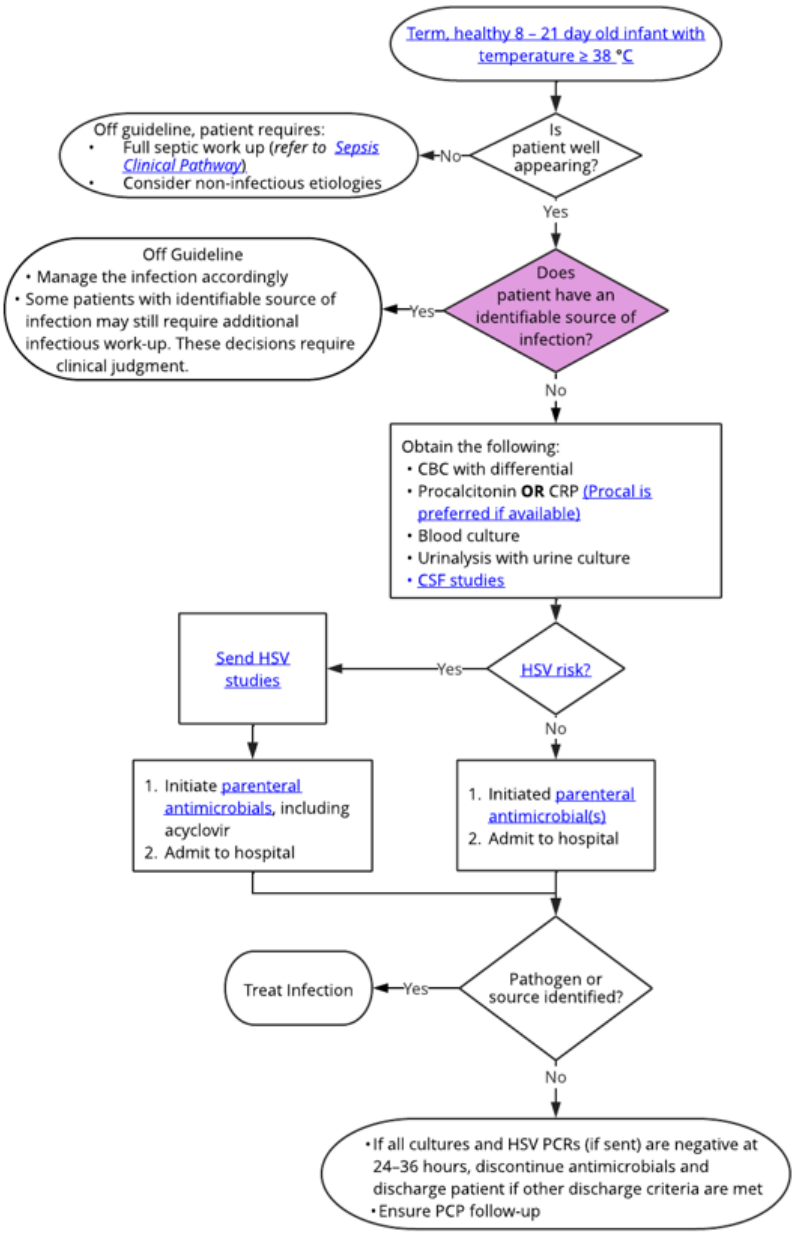
Febrile Infant
Clinical Pathway Synopsis

Febrile Infants 8 to 21 Days



Febrile Infant Quick Guide

Febrile Infants: 22 to 28 days old

Febrile Infants: 29 to 60 days old

Identifiable Source of Infection
Focal bacterial infection (e.g., cellulitis, omphalitis, septic arthritis, osteomyelitis)
OR
Viral infection (e.g., clinical evidence of bronchiolitis)

Note: Viral testing alone should not drive clinical decision making. A negative viral test does not rule out viral illness and a positive viral tests may be due to recent illness rather than the current presentation.

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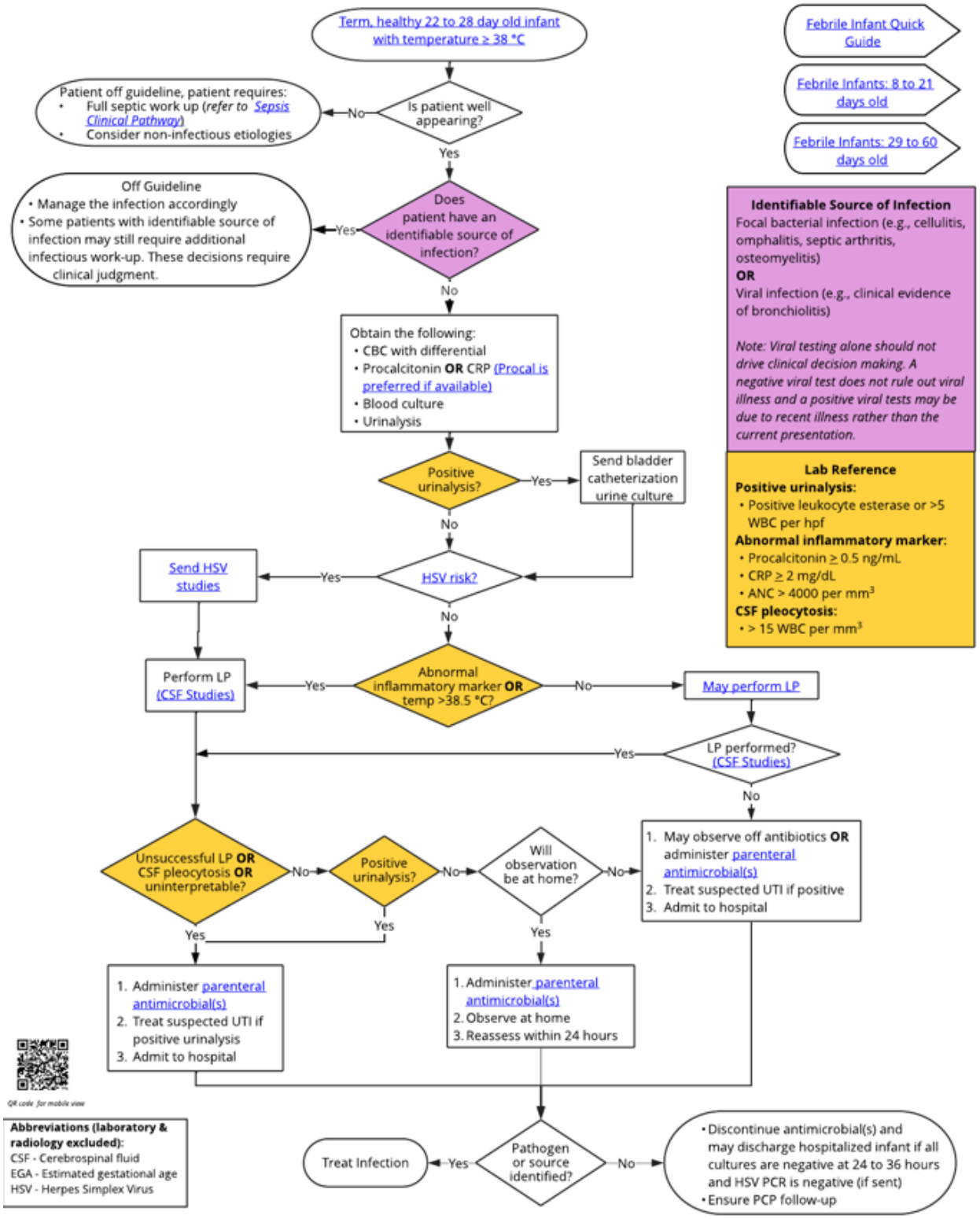
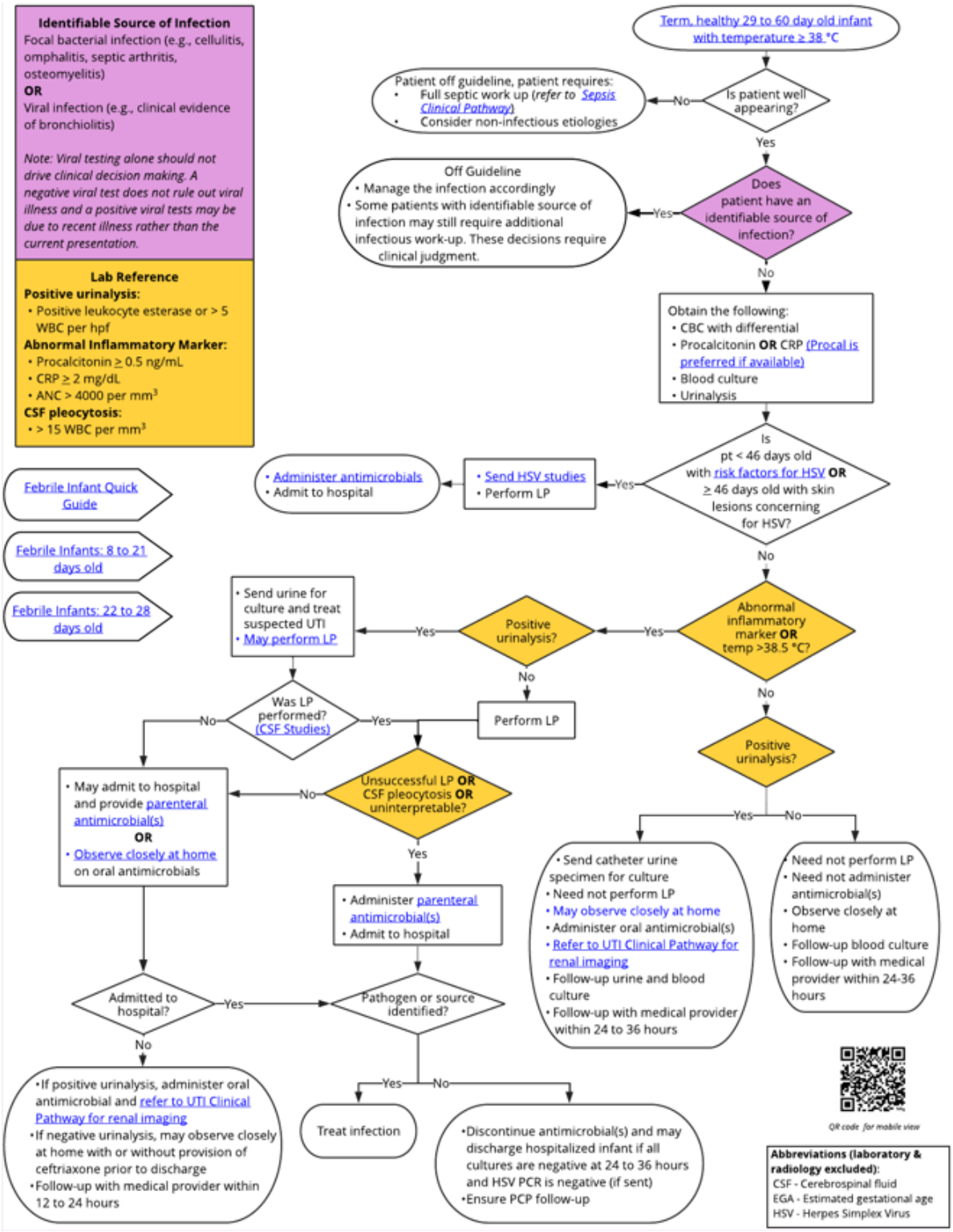
Abbreviations (laboratory & radiology excluded):
EGA - Estimated Gestational Age
CSF - Cerebrospinal Fluid
HSV - Herpes Simplex Virus

Febrile Infants 22 to 28 Days



Febrile Infants 29 to 60 Days



Objective of Clinical Pathway

To provide care standards for well-appearing febrile infants throughout the care continuum.

Background

Fever in infants can at times be the only sign of invasive bacterial infection. Although rates are lower than in the past (Pantell et al, 2021), missed diagnoses can have serious long-term adverse outcomes. Many febrile infants undergo extensive laboratory evaluations, including blood, urine, and cerebrospinal fluid cultures, followed by empiric broad spectrum antibiotics and hospitalization (Powell et al, 2019). However, risks associated with these medical interventions are increasingly recognized (Pantell et al, 2021), prompting the development of evidence based strategies for a more targeted approach. In 2021, the American Academy of Pediatrics (AAP) Subcommittee on Febrile Infants updated the clinical practice guidelines, providing recommendations based on patient age, clinical presentation, and laboratory findings. These recommendations assist providers in identifying infants at low risk of invasive bacterial infection and choosing diagnostic and therapeutic interventions for those at higher risk (Pantell et al, 2021).

Target Users

- Emergency Department Providers
- Urgent Care Clinic Providers
- General Pediatricians
- Pediatric Hospitalists
- Fellows
- Resident Physicians
- Pediatric Nurse Practitioners

Target Population

Inclusion Criteria

- Well-appearing
- Full-term (≥ 37 weeks estimated gestational age)
- 8 to 60-days of age
- Temperature ≥ 38 °C at home in the past 24 hours or determined in a clinical setting
- Without an identifiable source of infection

Exclusion Criteria

- ≤ 7 days
- Preterm infants ≤ 37 weeks
- Younger than 2 weeks of age whose perinatal courses were complicated by maternal fever, infection, and/or antimicrobial use
- Focal bacterial infection (eg, cellulitis, omphalitis, septic arthritis, osteomyelitis). These infections should be managed according to accepted standards
- Infants with clinical bronchiolitis, with or without positive test results for respiratory syncytial virus (RSV)
- Documented or suspected immune compromise
- Neonatal course was complicated by surgery or infection
- Congenital or chromosomal abnormalities
- Medically fragile infants requiring some form of technology or ongoing therapeutic intervention to sustain life
- Infants who have received immunizations within the last 48 hours

AGREE II

The American Academy of Pediatric national Guidelines provided guidance to the Febrile Infant Clinical Pathway committee (Pantell et al., 2021). See Table 1 for AGREE II.

Table 1

AGREE II[a] Summary for the Guideline Patell et al. (2021)

Domain	Percent Agreement	Percent Justification
Scope and purpose	97%	The aim of the guideline, the clinical questions posed and target populations **were** identified.
Stakeholder involvement	88%	The guideline **was developed** by the appropriate stakeholders and represents the views of its intended users.
Rigor of development	95%	The process used to gather and synthesize the evidence, the methods to formulate the recommendations and to update the guidelines **were** explicitly stated.
Clarity and presentation	100%	The guideline recommendations **are** clear, unambiguous, and easily identified; in addition, different management options are presented.
Applicability	96%	Barriers and facilitators to implementation, strategies to improve utilization and resource implications **were addressed** in the guideline.
Editorial independence	100%	The recommendations **were not** biased with competing interests.
Committee's recommendation for guideline use	Yes with modification	

Practice Recommendations:

Please refer to the American Academy of Pediatrics (Pantell et al., 2021) Clinical Practice Guideline for full practice recommendations, evaluation, and treatment recommendations.

Children's Mercy Practice Recommendations and Reasoning:

Children's Mercy adopted the majority of the practice recommendations made by the AAP Clinical Practice Guideline. Deviations include:

- The AAP recommends gentamicin for infants 8-21 days of age with suspected UTI or suspected infection with no focus identified. Gentamicin is generally not preferred at Children's Mercy; choices should be made based on clinical factors and local susceptibility patterns.
- The AAP advises that providers **may** obtain inflammatory markers (i.e., procalcitonin, CRP, CBC) for infants 8-21 days of age. They are not strongly recommended due to the fact that lumbar puncture is recommended in infants of this age regardless of inflammatory markers. However, Children's Mercy does recommend procalcitonin or CRP and CBC for infants 8-21 days of age. Lumbar puncture may be unsuccessful, yield too little CSF, or yield CSF with many red blood cells, making it difficult to interpret CSF WBC count and/or culture. In these cases, inflammatory markers may help guide the treatment plan.
- The AAP recommends that providers **may** obtain CSF studies for those infants 29-60 days of age with positive inflammatory markers and a negative urinalysis. However, we recognize the importance of consistency in care among settings and providers across our institution. To safely minimize variation in practice, Children's Mercy recommends providers obtain CSF for infants 29-60 days of age with elevated inflammatory markers and no identifiable source.

Updates from Previous Versions of the Clinical Pathway

- All age groups: Added link to Sepsis pathway for those who are ill-appearing
- All age groups: Procalcitonin was added as preferred to CRP, if it's readily available. This is consistent with the AAP guideline.
- 29-60 day age group: ID provided an update that HSV is rare beyond 46 days of age without skin findings. The HSV risk stratification is now divided into two age groups. For those 29-46 days of age, the HSV risks are the same as the prior version. For those 47-60 days of age, HSV testing and empiric treatment are only recommended if there are cutaneous lesions.
- All age groups: The pathway is only intended for those patients without an identified source of infection. This was highlighted by adding a question within the algorithm and providing examples of such sources of infection (e.g., cellulitis, bronchiolitis).

Measures

- Utilization of the clinical pathway
- Utilization of associated order sets

Value Implications:

The following potential improvements may reduce costs and resource utilization for healthcare facilities and reduce healthcare costs and non-monetary costs (e.g., missed school/work, loss of wages, stress) for patients and families.

- Decreased risk of over- or underdiagnosis
- Decreased risk of overtreatment
- Decreased frequency of admission
- Decreased inpatient length of stay
- Decreased unwarranted variation in care

Organizational Barriers:

- Variability of acceptable level of risk among providers
- Challenges with follow-up faced by some families

Organizational Facilitators:

- Collaborative engagement across care settings in clinical pathway development
- High rate of use of clinical pathway
- Standardized order set for Emergency Department, and Hospital Medicine

Order Sets:

- Inpt: Febrile Infant 0-60 days (inpatient) Pathway
- EDP Febrile Infant Pathway

Clinical Pathway Preparation

This clinical pathway was prepared by the EBP Department in collaboration with content experts at Children's Mercy Kansas City. The development of this clinical pathway supports the Performance Excellence initiative to promote care standardization that builds a culture of quality and safety that is evidenced by measured outcomes. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

Febrile Infant Clinical Pathway Representation.

- This clinical pathway was originally created with representation from Hospital Medicine, Emergency Medicine, Infectious Diseases, Urgent Care, and Pharmacy.

Revision Representation

- Christopher Veit, MD, MHPE, FAAP | Hospital Medicine | Committee Chair
- Erin Scott, DO | Emergency Medicine | Committee member
- Josh Herigon, MD, MPH, MBI | Infectious Diseases | Committee member
- Maria Blanco, MD | Urgent Care | Committee member

- Alaina Burns, Pharm.D., BCPPS | Pharmacy | Committee member

EBP Committee Members

- Katie Berg, MD, FAAP | Evidence Based Practice & Hospital Medicine | Committee member
- Jarrod Dusin, PhD, RD, CPHQ | Evidence Based Practice | Committee member

Clinical Pathway Development Funding

The development of this clinical pathway was underwritten by the Department of EBP and the divisions of Hospital Medicine, Emergency Medicine, Infectious Diseases, and Urgent Care.

Approval Process

This clinical pathway was reviewed and approved by the clinical pathway committee after garnering feedback from their respective divisions/departments. It was also approved by the EBP Department, Medical Executive Committee, and other appropriate hospital committees deemed suitable for this clinical pathway's intended use.

Revision Approval Obtained

Department/Unit	Date Obtained
Hospital Medicine	June 2025
Emergency Medicine	June 2025
Infectious Diseases	June 2025
Urgent Care	June 2025

Version History

Date	Comments
April 2017	Version 1
February 2022	Version 2 – Updated Based on 2021 American Academy of Pediatric National Guidelines
June 2025	Version 3 - All age groups: The pathway is only intended for those patients without an identified source of infection; Procalcitonin was added as preferred to CRP; 29-60 day age group: The HSV risk stratification is now divided into two age groups.

Date for Next Review

- June 2028

Implementation & Follow-Up

- Once approved, the clinical pathway was presented to appropriate care teams and implemented.
- Announcements were made via email to each division/department represented on the pathway committee, as well as any other division/department caring for patients meeting inclusion criteria for the pathway.
- Additional institution-side announcements were made via the hospital website and relevant huddles.
- In coordination with the AAP Value in Pediatrics Network REVISE II collaborative, care measurements may be assessed and shared with appropriate care teams to determine if changes need to occur.
- Pathways are reviewed every 3 years (or sooner) and updated as necessary within the EBP Department at CMKC. Pathway committiees are involved with every review and update.

Disclaimer

The content experts and the Office of EBP are aware of the controversies surrounding the Febrile Infant Clinical Pathway. When evidence is lacking or inconclusive, options in care are provided in the clinical pathway and the order sets that accompany the clinical pathway.

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time.

It is impossible to anticipate all possible situations that may exist and to prepare clinical pathways for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times

References

Brouwers, M.C. et al. for the AGREE Next Steps Consortium. (2010) AGREE II: Advancing guideline development, reporting and evaluation in healthcare. *Canadian Medical Association Journal, 182*, E839-842. Retrieved from https://www.agreetrust.org/wp-content/uploads/2017/12/AGREE-II-Users-Manual-and-23-item-Instrument-2009-Update-2017.pdf

Pantell, R. H., Roberts, K. B., Adams, W. G., Dreyer, B. P., Kuppermann, N., O'Leary, S. T., ... & Teichman, J. S. (2021). Evaluation and management of well-appearing febrile infants 8 to 60 days old. *Pediatrics*, *148*(2).

Powell, E. C., Mahajan, P. V., Roosevelt, G., Hoyle Jr, J. D., Gattu, R., Cruz, A. T., ... & Lillis, K. (2018). Epidemiology of bacteremia in febrile infants aged 60 days and younger. *Annals of emergency medicine*, *71*(2), 211-216.