

# Urinary Tract Infections

## EVIDENCE REPOSITORIES

Evidence repositories are collections of best available resources and evidence (clinical guidelines, peer reviewed literature, systematic reviews, etc.), collated by our knowledge synthesis team and content advisors. This evidence repository is not intended to be an exhaustive list of resources for a topic, but rather a curated list of current, evidence-based resources, based on expert consensus of relevance and usability for a general emergency department setting. We search databases (Cochrane Library, PubMed, TRIP Database) and web search engines (Google, Google Scholar) to locate evidence. Additionally, hospital websites are browsed for guidance documents, such as clinical practice guidelines (CPG) for healthcare professionals

Every effort is made to identify resources that are open access (i.e. publicly available, free of charge, not requiring a subscription).

More information about the creation of our evidence repositories can be found at <https://pubmed.ncbi.nlm.nih.gov/28537762/>

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TREKK developed resources for healthcare providers and parents & families can be found [here](#).

## Key Resources

1. Dos Santos J. [Urinary tract infections in children](#). BMJ Best Practice 2022.
2. National Institute for Health and Care Excellence. [Urinary tract infection in under 16s overview](#). 2022.
3. ECHO, ARCHE, TREKK Network. VIDEO: [Did you know babies and children can get urinary tract infections?](#) 2019.
4. Helman A, Ostrow O, Science M. [Emergency Medicine Cases Podcast: Pediatric UTI Myths and Misperceptions](#). 2019.

## Clinical Guidelines

1. Robinson JL, Finlay JC, Lang ME, Bortolussi R. [Urinary tract infection in infants and children: Diagnosis and management](#). Canadian Paediatric Society. 2020.
2. Seattle Children's Hospital. [Urinary Tract Infection \(UTI\) - Pathway](#). 2020.
3. Royal Children's Hospital Melbourne. Urinary tract infection. 2019. [https://www.rch.org.au/clinicalguide/guideline\\_index/Urinary\\_tract\\_infection/](https://www.rch.org.au/clinicalguide/guideline_index/Urinary_tract_infection/).
4. National Institute for Health and Care Excellence. [Urinary tract infection in children and young people](#). 2017.
5. Subcommittee on Urinary Tract Infection. [Reaffirmation of AAP Clinical Practice Guideline: The Diagnosis and Management of the Initial Urinary Tract Infection in Febrile Infants and Young Children 2-24 Months of Age](#). Pediatrics. 2016;138(6).
6. Stein R, Dogan HS, Hoebeke P, Kočvara R, Nijman RJ, Radmayr C, et al. [Urinary tract infections in children: EAU/ESPU guidelines](#). Eur Urol. 2015;67(3):546-58.
7. Roberts KB. [Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months](#). Pediatrics. 2011;128(3):595-610.
8. Finnell SM, Carroll AE, Downs SM. [Technical report—Diagnosis and management of an initial UTI in febrile infants and young children](#). Pediatrics. 2011;128(3):e749-70.

## Systematic Reviews

1. Esposito S, Biasucci G, Pasini A, Predieri B, Vergine G, Crisafi A, et al. [Antibiotic Resistance in Paediatric Febrile Urinary Tract Infections](#). J Glob Antimicrob Resist. 2022;29:499-506.

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2. Mattoo TK, Shaikh N, Nelson CP. [Contemporary Management of Urinary Tract Infection in Children](#). Pediatrics. 2021;147(2).
3. Uwaezuoke S, Ayuk A, Muoneke U. [Urinary tract infection in children: a review of the established practice guidelines](#). 2020.
4. Chua M, Ming J, Chang SJ, Santos JD, Mistry N, Silangcruz JM, et al. [A critical review of recent clinical practice guidelines for pediatric urinary tract infection](#). Can Urol Assoc J. 2018;12(4):112-8.
5. Korbel L, Howell M, Spencer JD. [The clinical diagnosis and management of urinary tract infections in children and adolescents](#). Paediatr Int Child Health. 2017;37(4):273-9.
6. Hudson A, Romao RLP, MacLellan D. [Urinary tract infection in children](#). Cmaj. 2017;189(16):E608.
7. Doern CD, Richardson SE. [Diagnosis of Urinary Tract Infections in Children](#). J Clin Microbiol. 2016;54(9):2233-42.
8. Bryce A, Hay AD, Lane IF, Thornton HV, Wootton M, Costelloe C. [Global prevalence of antibiotic resistance in paediatric urinary tract infections caused by Escherichia coli and association with routine use of antibiotics in primary care: systematic review and meta-analysis](#). Bmj. 2016;352:i939.
9. Shaikh N, Borrell JL, Evron J, Leeflang MM. [Procalcitonin, C-reactive protein, and erythrocyte sedimentation rate for the diagnosis of acute pyelonephritis in children](#). Cochrane Database Syst Rev. 2015;1(1):Cd009185.
10. Schwenger EM, Tejani AM, Loewen PS. [Probiotics for preventing urinary tract infections in adults and children](#). Cochrane Database Syst Rev. 2015;2015(12):Cd008772.
11. Strohmeier Y, Hodson EM, Willis NS, Webster AC, Craig JC. [Antibiotics for acute pyelonephritis in children](#). Cochrane Database Syst Rev. 2014(7):Cd003772.
12. Newman DH, Shreves AE, Runde DP. [Pediatric urinary tract infection: does the evidence support aggressively pursuing the diagnosis?](#) Ann Emerg Med. 2013;61(5):559-65.
13. Fitzgerald A, Mori R, Lakhanpaul M, Tullus K. [Antibiotics for treating lower urinary tract infection in children](#). Cochrane Database Syst Rev. 2012(8):Cd006857.
14. Williams G, Craig JC. [Long-term antibiotics for preventing recurrent urinary tract infection in children](#). Cochrane Database Syst Rev. 2011(3):Cd001534.
15. Roberts KB. [Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months](#). Pediatrics. 2011;128(3):595-610.
16. Finnell SM, Carroll AE, Downs SM. [Technical report—Diagnosis and management of an initial UTI in febrile infants and young children](#). Pediatrics. 2011;128(3):e749-70.

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17. Williams GJ, Macaskill P, Chan SF, Turner RM, Hodson E, Craig JC. [Absolute and relative accuracy of rapid urine tests for urinary tract infection in children: a meta-analysis](#). Lancet Infect Dis. 2010;10(4):240-50.
18. Sanders S, Barnett A, Correa-Velez I, Coulthard M, Doust J. [Systematic review of the diagnostic accuracy of C-reactive protein to detect bacterial infection in nonhospitalized infants and children with fever](#). J Pediatr. 2008;153(4):570-4.
19. Shaikh N, Morone NE, Lopez J, Chianese J, Sangvai S, D'Amico F, et al. [Does this child have a urinary tract infection?](#) Jama. 2007;298(24):2895-904.
20. Whiting P, Westwood M, Bojke L, Palmer S, Richardson G, Cooper J, et al. [Clinical effectiveness and cost-effectiveness of tests for the diagnosis and investigation of urinary tract infection in children: a systematic review and economic model](#). Health Technol Assess. 2006;10(36):iii-iv, xi-xiii, 1-154.
21. Whiting P, Westwood M, Watt I, Cooper J, Kleijnen J. [Rapid tests and urine sampling techniques for the diagnosis of urinary tract infection \(UTI\) in children under five years: a systematic review](#). BMC Pediatr. 2005;5(1):4.
22. Michael M, Hodson EM, Craig JC, Martin S, Moyer VA. [Short versus standard duration oral antibiotic therapy for acute urinary tract infection in children](#). Cochrane Database Syst Rev. 2003(1):Cd003966.

## Key Studies

1. Tamas V, Shah S, Hollenbach KA, Kanegaye JT. [Emergence of Extended-Spectrum  \$\beta\$ -Lactamase-Producing Pathogens in Community-Acquired Urinary Tract Infections Among Infants at a Pediatric Emergency Department](#). Pediatr Emerg Care. 2022;38(3):e1053-e7.
2. Lubell TR, Barasch JM, King B, Ochs JB, Fan W, Duong J, et al. [Urinary tract infections in children: Testing a novel, noninvasive, point-of-care diagnostic marker](#). Acad Emerg Med. 2022;29(3):326-33.
3. Furmick J, Scarboro C, Runyon M, Manning J. [Implementation of a Urinary Tract Infection Management Pathway to Evaluate Emergency Department Length of Stay in a Pediatric Emergency Department](#). Ann Emerg Med. 2022;79(3):270-8.
4. Cenzato F, Milani GP, Amigoni A, Sperotto F, Bianchetti MG, Agostoni C, et al. [Diagnosis and management of urinary tract infections in children aged 2 months to 3 years in the Italian emergency units: the ItaUTI study](#). Eur J Pediatr. 2022;181(7):2663-71.

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5. Boon HA, Verbakel JY, De Burghgraeve T, Bruel AVD. [Clinical prediction rules for childhood urinary tract infections: a cross-sectional study in ambulatory care](#). BJGP Open. 2022.
6. Bahans C, Dallochio A, Tran A, Dubos F, Soto B, Schoder G, et al. [The position during urine sample collection from young precontinent children through a bag does not limit contamination rates: Results from a randomized controlled trial: Does infant position influence quality of urine collection?](#) Arch Pediatr. 2022;29(5):359-63.
7. Suresh J, Krishnamurthy S, Mandal J, Mondal N, Sivamurukan P. [Diagnostic Accuracy of Point-of-care Nitrite and Leukocyte Esterase Dipstick Test for the Screening of Pediatric Urinary Tract Infections](#). Saudi J Kidney Dis Transpl. 2021;32(3):703-10.
8. Marchal S, Janicot J, Salicis J, Demonchy D, Herisse AL, Olla M, et al. [Quick-Wee versus bladder stimulation to collect midstream urine from precontinent infants under 1 year of age: a study protocol for a randomised controlled trial \(ES.Stimquick.U\)](#). BMJ Open. 2021;11(9):e046324.
9. Williams-Smith JA, Fougère Y, Pauchard JY, Asner S, Gehri M, Crisinel PA. [Risk factors for urinary tract infections in children aged 0-36months presenting with fever without source and evaluated for risk of serious bacterial infections](#). Arch Pediatr. 2020;27(7):372-9.
10. Poole NM, Kronman MP, Rutman L, Weissman SJ, Migita RT, Caglar D, et al. [Improving Antibiotic Prescribing for Children With Urinary Tract Infection in Emergency and Urgent Care Settings](#). Pediatr Emerg Care. 2020;36(6):e332-e9.
11. Ammenti A, Alberici I, Brugnara M, Chimenz R, Guarino S, La Manna A, et al. [Updated Italian recommendations for the diagnosis, treatment and follow-up of the first febrile urinary tract infection in young children](#). Acta Paediatr. 2020;109(2):236-47.
12. Weill O, Labrosse M, Levy A, Desjardins MP, Trottier ED, Gravel J. [Point-of-care ultrasound before attempting clean-catch urine collection in infants: a randomized controlled trial](#). CJEM. 2019;21(5):646-52.
13. Walters EM, D'Auria J, Jackson C, Walsh-Kelly C, Park D, Willis ZI. [An Ambulatory Antimicrobial Stewardship Initiative to Improve Diagnosis and Treatment of Urinary Tract Infections in Children](#). Jt Comm J Qual Patient Saf. 2019;45(12):829-37.
14. Schlechter Salinas AK, Hains DS, Jones T, Harrell C, Meredith M. [Testing for Urinary Tract Infection in the Influenza/Respiratory Syncytial Virus-Positive Febrile Infant Aged 2 to 12 Months](#). Pediatr Emerg Care. 2019;35(10):666-70.

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15. Rivanowitch E, Nassar R, Kristal E, Shalev R, Fruchtman Y, Hazan G, et al. [Urinary tract infection in young infants discharged from the emergency room with normal urinalysis](#). Acta Paediatr. 2019;108(4):745-50.
16. Maduemem KE, Rodriguez YD, Fraser B. [How Sensitive are Dipstick Urinalysis and Microscopy in Making Diagnosis of Urinary Tract Infection in Children?](#) Int J Prev Med. 2019;10:62.
17. Chaudhari PP, Monuteaux MC, Bachur RG. [Management of Urinary Tract Infections in Young Children: Balancing Admission With the Risk of Emergency Department Revisits](#). Acad Pediatr. 2019;19(2):203-8.
18. Tzimenatos L, Mahajan P, Dayan PS, Vitale M, Linakis JG, Blumberg S, et al. [Accuracy of the Urinalysis for Urinary Tract Infections in Febrile Infants 60 Days and Younger](#). Pediatrics. 2018;141(2).
19. Shaikh N, Hoberman A, Hum SW, Alberty A, Muniz G, Kurs-Lasky M, et al. [Development and Validation of a Calculator for Estimating the Probability of Urinary Tract Infection in Young Febrile Children](#). JAMA Pediatr. 2018;172(6):550-6.
20. Karavanaki KA, Soldatou A, Koufadaki AM, Tsentidis C, Haliotis FA, Stefanidis CJ. [Delayed treatment of the first febrile urinary tract infection in early childhood increased the risk of renal scarring](#). Acta Paediatr. 2017;106(1):149-54.
21. Shaikh N, Mattoo TK, Keren R, Ivanova A, Cui G, Moxey-Mims M, et al. [Early Antibiotic Treatment for Pediatric Febrile Urinary Tract Infection and Renal Scarring](#). JAMA Pediatr. 2016;170(9):848-54.
22. Shaikh N, Hoberman A, Keren R, Ivanova A, Gotman N, Chesney RW, et al. [Predictors of Antimicrobial Resistance among Pathogens Causing Urinary Tract Infection in Children](#). J Pediatr. 2016;171:116-21.
23. Hay AD, Sterne JA, Hood K, Little P, Delaney B, Hollingworth W, et al. [Improving the Diagnosis and Treatment of Urinary Tract Infection in Young Children in Primary Care: Results from the DUTY Prospective Diagnostic Cohort Study](#). Ann Fam Med. 2016;14(4):325-36.
24. Hay AD, Birnie K, Busby J, Delaney B, Downing H, Dudley J, et al. [The Diagnosis of Urinary Tract infection in Young children \(DUTY\): a diagnostic prospective observational study to derive and validate a clinical algorithm for the diagnosis of urinary tract infection in children presenting to primary care with an acute illness](#). Health Technol Assess. 2016;20(51):1-294.

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25. Schroeder AR, Chang PW, Shen MW, Biondi EA, Greenhow TL. [Diagnostic accuracy of the urinalysis for urinary tract infection in infants <3 months of age](#). Pediatrics. 2015;135(6):965-71.
26. Herreros ML, Tagarro A, García-Pose A, Sánchez A, Cañete A, Gili P. [Accuracy of a new clean-catch technique for diagnosis of urinary tract infection in infants younger than 90 days of age](#). Paediatr Child Health. 2015;20(6):e30-2.
27. Alberici I, Bayazit AK, Drozd D, Emre S, Fischbach M, Harambat J, et al. [Pathogens causing urinary tract infections in infants: a European overview by the ESCAPE study group](#). Eur J Pediatr. 2015;174(6):783-90.
28. Schnadower D, Kuppermann N, Macias CG, Freedman SB, Agrawal D, Mao J, et al. [Outpatient management of young febrile infants with urinary tract infections](#). Pediatr Emerg Care. 2014;30(9):591-7.
29. Coulthard MG, Lambert HJ, Vernon SJ, Hunter EW, Keir MJ, Matthews JN. [Does prompt treatment of urinary tract infection in preschool children prevent renal scarring: mixed retrospective and prospective audits](#). Arch Dis Child. 2014;99(4):342-7.
30. Bachur R, Harper MB. [Reliability of the urinalysis for predicting urinary tract infections in young febrile children](#). Arch Pediatr Adolesc Med. 2001;155(1):60-5.
31. Shaw KN, McGowan KL, Gorelick MH, Schwartz JS. [Screening for urinary tract infection in infants in the emergency department: which test is best?](#) Pediatrics. 1998;101(6):E1.
32. Hoberman A, Wald ER, Reynolds EA, Penchansky L, Charron M. [Is urine culture necessary to rule out urinary tract infection in young febrile children?](#) Pediatr Infect Dis J. 1996;15(4):304-9.