

Urinary tract infection in children

diagnosis, treatment and
long-term management

Clinical Guideline

August 2007

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Urinary tract infection in children

diagnosis, treatment and
long-term management

National Collaborating Centre for Women's
and Children's Health

Commissioned by the National Institute for
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Excluded studies

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Excluded studies

Predisposing factors

Bibliographic Information	Reason for rejecting study
Fanos V, Verlato G, Matti P, Pizzini C, Maffei C. Increased incidence of urinary tract infections in patients with coeliac disease. <i>Pediatric Nephrology</i> . 2002	Age range of study participants 3-75 years; could not extract data for only under 16s
Golding J, Emmett PM, Rogers IS. Does breast feeding protect against non-gastric infections? <i>Early Human Development</i> . 1997	A non-systematic review
Gottbrath-Flaherty EK, Agrawal R, Thaker V, Patel D, Ghai K. Urinary tract infections in cocaine-exposed infants. <i>Journal of Perinatology</i> . 1995 May	study design based on hypothesis of higher rates of UTI due to genitourinary tract malformations from prenatal cocaine exposure; outside scope of guideline
Grady R, Krieger J. Urinary tract infection in childhood. <i>Current Opinion in Urology</i> . 2001	A review, non- systematic and no primary data
Jeena PM, Coovadia HM, Adhikari M. Probable association between urinary tract infections (UTI) and common diseases of infancy and childhood: a hospital-based study of UTI in Durban, South Africa. <i>Journal of Tropical Pediatrics</i> . 1996 Apr	This is a study in South Africa, observational, retrospective study; weak study design and analysis (e.g. no tests of significance);
Kontiohari T, Nuutinen M, Uhari M. Dietary factors affecting susceptibility to urinary tract infection. <i>Pediatric Nephrology</i> . 2004	A review, but not systematic and no primary data
Lohr JA. The foreskin and urinary tract infections. <i>Journal of Pediatrics</i> .	commentary/review (unsystematic)
Nussinovitch M, Finkelstein Y, Klinger G, Kauschansky A, Volovitz B, Varsano I. Increased prevalence of urinary tract infections and anomalies in infants with pyloric stenosis. <i>Scandinavian Journal of Urology and Nephrology</i> . 1998 Dec	study design and analysis based on hypothesis of higher rates of UTI due to renal or urinary tract anomalies associated with pyloric stenosis; outside scope of guideline
Roberts JA. Factors predisposing to urinary tract infections in children. <i>Pediatric Nephrology</i> . 1996	Non-systematic review article
Saalman R, Fallstrom SP. High incidence of urinary tract infection in patients with coeliac disease. <i>Archives of Disease in Childhood</i> . 1996 Feb	Age range of children included 8 months to 18 years.
Singh-Naz N, Sprague BM, Patel KM, Pollack MM. Risk factors for nosocomial infection in critically ill children: A prospective cohort study. <i>Critical Care Medicine</i> . 1996	children in ICU beyond scope of the guideline
Johnson KE, Rodgers S. When cultural practices are health risks: the dilemma of female circumcision. <i>Holistic Nursing Practice</i> . 1994 Jan	review/commentary; no primary data reported
Milas V, Milas J, Puseljic S, Gardasanic J, Vukovic D, Milas J. Clinical importance of significant asymptomatic bacteriuria in newborns and infants during early postnatal period. <i>Collegium Antropologicum</i> . 2004 Dec	No data relevant to UTI in children
Moses S, Bailey RC, Ronald AR. Male circumcision: assessment of health benefits and risks.. <i>Sexually Transmitted Infections</i> . 1998 Oct	A non-systematic review with no primary data; adult population
Niku SD, Stock JA, Kaplan GW. Neonatal circumcision.. <i>Urologic Clinics of North America</i> . 1995 Feb	A non-systematic review, no primary data
Oostenbrink R, van der Heijden AJ, Moons KG, Moll HA. Prediction of vesico-ureteric reflux in childhood urinary tract infection: a multivariate approach. <i>Acta Paediatrica</i> . 2000 Jul	This study is not about predisposing factors for UTI.
Ramirez SP, Hsu SI, McClellan W. Low body weight is a risk factor for proteinuria in multiracial Southeast Asian pediatric population. <i>American Journal of Kidney Diseases</i> . 2001 Nov	no data on UTI
Rushton HG, Majd M. Pyelonephritis in male infants: How important is the foreskin? <i>Journal of Urology</i> . 1992	case-control study. does not specify if first time UTI; no 95% CI reported for ORs

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Bibliographic Information	Reason for rejecting study
Shaikh N, Hoberman A, Wise B, Kurs-Lasky M, Kearney D, Naylor S, Haralam MA, Colborn DK, Docimo SG. Dysfunctional elimination syndrome: is it related to urinary tract infection or vesicoureteral reflux diagnosed early in Life? <i>Pediatrics</i> . 2003	Among children who had UTI data were combined for those with first time and recurrent UTI; Data were reported separately for recurrence, but not analysed for first time UTI.
Twaij M. Urinary tract infection in children: A review of its pathogenesis and risk factors. <i>Journal of the Royal Society for the Promotion of Health</i> . 2000	review, not systematic and no primary data
Wijesinha SS, Atkins BL, Dudley NE, Tam PK. Does circumcision alter the periurethral bacterial flora? <i>Pediatric Surgery International</i> . 1998 Mar	Study to ascertain whether circumcision affects bacterial flora on glans penis, does not include any diagnosis of UTI
Aggarwal VK, Verrier JK. Vesicoureteric reflux: screening of first degree relatives. <i>Archives of Disease in Childhood</i> . 1989 Nov	Does not investigate or report on UTI
Albarus MH, Salzano FM, Goldraich NP. Genetic markers and acute febrile urinary tract infection in the 1st year of life. <i>Pediatric Nephrology</i> . 1997	Does not specify whether children investigated had previous UTI or not
Barroso JU, Barroso DV, Jacobino M, Vinhaes AJ, Macedo JA, Srougi M. Etiology of urinary tract infection in scholar children. <i>International Braz J Urol</i> . 2003	does not specify first time UTI in population of children 3- 14 yrs old
Canning DA. Cohort study on circumcision of newborn boys and subsequent risk of urinary-tract infection. <i>Journal of Urology</i> . 1999 Oct	primary data presented in another paper already included in the guideline
Chessare JB. Circumcision: Is the risk of urinary tract infection really the pivotal issue? <i>Clinical Pediatrics</i> . 1992	decision tree to help parents decide on circumcision; no primary data and not relevant for circumcision as risk factor for UTI
Cohen HA, Drucker MM, Vainer S, Ashkenasi A, Amir J, Frydman M, Varsano I. Postcircumcision urinary tract infection. <i>Clinical Pediatrics</i> . 1992 Jun	Does not specify if analysis is based on first episode of UTI only or if recurrent cases are included
Fujita K, Mizuno T, Ushiyama T, Suzuki K, Hadano S, Satoh S, Kambayashi T, Mugiya S, Nakano M. Complicating risk factors for pyelonephritis after extracorporeal shock wave lithotripsy. <i>International Journal of Urology</i> . 2000 Jun	Adult population
Goldman M, Barr J, Bistrizter T, Aladjem M. Urinary tract infection following ritual Jewish circumcision. <i>Israel Journal of Medical Sciences</i> . 1996 Nov	Does not specify whether first or recurrent UTI
Grio R, Porpiglia M, Vetro E, Uligini R, Piacentino R, Mini D, Marchino GL. Asymptomatic bacteriuria in pregnancy: maternal and fetal complications. <i>Panminerva Medica</i> . 1994 Dec	Pregnant population; no primary data
Harel L, Straussberg R, Jackson S, Amir J, Tiqwa P. Influence of circumcision technique on frequency of urinary tract infections in neonates. <i>Pediatric Infectious Disease Journal</i> . 2002 Sep	Does not specify if analysis is based on first episode of UTI only or if recurrent cases are included
Asharam K, Bhimma R, Adhikari M. Human immunodeficiency virus and urinary tract infections in children. <i>Annals of Tropical Paediatrics</i> . 2003	Immunosuppressed children are outside the scope of the guideline
Bonnin F, Lottmann H, Sauty L, Garel C, Archambaud F, Baudouin V, El GA, Loirat C, Bok BD, Aigrain Y. Scintigraphic screening for renal damage in siblings of children with symptomatic primary vesicoureteric reflux.[see comment]. <i>BJU International</i> . 2001 Apr	Does not investigate VUR in relation to UTI
Nayir A. Circumcision for the prevention of significant bacteriuria in boys. <i>Pediatric Nephrology</i> . 2001 Dec	Recruited at first UTI and followed for recurrence, not as a predisposing factor
Pierce AM, Hart CA. Vulvovaginitis: causes and management.[see comment]. <i>Archives of Disease in Childhood</i> . 1992 Apr	Investigates association between bacteriuria and vulvovaginitis without specifying or defining consequent UTI
Gorelick MH, Shaw KN. Clinical decision rule to identify febrile young girls at risk for urinary tract infection. <i>Archives of Pediatrics & Adolescent Medicine</i> . 2000	Does not specify first time UTI or if recurrent cases are included
Hansson S, Jodal U, Lincoln K, Svanborg EC. Untreated asymptomatic bacteriuria in girls: II - Effect of phenoxymethylpenicillin and erythromycin given for intercurrent infections. <i>BMJ</i> . 1989	Small study, case-series design. Also appears that the 51 girls in the sample all had previous UTI.

Bibliographic Information	Reason for rejecting study
Kenda RB, Fettich JJ. Vesicoureteric reflux and renal scars in asymptomatic siblings of children with reflux. Archives of Disease in Childhood. 1992	same data as from Kenda & Fettich 1997 which is already included
Noe HN. The long-term results of prospective sibling reflux screening. Journal of Urology. 1992	Age of included siblings not specified.
Noe HN, Wyatt RJ, Peeden JN, Rivas ML. The transmission of vesicoureteral reflux from parent to child. Journal of Urology. 1992	no data on UTI
Peeden JN, Noe HN. Is it practical to screen for familial vesicoureteral reflux within a private pediatric practice? Pediatrics. 1992	Investigates VUR as an outcome rather than UTI
Pisacane A, Graziano L, Mazarella G, Scarpellino B, Zona G. Breast feeding and urinary tract infection. Journal of Pediatrics. 1992	Does not specify if infants were recruited for first time or recurrent UTI
Plos K, Connell H, Jodal U, Marklund BI, Marild S, Wettergren B, Svanborg C. Intestinal carriage of P fimbriated Escherichia coli and the susceptibility to urinary tract infection in young children. Journal of Infectious Diseases. 1995	Does not specify whether children investigated had previous UTI or not
Van den Abbeele AD, Treves ST, Lebowitz RL, Bauer S, David RT, Retik A, Colodny A. Vesicoureteral reflux in asymptomatic siblings of patients with known reflux: radionuclide cystography. Pediatrics. 1987	Does not specify whether children investigated had previous UTI or not
Wiswell TE, Roscelli JD. Corroborative evidence for the decreased incidence of urinary tract infections in circumcised male infants. Pediatrics. 1986	This study purports to cover longer timeframe for same population as Wiswell et al 1985 but the numbers in this study are smaller and not consistent with those reported in the Winswell 1985 study.
Wiswell TE, Hachey WE. Urinary tract infections and the uncircumcised state: an update. Clinical Pediatrics. 1993	Primary data studies already included in the guideline;review included studies of low quality which were excluded from the guideline
Foxman B, Frerichs RR. Epidemiology of urinary tract infection: diet, clothing, and urination habits... part 2. American Journal of Public Health.	In adult women aged 16-39

Symptoms and signs

Bibliographic Information	Reason for rejecting study
Ahmed SM, Swedlund SK. Evaluation and treatment of urinary tract infections in children. <i>American Family Physician</i> . 1998	non systematic review; no primary data
Garcia FJ, Nager AL. Jaundice as an early diagnostic sign of urinary tract infection in infancy.[see comment]. <i>Pediatrics</i> . 2002 May	Study investigates jaundice as outcome rather than symptom of UTI
Heldrich FJ, Barone MA, Spiegler E. UTI: diagnosis and evaluation in symptomatic pediatric patients.[see comment]. <i>Clinical Pediatrics</i> . 2000 Aug	Study does not report on signs or symptoms of UTI
Labbe J. Self-induced urinary tract infection in school-age boys. <i>Pediatrics</i> . 1990 Nov	outside scope
Lee P, Verrier JK. Urinary tract infection in febrile convulsions. <i>Archives of Disease in Childhood</i> . 1991	The rate of UTI in 43% of children who presented with febrile convulsions in this study is not known; case-series study designed to assess local paediatric approach to diagnosing UTI
Loening-Baucke V. Urinary incontinence and urinary tract infection and their resolution with treatment of chronic constipation of childhood.. <i>Pediatrics</i> . 1997 Aug	Includes children whose age was outside scope and unable to separate data by age group
Persad R, Kamineni S, Mouriquand PD. Recurrent symptoms of urinary tract infection in eight patients with refluxing ureteric stumps. <i>British Journal of Urology</i> . 1994 Dec	The population is not those with first time UTI
Barroso JU, Barroso DV, Jacobino M, Vinhaes AJ, Macedo JA, Srougi M. Etiology of urinary tract infection in scholar children. <i>International Braz J Urol</i> . 2003	Definition of UTI not reported. No details given about cut-off values or urine collection method.
Dayan PS, Hanson E, Bennett JE, Langsam D, Miller SZ. Clinical course of urinary tract infections in infants younger than 60 days of age. <i>Pediatric Emergency Care</i> .	Aim of study was to assess the likelihood of progression to illness and speed of fever resolution rather than to document signs & symptoms of UTI
Jeena PM, Coovadia HM, Adhikari M. Probable association between urinary tract infections (UTI) and common diseases of infancy and childhood: a hospital-based study of UTI in Durban, South Africa. <i>Journal of Tropical Pediatrics</i> . 1996 Apr	poor study design; no age range specified, therefore unclear whether patients in sample were within scope
Nussinovitch M, Finkelstein Y, Klinger G, Kauschansky A, Volovitz B, Varsano I. Increased prevalence of urinary tract infections and anomalies in infants with pyloric stenosis. <i>Scandinavian Journal of Urology and Nephrology</i> . 1998 Dec	Retrospective case-series of infants with infantile hypertrophic pyloric stenosis
Vachvanichsanong P, Malagon M, Moore ES. Urinary tract infection in children associated with idiopathic hypercalciuria. <i>Scandinavian Journal of Urology and Nephrology</i> . 2001	Case review using idiopathic hypercalciuria as outcome rather than UTI
Schneider PF, Riley TV. Staphylococcus saprophyticus urinary tract infections: Epidemiological data from Western Australia. <i>European Journal of Epidemiology</i> . 1996	Symptoms of UTI not reported.
Shaw KN, Gorelick M, McGowan KL, Yakscoe NM, Schwartz JS. Prevalence of urinary tract infection in febrile young children in the emergency department. <i>Pediatrics</i> . 1998 Aug	Symptoms presented for 2411 children presenting to an emergency department that meet criteria for age, sex and temperature. Not investigating symptoms in children who specifically had UTI.
Pennesi M, Salvatore CM, Peratoner L; Title: Different clinical presentations of pyelonephritis in children with and without vesicoureteral reflux: an Italian Multicenter Study Journal Name: <i>Pediatrics</i> Year: 1998 Dec	This is published as a letter.
Al Mugeiren,M. Urinary tract infections in childhood: Epidemiology, clinical features, and therapeutic considerations Journal Name: <i>Advance in Therapy</i> Year: 1996	The paper includes children without symptom.

Urine collection

Bibliographic Information	Reason for rejecting study
Alam MT, Coulter JBS, Pacheco J, Correia JB, Ribeiro MGB, Coelho MFC, Bunn JEG. Comparison of urine contamination rates using three different methods of collection: Clean-catch, cotton wool pad and urine bag. <i>Annals of Tropical Paediatrics</i> . 2005	Study specifically excludes children who had suspected UTI.
BUYS H. Suprapubic aspiration under ultrasound guidance in children with fever of undiagnosed cause. (Research method of obtaining urine samples from children to test for urinary tract infection). <i>British Medical Journal</i> . 1994	Non-comparative study
Centre for Reviews and Dissemination. Screening tests for urinary tract infection in children: a meta-analysis (Structured abstract). <i>The Cochrane Library</i> . 2005	Structured abstract of meta-analysis that is included in HTA
Davies D. Bag urine specimens still not appropriate in diagnosing urinary tract infections in infants. <i>Canadian Journal of Infectious Diseases</i> . 2004	Review only - no primary data
Farrell M, Devine K, Lancaster G, Judd B. A method comparison study to assess the reliability of urine collection pads as a means of obtaining urine specimens from non-toilet-trained children for microbiological examination. <i>Journal of Advanced Nursing</i> .	Included in HTA
Feasey S. Are Newcastle urine collection pads suitable as a means of collecting specimens from infants? (Research on ability of the pads to produce uncontaminated specimens in non-toilet trained children with suspected urinary tract infection. 19 refs). <i>Paediatric Nursing</i> .	Included in HTA
Jodal U. Suprapubic aspiration of urine in the diagnosis of urinary tract infection in infants. <i>Acta Paediatrica</i> . 2002	Review only - no primary data
Li PS, Ma LC, Wong SN. Is bag urine culture useful in monitoring urinary tract infection in infants? <i>Journal of Paediatrics and Child Health</i> . 2002	Selection criteria not explained Unclear time lag between index test and reference standard Only those with a positive index test received the reference standard.
Macfarlane PI, Ellis R, Hughes C, Houghton C, Lord R. Urine collection pads: Are samples reliable for urine biochemistry and microscopy? <i>Pediatric Nephrology</i> . 2005	Study in healthy adult volunteers.
Peniakov M, Antonelli J, Naor O, Miron D. Reduction in contamination of urine samples obtained by in-out catheterization by culturing the later urine stream. <i>Pediatric Emergency Care</i> .	Letter to the Editor
PIERRO A. A method for urine collection in infants. <i>Archives of Disease in Childhood</i> . 1999	Non-comparative study
Rao S, Houghton C, Macfarlane PI. A new urine collection method; pad and moisture sensitive alarm [1]. <i>Archives of Disease in Childhood</i> .	Letter to the Editor
Shvartzman P, Nasri Y. Urine culture collected from gel-based diapers: developing a novel experimental laboratory method. <i>Journal of the American Board of Family Practice</i> . 2004 Mar	Study does not report age of patients studied, however assume adults because brand of diaper is 'Depend' which manufactures incontinence underwear for the elderly.
Vernon S. Urine collection from infants: a reliable method. (9 refs). <i>Paediatric Nursing</i> . 1995	Non-comparative study
Burke N. Alternative methods for newborn urine sample collection. <i>Pediatric Nursing</i> . 1995	Study collects urine samples from newborns in a neonatal intensive care unit – outside the scope.
Feasey S. Research & commentary: reliability of urine collection pads. <i>Paediatric Nursing</i> . 2002	Commentary only - no primary data
Hutchinson SK. Obtaining urine specimens from diapers. <i>Journal of the Association of Pediatric Oncology Nurses</i> . 1987	Comment only - no primary data
Kirkpatrick JM, Alexander J, Cain RM. Recovering urine from diapers: are test results accurate? <i>MCN: the American Journal of Maternal/Child Nursing</i> . 1997	Recruited healthy children who were part of a research project identifying appropriate levels of calcium in the body.

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Bibliographic Information	Reason for rejecting study
Lewis J. Clean-catch versus urine collection pads: a prospective trial. <i>Paediatric Nursing</i> . 1998	Small numbers: 16 samples analysed
Penney S, Andrews W, Levy R, Friel J. 24-hour urine collection device for low birth weight infants. <i>Neonatal Network: The Journal of Neonatal Nursing</i> . 1993	Non-comparative study. Explains a urine collection device
Raper J. Commentary on Suprapubic bladder aspiration versus urethral catheterization in ill infants: success, efficiency, and complication rates. <i>ENA'S Nursing Scan in Emergency Care</i> . 1994	Case study on Kawasaki disease
Reams PK, Deane DM. Bagged versus diaper urine specimens and laboratory values. <i>Neonatal Network: The Journal of Neonatal Nursing</i> . 1988	Urine collection is pad, over the top of a perforated bag and then samples of each compared. These samples are not independent.
Schlager TA, Dunn ML, Dudley SM, Lohr JA. Bacterial contamination rate of urine collected in a urine bag from healthy non-toilet-trained male infants. <i>Journal of Pediatrics</i> . 1990	Non-comparative study
Suri S. Simplifying urine collection from infants and children without losing accuracy. <i>MCN: the American Journal of Maternal/Child Nursing</i> . 1988	Not compared to a reference standard
O'Callaghan C, McDougall PN. Successful suprapubic aspiration of urine. <i>Archives of Disease in Childhood</i> . 1987	Non-comparative study
Austin BJ, Bollard C, Gunn TR. Is urethral catheterization a successful alternative to suprapubic aspiration in neonates? <i>Journal of Paediatrics & Child Health</i> . 1999 Feb	Study conducted in a neonatal intensive care unit - out of scope
Cohen HA, Woloch B, Linder N, Vardi A, Barzilai A. Urine samples from disposable diapers: an accurate method for urine cultures. <i>Journal of Family Practice</i> . 1997 Mar	Included in the HTA
Falcao MC, Leone CR, D'Andrea RA, Berardi R, Ono NA, Vaz FA. Urinary tract infection in full-term newborn infants: value of urine culture by bag specimen collection. <i>Revista do Hospital das Clinicas</i> . 1999 May	Not all children received the reference standard
Murphy BF, Fairley KF, Birch DF, Marshall AC, Durman OB. Culture of mid catheter urine collected via an open-ended catheter: a reliable guide to bladder bacteriuria. <i>Journal of Urology</i> . 1984 Jan	Adult population
Ramage IJ, Chapman JP, Hollman AS, Elabassi M, McColl JH, Beattie TJ. Accuracy of clean-catch urine collection in infancy. <i>Journal of Pediatrics</i> . 1999 Dec	Included in the HTA
Rees JC, Vernon S, Pedler SJ, Coulthard MG. Collection of urine from washed-up potties. <i>Lancet</i> . 1996 Jul	This is published as a letter to the editor.
Tobiansky R, Evans N. A randomized controlled trial of two methods for collection of sterile urine in neonates. <i>Journal of Paediatrics & Child Health</i> . 1998 Oct	Study recruited neonates who were being investigated for late onset sepsis – out of scope.
Carley SD. Best evidence topic report. Clean catch or bag specimen in UTI in non toilet trained children? <i>Emergency Medicine Journal</i> . 2006 Mar	Non-systematic review.
Garcia-Nieto V, Navarro JF, Sanchez-Almeida E, Garcia-Garcia M. Standards for ultrasound guidance of suprapubic bladder aspiration. <i>Pediatric Nephrology</i> . 1997	Non-comparative study
Kuzmic AC, Brkljacic B, Ivankovic D. The impact of bladder shape on the ultrasonographic measurement of bladder volume in children. <i>Pediatric Radiology</i> . 1	Non-comparative study
Mohammed SH. Suprapubic micturition cystourethrography. <i>Acta Radiologica</i> . 1988	Non-comparative study
Nangia S. Ultrasound guided suprapubic bladder aspiration. <i>Indian Pediatrics</i> . 1998 Aug	Letter to the editor
Roberts KB. The AAP practice parameter on urinary tract infections in febrile infants and young children. <i>American Family Physician</i> . 2000	Not related to SPA
Wright NB, BUYS H, Pead L, Hallett R, Maskell R. Suprapubic aspiration in children. Use of ultrasound guidance unclear. <i>British Medical Journal</i> . 1994	Letter to the editor

Bibliographic Information	Reason for rejecting study
Ozkan,B.; Kaya,O.; Akdag,R.; Unal,O.; Kaya,D. Suprapubic bladder aspiration with or without ultrasound guidance Journal Name: Clinical Pediatrics Year: 2000	This is published as a letter to the editor.
Vernon S, Foo Ck,Coulthard MG Title: How general practitioners manage children with urinary tract infection;An audit in the former Northern region. Journal Name: Br J Gen Pract;47;297-300	The study to determine how GPs manage children with suspected UTI by using postal questionnaire. Although this study addresses important issue, this does not directly address either diagnostic values or effectiveness of urine collection methods where there are other studies that address the question directly; hence this should be excluded.
Ahmad T, Vickers D, Campbell S, Coulthard MG, Pedler S. Urine collection from disposable nappies. Journal Name: Lancet. 1991 Sep 14;338(8768):674-6.	This paper has been included in the HTA, and we have subsequently included the data via the HTA.
Vernon S , Redfearn A, Pedler SJ,lambert HJ, Coulthard MJ. Urine collection on sanitary towels. Journal Name: Lancet 1994 344;612	This was published as a letter to the editor.
MacFarlane PI,Houghton C, Hughes C Title: Pad urine collection for early childhood urinary tract infection Journal Name: Lancet 1999;354;571	This was published as a letter to the editor.
Alam MT, Coulter JB, Pacheco J, Correia JB, Ribeiro MG, Coelho MF, Bunn JE. Comparison of urine contamination rates using three different methods of collection; clean catch, cotton wool pad and urine bag Journal Name: Ann Trop Paediatr. 2005 Mar;25(1):29-34	The paper specifically excluded children who had UTI from the study population. This means that this paper does not address either diagnostic value or effectiveness of urine collection for children with suspected UTI directly, where there are other studies address the question directly; hence this should be excluded.

Urine preservation

Bibliographic Information	Reason for rejecting study
Dorn GL. Microbial stabilization of antibiotic-containing urine samples by using the FLORA-STAT urine transport system. <i>Journal of Clinical Microbiology</i> . 1991	Flora-stat system not available in the UK
Pearson JC, Kromhout L, King EB. Evaluation of collection and preservation techniques for urinary cytology. <i>Acta Cytologica</i> . 1981 May	Not in humans
Beyer-Boon ME, Arentz PW, Kirk RS. A comparison of thiomersal and 50% alcohol as preservatives in urinary cytology. <i>Journal of Clinical Pathology</i> . 1979 Feb	In patients with urinary carcinoma
Horton JA, Kirshblum SC, Linsenmeyer TA, Johnston M, Rustagi A. Does refrigeration of urine alter culture results in hospitalized patients with neurogenic bladders? <i>Journal of Spinal Cord Medicine</i> . 1998	Only in patients with neurogenic bladders. Includes asymptomatic patients.

Urine testing

Bibliographic Information	Reason for rejecting study
Aliyu SH, Ludlum H, Abubakar I, Bentley N. What is the role of urine dipstick testing in the management of UTI? <i>British Journal of General Practice</i> . 2002 May	Review - no primary data
Arya SC. Dipstick urinalysis and the accuracy of the clinical diagnosis of urinary tract infection.. <i>Journal of Emergency Medicine</i> . 2002 Jan	Review not primary data
Barry H. What clinical variables predict the presence of a urinary tract infection in febrile young girls aged younger than 2 years? <i>Evidence-Based Practice</i> . -32676	Not about urine testing - Included in predisposing factors section
Bjerrum L, Grinsted P, Sogaard P. Can we rely on the results of urine microscopy and culture when tests are performed in general practice? <i>Ugeskrift for Laeger</i> . 2002	Foreign language - not correct question
Blom M, Sorensen TL, Espersen F, Frimodt-Moller N. Validation of FLEXICULT SSI-Urinary Kit for use in the primary health care setting. <i>Scandinavian Journal of Infectious Diseases</i> . 2002	Study to test susceptibility of bacteria to antimicrobials.
Buchsbaum GM, Albushies DT, Guzick DS. Utility of urine reagent strip in screening women with incontinence for urinary tract infection. <i>International Urogynecology Journal</i> . 2004 Nov	Study in adult women with incontinence
Butani RC, Shaffer RT, Szykowski RD, Weeks BE, Speights LG, Kadakia SC. Rapid diagnosis of infected ascitic fluid using leukocyte esterase dipstick testing. <i>American Journal of Gastroenterology</i> . 2004 Mar	Not looking at diagnosis of UTI
Church D, Gregson D. Screening urine samples for significant bacteriuria in the clinical microbiology laboratory. <i>Clinical Microbiology Newsletter</i> . 2004	Review only - no primary data
Eidelman Y, Raveh D, Yinnon AM, Ballin J, Rudensky B, Gottehrer NP. Reagent strip diagnosis of UTI in a high-risk population. <i>American Journal of Emergency Medicine</i> . 2002	Adults with a mean age of 78 years.
Frimodt-Moller N. Can urine microscopy be trusted? <i>Ugeskrift for Laeger</i> . 2002	Not in English
Fuchs PC. Urine culture. <i>MLO: Medical Laboratory Observer</i> . 1993	Comments only; not primary study
Harkless GH. A clear urine specimen on visual inspection cannot totally exclude a diagnosis of urinary tract infection.. <i>Evidence-Based Nursing</i> . 2001	Summary of study included in HTA
Herr SM, Wald ER, Pitetti RD, Choi SS. Enhanced urinalysis improves identification of febrile infants ages 60 days and younger at low risk for serious bacterial illness. <i>Pediatrics</i> . 2001	Not looking at diagnosis of UTI
Hinata N, Shirakawa T, Okada H, Shigemum K, Kamidono S, Gotoh A. Quantitative detection of Escherichia coli from urine of patients with bacteriuria by real-time PCR. <i>Molecular Diagnosis</i> . 2004	Does not look at urine testing but at tests to identify different bacteria
Isaacman DJ, Burke BL. Utility of the serum C-reactive protein for detection of occult bacterial infection in children. <i>Archives of Pediatrics & Adolescent Medicine</i> . 2002	Not looking at urine testing for UTI
Jortani SA, Pugia MJ, Elin RJ, Thomas M, Womack EP, Cast T, Valdes JR. Sensitive noninvasive marker for the diagnosis of probable bacterial or viral infection. <i>Journal of Clinical Laboratory Analysis</i> . 2004	investigating urinary trypsin inhibitor – not a test for UTI
Klaschik S, Lehmann LE, Raadts A, Book M, Hoefl A, Stuber F. Real-time PCR for detection and differentiation of gram-positive and gram-negative bacteria.. <i>Journal of Clinical Microbiology</i> . 2002 Nov	Does not look at urine testing but at tests to identify different bacteria
Koken T, Aktepe OC, Serteser M, Samli M, Kahraman A, Dogan N. Determination of cut-off values for leucocytes and bacteria for urine flow cytometer (UF-100) in urinary tract infections. <i>International Urology & Nephrology</i> . 2002	unclear age of patients. Assume adults since participants asked to use a sterile wet tissue before providing clean catch sample.

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
Lammers RL, Gibson S, Kovacs D, Sears W, Strachan G. Comparison of test characteristics of urine dipstick and urinalysis at various test cutoff points. <i>Annals of Emergency Medicine</i> . 2001	In women with dysuria, urgency or urinary frequency
Monane M, Gurwitz JH, Lipsitz LA, Glynn RJ, Choodnovskiy I, Avorn J. Epidemiologic and diagnostic aspects of bacteriuria: a longitudinal study in older women. <i>Journal of the American Geriatrics Society</i> . 1995	Adult population
Perry JD, Butterworth LA, Nicholson A, Appleby MR, Orr KE. Evaluation of a new chromogenic medium, Uriselect 4, for the isolation and identification of urinary tract pathogens. <i>Journal of Clinical Pathology</i> . 2003 Jul	Does not look at urine testing but at tests to identify different bacteria
Pewitt EB, Schaeffer AJ. Urinary tract infection in urology, including acute and chronic prostatitis. <i>Infectious Disease Clinics of North America</i> . 1997	Case series in adults
Pugia MJ, Sommer R, Corey P, Anderson L, Gleason S, Jortani SA, Elin RJ, Gopual DL, Valdes R, Lott JA. The uristatin dipstick is useful in distinguishing upper respiratory from urinary tract infections. <i>Clinica Chimica Acta</i> . 2004 Mar	Not urine testing accuracy for UTI
Rahn DD, Boreham MK, Allen KE, Nihira MA, Schaffer JI. Predicting bacteriuria in urogynecology patients. <i>American Journal of Obstetrics and Gynecology</i> . 2005	In women with urogynaecological problems.
Rehmani R. Accuracy of urine dipstick to predict urinary tract infections in an emergency department. <i>Journal of Ayub Medical College</i> . 2004	In adult patients.
Sharief N, Hameed M, Petts D. Use of rapid dipstick tests to exclude urinary tract infection in children... reprinted from the British Journal of Biomedical Science 1988;55:242-246. <i>Journal of Continuing Education Topics & Issues</i> .	Included in the HTA
Simerville JA, Maxted WC, Pahira JJ. Urinalysis: a comprehensive review.. <i>American Family Physician</i> . 2005 Mar 15	Non systematic review
Stauss J, Connolly LP, Perez-Rossello J, Treves ST. Pediatric acute pyelonephritis: diagnosis facilitated by skeletal scintigraphy. <i>Clinical Nuclear Medicine</i> . 2003 Oct	One case described only
Stephens MB, Wilder L. Is screening urinalysis in children worthwhile? <i>Journal of Family Practice</i> . 2003	Review - not primary data
Thayyil S, Shenoy M, Hamaluba M, Gupta A, Frater J, Verber IG. Is procalcitonin useful in early diagnosis of serious bacterial infections in children? <i>Acta Paediatrica</i> . 2005 Feb	Does not look at urine testing for UTI
Wald ER. Evaluating urine cultures in young infants.. <i>Pediatric Infectious Disease Journal</i> . 2004 Apr	Comment only not primary study
Wigton RS. The Uriscreeen test was not better than standard urinalysis and dipstick tests for detecting urinary tract infection in children.. <i>ACP Journal Club</i> . 2000	Review/comment of a study - no primary data
Wilson ML, Gaido L. Laboratory diagnosis of urinary tract infections in adult patients.. <i>Clinical Infectious Diseases</i> . 2004 Apr 15	Review - no primary data
Wright S. Review: both Gram stain and urine dipstick analysis were accurate in diagnosing urinary tract infection in children.. <i>Evidence-Based Nursing</i> . 2000	Review of a study by Daly (1995) - no primary data
Turner T. Dipstick urinalysis for screening of childhood urinary tract infection. . 2003	Describes itself as a systematic review, but is not. All relevant papers covered in our systematic review.
Gorelick MH, Shaw KN. Screening tests for urinary tract infection in children: a meta-analysis. <i>Pediatrics</i> . 1999	Covered by HTA
Kelly R. Identification of non-infected urine specimens in children. <i>British Journal of Nursing</i> . 1995	Study in children attending a neuropathic bladder clinic
Berger RE. The urine dipstick test useful to rule out infections. A meta-analysis of the accuracy. <i>Journal of Urology</i> . 2005 Sep	Commentary of a meta-analysis. Original meta-analysis included in guideline.

Bibliographic Information	Reason for rejecting study
Chan RW, Chow KM, Tam LS, Li EK, Wong SM, Li PK, Szeto CC. Can the urine dipstick test reduce the need for microscopy for assessment of systemic lupus erythematosus disease activity? <i>Journal of Rheumatology</i> . 2005 May	In patients with systemic lupus erythematosus.
Lopez Vargas JA, Cuartas Trujillo MC, Molina Upegui OL, Restrepo Ceballos AC, Maya Carmona CY, Jaramillo VS, Donado Gomez JH. Usefulness of urinalysis and urine Gram stain in the diagnosis of urinary tract infection in hospitalized patients. <i>Iatreia</i> . 2005	Foreign language
Nys S;van MT, Bartelds AIM, Stobberingh EE. Urinary tract infections in general practice patients: Diagnostic tests versus bacteriological culture. <i>Journal of Antimicrobial Chemotherapy</i> . 2006	Study in adult women
Oregioni O, Delaunay P, Bruna P, Gaudart A, Lemichez E, Boquet P, Landraud L. Urinary interleukin-8 is elevated in urinary tract infections independently of the causative germs. <i>Cytokine</i> . 2005	Laboratory based study - population unknown
Patel HD, Livsey SA, Swann RA, Bukhari SS. Can urine dipstick testing for urinary tract infection at point of care reduce laboratory workload? <i>Journal of Clinical Pathology</i> . 2005 Sep	Not in children.
Price CP, Newall RG, Boyd JC. Use of protein:creatinine ratio measurements on random urine samples for prediction of significant proteinuria: a systematic review. [51 refs]. <i>Clinical Chemistry</i> . 2005 Sep	Majority of studies included patients with pre-eclampsia or renal disease
Richards D, Toop L, Chambers S. Treating negative dipstick dysuria decreases symptoms. <i>Journal of Family Practice</i> . 2005	Synopsis only - Original trial evaluated response to antibiotics in adult women.
Wright OR, Safranek S. Urine dipstick for diagnosing urinary tract infection.. <i>American Family Physician</i> . 2006 Jan 1	Non-systematic review
Smith P; Morris A; Reller LB Title: Predicting urine culture results by dipstick testing and phase contrast microscopy Journal Name: Pathology Year: 2003	The study included patients aged from 1 month to 91 years. The data for children cannot be separated.

Antibiotic treatment

Bibliographic Information	Reason for rejecting study
Hari P, Mantan M, Bagga A. Management of urinary tract infections. <i>Indian Journal of Pediatrics</i> . 2003	Commentary - not an RCT
. Trimethoprim-sulfamethoxazole for treatment of urinary tract infections. <i>Medical Letter on Drugs and Therapeutics</i> . 1975	Old paper - not within 20 years
Adam D, Hager C, Dorn G, Bamberg P. A comparison of co-trimazine once daily and co-trimoxazole twice daily in treatment of urinary tract infections in children. <i>Journal of Antimicrobial Chemotherapy</i> . 1982	Old paper - not within 20 years
Al Mugeiren MM, Qadri SMH. Bacteriologic profile and drug resistance in pediatric patients with symptomatic bacteriuria. <i>Clinical Therapeutics</i> . 1996	Included in Cochrane review
Arav-Boger R, Leibovici L, Danon YL. Urinary tract infections with low and high colony counts in young women. Spontaneous remission and single-dose vs multiple-day treatment.. <i>Archives of Internal Medicine</i> . 1994	Women over 18 years
Arrieta AC, Bradley JS. Empiric use of cefepime in the treatment of serious urinary tract infections in children.. <i>Pediatric Infectious Disease Journal</i> . 2001	Neither cefepime nor ceftazidime are licenced for children in the UK
Bailey RR, Abbott GD. Treatment of urinary-tract infection with a single dose of amoxicillin. <i>Nephron</i> . 1977	Old paper - not within 20 years
Bailey RR. What evidence is there for the use of single-dose therapy for urinary tract infections in children? <i>Infection</i> . 1994	Conference proceedings - not an RCT
Bailey RR. Single-dose/short-term therapy in children and in pregnant women. <i>Infection</i> . 1994	Round table discussion document
Belet N, Islek I, Belet U, Sunter AT, Kucukoduk S. Comparison of trimethoprim-sulfamethoxazole, cephadroxil and cefprozil as prophylaxis for recurrent urinary tract infections in children. <i>Journal of Chemotherapy</i> . 2004	Treatment of recurrent infection. Patients recruited from long-term residential care facility for the elderly.
Bergfors PG. Clinical studies on co-trimazine in children. <i>Infection</i> . 1979	Co-trimazine not licensed in the UK
Bianchetti MG, Markus-Vecerova D, Schaad UB. Antibiotics in the treatment of urinary tract infections in hospitalized children. <i>Schweizerische Medizinische Wochenschrift</i> . 1995	Foreign language paper
Bolding OT. Clinical comparison of cefadroxil, new oral cephalosporin, and cephalixin in uncomplicated urinary tract infection. <i>Urology</i> . 1978	Old paper - not within 20 years
Bose W, Karama A, Linzenmeier G, Olbing H, Wellmann P. Controlled trial of co-trimoxazole in children with urinary-tract infection. Bacteriological efficacy and haematological toxicity. <i>Lancet</i> . 1974	Old paper - not within 20 years
Bourillon A, Burgio GR, Steffens L, Kranz A, Noack M, Weippl G, Malaka-Zafiriou K, Gatzola M, Fall M, Tetanye E, Toporovski J, Araujo Vieralves LF, Kissling M. Cefetamet pivoxil in the treatment of acute urinary tract infections in children. <i>Current Therapeutic Research, Clinical and Experimental</i> . 1994	Oral cefetamet Pivoxil not licenced for children in the UK
Brumfitt W, Hamilton-Miller JM. A review of the problem of urinary infection management and the evaluation of a potential new antibiotic.. <i>Journal of Antimicrobial Chemotherapy</i> . 1984	Old paper - not within 20 years
Brumfitt W, Hamilton-Miller JM. Efficacy and safety profile of long-term nitrofurantoin in urinary infections: 18 years' experience. <i>Journal of Antimicrobial Chemotherapy</i> . 1998	Patients ranged from 9-98 years. Data on children could not be extracted.
Butler AV, Cullen MJ, Parry MO, Sylvester DG, Speller DC. Acute cystitis in young women. Treatment with citrated nalidixic acid compared with co-trimoxazole. <i>Practitioner</i> . 1983	Study is in women 18-32 years
Cascio G, Pera A. [Cefazolin in treatment of acute urinary tract infections]. [Italian]. <i>Clinica Terapeutica</i> . 1974	Old paper - not within 20 years

Bibliographic Information	Reason for rejecting study
Casellas JM, Tome G, Exeni R, Grimoldi I, Goldberg M, Farinati AE. Serum and urinary cefpodoxime levels and time killing curves performed in the urine of children presenting urinary tract infections. <i>Pathologie et Biologie</i> . 1993	Not about bacterial resistance patterns - not an RCT
Chrapowicki T, Krzyzanowska-Rogozinska T, Kurowska D. [Treatment of acute and chronic urinary tract infections in children with an urinary chemotherapeutic agent]. [German]. <i>Zeitschrift fur Allgemeinmedizin</i> . 1975	Old paper - not within the last 20 years
Clemente E, Solli R, Mei V, Cera R, Caramia G, Carnelli V, Ruffini E, Venturoli V, Corsini A. Therapeutic efficacy and safety of pidotimod in the treatment of urinary tract infections in children. <i>Arzneimittel-Forschung</i> . 1994	Pidotimod not licensed in the UK
Contopoulos-Ioannidis DG, Giotis ND, Baliatsa DV, Ioannidis JP. Extended-interval aminoglycoside administration for children: a meta-analysis.[see comment]. <i>Pediatrics</i> . 2004	Review of aminoglycosides in paediatric infections, not UTI specific
Czerwionka-Szaflarska M, Pawlowska M. [Evaluation of the effectiveness of Uro-Vaxom in recurrent urinary tract infections in children]. [Polish]. <i>Pediatrica Polska</i> . 1996	Treatment of recurrent infections
Derluyn J, de Jaeger K, Vereecken R, Verduyn H. [Co-trimoxazole in urinary infections. Comparative double-blind study with an antibiotic]. [French]. <i>Acta Urologica Belgica</i> . 1973	Old paper - not within 20 years
Ellerstein NS, Sullivan TD, Baliah T, Neter E. Trimethoprim/sulfamethoxazole and ampicillin in the treatment of acute urinary tract infections in children: a double-blind study. <i>Pediatrics</i> . 1977	Old study - not within 20 years
Elo J, Ahava K. Cephalexin compared with ampicillin in urinary tract infections in children. <i>Journal of Antimicrobial Chemotherapy</i> . 1975	Old paper - not within 20 years
Emoto Y, Higashima H. [Furadantin C for urinary tract infection]. [Japanese]. <i>Hinyokika Kyo - Acta Urologica Japonica</i> . 1971	Old paper - not within 20 years
Fanos V, Cataldi L. Cefixime in urinary tract infections with special reference to pediatrics: Overview. <i>Journal of Chemotherapy</i> . 2001	Review article - not an RCT
Feldman W, Johnson DM, Newberry P, Weldon A, Naidoo S. Comparison of trimethoprim-sulfamethoxazole with sulfamethoxazole in urinary tract infections of children. <i>Canadian Medical Association Journal</i> . 1975	Old paper - not within 20 years
Francois P, Croize J, Bost C, Wollschlager K. [Comparative study of cefixime versus amoxicillin-clavulanic acid combination in the oral treatment of urinary tract infections in children].[see comment]. [French]. <i>Archives de Pediatrie</i> . 1995	Foreign Language
Fujii R, Shinozaki T, Meguro H, Arimasu O, Izumi K, Osano M, Oikawa T, Shiro H, Sunakawa K, Iwata S. [Comparative, controlled study on an ampicillin suppository (KS-R 1) with an oral form of ampicillin in urinary tract infections]. [Japanese]. <i>Japanese Journal of Antibiotics</i> . 1987	Foreign language paper
Ghiroa L, Craccoa AT, Sartora M, Comacchioa S, Zacchelloa G, Dall'Amicob R. Retrospective study of children with acute pyelonephritis: Evaluation of bacterial etiology, antimicrobial susceptibility, drug management and imaging studies. <i>Nephron</i> . 2002	Not an RCT
Ginsburg CM, McCracken GH, Petruska M. Once-daily cefadroxil versus twice-daily cefaclor for treatment of acute urinary tract infections in children. <i>Journal of Antimicrobial Chemotherapy</i> . 1982	Old paper - not within 20 years
Gonzalez E, Carranza C, Soto C, Romero P. [Comparative study of the activity of trimethoprim-sulfamethopyrazine and nitrofurantoin in urinary infections of children]. [Spanish]. <i>Revista Chilena de Pediatria</i> . 1985	Foreign language paper
Hayashi I, Ijuin M. [Clinical comparison of cephalexin and cephaloglycin in cystitis by double blind method]. [Japanese]. <i>Hinyokika Kyo - Acta Urologica Japonica</i> . 1970	Old paper - not within 20 years

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
Hellerstein S. Antibiotic treatment for urinary tract infections in pediatric patients. <i>Minerva Pediatrica</i> . 2003	Commentary - not an RCT
Helwig H, Kohler M, Weigand W. [Treatment of urinary tract infections in childhood with Co-tetroxazin]. [German]. <i>Zeitschrift fur Allgemeinmedizin</i> . 1983	Foreign language paper
Helwig H. Therapeutic strategies for urinary tract infections in children. <i>Infection</i> . 1994	Commentary - not an RCT
Howard JE, Donoso E, Mimica I, Zilleruelo G. Gentamicin for urinary-tract infections in infants. <i>Journal of Infectious Diseases</i> . 1971	Not sure if it is a RCT and published more than 20 years ago
Jodal U. The role of fosfomycin trometamol in the management of urinary tract infections in pediatrics.. <i>Infection</i> . 1992	Commentary - not and RCT
Kamidono S, Ishigami J, Arakawa S, Umezu K, Ohmori H, Ishito N, Nihira H, Ishino T, Kurokawa K, Fujimura N. [Double-blind comparison of cefotetan and cefmetazole in complex urinary tract infections]. [Japanese]. <i>Japanese Journal of Antibiotics</i> . 1983	Old paper - not within 20 years Foreign language paper
Kearns GL, Reed MD, Jacobs RF, Ardite M, Yogev RD, Blumer JL. Single-dose pharmacokinetics of ceftibuten (SCH 39720) in infants and children. <i>Antimicrobial Agents and Chemotherapy</i> . 1991	Does not include UTI
Khan AJ, Kumar K, Evans HE. Single-dose gentamicin therapy of recurrent urinary tract infection in patients with normal urinary tracts. <i>Journal of Pediatrics</i> . 1987	Not an RCT
Khan AJ. Efficacy of single-dose therapy of urinary tract infection in infants and children: a review. <i>Journal of the National Medical Association</i> . 1994	Not a systematic review
Krepler P, Steinbock H. [Clinical testing of a combination of sulfametrol and trimethoprim (Lidaprim) in urinary tract infections of children]. [German]. <i>Wiener Medizinische Wochenschrift</i> . 1976	Old paper - not within the last 20 years
Kunin CM. Use of antimicrobial agents in treating urinary tract infection.. <i>Advances in Nephrology From the Necker Hospital</i> . 1985	Commentary - not an RCT
Le Saux N, Pham B, Moher D. Evaluating the benefits of antimicrobial prophylaxis to prevent urinary tract infections in children: a systematic review.. <i>CMAJ Canadian Medical Association Journal</i> . 2000	Antibiotics for prophylaxis rather than treatment.
Lewis G. Treatment of acute urinary tract infections with cefadroxil administered once daily. <i>Journal of International Medical Research</i> . 1980	Old paper - not within 20 years
Lines DR. The effectiveness and safety of sulphamethoxazole-trimethoprim compound in childhood urinary infections. <i>Australian Paediatric Journal</i> . 1973	Old study - not within the last 20 years
Malaka-Zafiriou K, Papadopoulos F, Avgoustidou-Savopoulou P, Papachristos F. Comparison of cefadroxil and ampicillin in the treatment of urinary tract infections in children. <i>Clinical Therapeutics</i> . 1984	Old paper - not within 20 years
Mallo N, Dalet F, Hernandez J. [Clinical test of cefazedon (EMD 30 087) in complicated urinary infections (1)]. [Spanish]. <i>Revista Clinica Espanola</i> . 1980	Old paper - not within 20 years
Mamzoridi K, Kasteridou N, Peonides A, Niopas I. Pharmacokinetics of cefixime in children with urinary tract infections after a single oral dose. <i>Pharmacology and Toxicology</i> . 1996	Cohort of pharmacokinetics of cefixime in children - not an RCT, plus small sample size (n=6)
Martelli A, Cortecchia V, Ventriglia L. Aztreonam in the treatment of urinary tract infections: a multicenter trial. <i>Chemotherapy</i> . 1989	Not an RCT
Mazzulli T. Resistance trends in urinary tract pathogens and impact on management.. <i>Journal of Urology</i> . 2002	Not antibiotic treatment - narrative review on resistance trends in all age groups.
Minkov N, Zlatanov Z, Zozikov E, Staneva D, Krusheva R. [Brulamycin in the treatment of urinary infections-microbiological and clinical research]. [Bulgarian]. <i>Vutreshni Bolesti</i> . 1984	Old paper - not within the last 20 years Foreign language paper
Moe OJ, Meberg A, Eng J. Ampicillin and pivampicillin in the treatment of urinary tract infection in children. <i>Scandinavian Journal of Infectious Diseases</i> . 1977	Old paper - not within 20 years

Bibliographic Information	Reason for rejecting study
Naber K, Kaldewey W. [Comparative study of cefaclor versus amoxicillin in urinary tract infections]. [German]. <i>Infection</i> . 1979	Old paper - not within the last 20 years Foreign language paper
Nicolle LE. Asymptomatic bacteriuria: when to screen and when to treat. <i>Infectious Disease Clinics of North America</i> . 2003	Commentary on asymptomatic bacteriuria
Olbing H, Neussel H, Senge T, Hagel K, Linzenmeier G. [Problems in the therapy of pseudomonas infections of the urinary tract. Alternating comparison of carbenicillin and gentamycin in children]. [German]. <i>Deutsche Medizinische Wochenschrift</i> . 1971	Old paper - not within the last 20 years Foreign language paper
Palcoux JB, Raynaud EJ, Borderon JC, Dalous A, Geisert J, Pennaforte F, Peyramond D, Peyrille F. [Clinical trial of a clavulanic acid-amoxicillin combination in urinary infections in children]. [French]. <i>Annales de Pediatrie</i> . 1986	Half of the patients had an anomaly of the urinary collecting system Foreign language paper
Petersen KE, Nielsen EL, Vejlsgaard R. [Bacteriuria developing in children during treatment with ampicillin and pivampicillin]. [Danish]. <i>Ugeskrift for Laeger</i> . 1977	Old paper - not within 20 years Foreign language
Piekkala P, Huovinen P, Valimaki I. Comparative study of cefuroxime vs. amoxycillin in the parenteral treatment of children with upper urinary tract infection. <i>Current Therapeutic Research, Clinical and Experimental</i> . 1985	Commentary - not an RCT
Plumridge RJ, Golledge CL. Treatment of urinary tract infection. Clinical and economic considerations. <i>Pharmacoeconomics</i> . 1996	Commentary - not an RCT
Ponticelli C, Zucchelli P, Casucci G, Cervellati I, Dalla RC, Giro C, Motolese M. Multicentre comparison of cephacetrile and ampicillin in the treatment of urinary tract infections. <i>European Journal of Clinical Pharmacology</i> . 1974	Old paper - not within 20 years
Price JD, Harding JW. The use of amoxycillin in treatment of urinary tract infection in general practice. <i>British Journal of Clinical Practice</i> . 1973	Old paper - not within 20 years
Principi N, Corda R, Bassetti D, Varese LA, Peratoner L. Fosfomycin trometamol versus netilmicin in children's lower urinary tract infections. <i>Chemotherapy</i> . 1990	Fosfomycin Trometamol not licensed in the UK
Pylkkanen J, Vilksa J, Koskimies O. The length of antimicrobial therapy in upper vs. lower urinary tract infection of childhood. <i>Acta Paediatrica Scandinavica</i> . 1981	Included in Cochrane review but sulfafurazole not licenced for children in the UK
Reed K, Newton W. Oral or IV antibiotics for the treatment of febrile children with UTIs? <i>Journal of Family Practice</i> . 1999	Short summary only - full text report of study available. The full article has been included.
Reid G, Bruce AW, Cook RL, Llano M. Effect on urogenital flora of antibiotic therapy for urinary tract infection. <i>Scandinavian Journal of Infectious Diseases</i> . 1990	Study in women aged 18-72 years
Rodriguez W, Delucchi C, Bidegain MA, Rodriguez MS, Gleisner A, Figueroa S. [Treatment of urinary tract infections in children with trimethoprim-sulfamethoxy-pyridazine]. [Spanish]. <i>Revista Chilena de Pediatria</i> . 1983	Old paper - not within 20 years Foreign language
Rubin RH, Shapiro ED, Andriole VT, Davis RJ, Stamm WE. Evaluation of new anti-infective drugs for the treatment of urinary tract infection. Infectious Diseases Society of America and the Food and Drug Administration. <i>Clinical Infectious Diseases</i> . 1992	General guidelines for UTI drugs - not children specific
Rushton HG. Urinary tract infections in children: Epidemiology, evaluation, and management. <i>Pediatric Clinics of North America</i> . 1997	Book chapter - not an RCT
Sadanobu K, Shoji T, Nishimura Y, Miyazaki S. [Effect of combination therapy with TSP tablet and antibiotics for acute cystitis]. [Japanese]. <i>Hinyokika Kyo - Acta Urologica Japonica</i> . 1967	Old paper - not within 20 years Foreign language
Schach H, Scheidt J, Neussel H. [Results of treatment with trimethoprim-sulfamethoxazole in nonspecific urinary tract infections in pediatric urology]. [German]. <i>Monatsschrift für Kinderheilkunde</i> . 1972	Old paper - not within the 1st 20 years Foreign language paper
Shapiro ED. Short course antimicrobial treatment of urinary tract infections in children: a critical analysis. <i>Pediatric Infectious Disease</i> . 1982	Old paper - not within 20 years

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
Stansfeld JM. Duration of treatment for urinary tract infections in children. <i>British Medical Journal</i> . 1975	Outcome is reinfection, but compares two week treatment with 6 month prophylaxis.
Stein GE. Fosfomycin tromethamine: single-dose treatment of acute cystitis. <i>International Journal of Fertility and Womens Medicine</i> . 1999	Trials in adult women. Children's data was not available although narrative was included.
Tynan AP, Macis FR, Ward-McQuaid JN. Nifuratel in urinary infections. <i>British Journal of Urology</i> . 1969	Old paper - not within 20 years
Uijtendaal EV, Rademaker CM, Schobben AF, Fleer A, Kramer WL;van Vught AJ, Kimpfen JL;van Dijk A. Once-daily versus multiple-daily gentamicin in infants and children. <i>Therapeutic Drug Monitoring</i> . 2001	Not only UTI
Varde AB, Shetty HG, Jadav SK, Sheth SM, Acharya VN, Satoskar RS. Comparison of trimethoprim in combination with sulfadiazine or sulfamethoxazole in the treatment of urinary tract infections. <i>Journal of Postgraduate Medicine</i> . 1981	Old paper - not within 20 years
Vlatkovic G, Babic I. [Treatment of urinary tract infection in the child using Ceporex (cephalexin)]. [Croatian]. <i>Lijecnicki Vjesnik</i> . 1972	Old paper - not within 20 years Foreign language
Weber HP, Aberfeld U, Hildenbrand G, Knopfle G. [Treatment of initial urinary tract infection in children with cotrifamole and cotrimoxazole. A double-blind study]. [German]. <i>Deutsche Medizinische Wochenschrift</i> . 1982	Old paper - not within 20 years Foreign language paper
Whitworth JA. Single-dose therapy in the management of urinary tract infections. <i>Medical Journal of Australia</i> . 1986	Not an RCT
Yoshida K, Uchijima Y, Kobayashi N, Suwata J, Nakame Y, Saitoh H, Negishi T, Yamada T, Kageyama Y, Kura N. [Clinical efficacy of aztreonam in patients with complicated urinary tract infections]. [Japanese]. <i>Hinyokika Kiyo - Acta Urologica Japonica</i> . 1988	Foreign Language paper
Pohl A, Antes G, Forster J. Modes of administration of antibiotics for symptomatic urinary tract infections. <i>The Cochrane Library</i> . 2005	Cochrane protocol only
Kahan NR, Chinitz DP, Kahan E. Longer than recommended empiric antibiotic treatment of urinary tract infection in women: an avoidable waste of money. <i>Journal of Clinical Pharmacy and Therapeutics</i> . 2004 Feb	The population is adult women.
McKinnon PS, Neuhauser MM. Efficacy and cost of ampicillin-sulbactam and ticarcillin-clavulanate in the treatment of hospitalized patients with bacterial infections. <i>Pharmacotherapy</i> . 1999 Jun	Not UTI specific
Wang EC, Grasela TH, Walawander CA. Applying epidemiology-based outcomes research to clinical decision-making. A hypothetical model of biotechnology therapy in gram-negative sepsis. <i>Pharmacoeconomics</i> . 1999 Apr	Not UTI specific
Przybylski KG, Rybak MJ, Martin PR, Weingarten CM, Zaran FK, Stevenson JG, Levine DP. A pharmacist-initiated program of intravenous to oral antibiotic conversion. <i>Pharmacotherapy</i> . 1997 Mar	Unable to extract UTI information from other infections and childrens data from adult data
Adelman RD, Halsted CC, Jordan GW, Russo J. Use of urinary enzyme activities in the early detection of aminoglycoside nephrotoxicity: a study in children and adults receiving gentamicin or netilmicin. <i>Proceedings of the Western Pharmacology Society</i> . 1981	Old paper - not within 20 years
Carlsen NL, Hesselbjerg U, Glenting P. Comparison of long-term, low-dose pivmecillinam and nitrofurantoin in the control of recurrent urinary tract infection in children. An open, randomized, cross-over study. <i>Journal of Antimicrobial Chemotherapy</i> . 1985 Oct	Treatment for children with vesicoureteric reflux and current UTI
Demos CH, Green E. Review of clinical experience with amdinocillin monotherapy and comparative studies. [Review] [27 refs]. <i>American Journal of Medicine</i> . 1983 Aug 29	Old paper - not within last 20 years
Itsarayoungyuen S, Riff L, Schauf V, Hamilton L, Otrembiak J, Vidyasagar D. Tobramycin and gentamicin are equally safe for neonates: results of a double-blind randomized trial with quantitative assessment of renal function. <i>Pediatric Pharmacology</i> . 1982	Unable to extract data for UTI from other bacterial infections
. The management of urinary tract infection in children. [Review] [43 refs]. <i>Drug and Therapeutics Bulletin</i> . 1997 Sep	Commentary - not an RCT

Bibliographic Information	Reason for rejecting study
Hoppu K, Koskimies O, Vilska J. Trimethoprim in the treatment of acute urinary tract infections in children. <i>International Journal of Clinical Pharmacology, Therapy, and Toxicology</i> . 1988 Feb	Sulfisoxazole not licenced in the UK
Khan AJ, Kumar K, Evans HE. Three-day antimicrobial therapy of urinary tract infection. <i>Journal of Pediatrics</i> . 1981 Dec	Old paper - not within 20 years
Alban J. Urinary tract infections in children: experience with nalidixic acid. <i>Current Therapeutic Research, Clinical and Experimental</i> . 1970 Sep	Old paper - not within 20 years
Sanders WE. Ceftriaxone in treatment of serious infections. Urinary tract infections.. <i>Hospital Practice (Office Edition)</i> . 1991 Sep	Commentary - not an RCT
Martin AJ, Lacey RW. A blind comparison of the efficacy and incidence of unwanted effects of trimethoprim and co-trimoxazole in the treatment of acute infection of the urinary tract in general practice. <i>British Journal of Clinical Practice</i> . 1999	Study mainly in adults - cannot extract data on children
Gauthier M, Chevalier I, Sterescu A, Bergeron S, Brunet S, Taddeo D. Treatment of urinary tract infections among febrile young children with daily intravenous antibiotic therapy at a day treatment center. <i>Pediatrics</i> . 2004	Cohort study - not an RCT
Michael M, Hodson EM, Craig JC, Martin S, Moyer VA. Short compared with standard duration of antibiotic treatment for urinary tract infection: a systematic review of randomised controlled trials. <i>Archives of Disease in Childhood</i> . 2002	Re-print of cochrane review. The Cochrane review has been included.
Chao SM, Chong CY, Tan-Hendrick A, Tan ASL, Ng WYM. Efficacy and safety of once-a-day gentamicin in the treatment of childhood acute pyelonephritis. <i>Pediatric Nephrology</i> . 2001	Study published as full article that has been included
Michael M, Hodson E, Craig J, Martin S, Moyer V. Short versus standard duration antibiotic therapy for urinary tract infection in children: a meta-analysis. Supplement. <i>Pediatric Nephrology</i> . 2001	Abstract only - Inflammatory reaction and leukocyte trafficking, not antibiotic treatment
Carapetis J, Jaquier A, Buttery J, Starr M. A randomised controlled trial of once-daily gentamicin in children with urinary tract infections.. <i>Australian and New Zealand Journal of Medicine</i> . 1999	Abstract only - have the full text that has been included
Centre for Reviews and Dissemination.. Short-course versus conventional length antimicrobial therapy for uncomplicated lower urinary tract infections in children: a meta-analysis of 1279 patients (Structured abstract). <i>The Cochrane Library</i> . 2005	Summary comments from Centre for reviews and dissemination. The original Cochrane review has been included.
Centre for Reviews and Dissemination.. A meta-analysis of randomized, controlled trials comparing short- and long-course antibiotic therapy for urinary tract infections in children (Structured abstract). <i>The Cochrane Library</i> . 2005	From database of Abstracts of reviews of effects - reviews a meta-analysis. The original Cochrane review has been included.
Coulthard MG, Vernon SJ, Lambert HJ, Matthews JNS. A nurse led education and direct access service for the management of urinary tract infections in children: Prospective controlled trial. <i>British Medical Journal</i> . 2003	Outcomes not antibiotic treatment related. Include rate and quality of diagnosis, prophylaxis and prevention of scarring. This study does not address the clinical question directly where there is other studies do.
Tong X, Wang E, Feng L. Clinical study of oral cefixime in the treatment of urinary tract infection in 35 children. <i>Chinese Journal of Antibiotics</i> . 2005	Foreign language
Dromigny JA, Nabeth P, Juergens-Behr A, Perrier-Gros-Claude JD. Risk factors for antibiotic-resistant <i>Escherichia coli</i> isolated from community-acquired urinary tract infections in Dakar, Senegal. <i>Journal of Antimicrobial Chemotherapy</i> . 2005 Jul	Antibiotic resistance in Senegal is unlikely to apply to the UK context.
Lutter SA ;Currie ML ;Mitz LB ;Greenbaum LA . Antibiotic resistance patterns in children hospitalized for urinary tract infections.. <i>Archives of Pediatrics & Adolescent Medicine</i> . 2005 Oct	Study about resistance patterns in Milwaukee, USA. Unlikely to apply to the UK context.
Howard JB and Howard JE. Trimethoprim-sulfamethoxazole vs sulfamethoxazole for acute urinary tract infections in children. <i>American Journal of Diseases of Children</i> 1978; 132:(11)1085-7	This study was published more than 20 years ago.

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
Wallen L, Zeller WP, Goessler M et al. Single-dose amikacin treatment of first childhood E. coli lower urinary tract infections. <i>Journal of Pediatrics</i> 1983; 103:(2)316-9.	This study was published more than 20 years ago.

Symptomatic treatment

Bibliographic Information	Reason for rejecting study
Rogers J. Pass the cranberry juice... herbal remedy for the treatment of urinary tract infections. <i>Nursing Times</i> .	Opinion paper only
Miller JL, Krieger JN. Urinary tract infections cranberry juice, underwear, and probiotics in the 21st century. [Review] [31 refs]. <i>Urologic Clinics of North America</i> . 2002 Aug	Opinion paper only. Not a systematic review and based on poor quality primary studies. In adults, not children
Lynch DM. Cranberry for prevention of urinary tract infections.. <i>American Family Physician</i> . 2004 Dec 1	Included in a Cochrane review that has been reviewed.
Lowe FC, Fagelman E. Cranberry juice and urinary tract infections: what is the evidence? [Review] [22 refs]. <i>Urology</i> . 2001 Mar	Review but no quality assessment of included studies. No RCTs.
Kiel RJ, Nashelsky J, Robbins B, Bondi S. Clinical inquiries. Does cranberry juice prevent or treat urinary tract infection? [Review] [6 refs]. <i>Journal of Family Practice</i> . 2003 Feb	Letter only
Hrastinger A, Dietz B, Bauer R, Sagraves R, Mahady G. Is there clinical evidence supporting the use of botanical dietary supplements in children? <i>Journal of Pediatrics</i> . 2005	Not UTI specific
Greenberg JA, Newman SJ, Morgan MA. Cranberries and urinary-tract health: a knowledge assessment of American College of Obstetricians and Gynecologists fellows. <i>Journal of Alternative and Complementary Medicine</i> .	Letter only
Berger RE. Cranberries for preventing urinary tract infections. <i>Journal of Urology</i> . 2005 Jun	Abstract of cochrance review. The original Cochrane review has been reviewed.
. Cranberry and urinary tract infection.. <i>Drug and Therapeutics Bulletin</i> . 2005 Mar	Non-systematic review covering three groups, adult women, children with neuropathic bladder and older men and women.
Avorn J, Monane M, Gurwitz JH, Glynn RJ, Choodnovskiy I, Lipsitz LA. Reduction of bacteriuria and pyuria after ingestion of cranberry juice. <i>JAMA</i> . 1994 Mar	Previous UTI was significantly different between the groups at 6 months (7% of cranberry group vs. 25% of placebo group) and at 12 months (17% of cranberry group vs. 33% of placebo group). Suggests non-randomisation.
Abu Daia JM, Al Aaly MA, De Castro R. Urinary tract infection in childhood. A practical approach and pediatric urologists point of view. [Review] [15 refs]. <i>Saudi Medical Journal</i> . 2000 Aug	Review only – no primary data and not well referenced.
Baraff LJ. Management of fever without source in infants and children. [Review] [121 refs]. <i>Annals of Emergency Medicine</i> . 2000 Dec	Review only – no primary data
Avner JR, Baker MD. Management of fever in infants and children. [Review] [64 refs]. <i>Emergency Medicine Clinics of North America</i> . 2002 Feb	Review only – no primary data
Miser WF. Fever without source in infants and young children—a hot potato?[comment]. <i>American Family Physician</i> . 2001 Oct 1	not RCT or SR
Neveus T, Lackgren G, Tuvemo T, Hetta J, Hjalmas K, Stenberg A. Enuresis—background and treatment. [Review] [561 refs]. <i>Scandinavian Journal of Urology and Nephrology Supplementum</i> . 2000	Review only – no primary data
Shaw KN, Gorelick MH. Urinary tract infection in the pediatric patient. [Review] [88 refs]. <i>Pediatric Clinics of North America</i> . 1999	Review only – no primary data
Bachur R. Nonresponders: prolonged fever among infants with urinary tract infections. <i>Pediatrics</i> . 2000 May	Not related to symptomatic treatment
Roberts JA. Management of pyelonephritis and upper urinary tract infections. [Review] [57 refs]. <i>Urologic Clinics of North America</i> . 1999 Nov	Review only – no primary data
Strong S. Effective treatment for children's enuresis. <i>Nursing Times</i> . 1998 Jan 7	Opinion paper – no primary data and not UTI specific
. No evidence for practice of alternating doses of paracetamol and ibuprofen in children with fever. <i>Pharmaceutical Journal</i> .	not RCT or SR

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
Shortliffe LM. The management of urinary tract infections in children without urinary tract abnormalities. [Review] [52 refs]. <i>Urologic Clinics of North America</i> . 1995 Feb	Review only – no primary data
Dagan R, Sofer S, Philip M, Shachak E. Ambulatory care of febrile infants younger than 2 months of age classified as being at low risk for having serious bacterial infections. <i>Journal of Pediatrics</i> . 1988	In children with normal urinalysis Children with serious bacterial infections – not UTI specific.
Yurdakok M, Kinik E, Beduk Y. Treatment of enuresis: A study with imipramine, amitriptyline, chlorthalidone and piracetam. <i>Turkish Journal of Pediatrics</i> . 1986	Not UTI specific
Durbin Jr WA, Peter G. Management of urinary tract infections in infants and children. <i>Pediatric Infectious Disease</i> . 1984	Review only – no primary data
Scharer K, Manz F. Renal handling of citrate in children with various kidney disorders. <i>International Journal of Pediatric Nephrology</i> . 1985	Not related to symptomatic treatment
Shimoyama A. On enuresis of adolescents. <i>Japanese Journal of Psychosomatic Medicine</i> . 1985	Foreign language
Lynch NT, Grunert BK, Vasudevan SV, Severson RA. Enuresis: Comparison of two treatments. <i>Archives of Physical Medicine and Rehabilitation</i> . 1984	Not UTI specific
Louis JJ. Non steroidal anti-inflammatory drugs in pediatrics. <i>Pediatric</i> . 1984	The study is not about children who had UTI.
Mehrotra SN, Liu L, Srivastava JR, Singh SB. Evaluation of various methods in treatment of enuresis. <i>Indian Pediatrics</i> . 1980	No indication whether patients had UTI
Reid G, Devillard E. Probiotics for mother and child. [Review] [95 refs]. <i>Journal of Clinical Gastroenterology</i> . 2004 Jul	Review only – no primary data
Rogers J. An overview of the management of nocturnal enuresis in children. [Review] [55 refs]. <i>British Journal of Nursing</i> . 2003 Aug 14	not RCT or SR
Yeung CK. Nocturnal enuresis (bedwetting). [Review] [41 refs]. <i>Current Opinion in Urology</i> . 2003 Jul	Review only – no primary data
Rushton HG. Evaluation of the enuretic child. [Review] [38 refs]. <i>Clinical Pediatrics</i> . 1993 Jul	Review only – no primary data
Warady BA, Alon U, Hellerstein S. Primary nocturnal enuresis: current concepts about an old problem. [Review] [20 refs]. <i>Pediatric Annals</i> . 254 May	Review only – no primary data
Rushton HG. Nocturnal enuresis: epidemiology, evaluation, and currently available treatment options. [Review] [44 refs]. <i>Journal of Pediatrics</i> . 1989 Apr	Review – no primary data. Poorly referenced.
Lovering JS, Tallett SE, McKendry JB. Oxybutynin efficacy in the treatment of primary enuresis. <i>Pediatrics</i> . 1988 Jul	In children with no UTI and no history of UTI
Swedish Collaborative Study Group.. Nalidixic acid plus sodium citrate twice daily in treatment of acute urinary tract infection. <i>Scandinavian Journal of Primary Health Care</i> . 1988	In women > 16
Ferry S, Burman LG, Widberg B, Calmenius C. Short-term nalidixic acid plus sodium citrate in acute lower urinary tract infection. <i>Scandinavian Journal of Infectious Diseases</i> . 1987	Women 19-31 years
Elinder G, Soback S. Effect of Uristop on primary nocturnal enuresis. A prospective randomized double-blind study. <i>Acta Paediatrica Scandinavica</i> . 1985 Jul	In psychiatric population – no UTI
Spooner JB. Alkalinisation in the management of cystitis. <i>Journal of International Medical Research</i> . 1984	In women aged 18-60
Winterborn MH. The management of urinary infections in children. <i>British Journal of Hospital Medicine</i> . 458 Sep	Review only – no primary data
Stewart MA. Treatment of bedwetting. <i>JAMA</i> . 1975 Apr 21	Opinion paper only – no primary data
Aperia A, Berg U, Broberger O. Renal bicarbonate reabsorption and hydrogen ion excretion in children with recurrent urinary tract infections. The effect of fluorohydrocortisone. <i>Acta Paediatrica Scandinavica</i> . 1974 Mar	In children with recurrent UTI

Bibliographic Information	Reason for rejecting study
Johnstone JM. Cystometry and evaluation of anticholinergic drugs in enuretic children. <i>Journal of Pediatric Surgery</i> . 1972 Feb	Enuresis due to psychological stress – not UTI
Murphy S, Nickols J, Umphress A, Hammar S, Eddy R, Chapman W. Adolescent enuresis. A multiple contingency hypothesis. <i>JAMA</i> . 1971 Nov 22	UTI not mentioned and population of malnourished children
. Sedative and stimulant compared in enuresis. <i>Practitioner</i> . 1970 Apr	Not UTI specific
Esperanca M, Gerrard JW. Nocturnal enuresis: comparison of the effect of imipramine and dietary restriction on bladder capacity. <i>Canadian Medical Association Journal</i> . 1969 Dec 13	Only in children with sterile urine
Miyao M, Hasegawa Y, Matsuda H, Matsumura I, Imaoka M. Urinary alkaline phosphatase level in children. <i>Tokushima Journal of Experimental Medicine</i> . 1968 May	Not UTI specific
Agarwal HC, Mohan D, Mukerji DP. Eneuresis. An etiological and therapeutic review. [Review] [38 refs]. <i>Indian Journal of Medical Sciences</i> . 1967 Oct	Review – no primary data
Akpede GO, Akenzua GI. Management of children with prolonged fever of unknown origin and difficulties in the management of fever of unknown origin in children in developing countries. <i>Paediatric Drugs</i> . 2001	Review only – no primary data
Akpede GO, Akenzua GI. Aetiology and management of children with acute fever of unknown origin. <i>Paediatric Drugs</i> . 2001	Review only – no primary data
Aneja S. Nocturnal enuresis. <i>Indian Journal of Pediatrics</i> . 2002 Aug	Review paper – no primary data
Ashouri N, Butler J, Vargas-Shiraishi OM, Singh J, Arrieta A. Urinary tract infection in neonates: How aggressive a workup and therapy? <i>Infections in Medicine</i> .	Management plan – not related to symptomatic treatment
Bernard-Bonnin AC. Diurnal enuresis in childhood. [Review] [26 refs]. <i>Canadian Family Physician</i> . 2000 May	Not UTI specific
Meremikwu M, Oyo-Ita A. Paracetamol for treating fever in children. <i>The Cochrane Library</i> . 2005	Not specifically children who had UTI
Glazener CMA, Evans JHC. Desmopressin for nocturnal enuresis in children. <i>The Cochrane Library</i> . 2005	Not children with suspected UTI
Glazener CMA, Evans JHC, Cheuk DKL. Complementary and miscellaneous interventions for nocturnal enuresis in children. <i>The Cochrane Library</i> . 2005	not children with suspected UTI
Centre for Reviews and Dissemination.. Treating fever in children: paracetamol or ibuprofen? (Structured abstract). <i>The Cochrane Library</i> . 2005	not specifically children who had UTI
El Radhi AS, Board C. Providing adequate treatment for children with nocturnal enuresis. <i>British Journal of Community Nursing</i> .	not a RCT, not children who had UTI
Cichocka E, Majchrzyk-Ossowska T, Frelek M. Complications of desmopressin administration in nocturnal enuresis in children. <i>Pediatrics Polska</i> . 1996	Foreign language
Floret D. Acute fever in children. Criteria to identify serious illness in febrile children. <i>Revue du Praticien</i> .	Foreign language
Hagglund TB. Enuretic children treated with fluid restriction or forced drinking. A clinical and cystometric study. <i>Annales Paediatricae Fenniae</i> . 1965	Not UTI specific
Kellner JD. Management of fever without source in children: Changing times. <i>Paediatrics and Child Health</i> . 2003	Not specifically children with out UTI
Malhotra SM, Kennedy II WA. Urinary tract infections in children: Treatment. <i>Urologic Clinics of North America</i> . 2004	Review only – no primary data
Marchetti F, Bua J, Maschio M, Barbi E. Symptomatic treatment of fever and pain in paediatric practice. <i>Medico e Bambino</i> .	Foreign language
McCarthy PL, Klig JE, Kennedy WP, Kahn JS. Fever without apparent source on clinical examination, lower respiratory infections in children, and enterovirus infections. <i>Current Opinion in Pediatrics</i> . 2000	Review only – no primary data

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
McCarthy PL. Fever without apparent source on clinical examination. <i>Current Opinion in Pediatrics</i> . 2002	Review only – no primary data
Nappo S, Del Gado R, Chiozza ML, Biraghi M, Ferrara P, Caione P. Nocturnal enuresis in the adolescent: A neglected problem. <i>BJU International</i> . 2002	Not an RCT
Nelson DS, Gurr MB, Schunk JE. Management of febrile children with urinary tract infections. <i>American Journal of Emergency Medicine</i> .	Not related to UTI epidemiology
Tobias JD. Weak analgesics and nonsteroidal anti-inflammatory agents in the management of children with acute pain. [Review] [36 refs]. <i>Pediatric Clinics of North America</i> . 2000 Jun	Review only – no primary data
Wille S. Primary nocturnal enuresis in children. Background and treatment. <i>Scandinavian Journal of Urology and Nephrology Supplementum</i> . 1994	Review only – no primary data
Yannakoyorgos K, Ioannides E, Zahariou A, Anagnostopoulos D, Kasselas V, Kalinderis A. Management of nocturnal enuresis in children with desmopressin and bladder physiotherapy. <i>Pediatric Surgery International</i> . 1998 Apr	Not UTI specific
Norgaard JP, Van Gool JD, Hjalmas K, Djurhuus JC, Hellstrom A. Standardization and definitions in lower urinary tract dysfunction in children. <i>British Journal of Urology</i> . 1998	Enuresis and urinary incontinence – not UTI specific
De Grazia E ;Cimador M . Combined oxybutinin-desmopressin therapy in the treatment of nocturnal enuresis with urinary disorders. <i>Minerva Pediatrica</i> . 1999	Foreign language
Dairiki Shortliffe LM, McCue JD. Urinary tract infection at the age extremes: Pediatrics and geriatrics. <i>American Journal of Medicine</i> . 2002	Review only – no primary data
Caione P, Arena F, Biraghi H, Cigna RM, Chendi D, Chiozza ML, De Lisa A, De Grazia E, Fano M, Formica P, Garofalo S, Gramenzi R, Von Heland M, Lanza P, Lanza T, Maff. Nocturnal enuresis and daytime wetting: A multicentric trial with oxybutynin and desmopressin. <i>European Urology</i> . 1997	Only in children with no UTI
McCarthy PL, Bachman DT, Shapiro ED, Baron MA. Fever without apparent source on clinical examination, lower respiratory infections in children, bacterial infections, and acute gastroenteritis and diarrhea of infancy and early childhood. <i>Current Opinion in Pediatrics</i> . 1995	Text book chapter – no primary data
Van DV, Van d;Suijlekom-Smit LWA. Acute infections in children. <i>Geneesmiddelenbulletin</i> . 1992	Foreign language
Di MP, Agniel R, Gaillard JL, Denys P. Effects of cranberry juice on uropathogenic Escherichia coli in vitro biofilm formation. <i>Journal of Chemotherapy</i> . 2005 Oct	Non-systematic review
Howell AB, Reed JD, Krueger CG, Winterbottom R, Cunningham DG, Leahy M. A-type cranberry proanthocyanidins and uropathogenic bacterial anti-adhesion activity. <i>Phytochemistry</i> . 2005 Sep	Study of anti-adhesion activity in human urine
Najm W. Antimicrobial activity of urine ater ingestion of cranberry. <i>Focus on Alternative and Complementary Therapies</i> . 2005	Study of antimicrobial activity in adults without UTI

Predictors of recurrence

Bibliographic Information	Reason for rejecting study
Winberg J. What hygiene measures are advisable to prevent recurrent urinary tract infection and what evidence is there to support this advice? <i>Pediatric Nephrology</i> . 1994 Dec	Letter to the editor
Blethyn AJ, Jenkins HR, Roberts R, Verrier JK. Radiological evidence of constipation in urinary tract infection. <i>Archives of Disease in Childhood</i> . 1995 Dec	Half the number of controls (33) than cases (61). The study investigated radiological findings, but not reported clinical outcomes including symptoms and signs.
Lopez MM, Castillo LA, Chavez JB, Ramones C. Hypercalciuria and recurrent urinary tract infection in Venezuelan children. <i>Pediatric Nephrology</i> . 1999 Jun	Not enough information provided to indicate what number recurrence children are at. Normocalcuria may impact children differently e.g. For those with 10 recurrent UTI's the impact of lowering calcium is likely to be different than those who have only had 2 UTIs.
Romanczuk W, Korczawski R. Chronic constipation: a cause of recurrent urinary tract infections. <i>Turkish Journal of Pediatrics</i> . 1993 Jul	Study included children with chronic constipation and recurrent UTI – sub group analysis of guideline population. Not investigating constipation symptoms in all children with recurrent UTI. Not enough information on the number of recurrences.
Mingin GC, Hinds A, Nguyen HT, Baskin LS. Children with a febrile urinary tract infection and a negative radiologic workup: factors predictive of recurrence. [Review] [19 refs]. <i>Urology</i> . 2004 Mar	Stated aims were not fulfilled – aimed to identify risk factors for recurrence, but only one factor (gender) analysed. Author contact details were not supplied. Follow up available on 69/78 (88%) However numbers reported out of 78. Gender details not supplied for the 69 followed up, so stated aim of analysing risk for gender cannot be calculated.
Jantunen ME, Saxen H, Salo E, Siitonen A. Recurrent urinary tract infections in infancy: relapses or reinfections? <i>Journal of Infectious Diseases</i> . 2002	Study provides a genotypic analysis of recurrent UTI analytes in children with pyelonephritis. The study does not report clinically relevant predictors.
Persad R, Kamineni S, Mouriquand PD. Recurrent symptoms of urinary tract infection in eight patients with refluxing ureteric stumps. <i>British Journal of Urology</i> . 1994 Dec	Children recruited because of kidney damage secondary to VUR – not because of UTI.
Mingin GC, Nguyen HT, Baskin LS. Abnormal dimercapto-succinic acid scans predict an increased risk of breakthrough infection in children with vesicoureteral reflux. <i>Journal of Urology</i> . 2004	Children with VUR recruited to investigate breakthrough UTI.
Sillen U, Hellstrom AL, Holmdahl G, Solsnes E. The voiding pattern in infants with dilating reflux. <i>BJU International</i> . 1999 Jan	Not all children had UTI

Non-antibiotic strategies for managing recurrence

Bibliographic Information	Reason for rejecting study
. Cranberry and urinary tract infection.. <i>Drug and Therapeutics Bulletin</i> . 2005 Mar	Review, but not systematic review of RCTs. Based on poor quality studies and opinion papers. Review covers three groups, adult women, children with neuropathic bladder and older men and women.
Casimir F, Fitzgerald DA. Is there a role for circumcision in boys with recurrent urinary tract infections? <i>Journal of Paediatrics and Child Health</i> . 2003 Aug	Single case report
Cason DL, Carter BS, Bhatia J. Can circumcision prevent recurrent urinary tract infections in hospitalized infants? <i>Clinical Pediatrics</i> . 2000 Dec	Study is in boys in neonatal intensive care – out of scope
Galland L, Adatto K, Doebele K, Granowetter L, Erde K, Campisi J, Koprowski P. Behavioral aspects of recurrent UTI. <i>Journal of the American College Health Association</i> . 1977 Apr	Study in adult women – out of scope
Gerasimov SV. Probiotic prophylaxis in pediatric recurrent urinary tract infections. <i>Clinical Pediatrics</i> . 2004 Jan	Single case report
Lee B, Bhuta T, Craig J, Simpson J. Methenamine hippurate for preventing urinary tract infections. <i>The Cochrane Library</i> . 2005	Cochrance review – of the 8 included studies patients included: 1.pregnant patients with asymptomatic bacteriuria 2. post-menopausal women 3. menstruating women 4. Adult patients (mean age 50.5 years) 5. Women post gynaecological operation 6. Male patients with traumatic spinal cord injury 7. Adult women undergoing a vaginal operation or expanded hysterectomy 8. women undergoing uterovaginal prolapse surgery. None of the population is relevant to this guideline
Berger RE. Cranberries for preventing urinary tract infections. <i>Journal of Urology</i> . 2005 Jun	Abstract of cochrance review. The original Cochrane review has been reviewed.
Jepson RG, Mihaljevic L, Craig J. Cranberries for preventing urinary tract infections.. <i>The Cochrane Library</i> . 2005	Cochrance review – of the 8 included studies patients included: 1. Elderly women (mean age 78.5 years) 2. Children with neuropathic bladder 3. Elderly patients (mean age 81 years) 4. Adult women 5. Children with neuropathic bladder 6. Sexually active women 7. Sexually active women None of the population is relevant to this guideline
Lynch DM. Cranberry for prevention of urinary tract infections.. <i>American Family Physician</i> . 2004 Dec 1	Non-systematic review No primary data
. Cranberries and UTI: the evidence. (Review of research on use of cranberries to prevent and relieve urinary tract infections. 9 refs). <i>All Ireland J Nursing and Midwifery</i> .	Opinion paper
Foda MMR, Middlebrook PF, Gatfield CT, Potvin G, Wells G, Shillinger JF. Efficacy of Cranberry in Prevention of Urinary Tract Infection in a Susceptible Pediatric Population. <i>The Canadian journal of urology</i> . 1995	Study in children with neuropathic bladder – out of scope.

Bibliographic Information	Reason for rejecting study
Kontiokari T ;Salo J ;Eerola E ;Uhari M . Cranberry juice and bacterial colonization in children—a placebo-controlled randomized trial. <i>Clinical Nutrition</i> . 2005 Dec	Study evaluated effect of cranberry on nasopharyngeal and colonic flora – no clinically relevant outcomes reported
Super EA, Kemper KJ, Woods C, Nagaraj S. Cranberry use among pediatric nephrology patients. <i>Ambulatory Pediatrics</i> . 2005 Jul	Non-comparative study. Describes cranberry use among paediatric patients and perceived benefits.
Barbosa-Cesnik CT. Cranberry Juice and Urinary Tract Infections. <i>National Institut of Health</i> . 2006	Protocol of study in adult women
Hutchinson J. Do cranberries help prevent urinary tract infections? [17 refs]. <i>Nursing Times</i> . 2005 Nov 22	Review in adults.

Prophylaxis

Bibliographic Information	Reason for rejecting study
Beetz R. May we go on with antibacterial prophylaxis for urinary tract infections? <i>Pediatric Nephrology</i> . 2006	Review only – no primary data
Bollgren I. Antibacterial prophylaxis in children with urinary tract infection. <i>Acta Paediatrica, International Journal of Paediatrics, Supplement</i> . 1999	Commentary only – no primary data
Centre for Reviews and Dissemination.. Evaluating the benefits of antimicrobial prophylaxis to prevent urinary tract infections in children: a systematic review (Structured abstract). <i>Database of Abstracts of Reviews of Effectiveness</i> . 2006	CRD commentary on a systematic review. The original Cochrane review has been reviewed.
Granados EA. [Which treatment should children with recurrent urinary infections, without anatomical anomalies, receive?]. <i>Archivos espanoles de urologia</i> . 1998 May	Foreign language
Kaneko K, Ohtomo Y, Shimizu T, Yamashiro Y, Yamataka A, Miyano T. Antibiotic prophylaxis by low-dose cefaclor in children with vesicoureteral reflux. <i>Pediatric Nephrology</i> . 2003 May	Non-comparative study 25/39 children had UTIs
Le Saux N ;Pham B ;Moher D . Evaluating the benefits of antimicrobial prophylaxis to prevent urinary tract infections in children: a systematic review.. <i>CMAJ Canadian Medical Association Journal</i> . 2000	Systematic review where the majority of studies are cohort and case-control studies. Already have a Cochrane review of RCTs so this study does not provide additional information.
Montini G. Evaluation of the effectiveness of antibiotic prophylaxis in children with a history of upper urinary tract infections: a multicentre randomised study – Protocol. 2004 [No additional source data available].	Included in Cochrane review
Olbing H, Smellie JM, Jodal U, Lax H. New renal scars in children with severe VUR: a 10-year study of randomized treatment. <i>Pediatric nephrology (Berlin, Germany)</i> . 2003 Nov	Children randomised to prophylaxis or surgery.The data have been included in the Surgical section.
Seracini D ;Materassi M ;Danti A . Non-comparative open study on efficacy and safety of cefaclor as a prophylactic agent for urinary tract infections in children. <i>Pediatrica Medica e Chirurgica</i> . 1996	Foreign language
Shakil A, Reed L, Wilder L. Do antibiotics prevent recurrent UTI in children with anatomic abnormalities? <i>Journal of Family Practice</i> . 2004	Commentary only – no primary data
Smith EM, Elder JS, Husmann DA, Peters CA, Belman AB. Double antimicrobial prophylaxis in girls with breakthrough urinary tract infections. <i>Urology</i> . 1994	Not an RCT Case-series on girls with breakthrough infection
Stranieri G, Zampogna S, Ielapi V, Defilippo RG, Defilippo V, Cristofaro G, Galiano R, Capillo S, Madonna L, Cifala S, Ferro V, Rubino R. Cefixime for the prophylaxis of urinary tract infections in children with malformative uropathies: an open study. <i>European Review for Medical and Pharmacological Sciences</i> . 2003 Mar	In children who had UTI and urinary tract abnormalities
Wheeler D, Vimalachandra D, Hodson EM, Roy LP, Smith G, Craig JC. Antibiotics and surgery for vesicoureteric reflux: a meta-analysis of randomised controlled trials.. <i>Archives of Disease in Childhood</i> . 2003 Aug	Does not investigate effectiveness of prophylaxis – the data have been included in surgery vs. reflux section
Williams G, Lee A, Craig J. Antibiotics for the prevention of urinary tract infection in children: a systematic review of randomized controlled trials. <i>Journal of Pediatrics</i> . 2001	By the same authors who wrote the Cochrane review. 3/5 papers included in the Cochrane review, 1/5 excluded and 1/5 not mentioned. The original Cochrane review has been included.
Wingen AM, Koskimies O, Olbing H, Seppanen J, Tamminen-Mobius T. Growth and weight gain in children with vesicoureteral reflux receiving medical versus surgical treatment: 10-year results of a prospective, randomized study. International Reflux Study in Children (European Branch). <i>Acta Paediatrica</i> . 1999 Jan	Children randomised to prophylaxis or surgery. Th data have been included in surgery vs prophylaxis section
Stamm WE. Prevention of urinary tract infections. <i>American Journal of Medicine</i> . 1984 May 15	Commentary only – no primary data

Bibliographic Information	Reason for rejecting study
Baciulis V. Long-term cefadroxil prophylaxis in children with recurrent urinary tract infections [abstract]. <i>Nephrology, dialysis, transplantation : official publication of the European Dialysis and Transplant Association – European Renal Association</i> . 2003	Uncontrolled study
Coupris L. Antibiotic prophylaxis for surgery after vesico-ureteral reflux in children. <i>Drugs</i> . 1988	Study does not compare prophylaxis with surgery
Cooper CS, Chung BI, Kirsch AJ, Canning DA, Snyder HM. The outcome of stopping prophylactic antibiotics in older children with vesicoureteral reflux.. <i>Journal of Urology</i> . 2000 Jan	Case-series data only. Non-comparative
Rachmiel M, Aladjem M, Starinsky R, Strauss S, Villa Y, Goldman M. Symptomatic urinary tract infections following voiding cystourethrography. <i>Pediatric Nephrology</i> . 2005 Oct	Non-comparative study
Coulthard, M.G. Do kidneys outgrow the risk of reflux nephropathy?, Journal Name: Pediatric Nephrology Year: 2002 Jul	This is a theory paper does not contain primary research data, where there are other studies that address this clinical question directly.

Evaluation of the structure of the urinary tract

Bibliographic Information	Reason for rejecting study
Weizer AZ, Silverstein AD, Auge BK, Delvecchio FC, Raj G, Albala DM, Leder R, Preminger GM. Determining the incidence of horseshoe kidney from radiographic data at a single institution. <i>Journal of Urology</i> . 2003 Nov	Not in children who had UTI
De Kort LMO, Uiterwaal CSPM, Beek EJA, Jan Nievelstein RA, Klijn AJ, De Jong TPVM. Reliability of voiding cystourethrography to detect urethral obstruction in boys. <i>Urology</i> . 2004	Only 21/72 (30%) of boys who had UTI as indication for VCUG but results not presented separately for this group.
Karabacakoglu A, Karakose S, Ince O, Cobankara OE, Karalezli G. Diagnostic value of diuretic-enhanced excretory MR urography in patients with obstructive uropathy. <i>European Journal of Radiology</i> . 2004 Dec	Age range of patients 8 to 71 yrs, data not separable by age groups. Also no mention of UTI.
Kilic S, Altinok MT, Ipek D, Beytur A, Baydinc YC, Gunes G. Color Doppler sonography examination of partially obstructed kidneys associated with ureteropelvic junction stone before and after percutaneous nephrolithotripsy: preliminary report. <i>International Journal of Urology</i> . 2005 May	Age range of patients from 13 to 65 yrs thus outside scope of the guideline. Does not specify how many patients had UTI
Schoellnast H, Lindbichler F, Riccabona M. Sonographic diagnosis of urethral anomalies in infants: Value of perineal sonography. <i>Journal of Ultrasound in Medicine</i> . 2004	Study sample includes only 15/88 (17%) of children who had UTI;
Tsuchiya M, Hayashida M, Yanagihara T, Yoshida J, Takeda S, Tatsuma N, Tsugu H, Hino Y, Munakata E, Murakami M. Ultrasound screening for renal and urinary tract anomalies in healthy infants. <i>Pediatrics International</i> . 2003	Study was population based and included all children visiting a paediatric dept (n=5700); did not investigate whether any included children had or have had UTI
Mazzola BL, von Vigier RO, Marchand S <i>et al.</i> Behavioral and functional abnormalities linked with recurrent urinary tract infections in girls. <i>Journal of Nephrology</i> 2003; 16:(1)133-8.	The study only reported "functional" abnormalities of the urinary tract
Jodal U. The natural history of bacteriuria in childhood. <i>Infectious Disease Clinics of North America</i> 1987; 1:(4)713-29.	This study primarily includes asymptomatic bacteriuria

Detecting vesicoureteric reflux

Bibliographic Information	Reason for rejecting study
Cooper CS, Madsen MT, Austin JC, Hawtrey CE, Gerard LL, Graham MM, Rushton HG, Cooper C. Bladder pressure at the onset of vesicoureteral reflux determined by nuclear cystometrogram. <i>Journal of Urology</i> . 2003 Oct	Not in children who had UTI
Best J. Pediatric voiding cystourethrogram. <i>Images</i> . 2000	Guide to paediatric VCUG – no primary data
Elder JS. Imaging for vesicoureteral reflux—is there a better way? <i>Journal of Urology</i> . 2005 Jul	Editorial only – no primary data
Garcia-Nieto V, Siverio B, Monge M, Toledo C, Molini N. Urinary calcium excretion in children with vesicoureteral reflux. <i>Nephrology Dialysis Transplantation</i> . 2003	Not specifically in children who had UTI
Kosar A, Yesildag A, Oyar O, Perk H, Gulsoy U. Detection of vesicoureteric reflux in children by colour-flow Doppler ultrasonography. <i>BJU International</i> . 2003	Not in children who had UTI
McLaren CJ, Simpson ET. Vesico-ureteric reflux in the young infant with follow-up direct radionuclide cystograms: The medical and surgical outcome at 5 years old. <i>BJU International</i> . 2002	Not in children who had UTI
Rubenstein JN, Maizels M, Kim SC, Houston JTB. The pic cystogram: A novel approach to identify 'occult' vesicoureteral reflux in children with febrile urinary tract infections. <i>Journal of Urology</i> . 2003 Jun	Not all children were investigated for VUR because of a UTI. Cannot reliably construct a 2x2 table from the information provided.
Ascenti G, Zimbaro G, Mazziotti S, Chimenz R, Baldari S, Fede C. Vesicoureteral reflux: comparison between urosonography and radionuclide cystography. <i>Pediatric Nephrology</i> . 2003 Aug	Did not use appropriate reference standard. Contrast enhanced colour Doppler voiding ultrasonography compared to Direct radionuclide voiding cystography.
D'Errico G. The role of nuclear medicine in evaluation of vesicoureteral reflux and/or reflux nephropathy.[erratum appears in <i>Rays</i> . 2003 Jan-Mar;28(1):118]. [Review] [26 refs]. <i>Rays</i> . 2002 Apr	Non-systematic review No primary data
Darge K. Diagnosis of vesicoureteral reflux with ultrasonography. [Review] [70 refs]. <i>Pediatric Nephrology</i> . 2002 Jan	Non-systematic review No primary data
Darge K, Trusen A, Troeger J. Diagnostic imaging of vesicoureteral reflux. [Review] [50 refs]. <i>Rays</i> . 2002 Apr	Non-systematic review No primary data
Galia M, Midiri M, Pennisi F, Farina R, Bartolotta TV, De MM, Lagalla R. Vesicoureteral reflux in young patients: Comparison of voiding color Doppler US with echo enhancement versus voiding cystourethrogram for diagnosis or exclusion. <i>Abdominal Imaging</i> . 2004	Not all children had UTI 66/122 children underwent echo-enhanced Doppler cystosonography compared to VCUG following UTI, however numbers were not available for these children apart from the study group.
Hertz M, Rozenman J. Cystourethrography: technique, indications, and normal findings... part 1. <i>Applied Radiology</i> . 1983	Practice points for VCUG. No primary data
Konda R, Sato H, Sakai K, Abe Y, Fujioka T. Urinary excretion of vascular endothelial growth factor is increased in children with reflux nephropathy. <i>Nephron Clinical Practice</i> . 2004	Not in children who had UTI (only in children with 'reflux nephropathy') Did not use appropriate reference standard. Urinary levels of vascular endothelial growth factor (VEGF) compared to DMSA.
Kopac M, Kenig A, Kljucevsek D, Kenda RB. Indirect voiding urosonography for detecting vesicoureteral reflux in children. <i>Pediatric Nephrology</i> . 2005	Did not use appropriate reference standard. Echo-enhanced voiding ultrasonography compared to indirect voiding urosonography (IVUS)
Kuzmic AC, Brkljacic B. Color Doppler ultrasonography in the assessment of vesicoureteric reflux in children with bladder dysfunction. <i>Pediatric Surgery International</i> . 2002	Not in children who had UTI Colour Doppler ultrasonography compared VCUG to assess VUR in children with neuropathic bladder/sphincter dysfunction and non-neuropathic bladder.

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
Lee SK, Chang Y, Park NH, Kim YH, Woo S. Magnetic resonance voiding cystography in the diagnosis of vesicoureteral reflux: Comparative study with voiding cystourethrography. <i>Journal of Magnetic Resonance Imaging</i> . 2005	Not all children had UTI. 14/20 children underwent Magnetic resonance voiding cystourethrography (MRVC) compared to VCUUG following UTI, however numbers were not available for these children apart from the study group.
Mentzel HJ, Vogt S, John U, Kaiser WA. Voiding urosonography with ultrasonography contrast medium in children. <i>Pediatric Nephrology</i> . 2002 Apr	Not all children had a UTI 67/118 children underwent Voiding urosonography compared to VCUUG following UTI, however numbers were not available for these children apart from the study group.
Piaggio G,gl' Innocenti ML, Toma P, Calevo MG, Perfumo F. Cystosonography and voiding cystourethrography in the diagnosis of vesicoureteral reflux. <i>Pediatric Nephrology</i> . 2003 Jan	Not all children had UTI 156/305 ureteral units underwent cystosonography (CSG) compared to VCUUG following UTI, however numbers were not available for these children apart from the study group.
Riccabona M, Mache CJ, Lindbichler F. Echo-enhanced color Doppler cystosonography of vesicoureteral reflux in children. Improvement by stimulated acoustic emission. <i>Acta Radiologica</i> . 2003 Jan	Not all children had UTI 6/30 children underwent echo-enhanced Doppler cystosonography compared to VCUUG following UTI, however numbers were not available for these children apart from the study group.
Tasic V, Todorovska S. Echo-enhanced voiding urosonography for detection of vesicoureteric reflux in children [2]. <i>Pediatric Radiology</i> .	Letter to the Editor
Ascenti G, Zimbaro G, Mazziotti S, Chimenz R, Fede C, Visalli C, Scribano E. Harmonic US imaging of vesicoureteric reflux in children: Usefulness of a second generation US contrast agent. <i>Pediatric Radiology</i> . 2004	only 29/80 of children included in study had diagnosis of UTI
Berrocal T, Gaya F, Arjonilla A. Vesicoureteral reflux: Can the urethra be adequately assessed by using contrast-enhanced voiding US of the bladder? <i>Radiology</i> . 2005	Nearly half of study sample (44%) do not have UTI
Bhatnagar V, Mitra DK, Agarwala S, Kumar R, Patel C, Malhotra AK, Gupta AK. The role of DMSA scans in evaluation of the correlation between urinary tract infection, vesicoureteric reflux, and renal scarring. <i>Pediatric Surgery International</i> . 2002	This is a study that followed children who had had UTI up to investigate VUR and renal parenchymal defects in India. There are a large number of losses of follow up, and it was considered not applicable to the UK setting.
Darge K, Moeller R, Trusen A, Butter F, Gordjani N, Riedmiller H. Diagnosis of vesicoureteric reflux with low-dose contrast-enhanced harmonic ultrasound imaging. <i>Pediatric Radiology</i> . 2005	population includes 25/55 (45%) of children who did not have UTI
Grmek M, Fettich J. The importance of follow-up of children with vesicoureteral reflux grade 1. <i>Acta Paediatrica</i> .	Did not use appropriate reference standard. Probability that cyclic radionuclide cystography predicts VUR.
Jose TE, Mohiudheen H, Patel C, Kumar R, Chandrashekar B, Malhotra A. Direct radionuclide cystography by supra-pubic puncture: Comparison with conventional voiding cystourethrography. <i>Nuclear Medicine Communications</i> . 2004	Not all children had UTI. 1/43 children underwent supra-pubic Direct radionuclide cystography (SDRC) compared to VCU following UTI, however numbers were not available for this child apart from the study group
Kumar R, Aggarwal B, Aggarwal A, Ranjan BB, Aggarwal SK. Spectrum of diseases on micturating cystourethrography in pediatric patients presenting with recurrent urinary tract infections. <i>Asian Oceanian Journal of Radiology</i> . 2002	Non-comparative study. Describes VUR and other pathologies in children referred for a MCU.
Leung VY, Metreweli C, Yeung CK. Immature ureteric jet Doppler patterns and urinary tract infection and vesicoureteric reflux in children. <i>Ultrasound in Medicine and Biology</i> . 2002 Jul	study investigates correlations bet immature ureteric jet Doppler patterns and UTI and VUR; does not investigate immature patterns as a method for detecting VUR
Mahant S, Friedman J, MacArthur C. Renal ultrasound findings and vesicoureteral reflux in children hospitalised with urinary tract infection. <i>Archives of Disease in Childhood</i> . 2002	Included in HTA

Bibliographic Information	Reason for rejecting study
McEwing RL, Anderson NG, Hellewell S, Mitchel J. Comparison of echo-enhanced ultrasound with fluoroscopic MCU for the detection of vesicoureteral reflux in neonates. <i>Pediatric Radiology</i> . 2002	Not all children had a UTI. 1/100 children underwent Echo-enhanced ultrasonography compared to MCU following UTI.
Muensterer OJ. Comprehensive ultrasound versus voiding cysturethrography in the diagnosis of vesicoureteral reflux. <i>European Journal of Pediatrics</i> . 2002	Not all children had a UTI 101/193 children underwent renal ultrasound compared to VCUG following UTI, however numbers were not available for these children apart from the study group.
Nakamura M, Wang Y, Shigeta K, Shinozaki T, Taniguchi N, Itoh K. Simultaneous voiding cystourethrography and voiding urosonography: An in vitro and in vivo study. <i>Clinical Radiology</i> .	No information about whether children had a UTI. Inclusion criteria are diagnosed cases of VUR. Sub-set of patients from a study by Klesges (1998), which has been included.
Novljan G, Kenig A, Rus R, Kenda RB. Cyclic voiding urosonography in detecting vesicoureteral reflux in children. <i>Pediatric Nephrology</i> . 2003 Oct	Not all children had a UTI and did not use appropriate reference standard. 5/50 children underwent conventional voiding ultrasound compared to cyclic voiding ultrasound following UTI, however numbers were not available for these children apart from the study group.
Papadopoulou F, Efremidis SC, Economou A, Badouraki M, Panteleli M, Papachristou F, Soteriou I. Cyclic voiding cystourethrography: Is vesicoureteral reflux missed with standard voiding cystourethrography? <i>European Radiology</i> . 2002 Mar	Study sample (n=275) includes children (10%) without UTI
Valentini AL ;De Gaetano AM ;Destito C ;Marino V ;Minordi LM ;Marano P . The accuracy of voiding urosonography in detecting vesico-ureteral reflux: a summary of existing data. <i>European Journal of Pediatrics</i> . 2002 Jul	Age range of participants from included studies not specified. Indications for VUR were not limited to UTI but included ante- and post natal pyelectasis, myelomeningocele, spina bifida, noturnal enuresis, multicystic kidney, single kidney, and hypospadias
Fettich J, Colarinha P, Fischer S, Frokier J, Gordon I, Hahn K, Kabasakal L, Mann M, Mitjavila M, Olivier P, Piepsz A, Porn U, Roca I, Sixt R, Van VJ. Guidelines for direct radionuclide cystography in children. <i>European Journal of Nuclear Medicine and Molecular Imaging</i> . 2003 May	Guidelines for radionuclide cystography in children
Bower G, Lovegrove FT, Geijsel H, Van der SA, Guelfi G. Comparison of 'direct' and 'indirect' radionuclide cystography. <i>Journal of Nuclear Medicine</i> . 1985 May	Included in HTA
De SC ;De B ;Keuppens F ;Desprechins B ;Verboven M ;Piepsz A . How good is technetium-99m mercaptoacetyl triglycine indirect cystography? <i>European Journal of Nuclear Medicine</i> . 1994 Mar	Included in HTA
Hedman PJ, Kemp V, Voss H. Measurement of vesicoureteral reflux with intravenous 99mTc-DTPA compared to radiographic cystography. <i>Radiology</i> . 1978 Jan	No reference standard used.
Chevalier I, Gauthier M, Leroy S, Gendrel D, Breart G, Chalumeau M. Procalcitonin and vesicoureteral reflux in children with urinary tract infection... Leroy S, Adamsbaum C, Marc E et al. Procalcitonin as a predictor of vesicoureteral reflux in children with a first febrile urinary tract infection. <i>Pediatrics</i> . 2005;115(6). Available at: www.pediatrics.org/cgi/content/full/115/6/e706 . <i>Pediatrics</i> . 2005	Letter to the editor
Leroy S, Marc E, Adamsbaum C, Gendrel D, Breart G, Chalumeau M. Prediction of vesicoureteral reflux after a first febrile urinary tract infection in children: validation of a clinical decision rule.[see comment]. <i>Archives of Disease in Childhood</i> . 2006 Mar	Clinical decision rule validation
Thompson M, Simon SD, Sharma V, Alon US. Timing of follow-up voiding cystourethrogram in children with primary vesicoureteral reflux: Development and application of a clinical algorithm. <i>Pediatrics</i> . 2005	Study develops an algorithm for VCUG in children who have already been diagnosed with VUR

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
Pylkkanen J, Vilksa J, and Koskimies O. The value of level diagnosis of childhood urinary tract infection in predicting renal injury. <i>Acta Paediatrica Scandinavica</i> 1981; 70:(6)879-83.	It was unclear in this study which children in the whole of the study population exactly received the investigation for VUR.
Kunin CM. A ten-year study of bacteriuria in schoolgirls: final report of bacteriologic, urologic, and epidemiologic findings. <i>Journal of Infectious Diseases</i> 1970; 122:(5)382-93	This study primarily includes asymptomatic bacteriuria
Lindberg U, Claesson I, Hanson LA et al. Asymptomatic bacteriuria in schoolgirls. I. Clinical and laboratory findings. <i>Acta Paediatrica Scandinavica</i> 1975; 64:(3)425-31	This study primarily includes asymptomatic bacteriuria

Detecting renal parenchymal defects

Bibliographic Information	Reason for rejecting study
Araujo CB, Barroso JU, Barroso VA, Vinhaes AJ, Jacobino M, Calado A, Zerati FM. Comparative study between intravenous urography and renal scintigraphy with DMSA for the diagnosis of renal scars in children with vesicoureteral reflux. <i>International Braz J Urol.</i> 2003	No indication as to whether children had a previous UTI.
Atasever T, Ozkaya O, Abamor E, Soylemezoglu O, Buyan N, Unlu M. ^{99m} Tc ethylene dicycysteine scintigraphy for diagnosing cortical defects in acute pyelonephritis: A comparative study with ^{99m} Tc dimercaptosuccinic acid. <i>Nuclear Medicine Communications.</i> 2004	Numbers nor provided to assess diagnostic accuracy of ^{99m} Tc ethylene dicycysteine scintigraphy. Only positive results provided (a) and no way of assessing number of false negatives.
Baxter H. Renal scarring and the best imaging modalities for detection. <i>Synergy.</i> 2004	Commentary only
Bhatnagar V, Mitra DK, Agarwala S, Kumar R, Patel C, Malhotra AK, Gupta AK. The role of DMSA scans in evaluation of the correlation between urinary tract infection, vesicoureteric reflux, and renal scarring. <i>Pediatric Surgery International.</i> 2002	This is a study that followed children who had had UTI up to investigate VUR and renal parenchymal defects in India. There are a large number of losses of follow up, and it was considered not applicable to the UK setting.
Calado AA, Barroso JU, Barroso VA, Souza AS, Filho MZ. Ultrasound evaluation of renal scarring in children with vesicoureteral reflux. <i>Brazilian Journal of Urology.</i> 2002	Analyses the accuracy of renal ultrasound in detecting renal scars in patients who had VUR, not in children who had UTI.
Chromek M, Tullus K, Hertting O, Jaremko G, Khalil A, Li Y, Brauner A. Matrix metalloproteinase-9 and tissue inhibitor of metalloproteinases-1 in acute pyelonephritis and renal scarring. <i>Pediatric Research.</i> 2003 Feb 19	Not a diagnostic study – presents correlations only.
Hiraoka M, Hashimoto G, Tsuchida S, Tsukahara H, Ohshima Y, Mayumi M. Early treatment of urinary infection prevents renal damage on cortical scintigraphy. <i>Pediatric Nephrology.</i> 2003 Feb	Not a study of diagnostic accuracy – refers to treatment timing and will be included in treatmet section of the guideline.
Imperiale A ;Olianti C ;Sestini S ;Materassi M ;Daniela S ;lenuso R ;La CG . 123-I-hippuran renal scintigraphy with evaluation of single-kidney clearance for predicting renal scarring after acute urinary tract infection: Comparison with ^{99m} Tc-DMSA scanning. <i>Journal of Nuclear Medicine.</i> 2003	I-hippuran scans are not performed in UK and single kidney clearance rates are not calculated.
Kibar M, Yapar Z, Noyan A, Anarat A. Technetium-99m-N,N-ethylenedicycysteine and Tc-99m DMSA scintigraphy in the evaluation of renal parenchymal abnormalities in children. <i>Annals of Nuclear Medicine.</i> 2003	Children were evaluated for scarring because of abnormalities, not because of UTI
Kobayashi H, Miyakita H, Yamataka A, Koga H, Lane GJ, Miyano T. Serum basic fibroblast growth factor as a marker of reflux nephropathy. <i>Journal of Pediatric Surgery.</i> 2004	Not a study about diagnostic accuracy. Not specifically in children who had UTI
Moorthy I, Easty M, McHugh K, Ridout D, Biassoni L, Gordon I. The presence of vesicoureteric reflux does not identify a population at risk for renal scarring following a first urinary tract infection. <i>Archives of Disease in Childhood.</i> 2005	Study assumes that VUR indicates scarring. 2x2 table compared scarring found on DMSA (reference standard) with VUR found on cystogram. This study design would only be valid if we were 100% sure that VUR was the cause of scarring.
Padmakumar B, Carfy HM, Hughes DA, Judd BA. Role of intravenous urogram in investigation of urinary tract infection: An observational study. <i>Postgraduate Medical Journal.</i> 2004	Observational study only.
Taskinen S, Ronnholm K. Post-pyelonephritic renal scars are not associated with vesicoureteral reflux in children. <i>Journal of Urology.</i> 2005	Information not provided to construct a 2x2 table
Coulthard, M.G.; Flecknell, P.; Orr, H.; Manas, D.; O'Donnell, M. Renal scarring caused by vesicoureteric reflux and urinary infection: a study in pigs, <i>Journal Name: Pediatric Nephrology, Year 2003</i>	This is a study conducted on piglet, where there are other studies address this clinical question in human.

Surgical management of vesicoureteric reflux

Bibliographic Information	Reason for rejecting study
Wheeler D, Vimalachandra D, Hodson EM, Roy LP, Smith G, Craig JC. Antibiotics and surgery for vesicoureteric reflux: a meta-analysis of randomised controlled trials.. <i>Archives of Disease in Childhood</i> . 2003 Aug	Additional publication of Cochrane review material
Yu TJ, Chen W, Chen HY, Belman AB. Early versus late surgical management of fetal reflux nephropathy. <i>Journal of Urology</i> . 1997	Non-randomised study.
Yu TJ, Chen WF. Surgical management of grades III and IV primary vesicoureteral reflux in children with and without acute pyelonephritis as breakthrough infections: A comparative analysis. <i>Journal of Urology</i> . 1997	Comparative study, but not an RCT.
Gordjani N, Frankenschmidt A, Zimmerhackl LB, Brandis M. Subureteral collagen injection versus antireflux surgery in primary vesico-ureteral reflux grade III. <i>European Journal of Pediatrics</i> . 1996	The study is comparing different types of surgery. This is outside our remit.
Arima M, Matsui T, Ogino T, Shimada K, Hosokawa S, Mori Y, Ikoma F. Vesicoureteral reflux in infants under one year old: Follow-up study and consideration on development of renal scarring. <i>Urology</i> . 1993	Not an RCT
Wingen AM, Koskimies O, Olbing H, Seppanen J, Tamminen-Mobius T. Growth and weight gain in children with vesicoureteral reflux receiving medical versus surgical treatment: 10-year results of a prospective, randomized study. International Reflux Study in Children (European Branch). <i>Acta Paediatrica</i> . 1999 Jan	Included in Cochrane review
Jodal U, Hansson S, Hjalmas K. Medical or surgical management for children with vesico-ureteric reflux? <i>Acta Paediatrica</i> . 1999	Included in Cochrane review.
. Prospective trial of operative versus non-operative treatment of severe vesicoureteric reflux in children: five years' observation. Birmingham Reflux Study Group. <i>British medical journal (Clinical research ed)</i> . 1987 Jul	Included in Cochrane review.
Aboutaleb H, Bolduc S, Upadhyay J, Farhat W, Bagli DJ, Khoury AE. Subureteral polydimethylsiloxane injection versus extravesical reimplantation for primary low grade vesicoureteral reflux in children: A comparative study. <i>Journal of Urology</i> . 2003	Compared two surgical methods.
Centre for Reviews and Dissemination.. Antibiotics and surgery for vesicoureteric reflux: a meta-analysis of randomised controlled trials (Structured abstract). <i>Database of Abstracts of Reviews of Effectiveness</i> . 2005	CRD commentary on a systematic review
Duckett JW, Walker RD, Weiss R. Surgical results: International Reflux Study in Children - United States branch. <i>Journal of Urology</i> . 1992	Part of the International reflux study - included in Cochrane review.
Esbjorner E, Hansson S, Jakobsson B. Management of children with dilating vesico-ureteric reflux in Sweden. <i>Acta Paediatrica</i> . 2004	Not an RCT.
Fanos PV, Cataldi PL. Antibiotics or surgery for vesicoureteric reflux in children. <i>Lancet</i> .	Commentary only -
Hjalmas K, Lohr G, Tamminen-Mobius T, Seppanen J, Olbing H, Wikstrom S. Surgical results in the International Reflux Study in Children (Europe). <i>The Journal of urology</i> . 1992 Nov	Included in Cochrane review.
Holland NH, Kazee M, Duff D, McRoberts JW. Antimicrobial prophylaxis in children with urinary tract infection and vesicoureteral reflux. <i>Reviews of infectious diseases</i> . 1982	Included in Cochrane review.
Iitaka K, Motoyama O, Moriya S, Endo T, Sakai T. Management of vesicoureteral reflux in children. <i>Clinical and Experimental Nephrology</i> . 2000	Non-randomised trial
Manunta A, Patard JJ, Guille F, Moussa MA, Morin G, Guiraud P, Lobel B. Recurrent pyelonephritis without vesicoureteral reflux: Is there a role for an antireflux procedure? <i>Journal of Endourology</i> . 2001	Study in adults

Bibliographic Information	Reason for rejecting study
Olbing H, Hirche H, Koskimies O, Lax H, Seppanen U, Smellie JM, Tamminen-Mobius T, Wikstad I. Renal growth in children with severe vesicoureteral reflux: 10-year prospective study of medical and surgical treatment: the International Reflux Study in Children (European branch). <i>Radiology</i> . 2000 Sep	Included in Cochrane review.
Piepsz A, Tamminen-Mobius T, Reiners C, Heikkila J, Kivisaari A, Nilsson NJ, Sixt R, Risdon RA, Smellie JM, Soderborg B. Five-year study of medical or surgical treatment in children with severe vesicoureteral reflux dimercaptosuccinic acid findings. International Reflux Study Group in Europe. <i>European Journal of Pediatrics</i> . 1998 Sep	Included in Cochrane review.
Rahmani MA, Shakeel MM, Chaudhary IA. Vesico-ureteric reflux in children. <i>Journal of the College of Physicians and Surgeons Pakistan</i> . 2002	Non-randomised trial
Roseau E. [Vesico-ureteral reflux and nephropathy in the child: medical or surgical treatment?]. <i>Presse medicale (Paris, France)</i> . 2001	Foreign language
Smellie JM, Tamminen-Mobius T, Olbing H, Claesson I, Wikstad I, Jodal U, Seppanen U. Five-year study of medical or surgical treatment in children with severe reflux: radiological renal findings. The International Reflux Study in Children. <i>Pediatric nephrology (Berlin, Germany)</i> . 1992 May	Included in Cochrane review.
Smellie JM. Commentary: management of children with severe vesicoureteral reflux. <i>The Journal of urology</i> . 1992 Nov	Commentary only - no primary (original) data
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. Prospective trial of operative versus non-operative treatment of severe vesicoureteric reflux: two years' observation in 96 children. <i>British medical journal (Clinical research ed)</i> . 1983 Jul	Included in Cochrane review.
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Belloli G, Bolla G, Cappellari F, Musi L. Long-term follow up of surgically treated primary vesicorenal reflux. <i>Pediatric Surgery International</i> . 1994	Non-comparative study
Capozza N, Caione P. Dextranomer/hyaluronic acid copolymer implantation for vesico-ureteral reflux: a randomized comparison with antibiotic prophylaxis. <i>Journal of Pediatrics</i> . 2002 Feb	Included in Cochrane review

Urinary tract infection in children

Bibliographic Information	Reason for rejecting study
Elder JS, Diaz M, Caldamone AA, Cendron M, Greenfield S, Hurwitz R, Kirsch A, Koyle MA, Pope J, Shapiro E. Endoscopic therapy for vesicoureteral reflux: a meta-analysis. I. Reflux resolution and urinary tract infection. <i>Journal of Urology</i> . 2006 Feb	Outside scope
Venhola M, Huttunen NP, Uhari M. Meta-analysis of vesicoureteral reflux and urinary tract infection in children. <i>Scandinavian Journal of Urology and Nephrology</i> . 2006	Although meta-analysis was published in 2006, searches were conducted between 1966 and 1998. Of the trials included, 2 were not RCTs, and three were included in the cochrane review.
Jodal U. Ten-year results of randomized treatment of children with severe vesicoureteral reflux. Final report of the International Reflux Study in Children. <i>Pediatric Nephrology</i> . 2006	Aim of paper is to present the overall results of the International Reflux Study. 10 year results have been reported in more detail elsewhere and are included in the Cochrane review.
Mevorach RA, Hulbert WC, Rabinowitz R, Kennedy WA, Kogan BA, Kryger JV, Caldamone A, Clark WR, Kaplan GW, Durkee CT, Elder JS. Results of a 2-year multicenter trial of endoscopic treatment of vesicoureteral reflux with synthetic calcium hydroxyapatite. <i>Journal of Urology</i> . 2006 Jan	Outside scope
Weiss R, Duckett J, Spitzer A. Results of a randomized clinical trial of medical versus surgical management of infants and children with grades III and IV primary vesicoureteral reflux (United States). <i>Journal of Urology</i> . 1992	Included in Cochrane review

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Enquiries regarding the above guidelines can be addressed to:

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