSV
- Rapid vs sendout
- Viral testing guide

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COVID-19 Testing Considerations

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- Testing environment is constantly evolving
- Infection does NOT exclude other infections
- Before COVID-19 testing, ask the following questions
  - Any home test done? Do you have any home COVID tests?
  - Any recent COVID infection?
  - *Does the school/daycare/institution require COVID testing?*

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Are Rapid COVID-19 Antigen tests accurate in pediatrics?

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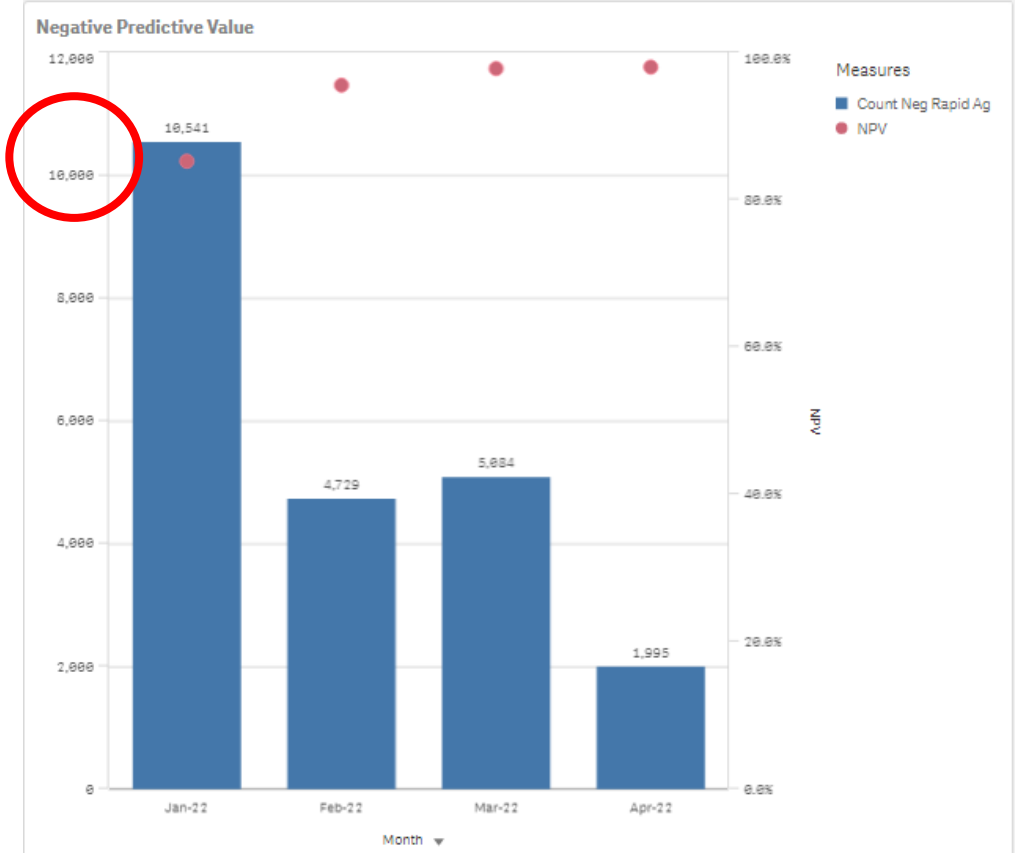
Sofia Rapid Antigen (n=133,000 patients)

- Negative Predictive Value (NPV) ~97%
- NPV lower if prevalence ↑↑
- Accuracy also lower if asymptomatic
  - Improves if done in sequence



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Practical COVID-19 Test Recommendations

- Consider for any new symptom of COVID-19
- Send out PCR with 1-2 day turnaround preferred over rapid
  - Patient is already staying home (fever)
- Can avoid testing if recent infection within 3 months
- Home rapid tests have similar accuracy to institutional rapids
  - Can recommend parent to do home rapid
- If rapid + and symptomatic, strongly discourage PCR confirmation
  - PPV nearly 100% if symptomatic
  - If asymptomatic, can consider PCR confirmation

Viral Testing: Influenza

- Usually unnecessary as they usually *do not change management*
  - Tamiflu/Baloxavir:
    - Do not prevent complications
    - Only decrease symptoms by 1 day, if started in 1st 48 hours of illness
    - Tamiflu is poorly tolerated (vomiting)

- Consider testing if:
  - Influenza surge + High risk (pre-existing condition or < 2yo) + < 48 hours of fever
  - Patient/parent request
  - *Persistent unexplained fever*

Influenza Surge 2022 – finally over?

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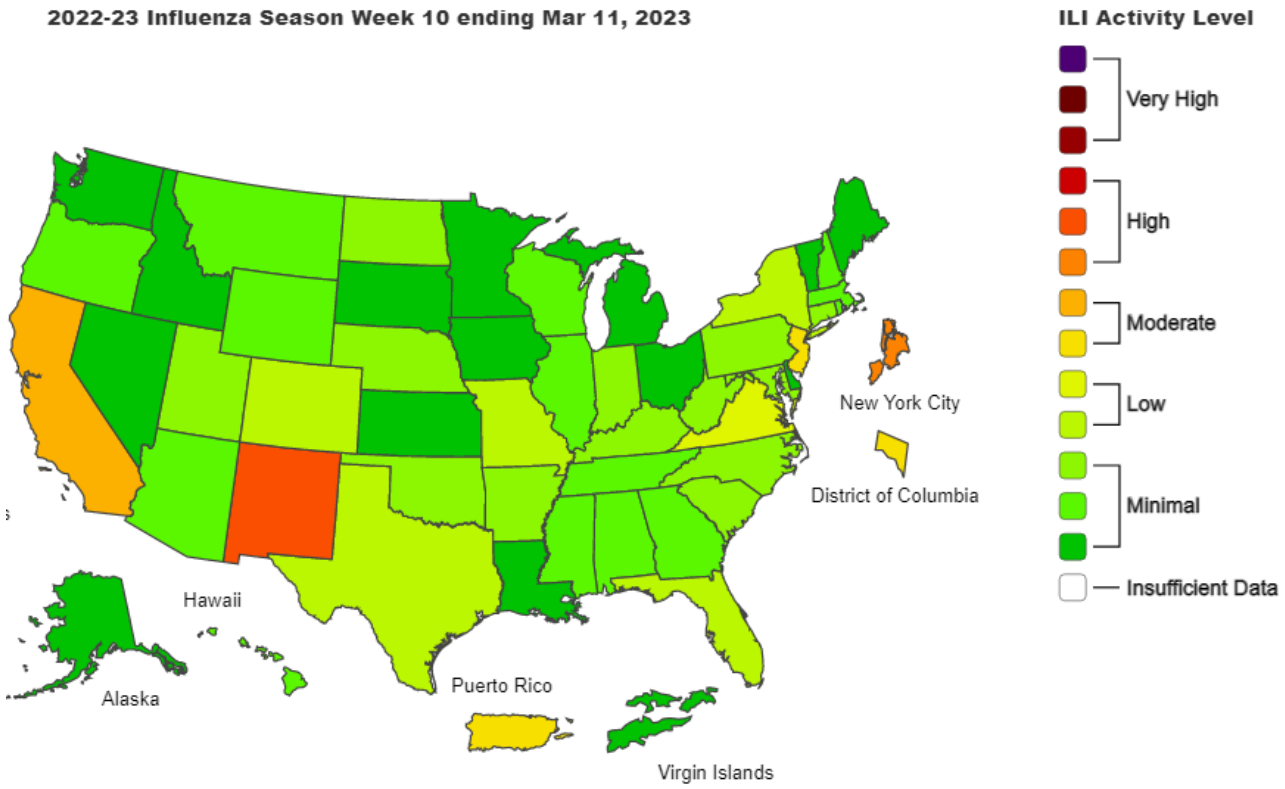
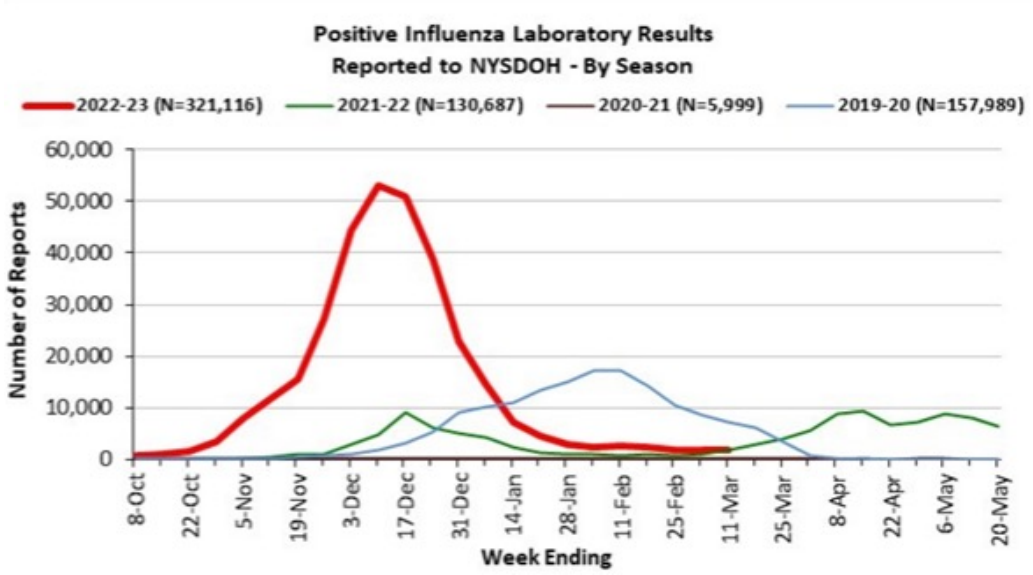


NY Positive Influenza Lab Results



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Viral Testing: RSV

- Usually unnecessary as they usually *do not change management*
  - No proven outpatient treatment for RSV
    - Albuterol/steroids ineffective
- Almost never need to do RSV testing!
  - <1m.o - increased risk of apnea
  - Vulnerable sibling at home
  - Persistent unexplained fever

Viral Testing Guideline

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Send-Out Viral Panel Options

Basic Viral Panel
- Flu, COVID, RSV (and regional variations)
- *Should NOT be sent if considering treatment with an antiviral*

Extended Viral Panel*
- Multiple viral pathogens, varies by lab/region ($$)

Respiratory Viral Panel*
- Multiple viral pathogens ($$$$)

**Extended and Respiratory Viral Panels DO NOT change management and should ONLY be sent due to parental insistence after other options discussed or significant extenuating circumstances*

Respiratory Viral Testing

version 10.27.22

Are you considering respiratory viral testing?

Influenza

- ☐ Patient <2yo
- ☐ Significant pulmonary or other chronic medical disease
- ☐ Patient immunocompromised
- ☐ <48 hrs of symptoms

If any of the above are positive, will an antiviral be prescribed?

NO → **No Testing Required**
Can consider send-out flu, or basic viral panel if possible COVID/RSV diagnosis

YES → **In-Office Rapid Flu Testing**

COVID

Is the need for results time-critical (medical procedure, flight, etc.) or vulnerable contact in the home?

NO → **Send-out COVID PCR**
OR consider basic viral panel if possible flu/RSV diagnosis

YES → **In-Office Rapid COVID Testing**

RSV

Is the patient high risk (<4 weeks old and/or pre-term infant ≤32 weeks)?

NO → **No Testing Required**
Can consider send-out RSV if required by daycare, or basic viral panel if possible flu/COVID diagnosis

YES → **In-Office Rapid RSV Testing**

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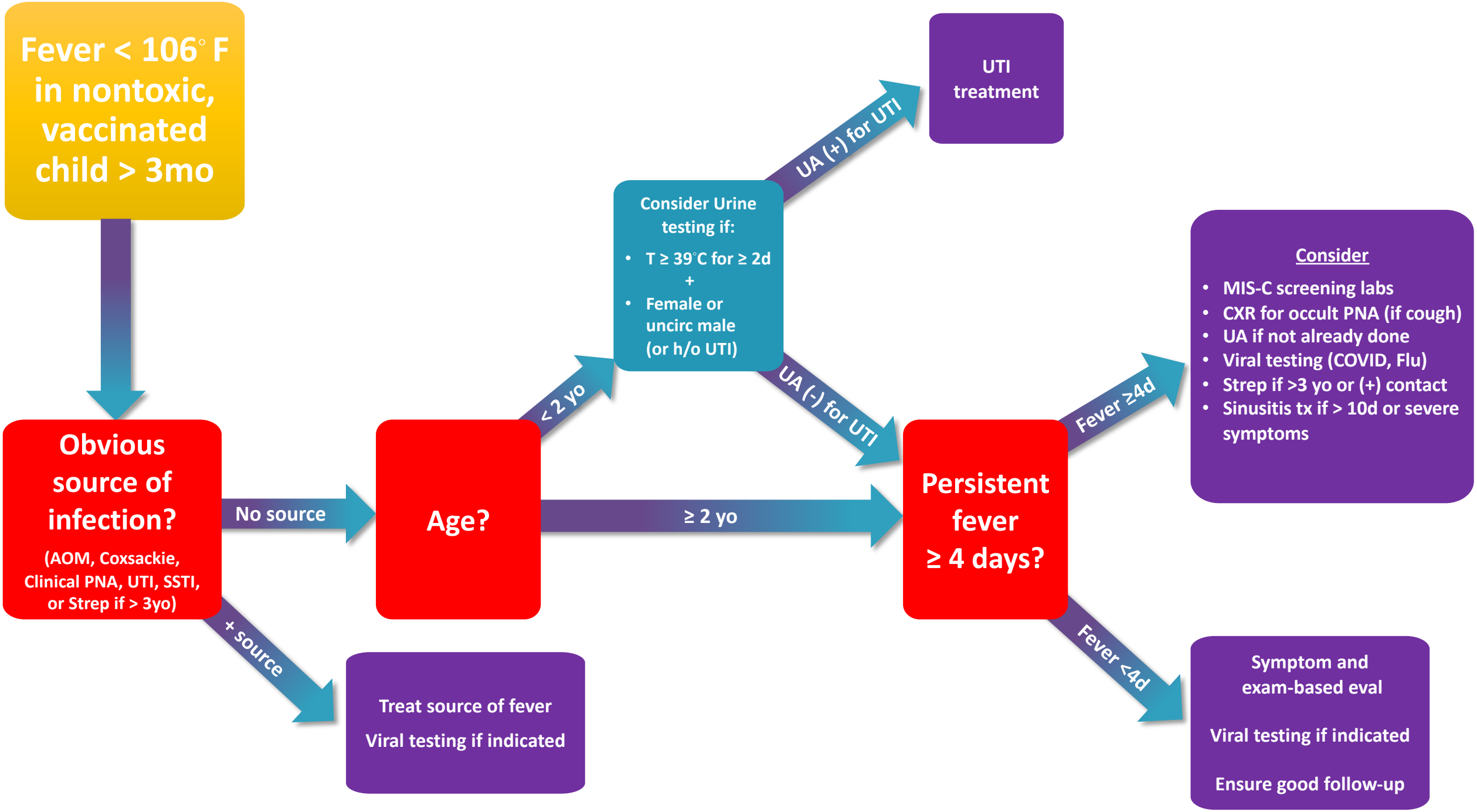
Fever < 106° F in nontoxic, vaccinated child > 3mo
Obvious source of infection?
(AOM, Coxsackie, Clinical PNA, UTI, SSTI, or Strep if > 3yo)
No source
+ source
Treat source of fever
Viral testing if indicated
Age?
< 2 yo
≥ 2 yo
Consider Urine testing if:
• T ≥ 39°C for ≥ 2d
+
• Female or uncirc male (or h/o UTI)
UA (+) for UTI
UTI treatment
UA (-) for UTI
Persistent fever ≥ 4 days?
Fever ≥4d
Consider
• MIS-C screening labs
• CXR for occult PNA (if cough)
• UA if not already done
• Viral testing (COVID, Flu)
• Strep if >3 yo or (+) contact
• Sinusitis tx if > 10d or severe symptoms
Fever <4d
Symptom and exam-based eval
Viral testing if indicated
Ensure good follow-up


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Let’s do some scenarios!
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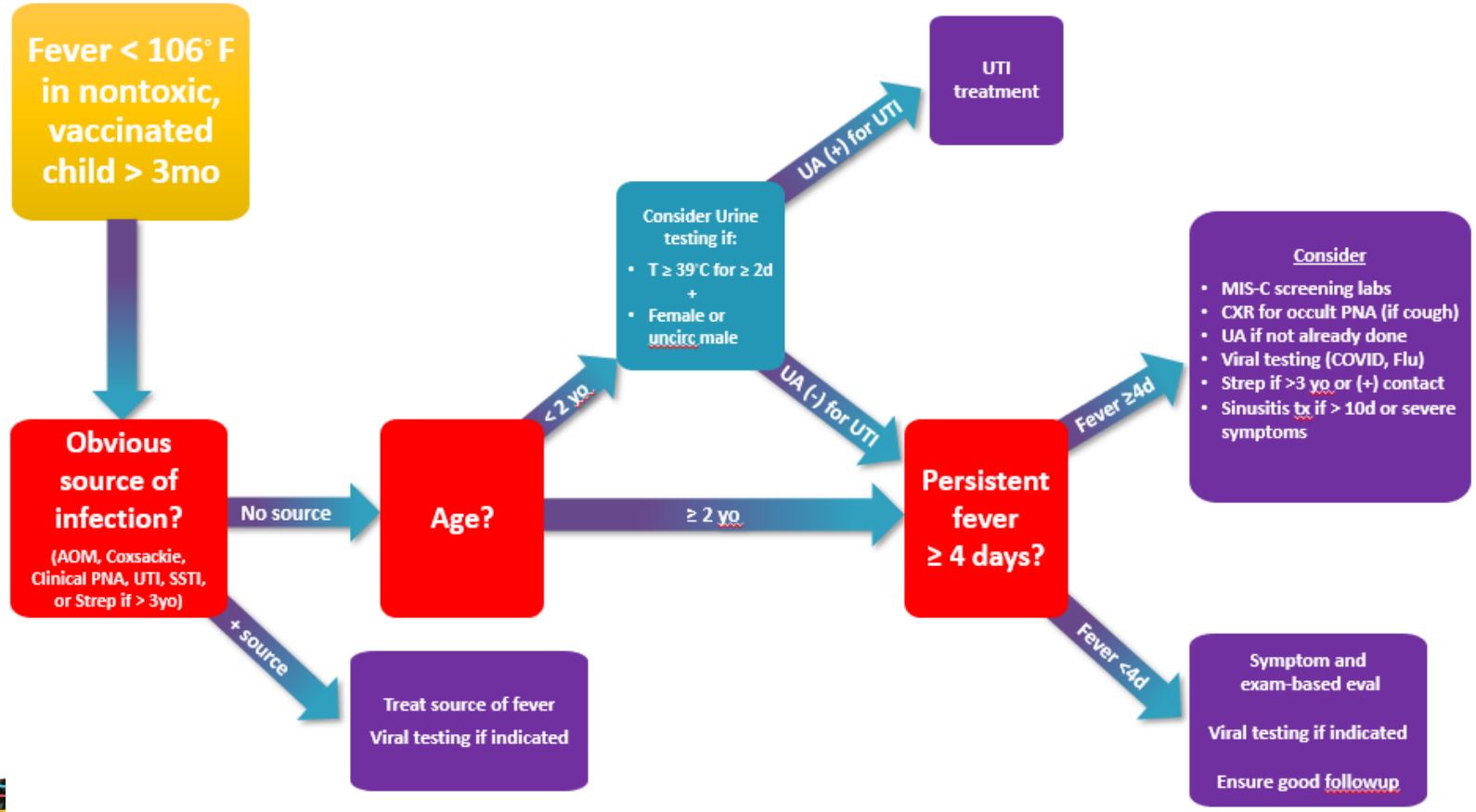
6mo F fever x 3 days tm 103F, cough and congestion, Vacc UTD.
Vitals wnl, nontoxic, no source for infection identified.
What is the best test to elucidate a diagnosis for this patient?

A. CXR

B. Bloodwork

C. ✔ UA/UCX

D. No test, f/u PMD



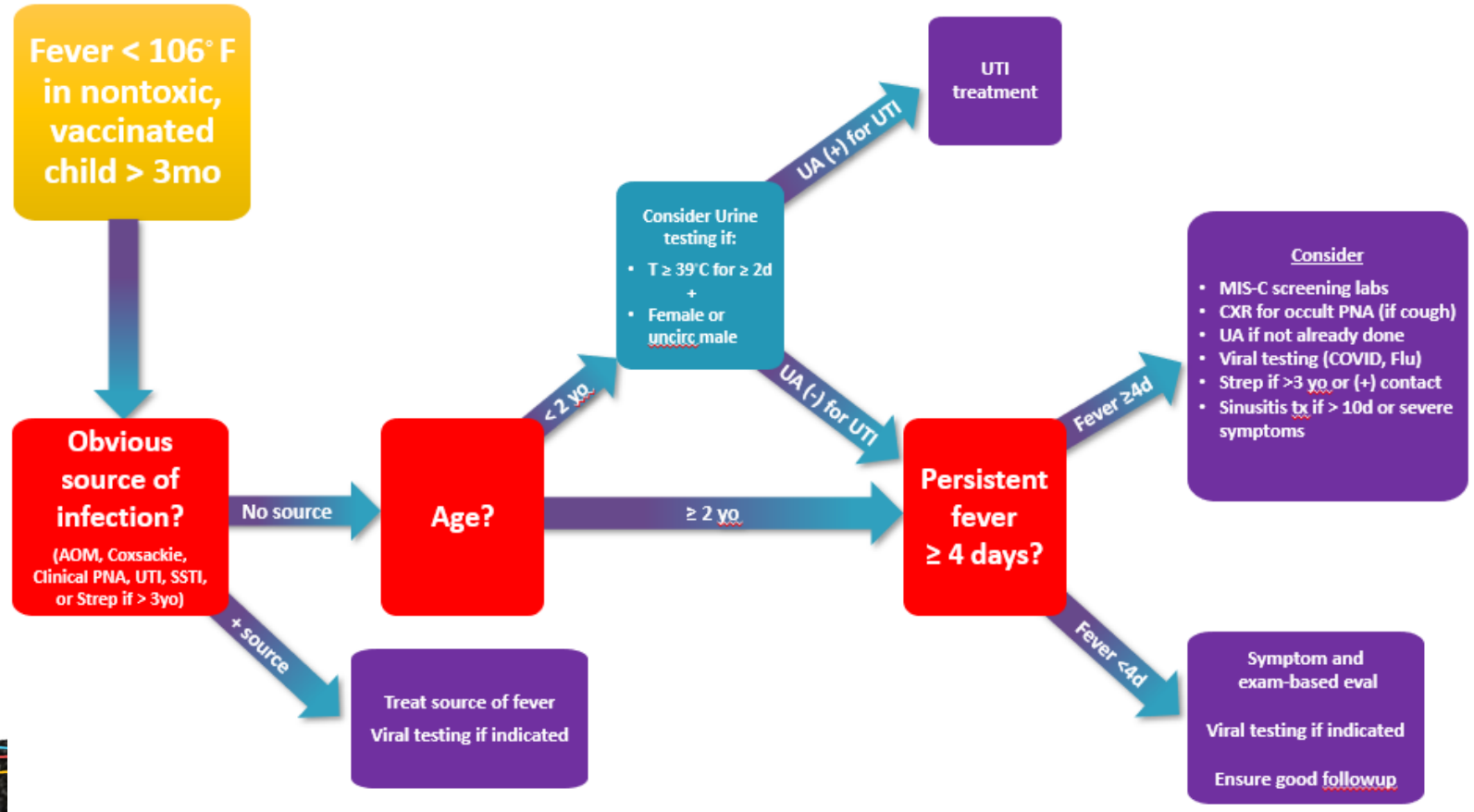
3yo F no PMHx cough and fever x 5 days, Tm 104F, UTD, No dysuria.
HR 120, RR 22, T 101, Sat 95%, Lungs clear, no resp. distress, nl exam.
What is the best test to elucidate a diagnosis for this patient?

A. ✓ CXR

B. Bloodwork

C. UA/UCX

D. No test, f/u PMD



7yo M fever x 5 days, Tm 102F, Vacc UTD, No cough or dysuria +vomiting, +non focal abdominal pain.
HR 145, BP wnl, O2 98%, T 101, nontoxic, blanching rash, otherwise nl exam. Strep test is negative
What is the most important test for this patient?

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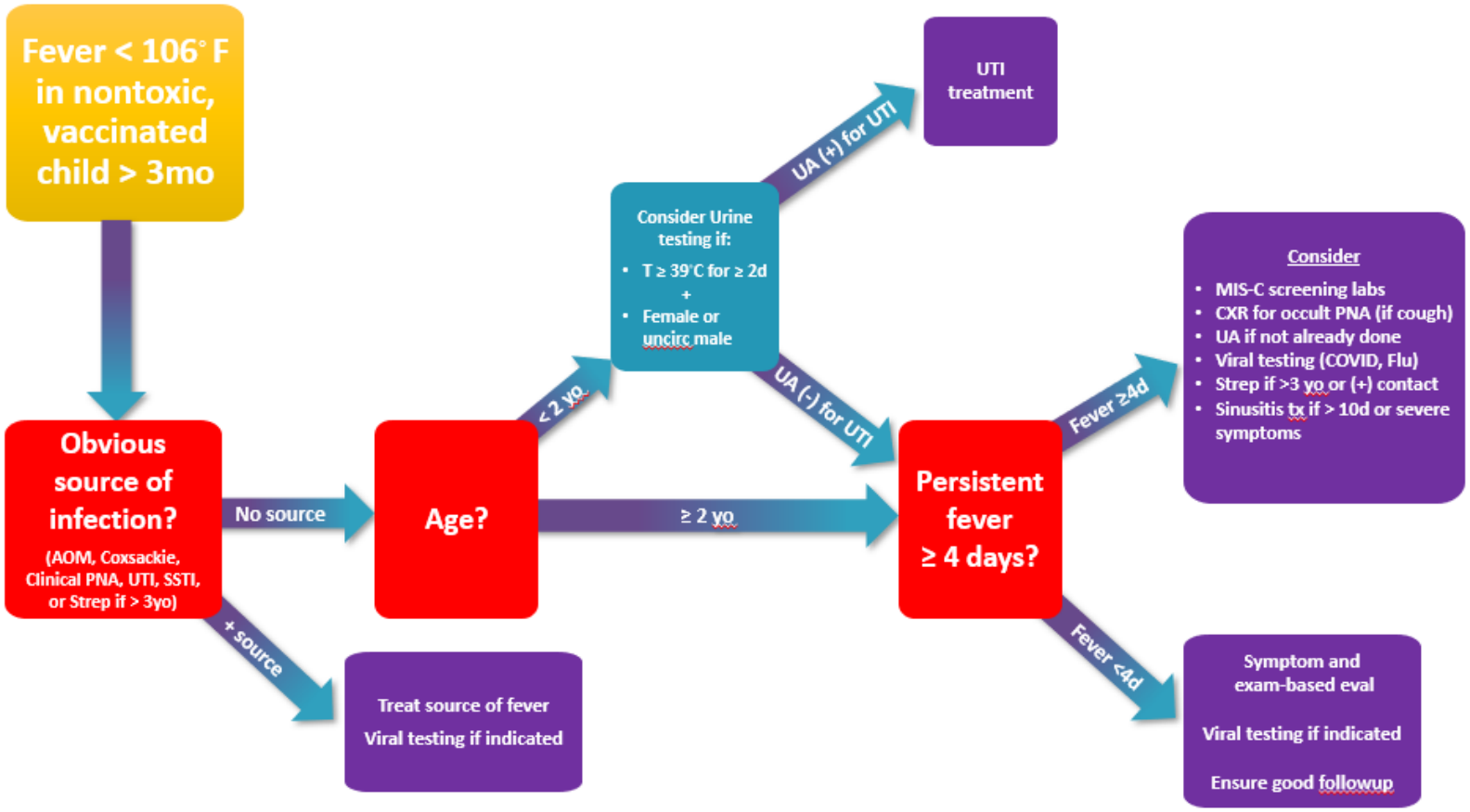
A. CXR

B. ✓ Bloodwork

C. UA/UCX

D. No test, f/u PMD



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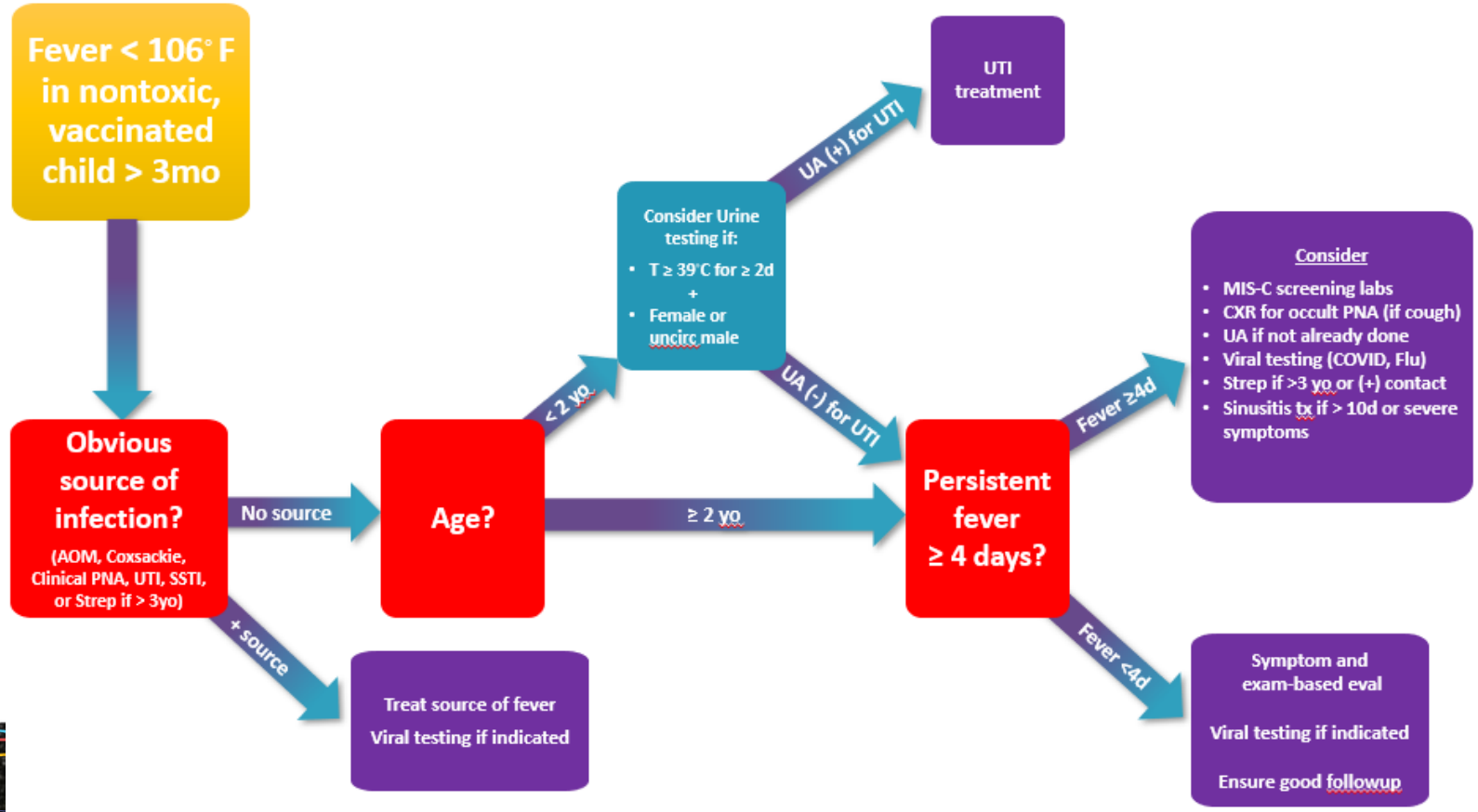
4yo M fever x 3 days, Tm 104, Vacc UTD, mild URI sx. Vomited x2 after cough. No dysuria. Vitals normal, nontoxic, non focal exam. What is the best approach to this patient?

A. CXR

B. Bloodwork

C. UA/UCX

D. ✓ No test, f/u PMD



How you can drive change:

- Fever Phobia is real, understand parental concern
- Most non-toxic, vaccinated pediatric patients with fever need no workup
- Structured Approach – just 5 simple questions!!!
  - High risk?
  - Source?
  - Age < 2 years old? (think urine)
  - Fever > 4 days?
  - Viral testing needed?

Session Evaluation

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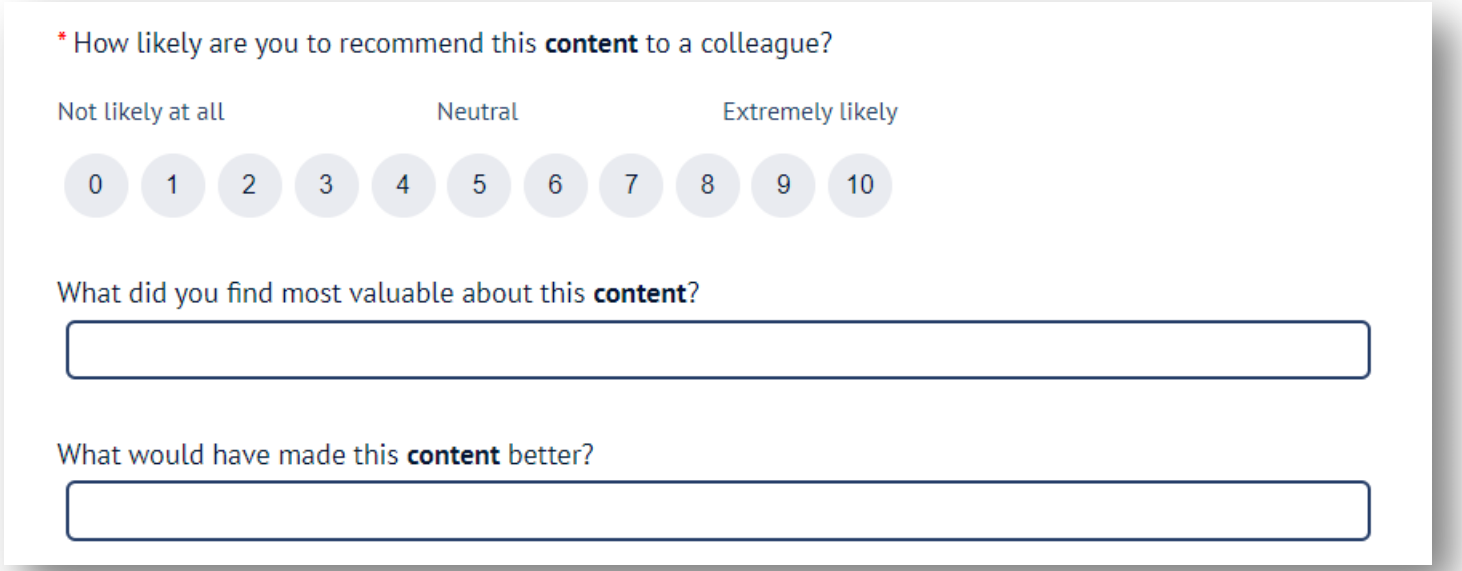
- Your feedback is valuable, take a moment to complete the survey for this session.
- To claim CME, you must complete a separate survey available after the convention.



Thank you

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