

Clinical update no. 524

24 October 2018

Case scenario: fever for 1 day in 6 week old infant. Term delivery, mother screened –ve for grp B *Strep*. Infant is alert and interacting, not tachypnoeic, good perfusion and capillary return <2 sec. Vital signs within normal range. Feeding is a little reduced but has wet nappies. What septic workup is required, and is an LP needed?

NSW HEALTH POLICY STATEMENT

INFANTS AND CHILDREN: ACUTE MANAGEMENT OF FEVER

PD2010_063 Issue date: October 2010

https://www1.health.nsw.gov.au/pds/ActivePDS/Documents/PD2010_063.pdf From 2010 - due for review.

neonates (0–4 weeks)

All febrile neonates should have a full septic workup and be admitted for parenteral antibiotics.

Infants aged 1–3 months will generally be managed in a similar fashion

Infants assessed as low risk may be able to be managed as outpatients with close follow up.



New evidence guides a risk assessment for meningitis, and the yield of doing an LP.

ORIGINAL ARTICLES www.jpeds.com • THE JOURNAL OF PEDIATRICS

Lumbar Puncture for All Febrile Infants 29-56 Days Old: A Retrospective Cohort Reassessment Study

Richard Scartone, MD^{1,2}, Ashlee Murray, MD, MPH^{1,2}, Payal Gala, MD^{1,2}, and Fran Balamuth, MD, PhD, MSCE^{1,2}

J Pediatr 2017;187:200-5

1188 febrile infants age 29-56 days assessed as low risk (Philadelphia criteria).

Table 1. Factors that define an infant at low risk for SBI

Past medical histories	Physical examination	Laboratory results
No chronic medical conditions No history of prematurity (<37 weeks gestation) No systemic antibiotics within 72 hours of visit	No skin or soft tissue infection such as omphalitis, mastitis, abscess, or cellulitis Not "irritable," "septic," "lethargic," or "toxic-appearing" No documented hypothermia (<36.5°F)	Peripheral WBC 5-15 000 per microliter Band/Neutrophil ratio <0.2 in blood No hypoglycemia (<50 mg/dL) Standard urinalysis negative or small leukocyte esterase, negative nitrites, and <10 WBC/hpf or enhanced urinalysis <10 WBC/mm ³ and negative Gram stain Chest radiograph negative (if obtained)

There were no cases of bacterial meningitis in low risk infants, with a single case in a child wrongly assessed as low risk. Another 40 (3.4%) +ve CSF cultures were contaminants.

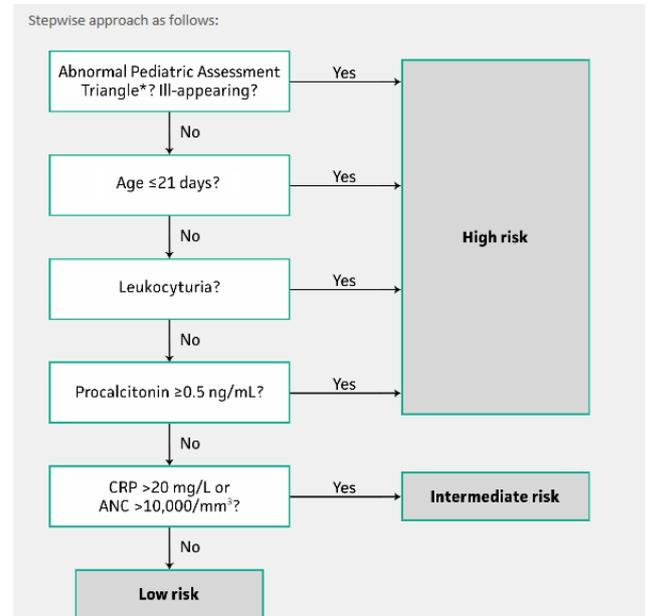
Step-by-Step Approach to Febrile Infants ☆

Identifies febrile infants ≤90 days old at low risk of invasive bacterial infections.

INSTRUCTIONS

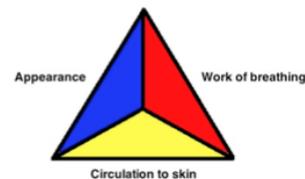
Use in previously healthy infants ≤90 days old presenting with fever without a source.

There has been interest in the "Step by Step" approach to febrile infants. www.mdcalc.com/step-step-approach-febrile-infants



Pediatric Assessment Triangle

Dieckmann R et al. *Pediatr Emerg Care* 2010. PMID 20386420
ER CAST: <http://blog.eroast.org/2010/05/the-toxic-neonate/>
(Courtesy of Dr. Michelle Reina & Dr. Rob Bryant)



The PAT functions as a rapid, initial assessment to determine "sick" or "not sick," and should be immediately followed by/not delay the ABCDEs. It can be utilized for serial assessment of patients to track response to therapy.

Appearance: The "Tickles" (TICLS) Mnemonic

Characteristic	Normal features
T one	Move spontaneously, resists examination, sits or stands (age appropriate)
I nteractiveness	Appears alert/engaged with clinician or caregiver, interacts well with people/environment, reaches for objects
C onsolability	Stops crying with holding/comforting by caregiver, has differential response to caregiver vs. examiner
L ook/gaze	Makes eye contact with clinician, tracks visually
S peech/cry	Uses age-appropriate speech

Work of breathing

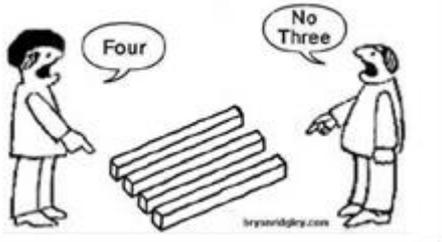
Characteristic	Abnormal features
Abnormal airway sounds	Snoring, muffled/hoarse speech, stridor, grunting, wheezing
Abnormal positioning	Sniffing position, tripodding, prefers seated posture
Retractions	Supraclavicular, intercostal, or substernal, head bobbing (infants)
Flaring	Flaring of the nares on inspiration

Circulation to skin

Characteristic	Abnormal features
Pallor	White/pale skin or mucous membranes
Mottling	Patchy skin discoloration due to variable vasoconstriction
Cyanosis	Bluish discoloration of skin/mucous membranes

If any single aspect is abnormal, then the infant should be considered high-risk

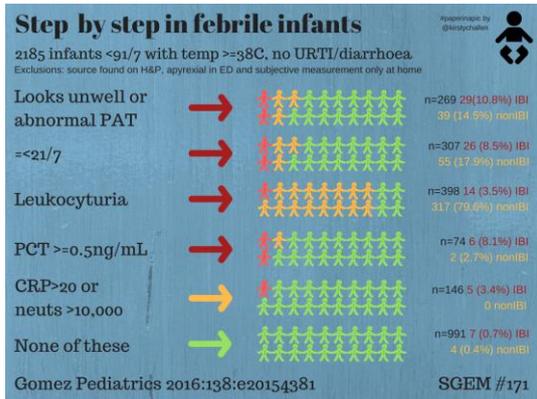
At the outset it's a non-starter for most EDs because procalcitonin is not widely used. Also, it was done in dedicated paediatric EDs in Europe, so external validity without paediatric input has not been validated. Several components are subjective.



Validation of the "Step-by-Step" Approach in the Management of Young Febrile Infants

Borja Gomez, MD,* Santiago Mitegui, MD, PhD,* Silvia Bressan, MD, PhD,† Liviana Da Dal, MD,† Alain Gervais, MD,† Laurence Lacroix, MD,† on behalf of the European Group for Validation of the Step-by-Step Approach

PEDIATRICS Volume 138, number 2, August 2016.



Red: invasive bacterial infection (IBI);
Orange: non-IBI; Green: no bacterial infection

Invasive bacterial infection: "isolation of a bacterial pathogen in a blood or CSF culture".



Intermediate risk: 3.4%; high risk: 8.1% IBI.

Sensitivity in low risk infants 22-90 days:

- IBI: sensitivity 92%
- 7 missed
- 4 were 22-28 days
- 6 had fever <2hr

Procalcitonin was $\geq 0.5\text{ng/ml}$ in 74 with 6 IBIs, including a bacterial meningitis and 3 septic

infants >21 days not identified by clinical appearance or +ve u/a.

Of 2185 infants 0-90 days there were 87 with IBI, of which 22 were aged 29-90 days. Three of those aged 29-90 days met low risk criteria (being 36, 38 and 84 days old), i.e. looked clinically well, so essentially occult bacteraemia. All had good outcomes.

TABLE 2 Bacterial Infections Diagnosed

Infection Type	Count	Percentage
IBIs	87	3.9%
Bacterial sepsis	26	
Bacteremic UTI	25	
Occult bacteremia	24	
Bacterial meningitis	10	
Cellulitis-adenitis syndrome with bacteremia	1	
Septic arthritis	1	
Non-IBI	417	19.1%
UTI	409	
Bacterial gastroenteritis	5	
Cellulitis-adenitis syndrome with negative cultures	1	
Omphalitis with negative cultures	1	
Myositis with negative cultures	1	
Possible bacterial infections	98	4.5%
Possible UTI (positive urine culture without leukocyturia)	88	
Pneumonia with negative cultures	7	
Acute otitis media with negative cultures	3	

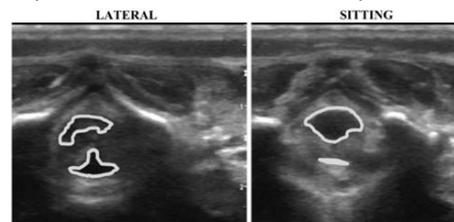
CASE RESOLUTION. A full septic workup with LP for infants <30 days is still required. Attempts to lower the age cut off to 21 days is sporting to say the least. The Step by Step approach involved procalcitonin and a paediatric ED setting, so paediatric input is required, and most EDs don't use procalcitonin. IBIs in those presenting with fever <2hr duration mandate a period of observation, and if paediatrics are happy to manage as an outpatient then close follow up is mandatory. However bacterial meningitis is rare in those with low risk criteria at age 29-90 days, and LP is not mandatory.

ORIGINAL ARTICLE

The Sonographic Appearance of Spinal Fluid at Clinically Selected Interspaces in Sitting Versus Lateral Positions

Pediatr Emer Care 2018;34: 334-338

At <3mth LP is better done sitting up, with a larger space than when in left lateral position.



Spinal fluid area measurements in lateral versus sitting positions for a representative subject.

These updates are a review of current literature and do not replace local treatment protocols and policy. Treating doctors are individually responsible for following standard of care.