

Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women (Review)

Lutters M, Vogt-Ferrier NB



**THE COCHRANE
COLLABORATION®**

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2008, Issue 3

<http://www.thecochranelibrary.com>



Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women (Review)
Copyright © 2008 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

TABLE OF CONTENTS

HEADER	1
ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	2
OBJECTIVES	3
METHODS	3
RESULTS	5
DISCUSSION	8
AUTHORS' CONCLUSIONS	9
ACKNOWLEDGEMENTS	10
REFERENCES	10
CHARACTERISTICS OF STUDIES	21
DATA AND ANALYSES	34
Analysis 1.1. Comparison 1 Single dose versus short-course treatment, Outcome 1 Persistent UTI: short-term.	36
Analysis 1.2. Comparison 1 Single dose versus short-course treatment, Outcome 2 Persistent UTI: long-term.	37
Analysis 1.3. Comparison 1 Single dose versus short-course treatment, Outcome 3 Clinical failure (persistence of symptoms): short-term.	37
Analysis 1.7. Comparison 1 Single dose versus short-course treatment, Outcome 7 Reinfection rate: short-term.	38
Analysis 1.8. Comparison 1 Single dose versus short-course treatment, Outcome 8 Reinfection rate: long-term.	38
Analysis 1.9. Comparison 1 Single dose versus short-course treatment, Outcome 9 Acceptability (little or not satisfied with treatment).	38
Analysis 2.1. Comparison 2 Single dose versus long-course treatment, Outcome 1 Persistent UTI: short-term.	39
Analysis 2.2. Comparison 2 Single dose versus long-course treatment, Outcome 2 Persistent UTI: long-term.	39
Analysis 2.3. Comparison 2 Single dose versus long-course treatment, Outcome 3 Clinical failure (persistence of symptoms): short-term.	40
Analysis 2.5. Comparison 2 Single dose versus long-course treatment, Outcome 5 Adverse drug reactions.	40
Analysis 2.6. Comparison 2 Single dose versus long-course treatment, Outcome 6 Discontinuation due to adverse reactions.	41
Analysis 2.7. Comparison 2 Single dose versus long-course treatment, Outcome 7 Acceptability (little or not satisfied with treatment).	41
Analysis 3.1. Comparison 3 Short-course versus long-course treatment, Outcome 1 Persistent UTI: short-term.	42
Analysis 3.2. Comparison 3 Short-course versus long-course treatment, Outcome 2 Persistent UTI: long-term.	43
Analysis 3.3. Comparison 3 Short-course versus long-course treatment, Outcome 3 Clinical failure (persistence of symptoms): short-term.	45
Analysis 3.4. Comparison 3 Short-course versus long-course treatment, Outcome 4 Clinical failure (persistence of symptoms): long-term.	47
Analysis 3.5. Comparison 3 Short-course versus long-course treatment, Outcome 5 Adverse drug reactions.	47
Analysis 3.6. Comparison 3 Short-course versus long-course treatment, Outcome 6 Discontinuation due to adverse reactions.	48
Analysis 3.7. Comparison 3 Short-course versus long-course treatment, Outcome 7 Reinfection rate: short-term.	48
Analysis 3.8. Comparison 3 Short-course versus long-course treatment, Outcome 8 Reinfection rate: long-term.	49
Analysis 3.9. Comparison 3 Short-course versus long-course treatment, Outcome 9 Acceptability (little or not satisfied with treatment).	49
Analysis 3.10. Comparison 3 Short-course versus long-course treatment, Outcome 10 Mean number of adverse events/patient (day 5).	50
Analysis 3.11. Comparison 3 Short-course versus long-course treatment, Outcome 11 Mean number of adverse events/patient (day 9).	50
Analysis 4.1. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 1 Persistent UTI: short-term.	51
Analysis 4.2. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 2 Persistent UTI: long-term.	54

Analysis 4.3. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 3 Clinical failure (persistence of symptoms): short-term.	56
Analysis 4.5. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 5 Adverse drug reactions.	57
Analysis 4.6. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 6 Discontinuations due to adverse reactions.	57
Analysis 4.7. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 7 Acceptability (little or not satisfied with treatment).	58
Analysis 5.1. Comparison 5 3 days versus 5 days, Outcome 1 Persistent UTI: short term (3 days after treatment).	58
Analysis 5.2. Comparison 5 3 days versus 5 days, Outcome 2 Clinical failure (not recovered): short term (3 days after treatment).	59
APPENDICES	59
WHAT'S NEW	65
HISTORY	65
CONTRIBUTIONS OF AUTHORS	66
DECLARATIONS OF INTEREST	66
INDEX TERMS	66

[Intervention review]

Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Monika Lutters¹, Nicole B Vogt-Ferrier²

¹Apotheke, Kantonsspital Baden, Baden, Switzerland. ²Unité de Gériatopharmacologie Clinique, Hôpitaux Universitaires de Genève, Thônex, Switzerland

Contact address: Monika Lutters, Apotheke, Kantonsspital Baden, Baden, CH-5404, Switzerland. Monika.Lutters@ksb.ch. (Editorial group: Cochrane Renal Group.)

Cochrane Database of Systematic Reviews, Issue 3, 2008 (Status in this issue: *Edited, conclusions changed*)

Copyright © 2008 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

DOI: 10.1002/14651858.CD001535.pub2

This version first published online: 16 July 2008 in Issue 3, 2008. Re-published online with edits: 16 July 2008 in Issue 3, 2008.

Last assessed as up-to-date: 6 May 2008. ([Dates and statuses?](#))

This record should be cited as: Lutters M, Vogt-Ferrier NB. Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women. *Cochrane Database of Systematic Reviews* 2008, Issue 3. Art. No.: CD001535. DOI: 10.1002/14651858.CD001535.pub2.

ABSTRACT

Background

Urinary tract infections (UTI) are common in elderly patients. Authors of non systematic literature reviews often recommend longer treatment durations (7 to 14 days) for older women, but the evidence for such recommendations is unclear.

Objectives

To determine the optimal duration of antibiotic treatment for uncomplicated symptomatic lower UTI in elderly women.

Search strategy

We contacted known investigators and pharmaceutical companies, screened reference lists of identified articles, reviews and books, and searched MEDLINE, EMBASE, CINAHL, Healthstar, Popline, Gerolit, Bioethics Line, *The Cochrane Library*, Dissertation Abstracts International and Index to Scientific & Technical Proceedings without language restriction.

Date of most recent search: 7 May 2008.

Selection criteria

All randomised controlled trials (RCTs) comparing different treatment durations of oral antibiotics for uncomplicated symptomatic lower UTIs in elderly women were included. Whenever possible we obtained outcome data for older women included in studies with a broader age range. We excluded patients with fever, flank pain or complicating factors; studies with treatment durations longer than 14 days and prevention studies.

Data collection and analysis

The two authors independently assessed study quality and extracted data. Statistical analyses were performed using the random effects model and results expressed as risk ratio (RR) for dichotomous outcomes and mean difference (MD) for continuous outcomes with 95% confidence intervals (CI).

Main results

Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women (Review)

Copyright © 2008 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Fifteen studies (1644 elderly women) were included. Three studies compared single dose with short-course treatment (3 to 6 days), six compared single dose with long-course treatment (7 to 14 days) and six compared short- with long-course treatment. Methodological quality of all studies was low except for a more recent geriatric study. There was a significant difference for persistent UTI between single dose and short-course treatment (RR 2.01, 95% CI 1.05 to 3.84) and single versus long-course treatment (RR 1.93, 1.01 to 3.70 95% CI), in the short-term (< 2 weeks post-treatment) but not at long-term follow-up or on clinical outcomes. Patients preferred single dose treatment (RR 0.73, 95% CI 0.60 to 0.88) to long-course treatments, but this was based on one study comparing different antibiotics. Short versus longer treatments showed no significant difference in efficacy. Rate of adverse drug reactions increased significantly with longer treatment durations in only one study.

Authors' conclusions

Short-course treatment (3 to 6 days) could be sufficient for treating uncomplicated UTIs in elderly women, although more studies on specific commonly prescribed antibiotics are needed.

PLAIN LANGUAGE SUMMARY

Antibiotic duration for treating uncomplicated symptomatic lower urinary tract infection in elderly women

As people age (especially women), they become more prone to infections in the bladder (UTI - urinary tract infections). Older people are more likely to have adverse reactions to drugs. Up to the present time older women with uncomplicated UTI were treated longer than younger patients - without any scientific evidence and with an increased risk of adverse drug reactions. We defined three groups of treatment durations: single-dose, short (3 to 6 days) and longer courses (7 to 14 days).

We identified 15 studies (1644 elderly women) comparing single dose, short-course (3 to 6 days) and long course (7 to 14 days) antibiotic treatment for uncomplicated symptomatic UTI in elderly women. Our review suggests that single dose treatments are less effective than short or long courses, but better accepted by the patients. On the other hand longer courses may have more side effects. On the basis of the evidence available at present, an antibiotic treatment of 3 to 6 days could be sufficient for treating uncomplicated UTIs in elderly women, although more studies on specific, commonly prescribed antibiotics are needed.

BACKGROUND

Urinary tract infections (UTIs) are very common in older people. It is the most frequent bacterial infection recorded in older people, followed by pneumonia and skin/soft tissue infections (Emori 1991; Michel 1991; Smith 1994). Bacteriuria is present in less than 5% of women and less than 0.1% of men in the young to middle-age age range (Kaye 1980), compared with at least 20% of women and 10% of men over the age of 65 (Sobel 1990). The prevalence of bacteriuria depends on where a person is living and is very high in institutionalised women with functional disability (25% to 50%) (Abrutyn 1991; Nicolle 1993).

The causes of the increased susceptibility to UTI in older people are multiple: decline in cell-mediated immunity, altered bladder defences due to obstructive uropathy, neurogenic bladder dysfunction, increased bacterial receptivity of uroepithelial cells (Reid 1984), increased risk of contamination due to faecal and urinary incontinence as well as urethral instrumentation and catheterization, and decrease in prostatic and vaginal antibacterial factors associated with changes in zinc levels, urinary and vaginal pH, and hormones, especially lack of estrogens (Sant 1987).

The bacteriological features of UTI also differ between elderly and young patients. *Escherichia coli* and *Staphylococcus saprophyticus* are the most common causative organisms of UTI in young adults, accounting for 80% to 90% of all cases (Winickoff 1981). *E. coli* is also the most common pathogen in elderly women, varying from 90% in outpatients to 45% in hospitalised patients. In contrast with younger people, *Proteus*, *Klebsiella*, *Enterobacter*, *Serratia*, *Pseudomonas* spp., and other gram-negative bacteria as well as enterococci are also frequently encountered (Kunin 1987). *S. saprophyticus* is very rarely isolated in older people. In addition, elderly patients often show a different response to treatment (Harding 1991; Nolan 1988). The most important factors that affect pharmacokinetic and pharmacodynamic drug response in elderly patients are a decline in renal function, reduced body weight, decreased response to homeostatic changes, presence of multiple underlying disease, and polypharmacy, which lead to an increased risk of drug interactions and toxicity (Borrego 1997). All these differences suggest that older patients with UTI need a different treatment approach than younger patients.

UTIs are classified as either asymptomatic or symptomatic UTIs. Symptomatic UTI include uncomplicated lower (cystitis) and up-

per UTI (pyelonephritis) and complicated infections of the lower or upper urinary tract (Stamm 1992; Wood 1996). UTIs in men are considered as complicated infections.

In young women with uncomplicated lower UTI, many studies have shown that short-term treatments with antibiotics (1 to 3 days) are as effective as the traditional longer treatments (7 to 14 days), are less expensive, associated with fewer side effects and result in better compliance. However, the results from several studies and two systematic reviews have shown that single-dose treatment is less effective than longer treatments (Norrby 1990; Warren 1999). Most authors, including the Infectious Diseases Society of America, recommend a 3-day treatment for lower, uncomplicated UTI in young women (Norrby 1990; Warren 1999). In elderly women, the situation is less clear. Excessively long antimicrobial therapy may have negative implications with respect to community levels of antimicrobial resistance (Goessens 2007; Tam 2007).

We performed a critical quality assessment of the many published review articles on UTIs in older people (Lutters 2000). The overall methodological quality was low (mean score 2.0–1.1 on a scale of 9). In particular, none of the identified reviews specified the methods of identifying, selecting and validating the included information. The resulting treatment recommendations varied enormously, especially for the treatment duration for uncomplicated lower UTI in elderly women, which differed from 3 to 10 days (Wood 1996). Many authors did not recommend short treatment (1 to 3 days) in elderly women because it is said to be less effective than in younger women (Baldassarre 1991; Humbert 1992; Nicolle 1992; Nygaard 1996; Stamm 1993). However, this recommendation was based either on previous review articles or on results from three studies which did not specifically assess efficacy in elderly women. Indeed, two of these studies compared women over and under 40 years old (Pfau 1984; Saginur 1992). The participants mean age was 26 in one study and 36 years in the other (Pfau 1984; Saginur 1992). The third study included only women with urinary catheters, i.e. complicated UTI (Harding 1991).

Since this survey, the Infectious Diseases Society of America published guidelines on the treatment of UTI based on an extensive review of the literature using meta-analytical techniques (Warren 1999). However their findings applied primarily to younger women and did not include clinical outcomes like improvement of urinary symptoms.

We performed this systematic review to determine the optimal treatment duration of uncomplicated symptomatic lower UTIs in elderly women. Men and patients with upper or complicated UTI were excluded from this review because they usually require longer and more aggressive treatment (Baldassarre 1991; Childs 1996; Nicolle 1994; Wood 1996). Patients with asymptomatic UTI were also excluded, because there is consensus in the medical literature that elderly patients without symptoms should not be treated (Humbert 1992).

First published in 2002, our objective is to update this review as new studies appear.

OBJECTIVES

To determine the benefits (clinical and bacteriological efficacy) and harms (adverse drug reactions) of different durations of antibiotic treatment for uncomplicated symptomatic lower UTIs in elderly women.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs) comparing different treatment durations of oral antibiotics for uncomplicated lower UTIs in elderly women.

Types of participants

Elderly women (over 60 years old or as defined by the study), with acute uncomplicated lower UTI, (i.e. symptoms of dysuria, urgency, frequency or suprapubic pain) and a significant positive urine culture ($\geq 10^3$ colony forming units (cfu)/mL) and pyuria (≥ 5 leukocytes/mm³) (Naber 1990; Rubin 1992; Stamm 1992). Studies including other persons (e.g. men, younger persons, patients with asymptomatic bacteriuria) were included if those patients made up $\leq 20\%$ of all participants or if separate data for elderly women were available. If a study included such a mixed population without giving details on subgroups, we contacted the authors of the study to ask for separate data for the group of elderly women with acute uncomplicated lower UTI.

Patients with pyelonephritis (symptoms of fever or flank pain) and those with complicating factors such as indwelling or intermittent urinary catheters, > 100 mL post-void residual urine, obstructive uropathy, vesicoureteral reflux and other urological abnormalities, azotaemia due to intrinsic kidney disease or kidney transplantation, were excluded.

Types of interventions

Treatment group

Any oral antibiotic treatment used for the treatment of UTI.

Control group

Any oral antibiotic treatment with a different treatment duration. We preferred studies comparing the same antibiotic with the same dosage (except when a single dose is used), but a different treatment

duration. We included only antibiotic treatments used at a dose recommended in an official pharmacopoeia for the treatment of lower uncomplicated UTI.

We also included studies comparing a different antibiotic with a different treatment duration, because they provided more information, especially on clinical outcomes. However, these studies are confounded by the different antibiotics used (see discussion). To anticipate large variations in durations, we defined the following categories of duration and made comparisons between these:

1. Single dose
2. Short-course (3 to 6 days)
3. Long-course (7 to 14 days)
4. 3 to 14 days (combination of group 2 and 3)

Longer as well as prophylactic treatments were excluded.

Types of outcome measures

Studies which measured at least one of the following outcomes (as defined in the study report):

- clinical treatment failure: persistence of urinary symptoms (i.e. dysuria, frequency, urgency and suprapubic pain), as study defined
- mental and functional status (e.g. confusion, weakness, falls)
- incidence of new symptoms of cystitis (after initial clinical cure)
- development of pyelonephritis, urosepsis or other renal complications
- long-term mortality, all cause and related to UTI
- total rate of adverse drug reactions (as study defined)
- discontinuations of treatment due to adverse drug reactions
- quality of life
- convenience for the patient (e.g. compliance, satisfaction with the treatment)
- persistent UTI (significant positive urine culture at follow-up: $\geq 10^3$ cfu/mL)
- recurrence of bacterial infection after initial eradication of bacteria (i.e. relapse with the same organism or reinfection with a different one)

We anticipated that studies would report outcomes at different time points. If possible, outcomes were to be recalculated for common time points from the raw data. As this was not possible, outcomes were pooled for short-term effects (i.e. during, immediately after or up to two weeks post-treatment) and long-term effects (> two weeks post-treatment).

Search methods for identification of studies

Initial search

We searched the following databases: MEDLINE, EMBASE, CINAHL, Healthstar, Popline, Gerolit, Bioethics Line, *The Cochrane Library*, the trial register of the Cochrane Renal Group,

Dissertation Abstracts International (1991-95), Index to Scientific & Technical Proceedings (1978-85).

In MEDLINE, the first two sections of the optimal MEDLINE search strategy (Dickersin 1994) were applied to identify RCTs, and combined with the terms used in Appendix 1 - *Electronic Databases*

EMBASE was searched by a professional librarian.

For the other databases a similar, often simplified search strategy was used.

The reference lists of identified articles, reviews, books and book chapters on the treatment of infections in older people were searched. Available abstracts of conferences in the fields of infectious diseases, geriatric medicine and pharmacology were screened. Unpublished data were sought from known authors working in this field as well as from pharmaceutical companies marketing antibiotics that are used in UTIs.

Review updates

For updates, electronic searches in CENTRAL, the Cochrane Renal Group's specialised register and MEDLINE were performed. No language restriction was applied. Articles written in languages other than those familiar to the authors have been translated and evaluated by native speakers.

Date of most recent search: May 2008

Data collection and analysis

Study selection and data extraction were independently performed by both authors, using specifically designed forms (available on request from the authors). Authors were not blinded to authors or text source, because a RCT has shown that blinding did not significantly decrease bias when conducting meta-analyses of RCTs (Berlin 1997). Discrepancies were resolved by discussion, or, if no consensus could be reached, by seeking advice from a third party. Where important data have not been reported, triallists were contacted to get the necessary information.

The following data were extracted for each included study:

- study design
- method of randomizations
- blinding
- number of participants
- exclusions after randomizations
- loss-to-follow-up
- setting (community, long-stay institution, hospital)
- description of the study population
- detailed description of the treatments used (substance, galenic form, dosage, duration)
- description and results of all measured outcomes

The level of allocation concealment was assessed using the criteria described in the Cochrane Handbook (Mulrow 1994). Studies were graded A if the assigned treatment was adequately concealed

prior to allocation, B if there was inadequate information to judge concealment, and C if the assigned treatment was clearly not concealed prior to allocation. All data were analysed together, and then a subgroup analysis was performed to determine if the inclusion of lower quality studies (levels B and C) affects the overall result. To further test the robustness of the results, we planned to perform several other subgroup analyses (if enough studies were available):

- blinded versus non blinded studies
- studies with a high versus a low drop-out rate
- studies including only elderly persons versus studies with a mixed population.

Statistical assessment

Risk ratio (RR) and 95% confidence intervals (CI) were used for dichotomous outcomes and mean difference (MD) for continuous outcomes. Heterogeneity was tested using the I^2 statistic (Higgins 2003). I^2 values of 25%, 50% and 75% correspond to low, medium and high levels of heterogeneity. The RR from each study were combined using a random effects model. If enough studies were identified, variables which are likely to influence the outcome of the studies were assessed in subgroup analyses. Such variables include:

- studies comparing the same antibiotic
- different antibiotic classes (e.g. beta-lactams, quinolones) or molecules
- place of residence (community, long-stay institution, hospital)
- patients' age (over 75 years old).

We planned to use the funnel plot approach to assess the likelihood of publication bias.

RESULTS

Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

Our initial literature search identified more than 7000 references (see [Appendix 2 - Results of Initial Search](#)). After triage of titles and abstracts, we retained 69 articles (of 56 authors) that could be included in our review. However, most of these articles did not report precise age data of included patients, and a subgroup analysis of elderly patients was often missing. We contacted the authors of all these studies, but we got either no answer, the raw data were no longer available or they only included younger patients. We finally included only those studies which were done in elderly populations or which reported separate outcome data for elderly patients.

In most of the cases, the two authors took the same decision of selection or non-selection of identified references (94%). Although

they screened only a part of all identified references two times independently, none of the finally selected studies would have been missed (see [Appendix 3 - Inter-individual variability of study selection](#)).

We included 15 studies in our review. Only seven of these studies (Andersen 1986; Gellermann 1988; Flanagan 1991; Lacey 1981; van Merode 2005; Vogel 2004) compared the same antibiotic in different treatment durations. We did a separate analysis for those seven studies. The 15 included studies were published between 1981 and 2005. Eleven were discovered by a MEDLINE search, one in EMBASE and one in the Cochrane Renal Group's specialised register. The remaining two studies were found by screening the bibliographies of identified studies and reviews and by contacting pharmaceutical companies (see [Appendix 4 - Sources of included studies](#)). We did not find duplicate publications. The majority of the 15 studies were conducted in European countries. Ten studies took place in an outpatient setting, two in hospitals, one in both settings, and two studies did not describe the setting. Two studies included men (Ferraro 1990; Lacey 1981) and Lacey 1981 also included asymptomatic and complicated UTIs. In nine studies (Andersen 1986; Gellermann 1988; Guibert 1996; Guibert 1997; Jardin 1990; Matsumoto 1994; Piipo 1990; Stein 1992; van Merode 2005) we considered only the outcome results of the subgroup of elderly women. Elderly patients were defined differently throughout the studies (i.e. over 50, 58, 60, 63 or 65 years), so seven studies (or analysed subgroups) also included patients under 60 years. All these studies compared different antibiotics.

The presence of resistant organisms in the urine was handled differently throughout the studies. Flanagan 1991 did not use one specific antibiotic/treatment group but chose the treatment from four antibiotics according to the sensitivity of urinary pathogens. Piipo 1990 and Vogel 2004 stated that all initially isolated bacteria were sensitive to the study antibiotic. Two studies (Lacey 1981; Raz 1996) excluded all patients with resistant organisms. Guibert 1993 and Stein 1992 excluded these patients only for the evaluation of the bacteriological efficacy, but included them for all other outcomes. van Merode 2005 included also resistant uropathogens and gave detailed outcome information of patients with trimethoprim-resistant isolates. The remaining seven studies did not mention how they handled resistant pathogens. However they did not formally exclude resistant uropathogens from the study.

All 15 studies used various antibiotic treatment regimens (e.g. sulfamethizole, trimethoprim, fosfomycin trometamol, cephalexin, and various fluoroquinolones). Six studies compared single dose treatment with short-term (3 to 6 days) treatment (Andersen 1986; Gellermann 1988; Guibert 1996; Jardin 1990; Lacey 1981; Matsumoto 1994), three compared single dose to longer treatment durations (7 to 14 days) (Ferraro 1990; Flanagan 1991; Guibert 1993) and five studies assessed short-term versus long-term treatment (Guibert 1997; Piipo 1990; Raz 1996; Stein 1992; Vogel 2004). In the last update we identified one study comparing a 3-day with a 5-day treatment (van Merode 2005). We included this

study in a separate comparison group.

With respect to the seven studies comparing the same antibiotic, three studies compared single dose with short-term treatment (Andersen 1986; Gellermann 1988; Lacey 1981), one study compared single dose versus long-term treatment (Flanagan 1991), two compared 3-day with 7-day treatment (Piipo 1990; Vogel 2004), and one study 3 days versus 5 days of treatment (van Merode 2005).

Risk of bias in included studies

Allocation concealment

In only five studies (Guibert 1996; Guibert 1997; Piipo 1990; Stein 1992; Vogel 2004) the assigned treatment was adequately concealed prior to allocation (numbered boxes, by telephone, numbered sealed envelopes). In eight studies (Andersen 1986; Ferraro 1990; Gellermann 1988; Guibert 1993; Jardin 1990; Lacey 1981; Matsumoto 1994; Raz 1996; van Merode 2005) the allocation concealment was not clear or not described, and Flanagan 1991 used an open random list.

Randomisation method

The method of randomisation was described in 6/15 studies (random tables or computer generator) (Flanagan 1991; Gellermann 1988; Guibert 1993; Stein 1992; van Merode 2005; Vogel 2004).

Blinding

In nine studies, neither patients nor outcome assessors were blinded to treatment (Ferraro 1990; Guibert 1993; Guibert 1996; Guibert 1997; Jardin 1990; Matsumoto 1994; Raz 1996; Flanagan 1991; Gellermann 1988). Of the remaining six studies, four were double-blind (Andersen 1986; Piipo 1990; Stein 1992; Vogel 2004) and two were single-blind (Lacey 1981; van Merode 2005). Only two studies provided an intention-to-treat analysis of the results (Gellermann 1988; Vogel 2004). Eleven studies described why patients had been excluded after randomisation (Flanagan 1991; Guibert 1993; Guibert 1996; Guibert 1997; Jardin 1990; Lacey 1981; Piipo 1990; Raz 1996; Stein 1992; van Merode 2005; Vogel 2004;).

Baseline characteristics

Baseline characteristics of the different treatment groups were described and compared in 11 studies (Andersen 1986; Flanagan 1991; Gellermann 1988; Guibert 1993; Guibert 1996; Guibert 1997; Jardin 1990; Lacey 1981; Raz 1996; Stein 1992; Vogel 2004). In 8/15 studies there was no statistically significant difference between the groups (Ferraro 1990; Gellermann 1988; Guibert 1993; Guibert 1996; Guibert 1997; Lacey 1981; Matsumoto 1994; Piipo 1990).

Sample size/power calculation

Eight studies described a sample size and power calculation (Guibert 1993; Guibert 1996; Guibert 1997; Jardin 1990; Raz 1996; Stein 1992; van Merode 2005; Vogel 2004). The total number of patients enrolled in these studies ranged from 60 to 595 patients. Sample size for elderly patients (used for the meta-analysis) ranged from 23 to 482 subjects assessed for outcome analysis, most included < 100 elderly women.

The quality of the seven studies comparing the same antibiotic was not better than the overall quality of studies (2/7 studies were graded A for allocation concealment, 5/7 single- or double-blinded), but overall the most recently published study (Vogel 2004) showed greater attention to study design quality. See Appendix 5 - *Quality of included studies*.

Effects of interventions

The clinical failure rate (persistence of urinary symptoms), our main outcome parameter, was reported in only 7/15 studies. In contrast, the bacteriological eradication rate was always reported. In three studies, the bacterial eradication rate was not given for the subgroup of elderly patients (in case of studies with mixed populations). Adverse drug reactions were evaluated in most studies, but these data were often missing for the subgroup of elderly patients. Other outcome parameters such as quality of life or the development of complications (e.g. pyelonephritis, urosepsis) were not reported at all. Due to the variety of included studies (i.e. comparison of various treatment durations) and the resulting classification into five comparison groups, the data of only one study were available for many outcome parameters.

Guibert tested in two studies the acceptability of single dose versus 3 days (Guibert 1996) and 10 days of treatment (Guibert 1993). Patients were asked if they were "very satisfied", "satisfied", "little satisfied" or "not satisfied" with the treatment.

Single dose versus short-course treatment

Persistent UTI (i.e. significant positive urine culture at follow-up)

The rate of persistent UTI at short-term follow-up (\leq two weeks post-treatment) was significantly higher for single dose therapy compared to short-course treatment (Analysis 1.1: RR 2.01, 95% CI 1.05 to 3.84; $I^2 = 36\%$). At long-term follow-up ($>$ two weeks), the rate of bacteriological persistence was similar in both groups (Analysis 1.2: RR 1.18, 95% CI 0.59 to 2.32; $I^2 = 0\%$). There was no significant heterogeneity.

Clinical failure

One study (Matsumoto 1994) reported short-term clinical failure and found no difference between single dose and short-course treatment (Analysis 1.3: RR 1.69, 95% CI 0.08 to 37.26).

Reinfection rate

Lacey 1981 reported no significant differences in either short-term (Analysis 1.7: RR 0.67, 95% CI 0.28 to 1.62) and long-term (Analysis 1.8: RR 2.81, 95% CI 0.81 to 9.79) reinfection rates.

Treatment acceptability/dissatisfaction

Guibert 1996 reported less patients were dissatisfied with single dose compared to short-course treatment, however this was not significant (Analysis 1.9: RR 0.30, 95% CI 0.09 to 1.05).

Single dose versus long-course treatment

Persistent UTI

There was a significant decrease in persistent UTI for long-course treatment compared to single dose therapy at short-term follow-up (≤ 2 weeks post-treatment) (Analysis 2.1: RR 1.93, 95% CI 1.01 to 3.70; $I^2 = 31\%$) but not at long-term follow-up (> 2 weeks) (Analysis 2.2: RR 1.28, 95% CI 0.89 to 1.84; $I^2 = 0\%$). There was no significant heterogeneity between the studies.

Clinical failure

One study (Guibert 1993) reported short-term clinical failure and found no difference between single dose and long-course treatment (Analysis 2.3: RR 1.94, 95% CI 0.68 to 5.57).

Adverse reactions

There were no significant differences in the rate of adverse drug reactions (Analysis 2.5: RR 0.80, 95% CI 0.45 to 1.41; $I^2 = 0\%$) or discontinuation due to adverse reactions (Analysis 2.6: RR 0.33, 95% CI 0.01 to 7.87) between single dose and long-course treatment.

Treatment acceptability/dissatisfaction

Guibert 1993 reported significantly more patients were satisfied with single dose compared to long-course treatment (Analysis 2.7: RR 0.73, 95% CI 0.60 to 0.88).

Short-course versus long-course treatment

Raz 1996 compared two different antibiotics (ofloxacin for 3 days with cephalexin given for 7 days), Vogel 2004 compared 3 days versus 7 days ciprofloxacin in a large population of elderly women and Piipo 1990 compared 3 days versus 7 days norfloxacin in a small subgroup of elderly women. Stein 1992 compared 3 days temafloxacin versus 7 days ciprofloxacin including a subgroup analysis of patients over 65 years.

Persistent UTI

There was no significant difference in the number of persistent UTIs for those on short-course compared to long-course treatment

within the first two weeks (Analysis 3.1.1: RR 0.85, 95% CI 0.29 to 2.47). There was no difference between the two groups at long-term follow-up (Analysis 3.2.1: RR 0.85, 95% CI 0.54 to 1.32). Including only studies comparing the same antibiotic (Piipo 1990; Vogel 2004), there was no significant difference at short (Analysis 3.1.2: RR 1.00, 95% CI 0.39 to 2.19) and long-term (Analysis 3.2.2: RR 1.18, 95% CI 0.50 to 2.81) follow-up.

Clinical failure

There was no difference between short-course and long-course treatment for short-term clinical failure (Analysis 3.3.1: RR 0.98, 95% CI 0.62 to 1.54). One study (Raz 1996) reported no difference between short-course or long-course treatment for long-term clinical failure (Analysis 3.4: RR 0.75, 95% CI 0.49 to 1.13). Excluding Raz 1996 did not change these results (Analysis 3.3.2: RR 0.96, 95% CI 0.27 to 3.47).

Adverse reactions

There were no significant differences in the rate of adverse drug reactions (Analysis 3.5: RR 0.87, 95% CI 0.26 to 2.93) or discontinuation due to adverse reactions (Analysis 3.6: RR 0.11, 95% CI 0.01 to 1.97) between short-course and long-course treatment. Vogel 2004 reported statistically significant decreases in the mean number of adverse events/patient at day 5 (Analysis 3.10: MD -0.70, 95% CI -1.09 to -0.31) and day 9 (Analysis 3.11: MD -0.90, 95% CI -1.33 to -0.47) for short-course treatment.

Reinfection rate

Raz 1996 reported no significant differences in the short-term reinfection rate (Analysis 3.7: RR 4.37, 95% CI 0.98 to 19.49). Two studies reported long-term reinfection rates (Raz 1996; Vogel 2004) and this showed no significant difference between short-course and long-course treatments (Analysis 3.8: RR 1.30, 95% CI 0.42 to 4.01; $I^2 = 72\%$).

Treatment acceptability/dissatisfaction

Guibert 1997 reported more patients were satisfied with short-course treatment compared to long-course treatment, however this was not significant (Analysis 3.9: RR 0.35, 95% CI 0.07 to 1.72).

Single dose versus short- or long-course treatment (3 to 14 days)

We combined the short-course and long-course treatment groups and compared to single dose treatment.

Persistent UTI

The rate of persistent UTI was not significantly different for single dose therapy compared to short-course or long-course treatment at either short-term follow-up (≤ 2 weeks post-treatment) (Analysis 4.1.1: RR 1.51, 95% CI 0.92 to 2.49; $I^2 = 28\%$) or long-term

follow-up (> 2 weeks) (Analysis 4.2.1: RR 1.14, 95% CI 0.80 to 1.63; I² = 0%).

Clinical failure

There was no statistical difference between single dose and short- or long-course treatment for short-term clinical failure (Analysis 4.3: RR 1.91, 95% CI 0.70 to 5.19; I² = 0%).

Adverse reactions

There were no significant differences in the rate of adverse drug reactions (Analysis 4.5: RR 0.80, 95% CI 0.45 to 1.41; I² = 0%) or discontinuation due to adverse reactions (Analysis 4.6: RR 0.33, 95% CI 0.01 to 7.87) between single dose and short-course or long-course treatment.

Treatment acceptability/dissatisfaction

Guibert 1993 and Guibert 1996 reported less patients were dissatisfied with single dose compared to short-course or long-course treatment, however this was not significant (Analysis 4.7: RR 0.58, 95% CI 0.27 to 1.25; I² = 48%).

Antibiotics used

When the four studies comparing the same antibiotic in each group were analysed (Andersen 1986; Flanagan 1991; Gellermann 1988; Lacey 1981), there was no statistical difference between the single dose group and short-course or long-course treatment group for persistent UTI at short-term follow-up (≤ 2 weeks post-treatment) (Analysis 4.1.2: RR 1.87, 95% CI 0.91 to 3.83; I² = 41%) or at long-term follow-up (Analysis 4.2.2: RR 1.06, 95% CI 0.50 to 2.24; I² = 16%).

Only one of the four studies reported adverse drug reactions (Flanagan 1991). There was no statistical difference between the single dose group and the short-course or long-course treatment group (Analysis 4.5: RR 0.14, 95% CI 0.01 to 2.85).

Other clinical outcomes were not available.

Healthcare settings

Of the four studies comparing the same antibiotic two studies were undertaken in hospitals (Flanagan 1991; Lacey 1981) and two included ambulatory women (Andersen 1986; Gellermann 1988). There was no significant difference between single dose treatment and short-course or long-course treatment for either hospital patients (Analysis 4.1.3: RR 2.57, 95% CI 0.64 to 10.37; I² = 67%) or ambulatory women (Analysis 4.1.4: RR 1.35, 95% CI 0.64 to 2.86; I² = 0%).

There were insufficient studies to analyse clinical cure or adverse drug reactions.

The other subgroup analyses planned in the protocol (e.g. antibiotic classes and patients' age) were not done due to the low number and heterogeneity of included studies. The planned sensitivity analyses were also not undertaken because of the same reasons.

There were insufficient studies to analyse for publication bias.

Three versus 5-day treatment

We included one study identified at our last update in this separate comparison group (van Merode 2005).

Persistent UTI

van Merode 2005 found more persistent UTI in the 3-day than in the 5-day treatment group, however this difference was not statistically significant (Analysis 5.1: RR 2.72, 95% CI 0.90 to 8.27). This subgroup analysis of older patients included only 26 patients (12 and 14 in each group). The authors had calculated that they needed 142 patients/treatment regimen to detect a difference in efficacy of 10%. Therefore sample size was too small to detect a significant difference.

The rate of trimethoprim-resistant *E. coli* reported in this study was high (16%).

Clinical failure

The self-reported rate of clinical failure was similar in both treatment regimens (Analysis 5.2: RR 1.17, 95% CI 0.29 to 4.74). Interestingly, it took the same time to recover from symptoms of UTI as the rate of recovery increased from day 1 to day 3 after the end of therapy, regardless of the duration of treatment (van Merode 2005).

DISCUSSION

The discussion will focus on the results and their clinical interpretation but also on important methodological quality issues.

Methodological Issues

The methodological quality of most studies was low, as only a few studies reported an adequate method of allocation concealment (five studies) and blinding of patients and outcome assessors (four studies). Only one more recent study (Vogel 2004) met high methodological quality standards (overall quality ranking A).

While all studies showed results of bacteriological cure rate, clinically important outcomes such as cure of symptoms or kidney complications were rarely described. Again, the more recent studies (van Merode 2005; Vogel 2004) did report on improvement of symptoms such as nocturia, urgency, frequency, burning on micturition and suprapubic pain after treatment.

Other quality issues pertain to the many sources of heterogeneity between included studies. Two studies included men, and one of these also included patients with urinary catheters (Lacey 1981). These patients are usually more difficult to treat and need longer treatment durations (i.e. 10 to 14 days) (Nicolle 1992; Nygaard 1996; Stamm 1993; Wood 1996). Lacey 1981 included patients with asymptomatic bacteriuria. This is a frequent and usually

benign infection in elderly patients which often resolves spontaneously and does not need antimicrobial treatment (Humbert 1992; Kasviki-Charvati 1982; Sourander 1972).

Another possible source of heterogeneity between studies is the different handling of patients with organisms resistant to the study drugs. Some studies excluded those patients. In clinical practice, patients with uncomplicated lower UTI are usually treated empirically. Norrby 1992 recommended in his overview on study design in UTI to continue treatment of cystitis even if the causative organism is reported as being resistant to one or more of the study drugs. Therefore patients with resistant pathogens should be included in studies on UTI and also evaluated for efficacy. In the more recent study by Vogel 2004 none of the identified bacteria were resistant to ciprofloxacin.

In nine studies we were able to do a subgroup analysis of elderly patients. However, not all authors reported the outcomes for elderly patients, and we are unsure if these subgroups were stratified and/or comparable a priori. Most of the studies included relatively young women (e.g. > 50 years), whereas only three studies enrolled older patients (mean age > 78 years) who are often more fragile and present multiple comorbidities.

The setting of studies in elderly patients is very important, because the prevalence of UTI in older people depends on the place of living which may influence the outcome of UTI. Our results suggest that longer treatment durations may be necessary for hospitalised patients. However, the two studies taking place in hospital only included much older patients (mean age 80 and 82) than the other studies. This may also affect the response to treatment. Unfortunately, none of the studies took place in nursing homes where recurrent UTI is a frequent problem (Nicolle 1983; Nicolle 1993). One geriatric study (Vogel 2004) included elderly women from both ambulatory clinics and hospital acute care units.

Eight of the 15 studies compared different treatment durations and different antibiotics. These may not be necessarily equivalent - neither in their bacterial efficacy nor in half-life or adverse drug reactions. For example, several studies showed that trimethoprim, pivmecillinam, amoxicillin and certain cephalosporins are less effective than fluoroquinolones, co-amoxiclav or cotrimoxazole - given the same treatment duration (Ewer 1988; Gallacher 1986; Hooton 1995; Jonsson 1990). These findings may explain the better bacterial efficacy of a 3-day course of ofloxacin compared to a 7-day course with cephalexin (Raz 1996).

Some antibiotics may not be appropriate for short-course treatment for pharmacokinetic reasons. Several penicillins and cephalosporins have a relatively short half-life (1 to 2 hours in young people, 2 to 4 hours in older people), whereas the fluoroquinolones, cotrimoxazole and fosfomycin have longer half-lives (4 to 12 hours, 8 to 13 hours, 4 to 50 hours respectively) (Compendium 1998; McCue 1992). Indeed, Norrby 1990 has shown in his systematic review, that the optimal treatment duration for lower, uncomplicated UTI in women (of all ages) depends on the type of antibiotic: three days for cotrimoxazole and the

fluoroquinolones and five days for beta-lactam antibiotics. Due to these findings we included the seven studies comparing the same antibiotic for a different length of time in a separate meta-analysis. Unfortunately, clinical outcomes like persistence of symptoms (our primary outcome) or patients' acceptability were not reported. The other results were similar to the meta-analyses of all 15 studies.

Discussion of results

There was a significant difference for persistent UTI between single dose and short-course treatment in the short-term (< 2 weeks post-treatment) (RR 2.01, 95% CI 1.05 to 3.84), but not at the long-term follow-up (RR 1.18, 95% CI 0.59 to 2.32) or on clinical outcomes. However sample size of the last two outcome parameters was small.

There was a significant decrease in persistent UTI for long-course treatment compared to single dose for short-term (RR 1.93, 95% CI 1.01 to 3.70) but not long-term follow-up (RR 1.28, 95% CI 0.89 to 1.84). There was no statistically significant difference adverse drug reactions. Patients preferred single dose treatment (RR 0.73, 95% CI 0.60 to 0.88) to longer treatments (7 to 14 days), but this was based on only one study comparing different antibiotics.

Short versus longer treatments showed no significant difference in efficacy. Rate of adverse drug reactions increased significantly with longer treatment durations in only one study (Vogel 2004). This study suggested a safety advantage for three day therapy. However ciprofloxacin can cause central side effects in geriatric patients which are rare with antibiotics which do not permeate tissues and remain concentrated in the urine (norfloxacin for example). Other studies in our review with other antibiotics did not cause higher side effects rates in the longer treatment arms.

In one study (which we analysed separately) a three day treatment was compared with a five day regimen of trimethoprim (van Merode 2005). There was no statistically significant difference in bacterial and clinical outcomes, but the sample size was very small. Two other systematic reviews, which mainly included studies with younger patients, found that single dose therapy was less effective than longer treatment durations (Norrby 1990; Warren 1999). The same systematic reviews showed that most antimicrobials given for three days (e.g. trimethoprim, cotrimoxazole or a fluoroquinolone) were as effective as the same antibiotic given for a longer duration. Therefore, a three day course is recommended in younger patients with uncomplicated lower UTI (Warren 1999). These results seem also to apply to older patients, but further investigations are needed to determine the optimal treatment duration in relation to specific antibiotics.

AUTHORS' CONCLUSIONS

Implications for practice

This review suggests that single dose antibiotic treatment is less effective but may be better accepted by the patients than longer treatment durations (3 to 6 days). In addition, there was no difference between short-course (3 to 6 days) and long-course (7 to 14 days) antibiotics in regards to treatment efficacy. Longer courses may be associated with more adverse drug events. The evidence suggests the optimal treatment duration in elderly women is 3 to 6 days.

Implications for research

The more recent ciprofloxacin study (Vogel 2004) offers a high quality model for designing new geriatric RCTs with clinically relevant outcomes, testing the efficacy of different treatment durations of a given antibiotic in elderly women. Indeed it would be clinically relevant, to verify the optimal treatment duration of other antibiotics especially those with narrow spectrum antibacterial activity and less systemic side effects.

ACKNOWLEDGEMENTS

We thank Narelle Willis, Managing Editor of the Cochrane Renal Group, for her great and dedicated help when updating the review.

REFERENCES

References to studies included in this review

Andersen 1986 *{published data only}*

Andersen B, Bonderup OK, Tilma A. Urinary tract infection in general practice treated with sulfametizole in a single dose or for six days [Urinvejsinfektion i almen praksis behandlet med sulfametizol som enkelt dosis eller i seks dage]. *Ugeskrift for Laeger* 1986;**148**(9):511–3. [EMBASE: 1986075363]

Ferraro 1990 *{published data only}*

Ferraro G, Ambrosi G, Bucci L, Palmieri R, Palmieri G. Fosfomycin trometamol versus norfloxacin in the treatment of uncomplicated lower urinary tract infections of the elderly. *Chemotherapy* 1990;**36** (Suppl 1):46–9. [EMBASE: 1991016672]

Flanagan 1991 *{published data only}*

Flanagan PG, Rooney PJ, Davies EA, Stout RW. A comparison of single-dose versus conventional-dose antibiotic treatment of bacteriuria in elderly women. *Age & Ageing* 1991;**20**(3):206–11. [MEDLINE: 1853794]

Gellermann 1988 *{published data only}*

Gellermann HJ, Grote J, Peters-Haertel W, Verbeek H. Short-term therapy with ciprofloxacin of uncomplicated infections of the urinary tract in female patients [Kurzzeit-Therapie von unkomplizierten harnwegsinfektionen der frau mit ciprofloxacin]. *Medizinische Welt* 1988;**39**(51-2):1585–91. [CENTRAL: CN-00406885]

Guibert 1993 *{published data only}*

Guibert J, Mazeman E, Colau JC, Delavault P. Acute cystitis in women over 50 years of age. Efficacy of pefloxacin with single dose and norfloxacin for 10 days [Cystite aiguë chez la femme de plus de 50 ans. Efficacité de la péfloxacin en dose unique et de la norfloxacin prescrite pendant 10 jours]. *Presse Medicale* 1993;**22**(7):288–92. [MEDLINE: 8502627]

Guibert 1996 *{published data only}*

Guibert J, Capron MH, Giacomino A. Treatment of non-complicated acute cystitis in women: lomefloxacin versus pefloxacin [Traitement de la cystite aiguë non compliquée de la femme: loméfloxacin versus péfloxacin]. *Presse Medicale* 1996;**25**(28):1271–5. [MEDLINE: 8949786]

Guibert 1997 *{published data only}*

Guibert J, Herman H, Capron MH. Treatment of uncomplicated recurrent cystitis in women: lomefloxacin versus norfloxacin [Traitement de la cystite non compliquée récidivante de la femme: loméfloxacin versus norfloxacin]. *Fertilite Contraception Sexualite* 1997;**25**(1):79–84. [MEDLINE: 9064058]

Jardin 1990 *{published data only}*

Jardin A. A general practitioner multicenter study: fosfomycin trometamol single dose versus pipemidic acid multiple dose. *Infection* 1990;**18**(Suppl 2):89–93. [MEDLINE: 2286468]

- Lacey 1981** *{published data only}*
Lacey RW, Simpson MHC, Lord VL, Fawcett C, Button ES, Luxton DE, et al. Comparison of single-dose trimethoprim with a five-day course for the treatment of urinary tract infections. *Age & Ageing* 1981;**10**(3):179–85. [MEDLINE: 7023207]
- Matsumoto 1994** *{published data only}*
Matsumoto T, Ogata N, Kumazawa J, Hasegawa Y, Nakamura M, Sakamoto N, et al. Single-dose therapy of isepamicin for the treatment of acute uncomplicated cystitis - Comparison with a three-day regimen of ofloxacin. *Nishinippon Journal of Urology* 1994;**56**(3):239–50. [1994124884]
- Piipo 1990** *{published data only}*
Piipo T, Pitkääjärvi T, Salo SA. Three-day versus seven-day treatment with norfloxacin in acute cystitis. *Current Therapeutic Research, Clinical & Experimental* 1990;**47**(4):644–53. [EMBASE: 1990140005]
- Raz 1996** *{published data only}*
Raz R, Rozenfeld S. 3-day course of ofloxacin versus cefalexin in the treatment of urinary tract infections in postmenopausal women. *Antimicrobial Agents & Chemotherapy* 1996;**40**(9):2200–1. [MEDLINE: 8878607]
- Stein 1992** *{published data only}*
Stein GE, Philip E. Comparison of three-day temafloxacin with seven-day ciprofloxacin treatment of urinary tract infections in women. *Journal of Family Practice* 1992;**34**(2):180–4. [MEDLINE: 1310715]
- van Merode 2005** *{published and unpublished data}*
van Merode T, Nys S, Stobberingh E. Acute uncomplicated lower urinary tract infections in general practice: clinical and microbiological cure rate after three- versus five days treatment. *European Journal of General Practice* 2005;**11**(2):55–8. [MEDLINE: 16392777]
- Vogel 2004** *{published data only}*
Vogel T, Verreault R, Gourdeau M, Morin M, Grenier-Gosselin L, Rochette L. Optimal duration of antibiotic therapy for uncomplicated urinary tract infection in older women: a double-blind randomized controlled trial. *CMAJ* 2004;**170**(4):469–73. [MEDLINE: 14970093]
- References to studies excluded from this review**
- Abadi 1986** *{published data only}*
Abadi T, Razeto L, Katz E, Pallavicini M. Single dose of nitrofurantoin in the treatment of acute uncomplicated urinary tract infection [Dosis unica de nitrofurantoina en el tratamiento de la infección urinaria aguda no complicada]. *Revista Medica de Chile* 1986;**114**(11):1047–51. [MEDLINE: 3299592]
- Abadi 1987** *{published data only}*
Abadi T, Pino J, Razeto L, Kojchen L, Pallavicini M. A single dose of sulfamethoxazole-trimethoprim vs. a 7-day course of nitrofurantoin in the treatment of acute non-complicated urinary tract infection in women [Dosis unica de sulfametoxazol-trimetoprim versus nitrofurantoina por siete días en el tratamiento de la infección urinaria aguda no complicada en la mujer]. *Revista Medica de Chile* 1987;**115**(12):1166–9. [MEDLINE: 3332924]
- Abbas 1984** *{published data only}*
Abbas AMA, Goel PK, Venkit N, Gowers E. Augmentin therapy in the treatment of urinary tract infections in general practice. *British Journal of Clinical Practice* 1984;**38**(2):49–51. [EMBASE: 1984077896]
- Allgulander 1979** *{published data only}*
Allgulander S, Holm S, Lundgren C. The use of co-trimazine and cotrimoxazole in elderly patients with urinary tract infections. *Infection* 1979;**7**(Suppl 4):S404–7. [MEDLINE: 389815]
- Ancill 1987** *{published data only}*
Ancill RJ, Ballard JH, Capewell MA. Urinary tract infections in geriatric inpatients: A comparative study of amoxicillin-clavulanic acid and cotrimoxazole. *Current Therapeutic Research* 1987;**41**(4):444–8. [EMBASE: 1987132825]
- Anderson 1979** *{published data only}*
Anderson JD, Aird MY, Johnson AM, Ree R, Goresky D, Brumwell CA, et al. The use of a single 1 g dose of amoxicillin for the treatment of acute urinary tract infections. *Journal of Antimicrobial Chemotherapy* 1979;**5**(4):481–3. [MEDLINE: 385583]
- Anderson 1980** *{published data only}*
Anderson JD. Single dose treatment of acute urinary infections in women. *Journal of Antimicrobial Chemotherapy* 1980;**6**(2):170–2. [EMBASE: 1980100863]
- Andrewes 1981** *{published data only}*
Andrewes DA, Chuter PJ, Dawson MJ, Eden BW, Moore RMA, Freestone DS, et al. Trimethoprim and co-trimoxazole in the treatment of acute urinary tract infections: patient compliance and efficacy. *Journal of the Royal College of General Practitioners* 1981;**31**(226):274–80. [MEDLINE: 6975823]
- Aragones 1990** *{published data only}*
Aragones E, Torres M, Sarra N, Marti R. Single dose in therapeutic strategy in acute urinary tract infection [La monodosis en la estrategia terapéutica de la infección aguda del tracto urinario]. *Atencion Primaria* 1990;**7**(5):84–5. [MEDLINE: 2129709]
- Arredondo 2004** *{published data only}*
Arredondo-García JL, Figueroa-Damián R, Rosas A, Jáuregui A, Corral M, Costa A, et al. Comparison of short-term treatment regimen of ciprofloxacin versus long-term treatment regimens of trimethoprim/sulfamethoxazole or norfloxacin for uncomplicated lower urinary tract infections: a randomized, multicentre, open-label, prospective study. *Journal of Antimicrobial Chemotherapy* 2004;**54**(4):840–3. [MEDLINE: 15347634; : CN-00491170]
- Auquer 2002** *{published data only}*
Auquer F, Cordon F, Gorina E, Caballero JC, Adalid C, Batlle J, the Urinary Tract Infection Study Group. Single-dose ciprofloxacin versus 3 days of norfloxacin in uncomplicated urinary tract infections in women. *Clinical Microbiology & Infection* 2002;**8**(1):50–4. [MEDLINE: 21904068; : CN-00378927]
- Backhouse 1989** *{published data only}*
Backhouse CI, Matthews JA. Single-dose enoxacin compared with 3-day treatment for urinary tract infection. *Antimicrobial Agents & Chemotherapy* 1989;**33**(6):877–80. [MEDLINE: 2764538]
- Bailey 1977** *{published data only}*
Bailey RR, Abbott GD. Treatment of urinary-tract infection with a single dose of amoxicillin. *Nephron* 1977;**18**(6):316–20. [MEDLINE: 876437]

- Bailey 1978** *{published data only}*
Bailey RR, Abbott GD. Treatment of urinary tract infection with a single dose of trimethoprim-sulfamethoxazole. *Canadian Medical Association Journal* 1978;**118**(5):551–2. [MEDLINE: 630515]
- Bailey 1980** *{published data only}*
Bailey RR, Blake E. Treatment of uncomplicated urinary tract infections with a single dose of co-trimoxazole. *New Zealand Medical Journal* 1980;**92**(699):285–6. [MEDLINE: 7003448]
- Bailey 1982** *{published data only}*
Bailey RR, Peddie B, Chambers PFM, Crofts HG, Davies PR, Bishop V, et al. Single dose doxycycline, cefuroxime and pivmecillinam for treatment of bacterial cystitis. *New Zealand Medical Journal* 1982;**95**(717):699–700. [MEDLINE: 6292803]
- Bailey 1984** *{published data only}*
Bailey RR, Blake E, Peddie BA. Comparison of single dose netilmicin with a five-day course of co-trimoxazole for uncomplicated urinary tract infections. *New Zealand Medical Journal* 1984;**97**(754):262–4. [MEDLINE: 6374533]
- Bailey 1985a** *{published data only}*
Bailey RR, Hooton TM, Stamm WE. Single-dose therapy for cystitis in women. *JAMA* 1985;**254**(8):1034–5. [1985212822]
- Bailey 1985b** *{published data only}*
Bailey RR, Keenan TD, Elliott JC, Peddie BA, Bishop V. Treatment of bacterial cystitis with a single dose of trimethoprim, co-trimoxazole or amoxicillin compared with a course of trimethoprim. *New Zealand Medical Journal* 1985;**98**(779):387–9. [MEDLINE: 3887254]
- Basista 1991** *{published data only}*
Basista MP. Randomized study to evaluate efficacy and safety of ofloxacin vs. trimethoprim and sulfamethoxazole in treatment of uncomplicated urinary tract infection. *Urology* 1991;**37** Suppl(3):21–7. [MEDLINE: 2003341]
- Bergan 1990** *{published data only}*
Bergan T. Degree of absorption, pharmacokinetics of fosfomycin trometamol and duration of urinary antibacterial activity. *Infection* 1990;**18** Suppl(2):65–9. [EMBASE: 1990344485]
- Bitsch 1985** *{published data only}*
Bitsch M, Hansen PH, Pagh J. Treatment of acute urinary infections. Comparison between pivmecillinam for 3 days and sulfamethizole therapy for 6 days [Behandling af akut urinvejsinfektion. En sammenligning af 3 dages pivmecillinam– og 6 dages sulfametizolbehandling]. *Ugeskrift for Laeger* 1985;**147**(17):1392–5. [MEDLINE: 4002410]
- Boerema 1990** *{published data only}*
Boerema JBJ, Willems FTC. Fosfomycin trometamol in a single dose versus norfloxacin for seven days in the treatment of uncomplicated urinary infections in general practice. *Infection* 1990;**18** Suppl(2):80–8. [MEDLINE: 2286467]
- Bordier 1978** *{published data only}*
Bordier B, Rosatti P, Junod JP. Cotrimoxazol therapy in urinary tract infection of elderly [author's translation] [Traitement des infections urinaires chez le vieillard par le cotrimoxazole]. *Schweizerische Rundschau für Medizin Praxis* 1978;**67**(27):1003–9. [MEDLINE: 674077]
- Brosf 1980** *{published data only}*
Brosf AB. Five-day therapy with cephradine capsules, 500 mg BID, for the treatment of acute, uncomplicated urinary tract infections. *Clinical Therapeutics* 1980;**3**(4):285–91. [MEDLINE: 7023676]
- Brouhard 1981** *{published data only}*
Brouhard BH, Cunningham RJ, Eriksson K, et al. Single-dose antibiotics for urinary infections. *Lancet* 1981;**1**(8215):331. [MEDLINE: 6109972]
- Brumfitt 1993** *{published data only}*
Brumfitt W, Hamilton Miller JM, Walker S. Enoxacin relieves symptoms of recurrent urinary infections more rapidly than cefuroxime axetil. *Antimicrobial Agents & Chemotherapy* 1993;**37**(7):1558–9. [EMBASE: 1993202406]
- Buckwold 1982** *{published data only}*
Buckwold FJ, Ludwig P, Harding GKM, Thompson L, Slutchuk M, Shaw J, et al. Therapy for acute cystitis in adult women. Randomized comparison of single-dose sulfisoxazole vs trimethoprim-sulfamethoxazole. *JAMA* 1982;**247**(13):1839–42. [MEDLINE: 7038165]
- Capalbi 1987** *{published data only}*
Capalbi A, Buzzi M, Alessandrini A, Allegra E, Mogini C, Di Salvo G. Treatment of urinary infections in gynecology. Comparative study of norfloxacin, oxolinic acid and pipemidic acid carried out on ambulatory patients [Trattamento delle infezioni urinarie in ginecologia]. *Minerva Urologica e Nefrologica* 1987;**39**:383–9. [EMBASE: 1988073830]
- Capri 1991** *{published data only}*
Capri S, Del Bono GP. Treatment of acute cystitis: cost-effectiveness analysis of the single dose versus conventional therapy [Indagine sulla terapia della cistite acuta: analisi cost–efficacia della dose singola verso la terapia convenzionale]. *Giornale Italiano di Chemioterapia* 1991;**38**(1-3):163–4. [MEDLINE: 1365579]
- Carmignani 2005** *{published data only}*
Carmignani G, De Rose AF, Olivieri L, Salvatori E, Rosignoli MT, Dionisio P. Prulifloxacin versus ciprofloxacin in the treatment of adults with complicated urinary tract infections. *Urologia Internationalis* 2005;**74**(4):326–31. [MEDLINE: 15897698]
- Charlton 1976** *{published data only}*
Charlton CAC, Crowther A, Davies JG, Dynes J, Haward MWA, Mann PG, et al. Three-day and ten-day chemotherapy for urinary tract infections in general practice. *BMJ* 1976;**1**(6002):124–6. [MEDLINE: 764915]
- Charlton 1981** *{published data only}*
Charlton CAC, Crowther A, Davies JG, Dines J, Jackson GE, Mann PG, et al. Three-day and one-day chemotherapy for urinary tract infections in general practice. *Journal of Antimicrobial Chemotherapy* 1981;**8**(5):409–12. [EMBASE: 1982064141]
- Cheung 1988** *{published data only}*
Cheung R, Sullens CM, Seal D, Dickins J, Nicholson PW, Seshmukh AA, et al. The paradox of using a 7 day antibacterial course to treat urinary tract infections in the community. *British Journal of Clinical Pharmacology* 1988;**26**(4):391–8. [EMBASE: 1988251668]
- Compton 1983** *{published data only}*
Compton AB. Single dose trimethoprim-sulfamethoxazole in acute cystitis. *Military Medicine* 1983;**148**(7):622–3. [EMBASE: 1983246086]

- Cooper 1990a** *{published data only}*
Cooper J, Raeburn A, Brumfitt W, Hamilton-Müller JMT. Single dose and conventional treatment for acute bacterial and non-bacterial dysuria and frequency in general practice. *Infection* 1990;**18**(2):65–9. [MEDLINE: 2185155]
- Cooper 1990b** *{published data only}*
Cooper J, Raeburn AL, Brumfitt W, Hamilton-Miller JMT. General practitioner study: fosfomicin trometamol versus amoxicillin clavulanate in acute urinary tract infections. *Chemotherapy* 1990;**36** Suppl (1):24–6. [MEDLINE: 2085984]
- Cosmi 1996** *{published data only}*
Cosmi EV, Cantini L, Monici Preti PA, Di Renzo GC, Abate F, Balsotti G, et al. Efficacy and tolerability of brodimoprim at two different dosage schedules in the treatment of acute uncomplicated bacterial cystitis: comparative study vs. pefloxacin. *European Journal of Obstetrics, Gynecology, & Reproductive Biology* 1996;**64**(2):207–11. [MEDLINE: 8820004]
- Counts 1982** *{published data only}*
Counts GW, Stamm WE, McKeivitt M, Running K, Holmes KK, Turck M. Treatment of cystitis in women with a single dose of trimethoprim-sulfamethoxazole. *Reviews of Infectious Diseases* 1982;**4**(2):484–90. [MEDLINE: 6981166]
- Cox 1992** *{published data only}*
Cox CE, Serfer HS, Mena HR, Briefer C, Childs SJ, Gordon SF, et al. Ofloxacin versus trimethoprim/sulfamethoxazole in the treatment of uncomplicated urinary tract infection. *Clinical Therapeutics* 1992;**14**(3):446–57. [MEDLINE: 1638586]
- Craft 1991** *{published data only}*
Craft JC, Hurley M, Hsu P, Pernet A. Efficacy and safety of three-day temafloxacin versus seven-day ciprofloxacin therapy in the treatment of uncomplicated urinary tract infections [abstract]. *European Journal Of Clinical Microbiology & Infectious Diseases* 1991;**10**(Special Issue):195–6. [CENTRAL: CN-00460587]
- * Craft JC, Hurley M, Hsu P, Pernet A. Safety and efficacy of 3 days of temafloxacin vs 7 days of ciprofloxacin in the treatment of females with uncomplicated urinary tract infections. *Journal of Chemotherapy* 1991;**3** Suppl(4):363–4.
- Crocchiolo 1990** *{published data only}*
Crocchiolo P. Single-dose fosfomicin trometamol versus multiple dose cotrimoxazole in the treatment of lower urinary tract infections in general practice. *Chemotherapy* 1990;**36** Suppl(1):37–40. [MEDLINE: 2085988]
- Daengsvang 1990** *{published data only}*
Daengsvang P. Safety and efficacy of 3 days of temafloxacin vs 7 days of ciprofloxacin in the treatment of females with simple cystitis. *Infectious Diseases International Congress; 1990 July; Montreal (Canada)*. 1990:45.
- de Almeida 1994** *{published data only}*
de Almeida Claro J, Urubatan Reis C, Bandeira S, Lima N, Scafi C, Rodrigues Netto N. Single-dose (800 mg) pefloxacin vs. seven-day therapy with norfloxacin and co-trimoxazole in the management of low-tract urinary infection [Tratamento dose-única com 800 mg de pefloxacina versus tratamento de sete dias com norfloxacina e cotrimoxazol na infecção urinária baixa]. *Jornal Brasileiro de Ginecologia* 1994;**104**(7):235–7. [EMBASE: 1994282657]
- de Jong 1991** *{published data only}*
de Jong Z, Pontonnier F, Plante P. Single-dose fosfomicin trometamol (Monuril) versus multiple-dose norfloxacin: Results of a multicenter study in females with uncomplicated lower urinary tract infections. *Urologia Internationalis* 1991;**46**(4):344–8. [MEDLINE: 1926651]
- del Rio 1996** *{published data only}*
Del Rio G, Dalet F, Agular L, Caffaratti J, Dal-Ré R. Single-dose rifloxacin versus 3-day norfloxacin treatment of uncomplicated cystitis: Clinical evaluation and pharmacodynamic considerations. *Antimicrobial Agents & Chemotherapy* 1996;**40**(2):408–12. [MEDLINE: 8834888]
- Dickie 1986** *{published data only}*
Dickie AS, Lang SD. Pilot study of single dose augmentin for acute bacterial cystitis. *New Zealand Medical Journal* 1986;**99**(807):600. [MEDLINE: 3462558]
- Dickreuter 1984** *{published data only}*
Dickreuter W, Berger C. Single-dose versus 5-day cotrimoxazole therapy in acute symptomatic urinary tract infections in the female. A prospective randomized study [Einmaldosis versus 5-Tage-Cotrimoxazol-Therapie akuter symptomatischer Harnwegsinfekte bei Frauen]. *Geburtshilfe und Frauenheilkunde* 1984;**44**(12):803–7. [MEDLINE: 6396153]
- Dubois 1984** *{published data only}*
Dubois J, St.-Pierre C, Auger P, Philips R, Perrier A. Single-dose pefloxacin vs. seven days of trimethoprim-sulfamethoxazole in uncomplicated infection of the lower urinary tract in women. *Reviews of Infectious Diseases* 1989;**11** Suppl(5):1343–4.
- Elhanan 1994** *{published data only}*
Elhanan G, Tabenkin H, Yahalom R, Raz R. Single-dose fosfomicin trometamol versus 5-day cephalixin regimen for treatment of uncomplicated lower urinary tract infections in women. *Antimicrobial Agents & Chemotherapy* 1994;**38**(11):2612–4. [MEDLINE: 7872756]
- Fair 1980** *{published data only}*
Fair WR, Crane DB, Peterson LJ, Dahmer C, Tague B, Amos W. Three-day treatment of urinary tract infections. *Journal of Urology* 1980;**123**(5):717–21. [MEDLINE: 7420563]
- Fairley 1970** *{published data only}*
Fairley KF. Cephalixin in recurrent urinary tract infection. *Postgraduate Medical Journal* 1970;**Suppl**:24–7. [MEDLINE: 5488203]
- Falck 1984** *{published data only}*
Falck G, Ericsson M, Skjutare-Emmanuelson A, Fellner H. 3-day care of lower urinary tract infection in women [Tredagarsbehandling av nedre urinvägsinfektion hos kvinnor]. *Läkartidningen* 1984;**81**(50):4732–3. [MEDLINE: 6521572]
- Falck 1988** *{published data only}*
Anonymous. Double-blind comparison of 3-day versus 7-day treatment with norfloxacin in symptomatic urinary tract infections. The Inter-Nordic Urinary Tract Infection Study Group. *Scandinavian Journal of Infectious Diseases* 1988;**20**(6):619–24. [MEDLINE: 2906171]
- Fang 1978** *{published data only}*
Fang LS, Tolkoff-Rubin NE, Rubin RH. Efficacy of single-dose and conventional amoxicillin therapy in urinary-tract infection localized by the antibody-coated bacteria technic. *New England Journal of Medicine* 1978;**298**(8):413–6. [MEDLINE: 340949]

- Ferry 2007** {published data only}
 Ferry SA, Holm SE, Stenlund H, Lundholm R, Monsen TJ. Clinical and bacteriological outcome of different doses and duration of pivmecillinam compared with placebo therapy of uncomplicated lower urinary tract infection in women: the LUTIW project. *Scand J Prim Health Care* 2007;**25**(1):49–57. [MEDLINE: 17354160]
- Fihn 1988** {published and unpublished data}
 Fihn SD, Johnson C, Roberts PL, Running K, Stamm WE. Trimethoprim-sulfamethoxazole for acute dysuria in women: A single-dose or 10-day course. *Annals of Internal Medicine* 1988;**108**(3):350–7. [MEDLINE: 3257670]
- Fischer 1982** {published data only}
 Fischer J, Escher J. Comparative study of co-soltrim and amoxicillin in acute urinary tract infections [Vergleichende Studie von Co-siltrim und Amoxicillin bei akuten Harnwegsinfektionen]. *Schweizerische Rundschau für Medizin Praxis* 1982;**71**(35):1352–5. [MEDLINE: 6752936]
- Flavell-Matts 1985** {published data only}
 Flavell Matts SG, Francourt GJ, Mitchell CJ, Gowers E, Boston PF. Further data on augmentin and co-trimoxazole in the treatment of urinary tract infection. *British Journal of Clinical Practice* 1985;**39**(5):179–84. [MEDLINE: 3907682]
- Fünfstück 1990** {published data only}
 Fünfstück R, Jansa U, Stein G, Scheider S. Comparative studies of the effectiveness of 1-day treatment and 7-day treatment with sulfamerazine/trimethoprim (Berlocombin) of patients with urinary tract infection [Vergleichende Untersuchungen zur Wirksamkeit einer Ein-Tages-Behandlung und einer Sieben-Tage-Behandlung mit Sulfamerazin/Trimethoprim (Berlocombin) bei Patienten mit einer Harnwegsinfektion]. *Zeitschrift für die Gesamte Innere Medizin und Ihre Grenzgebiete* 1990;**45**(1):1–5. [MEDLINE: 2330731]
- Gallego Gomez 1987** {published data only}
 Gallego Gomez J, Llopis Minguez B, Boronat Tormo F, Martinez Garcia R, Oliver Amoros F, Gobernado Serrano M, et al. Norfloxacin versus piperidic acid in acute cystitis [Norfloxacina versus acido pipemidico en cistitis agudas]. *Archivos Espanoles de Urologia* 1987;**40**(2):71–4. [MEDLINE: 3592776]
- Gippert 1981** {published data only}
 Gippert H, Norberg A, Norberg B, Kahlmeter G, Bukh N. Symptomatic bacteriuria in non-catheterized geriatric patients with urinary incontinence; the effect of short-term treatment with pivmecillinam or the combination pivmecillinam-pivampicillin. *Journal of Antimicrobial Chemotherapy* 1981;**7**:185–91. [MEDLINE: 6260728]
- Gordin 1987** {published data only}
 Gordin A, Kalima S, Mäkela P, Antikainen R. Comparison of three- and ten-day regimens with a sulfadiazine-trimethoprim combination and pivmecillinam in acute lower urinary tract infections. *Scandinavian Journal of Infectious Diseases* 1987;**19**:97–102. [MEDLINE: 3563430]
- Gordon 1978** {published data only}
 Gordon WE. Efficacy and safety of cefadroxil. *Journal of the Kentucky Medical Association* 1978;**76**(3):121–3. [MEDLINE: 632656]
- Gossius 1984a** {published data only}
 Gossius G. Single-dose nitrofurantoin therapy for urinary tract infections in women. *Current Therapeutic Research, Clinical & Experimental* 1984;**35**(6):925–31. [EMBASE: 1984180670]
- Gossius 1984b** {published data only}
 Gossius G, Vorland L. A randomised comparison of single-dose vs. three-day and ten-day therapy with trimethoprim-sulfamethoxazole for acute cystitis in women. *Scandinavian Journal of Infectious Diseases* 1984;**16**(4):373–9. [MEDLINE: 6396834]
- Gossius 1986** {published data only}
 Gossius G, Vorland L. Treatment for acute cystitis in women. Single-dose versus a 3-day and 10-day therapeutic regimen with trimethoprim-sulfamethoxazole [Behandling av akutt cystitt hos kvinner. Enkeldose versus tredagers og tidagers behandlingsregime med trimethoprim-sulfamethoxazol]. *Tidsskrift for Den Norske Laegeforening* 1986;**106**(16):1395–8. [MEDLINE: 3529490]
- Goto 1999** {published data only}
 Goto T, Kitagawa T, Kawahara M, Hayami H, Ohi Y. Comparative study of single-dose and three-day therapy for acute uncomplicated cystitis. *Hinyokika Kiyo - Acta Urologica Japonica* 1999;**45**(2):85–9. [MEDLINE: 10212779]
- Greenberg 1981** {published and unpublished data}
 Greenberg RN, Sanders CV, Lewis AC, Marier RL. Single-dose cefaclor therapy of urinary tract infection. Evaluation of antibody-coated bacteria test and C-reactive protein assay as predictors of cure. *American Journal of Medicine* 1981;**71**(5):841–5. [MEDLINE: 7304657]
- Greenberg 1986** {published data only}
 Greenberg RN, Reilly PM, Luppen KL, Weinandt WJ, Ellington LL, Bollinger MR. Randomized study of single-dose, three-day, and seven-day treatment of cystitis in women. *Journal of Infectious Diseases* 1986;**153**(2):277–82. [MEDLINE: 3484773]
- Greenwood 1994** {published data only}
 Greenwood D. Fosfomycin trometamol and the single-dose treatment of cystitis. *Journal of Medical Microbiology* 1994;**41**(5):293–4. [MEDLINE: 7966199]
- Grüneberg 1967** {published data only}
 Grüneberg RN, Brumfitt W. Single-dose treatment of acute urinary tract infection: a controlled trial. *BMJ* 1967;**3**(566):649–51. [MEDLINE: 6038338]
- Hansen 1981** {published data only}
 Hansen PH, Kristensen KH, Lenler-Eriksen HA, Pagh J, Ostergard JE. Pivmecillinam (Selexid) in acute cystitis. A comparative study of 3- and 7-day treatments [Pivmecillinam (Selexid*) til akut cystitis. En sammenligning af 3 og 7 dages behandling]. *Ugeskrift for Laeger* 1981;**143**(11):670–3. [MEDLINE: 6269263]
- Heer 1980** {published data only}
 Heer H. Tibirox for urinary tract infections. Effectiveness in hospitalized and ambulatory patients [Tibirox bei harnwegsinfektionen. Wirksamkeit bei hospitalisierten und ambulanten patienten]. *ZFA - Zeitschrift für Allgemeinmedizin* 1980;**56**(13):949–52. [MEDLINE: 7415463]
- Henning 1981** {published data only}
 Henning C, Kjellberg L. Single-dose and weekly therapy of acute urinary infections [Eingangs- och veckobehandling vid akuta urinvägsinfektioner]. *Läkartidningen* 1981;**78**(40):3473–4. [MEDLINE: 7033696]
- Henry 1999** {published data only}
 Henry DC, Nenad RC, Irvani A, Tice AD, Mansfield DL, Magner DJ, et al. Comparison of sparfloxacin and ciprofloxacin in the treat-

- ment of community-acquired acute uncomplicated urinary tract infection in women. *Clinical Therapeutics* 1999;**21**(6):966–81. [MEDLINE: 10440621]
- Hill 1985** *{published data only}*
Hill S, Yeates M, Pathy J, Morgan JR. A controlled trial of norfloxacin and amoxicillin in the treatment of uncomplicated urinary tract infection in the elderly. *Journal of Antimicrobial Chemotherapy* 1985;**15**(4):505–8. [MEDLINE: 3159711]
- Hinnah 1991** *{published data only}*
Hinnah V, Strohmenger P. Single-dose oral ciprofloxacin versus trimethoprim sulfamethoxazole in the treatment of acute urinary tract infections. *Zeitschrift für Allgemeinmedizin* 1991;**67**(18):1179–82. [MEDLINE: 1991215200]
- Hoigne 1977** *{published data only}*
Hoigné R, Sturm H, Fahrer H, Spiess J, Patrizzi R. Choice of the therapeutic schedule of cotrimoxazole in urinary tract infections; comparison of the effect with this of trimethoprim alone [Untersuchungen über therapieschema und wirkung von cotrimoxazol bei harnwegsinfektionen, vergleichend mit hohen dosen trimethoprim allein]. *Schweizerische Rundschau für Medizin Praxis* 1977;**66**(4):111–6. [MEDLINE: 319450]
- Hooton 1985** *{published data only}*
Hooton TM, Running K, Stamm WE. Single-dose therapy for cystitis in women. A comparison of trimethoprim-sulfamethoxazole, amoxicillin, and cycloacillin. *JAMA* 1985;**253**(3):387–90. [MEDLINE: 3871233]
- Hooton 1989** *{published data only}*
Hooton TM, Latham RH, Wong ES, Johnson C, Roberts PL, Stamm WE. Ofloxacin versus trimethoprim-sulfamethoxazole for treatment of acute cystitis. *Antimicrobial Agents & Chemotherapy* 1989;**33**(8):1308–12. [MEDLINE: 2802557]
- Hooton 1991** *{published data only}*
Hooton TM, Johnson C, Winter C, Kuwamura L, Rogers ME, Roberts PL, et al. Single-dose and three-day regimens of ofloxacin versus trimethoprim-sulfamethoxazole for acute cystitis in women. *Antimicrobial Agents & Chemotherapy* 1991;**35**(7):1479–83. [MEDLINE: 1929311]
- Hoover 1982** *{published data only}*
Hoover DL, Martin RW, Reynolds BH, Krall JM. Rapid diagnosis and single-dose treatment of uncomplicated urinary tract infection. *Journal of American College of Health* 1982;**31**:61–6. [MEDLINE: 7153433]
- Hoyme 1993** *{published data only}*
Hoyme UB, Alimi M, Keuter U, Krasemann C, Krolla H, Philipps K, et al. Single dose therapy of uncomplicated urinary tract infections in women. Remission rates with ciprofloxacin in two prospective randomized comparative studies [Einmaltherapie von unkomplizierten Harnwegsinfektionen der Frau. Heilungsraten mit Ciprofloxacin in zwei prospektiven randomisierten Vergleichsstudien]. *Fortschritte der Medizin* 1993;**111**(3):35–8. [MEDLINE: 8444395]
- Huang 2002** *{published data only}*
Huang CK, Chen YS, Lee SS, Lin WR, Tsai HC, Lin HH, et al. Safety and efficacy of cefepime versus ceftazidime in the treatment of severe infections. *Journal of Microbiology Immunology & Infection* 2002;**35**(3):159–67. [MEDLINE: 22267824]
- Humbert 1987** *{published data only}*
Humbert G, Borsa-Lebas F, Lecomte F. Short-course therapy of urinary tract infections [Les traitements courts de l'infection urinaire]. *Medecine et Maladies Infectieuses* 1987;**17**(12 BIS):791–4. [EMBASE: 1988014375]
- Iravani 1985** *{published data only}*
Iravani A, Richard GA. Single-dose ceftriaxone versus multiple-dose trimethoprim-sulfamethoxazole in the treatment of acute urinary tract infections. *Antimicrobial Agents & Chemotherapy* 1985;**27**(2):158–61. [MEDLINE: 3872627]
- Iravani 1989** *{published data only}*
Iravani A, Richard GA. Single-dose cefuroxime axetil versus multiple-dose cefaclor in the treatment of acute urinary tract infections. *Antimicrobial Agents & Chemotherapy* 1989;**33**(8):1212–6. [MEDLINE: 2802549]
- Iravani 1991a** *{published data only}*
Iravani A. Treatment of uncomplicated urinary tract infections with temafloxacin. *American Journal of Medicine* 1991;**91** Suppl(6A):124–8. [MEDLINE: 1662882]
- Iravani 1991b** *{published data only}*
Iravani A. Comparative, double-blind, prospective, multicenter trial of temafloxacin versus trimethoprim-sulfamethoxazole in uncomplicated urinary tract infections in women. *Antimicrobial Agents & Chemotherapy* 1991;**35**(9):1777–81. [MEDLINE: 1952847]
- Iravani 1993** *{published data only}*
Iravani A. Multicenter study of single-dose and multiple-dose fleroxacin versus ciprofloxacin in the treatment of uncomplicated urinary tract infections. *American Journal of Medicine* 1993;**94** Suppl(3A):89–96. [MEDLINE: 8452189]
- Iravani 1995** *{published data only}*
Iravani A, Tice AD, McCarty J, Sikes DH, Nolen T, Gallis HA, et al. Short-course ciprofloxacin treatment of acute uncomplicated urinary tract infection in women. The minimum effective dose. The Urinary Tract Infection Study Group. *Archives of Internal Medicine* 1995;**155**(5):485–94. [MEDLINE: 7864704]
- Iravani 1999** *{published data only}*
Iravani A, Klimberg I, Briefer C, Munera C, Kowalsky SF, Echols RM, et al. A trial comparing low-dose, short-course ciprofloxacin and standard 7 day therapy with co-trimoxazole or nitrofurantoin in the treatment of uncomplicated urinary tract infection. *Journal of Antimicrobial Chemotherapy* 1999;**43** Suppl(A):67–75. [MEDLINE: 10225575]
- Ishihara 1998** *{published data only}*
Ishihara S, Ban Y, Kawada Y, Ito SI, Yasuhisa I, Doi T, et al. Fleroxacin treatment for acute uncomplicated cystitis in women: comparison of 3-day and 7-day therapy. *Hinyokika Kyo - Acta Urologica Japonica* 1998;**44**(6):431–6. [MEDLINE: 9719946]
- Johansen 1981** *{published data only}*
Johansen KS, Grosen G, Holm Nielsen E, Jacobsen J, Jensen SH, Juel-Jacobsen T, et al. Patients with symptoms of acute urinary infections treated with piromidic acid or sulfamethizole in general practice. A double-blind clinical controlled multicentre study [Patienter med symptomer på akut urinvejsinfektion behandlet med piromidsyre eller sulfametizol i almen praksis. En doggeltblind, klinisk, kontrolleret multicenterundersøgelse]. *Ugeskrift for Læger* 1981;**143**(39):2491–4. [MEDLINE: 7029845]

- Jones 1983** *{published data only}*
Jones RH. Single-dose and seven-day trimethoprim and co-trimoxazole in the treatment of urinary tract infection. *Journal of the Royal College of General Practitioners* 1983;**33**(254):585–9. [MEDLINE: 6605424]
- Jordan 1986** *{published data only}*
Jordan NS. Single-dose antibiotic therapy for urinary tract infections and type II error. *Archives of Internal Medicine* 1986;**146**(2):413–4. [MEDLINE: 3484941]
- Khatib 1981** *{published data only}*
Khatib A. Comparative efficacy of single- and eight-day treatment of urinary tract infections with carfecillin (Uticillin). *Journal of International Medical Research* 1981;**9**(3):186–8. [MEDLINE: 7238994]
- Kirby 1984** *{published data only}*
Kirby CP. Treatment of simple urinary tract infections in general practice with a 3-day course of norfloxacin. *Journal of Antimicrobial Chemotherapy* 1984;**13** Suppl(B):107–12. [MEDLINE: 6234270]
- Kiyota 1992** *{published data only}*
Kiyota H, Machida T, Masuda F, Ohishi Y, Onodera S, Suzuki H, et al. Single-dose treatment of tosufloxacin (TFLX) for acute uncomplicated cystitis. *Kansenshogaku Zasshi - Journal of the Japanese Association for Infectious Diseases* 1992;**66**(4):529–35. [MEDLINE: 1624848]
- Kosmidis 1988** *{published data only}*
Kosmidis J, Gargalianos P, Adams G, Petropoulou D, Makris D. Fleroxacin in single dose oral therapy of uncomplicated lower urinary tract infection. *Journal of Antimicrobial Chemotherapy* 1988;**22** Suppl(D):219–21. [MEDLINE: 3144541]
- Koyama 2000** *{published data only}*
Koyama Y, Mikami O, Matsuda T, Murota T, Ohara T, Kawamura H, et al. Efficacy of single-dose therapy with levofloxacin for acute cystitis: comparison to three-day therapy. *Hinyokika Kyo - Acta Urologica Japonica* 2000;**46**(1):49–52. [MEDLINE: 10723666]
- Kumamoto 1992** *{published data only}*
Kumamoto Y. Single-dose treatment of female acute uncomplicated cystitis. *Infection* 1992;**20** Suppl(3):173–4. [MEDLINE: 1337061]
- Källenius 1979** *{published data only}*
Källenius G, Winberg J. Urinary tract infections treated with single dose of short-acting sulphonamide. *BMJ* 1979;**1**(6172):1175–6. [MEDLINE: 444997]
- Lecomte 1991** *{published data only}*
Lecomte F, Humbert G. Short-term treatment of urinary tract infection in adults [Les traitements courts de l'infection urinaire chez l'adulte]. *Medecine et Maladies Infectieuses* 1991;**21**(2 BIS):109–23. [EMBASE: 1991154459]
- Leelarasamee 1995** *{published and unpublished data}*
Leelarasamee A, Leelarasamee I. Comparative efficacies of oral pefloxacin in uncomplicated cystitis. Single dose or 3-day therapy. *Drugs* 1995;**49** Suppl(2):365–7. [MEDLINE: 8549364]
- Leigh 1980** *{published data only}*
Leigh DA, Marriner J, Fabb S. Treatment of domiciliary urinary tract infections with a single dose of amoxicillin. *Journal of Antimicrobial Chemotherapy* 1980;**6**(3):403–5. [MEDLINE: 7400073]
- Lewis 1980** *{published data only}*
Lewis G. Treatment of acute urinary tract infections with cefadroxil administered once daily. *Journal of International Medical Research* 1980;**8** Suppl(1):29–33. [MEDLINE: 7439502]
- Lightstone 1988** *{published data only}*
Lightstone BL, Greaves WE, Humphries JM. Comparison of Mictral with amoxicillin, trimethoprim and nitrofurantoin in the treatment of acute cystitis. *British Journal of Clinical Practice* 1988;**42**(7):283–8. [MEDLINE: 3075504]
- Lockey 1980** *{published data only}*
Lockey JE, Williams DN, Raij L, Sabath LD. Comparison of 4 and 10 days of doxycycline treatment for urinary tract infection. *Journal of Urology* 1980;**124**(5):643–5. [MEDLINE: 7005459]
- Ludwig 1987** *{published data only}*
Ludwig G, Pauthner H. Clinical experience with ofloxacin in upper and lower urinary tract infections. A comparison with co-trimoxazole and nitrofurantoin. *Drugs* 1987;**34** Suppl(1):95–9. [MEDLINE: 3501751]
- Mabeck 1980a** *{published data only}*
Mabeck CE, Vejlsgaard R. Urinary tract infections in general practice. III. Treatment with sulphamethizole, trimethoprim or co-trimazine (sulphadiazine-trimethoprim) [Urinvejsinfektioner i almen praksis. III. Behandling med sulfametizol, trimetoprim eller Co-trimazin* (sulfadiazin-trimtoprim)]. *Ugeskrift for Laeger* 1980;**142**(26):1664–8. [MEDLINE: 6996257]
- Mabeck 1980b** *{published data only}*
Mabeck CE, Vejlsgaard R. Treatment of urinary tract infections in general practice with sulfamethizole, trimethoprim or co-trimazine (sulphadiazine-trimethoprim). *Journal of Antimicrobial Chemotherapy* 1980;**6**(6):701–8. [MEDLINE: 7440462]
- Mallo 1979** *{published data only}*
Mallo N, Dalet F. Clinical bacteriological study of dibekacine in urinary infections [Estudio clínico-bacteriológico de la dibekacine en las infecciones urinarias]. *Revista Clínica Espanola* 1979;**155**(6):417–21. [MEDLINE: 397556]
- Marsh 1980** *{published data only}*
Marsh BT, Menday AP. Comparative efficacy of 3-day and 7-day chemotherapy with pivmecillinam in urinary tract infections in general practice. *Journal of International Medical Research* 1980;**8**(2):105–11. [MEDLINE: 6245976]
- Martin 1983** *{published data only}*
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. *British Journal of Clinical Practice* 1983;**37**(3):105–11. [MEDLINE: 6603859]
- Masterton 1995** *{published data only}*
Masterton RG, Bochsler JA. High-dosage co-amoxiclav in a single dose versus 7 days of co-trimoxazole as treatment of uncomplicated lower urinary tract infection in women. *Journal of Antimicrobial Chemotherapy* 1995;**35**(1):129–37. [MEDLINE: 7768760]
- Matsumoto 1991** *{published data only}*
Matsumoto T, Tanaka M, Ogata N, Kumazawa J and Collaborative Research Group. Efficacy of single-dose ciprofloxacin therapy for

- acute uncomplicated cystitis. *European Journal of Clinical Microbiology & Infectious Diseases* 1991;**430** - **Special Issue**:430.
- Menday 2000** *{published data only}*
Menday AP. Comparison of pivmecillinam and cephalexin in acute uncomplicated urinary tract infection. *International Journal of Antimicrobial Agents* 2000;**13**(3):183–7. [MEDLINE: 10724022]
- Minassian 1998** *{published data only}*
Minassian MA, Lewis DA, Chattopadhyay, Bovill B, Duckworth GJ, Williams JD. A comparison between single-dose fosfomicin trometamol (Monuril) and a 5-day course of trimethoprim in the treatment of uncomplicated lower urinary tract infection in women. *International Journal of Antimicrobial Agents* 1998;**10**(1):39–47. [MEDLINE: 9624542]
- Mompo 1986** *{published data only}*
Mompo JA, Gallego J, Boronat F, Martinez R, Gobernado M, Jimenez Cruz JF. Treatment with a single-dose antibiotic in non-complicated bacterial cystitis. Comparative study [Tratamiento con dosis unica de antimicrobiano en la cistitis bacteriana no complicada. Estudio comparativo]. *Actas Urologicas Espanolas* 1986;**10**(2):95–8. [MEDLINE: 3728123]
- Musierowicz 1980** *{published data only}*
Musierowicz A, Borowski J, Zaremba M, Prokopowicz, Darewicz J, Gruszecki W, et al. Clinical evaluation of a derivative of 6-beta-amidino penicillanic acid (preparation HX) in urinary tract infections [Ocena kliniczna pochodnej kwasu 6-beta-amidynopenicylanowego (preparatu HX) w zakazeniach ukladu moczowego]. *Polski Tygodnik Lekarski* 1980;**35**(27):1017–9. [MEDLINE: 6252549]
- Naber 2004** *{published data only}*
Naber KG, Allin DM, Clarysse L, Haworth DA, James IG, Raini C, et al. Gatifloxacin 400 mg as a single shot or 200 mg once daily for 3 days is as effective as ciprofloxacin 250 mg twice daily for the treatment of patients with uncomplicated urinary tract infections. *International Journal of Antimicrobial Agents* 2004;**23**(6):596–605. [MEDLINE: 15194131]
- Neringer 1992** *{published data only}*
Neringer R, Forgren A, Hansson C, Ode B. Lomefloxacin versus norfloxacin in the treatment of uncomplicated urinary tract infections: three-day versus seven-day treatment. The South Swedish Loxex Study Group. *Scandinavian Journal of Infectious Diseases* 1992;**24**(6):773–80. [MEDLINE: 1337623]
- Neu 1990** *{published data only}*
Neu HC. Fosfomicin trometamol versus amoxicillin - Single-dose multicenter study of urinary tract infections. *Chemotherapy* 1990;**36 Suppl**(1):19–23. [MEDLINE: 2085982]
- Norrby 1993** *{published data only}*
Norrby SR, O'Reilly T, Zak O. Efficacy of antimicrobial agent treatment in relation to treatment regimen: experimental models and clinical evaluation. *Journal of Antimicrobial Chemotherapy* 1993;**31 Suppl**(D):41–54. [MEDLINE: 8335523]
- Ode 1987** *{published data only}*
Ode B, Walder M, Forsgren A. Failure of a single dose of 100 mg ofloxacin in lower urinary tract infections in females. *Scandinavian Journal of Infectious Diseases* 1987;**19**(6):677–9. [MEDLINE: 3327150]
- Olsovsky 1988** *{published data only}*
Olsovsky Z, Nedbalek A, Herboczek K, Konecny J. Use of single and short-term therapy of non-complicated infections of the urinary pathways in routine practice [Vyuziti jednorazove a kratkokobe terapie nekomplikovanych infekci mocovych cest]. *Rozhledy V Chirurgii* 1988;**67**(10):688–93. [MEDLINE: 3206315]
- Onodera 1980** *{published data only}*
Onodera S. Clinical evaluation of cefatrizine for urinary tract infections (author's transl). *Japanese Journal of Antibiotics* 1980;**33**(4):510–3. [MEDLINE: 6997535]
- Oosterlinck 1980** *{published data only}*
Oosterlinck, Welvaert P, Verbaeys A, Schelfout W, Wijndaele JJ, De Maeyer P. Pipemidic acid: a new antibiotic for the urinary tract. A comparative, double-blind study of pipemidic acid and amoxicillin [L'acide pipémidique: un nouvel antibiotique des voies urinaires. Une étude comparative, en double-insu, entre l'acide pipémidique et l'amoxicilline]. *Acta Urologica Belgica* 1980;**48**(4):471–7. [MEDLINE: 7006346]
- Osterberg 1990** *{published and unpublished data}*
Österberg E, Aberg H, Hallander HO, Kallner A, Lundin A. Efficacy of single-dose versus seven-day trimethoprim treatment of cystitis in women: A randomized double-blind study. *Journal of Infectious Diseases* 1990;**161**(5):942–7. [MEDLINE: 2182732]
- Otieno 1988** *{published data only}*
Otieno LS, Kanja C. Trimethoprim (monotrim) compared with trimethoprim-sulphonamide in the treatment of bacterial urinary tract infection. *East African Medical Journal* 1988;**65**(1):18–21. [MEDLINE: 3046920]
- Patrick 1991** *{published data only}*
Patrick K, Kaplanski M, Trumble B, Pizzuti D, Cerruti R, St. Clair PJ. Randomized trial of single dose and multiple dose feroxacin versus ciprofloxacin for uncomplicated urinary tract infections [abstract]. *European Journal of Clinical Microbiology & Infectious Diseases* 1991;**10**(Special Issue):462–3.
- Pawelczyk 2002** *{published data only}*
Pawelczyk I, Grzyb M, Zelawski W, Wylezek D, Starzewski JJ, Kozera J. [Instillagel in prevention of postoperative urinary tract infection--randomized trial]. [Polish] [Instillagel w profilaktyce pooperacyjnych zakazen ukladu moczowego. Badanie randomizowane.]. *Wiadomosci Lekarskie* 2002;**55**(5-6):288–95. [MEDLINE: 22221545]
- Peddie 1981** *{published data only}*
Peddie BA, Little PJ, Piesse HP. Pivmecillinam in uncomplicated urinary tract infections in general practice. *New Zealand Medical Journal* 1981;**93**(678):109–11. [MEDLINE: 6267530]
- Petersen 1990** *{published data only}*
Petersen EE, Wingen F, Fairchild KL, Halfhide A, Hendrischk A, Links M, et al. Single dose pefloxacin compared with multiple dose cotrimoxazole in cystitis. *Journal of Antimicrobial Chemotherapy* 1990;**26 Suppl**(B):147–52. [MEDLINE: 2258341]
- Pfau 1984** *{published data only}*
Pfau A, Sacks TG, Shapiro A, Shapiro M. A randomized comparison of 1-day versus 10-day antibacterial treatment of documented lower urinary tract infection. *Journal of Urology* 1984;**132**(5):931–3. [MEDLINE: 6387183]

- Pitkääjärvi 1990** *{published data only}*
Pitkääjärvi T, Pyykönen ML, Kannisto K, Piippo T, Viita P. Pivmecillinam treatment in acute cystitis. Three versus seven days study. *Arzneimittel-Forschung* 1990;**40**(10):1156–8. [MEDLINE: 2291755]
- Polubiec 1988** *{published data only}*
Polubiec A, Weuta H, Stepka K, Ktos K, Strazynska R, Jorasz J. Bacterial infections of the lower urinary tract treated with ciprofloxacin or cefalexin - a comparative study. *Infection* 1988;**16** Suppl(1):62–4. [MEDLINE: 3286518]
- Pontzer 1983** *{published data only}*
Pontzer RE, Krieger RE, Boscia JA, McNamee W, Levison ME, Kaye D. Single-dose cefonicid therapy for urinary tract infections. *Antimicrobial Agents & Chemotherapy* 1983;**23**(6):814–6. [MEDLINE: 6555015]
- Porpacz 1984** *{published data only}*
Porpacz P. Cefotaxime in the treatment of urinary tract infections. *Journal of Antimicrobial Chemotherapy* 1984;**14** Suppl(B):311–5. [MEDLINE: 6094458]
- Prat 1986** *{published data only}*
Prat V, Horcickova M, Milotova Z, Matousovic K, Hatala M. The therapeutic effect of a single administration of 1g of cefotaxime in urinary tract infections [Lecebny ucinek jednorazoveho podani 1g cefotaximu pri infekci mocovych cest]. *Casopis Lekarů Ceskych* 1986;**125**(35):1097–9. [MEDLINE: 3757001]
- Prentice 1985** *{published data only}*
Prentice RD, Wu LR, Gehlbach SH, Hanlon JT, Clapp-Channing NE, Finn AL. Treatment of lower urinary tract infections with single-dose trimethoprim-sulfamethoxazole. *Journal of Family Practice* 1985;**20**(6):551–7. [MEDLINE: 3873511]
- Ranno 1986** *{published data only}*
Ranno S, Bellotti MG, Raimondi A, Minaldi G. Investigation of the therapeutic action of aztreonam in the treatment of acute and chronic urinary infections [Sutdio sull'attivita terapeutica dell'aztreonam nel trattamento delle infezioni urinarie acute e croniche]. *Minerva Urologica e Nefrologica* 1986;**38**(1):65–9. [EMBASE: 1986233148]
- Rapoport 1981** *{published and unpublished data}*
Rapoport J, Rees GA, Willmott NJ, Slack RCB, O'Grady FW. Treatment of acute urinary tract infection with three doses of co-trimoxazole. *British Medical Journal Clinical Research Ed* 1981;**283**(6302):1302–3. [MEDLINE: 6794832]
- Raz 1991** *{published data only}*
Raz R, Rottensterich E, Boger S, Potasman I. Comparison of single-dose administration and three-day course of amoxicillin with those of clavulanic acid for treatment of uncomplicated urinary tract infection in women. *Antimicrobial Agents & Chemotherapy* 1991;**35**(8):1688–90. [MEDLINE: 1929343]
- Reeves 1981** *{published data only}*
Reeves DS. Single dose treatment of urinary tract infections. *Lancet* 1981;**1**(8217):444. [MEDLINE: 6110075]
- Reynaert 1990** *{published data only}*
Reynaert J, Van Eyck D, Vandepitte J. Single dose fosfomycin trometamol versus multiple dose norfloxacin over three days for uncomplicated UTI in general practice. *Infection* 1990;**18** Suppl(2):77–9. [MEDLINE: 2286466]
- Richard 2002** *{published data only}*
Richard GA, Mathew CP, Kirstein JM, Orchard D, Yang JY. Single-dose fluoroquinolone therapy of acute uncomplicated urinary tract infection in women: results from a randomized, double-blind, multicenter trial comparing single-dose to 3-day fluoroquinolone regimens. *Urology* 2002;**59**(3):334–9. [MEDLINE: 21874689; : CN–00408507]
- Richards 1984** *{published data only}*
Richards HH. Comparative efficacy of 3-day and 7-day chemotherapy with twice-daily pivmecillinam in urinary tract infections seen in general practice. *Current Medical Research & Opinion* 1984;**9**(3):197–203. [MEDLINE: 6499513]
- Rosenstock 1985** *{published data only}*
Rosenstock J, Smith LP, Gurney M, Lee K, Weinberg WG, Longfield JN, et al. Comparison of single-dose tetracycline hydrochloride to conventional therapy of urinary tract infections. *Antimicrobial Agents & Chemotherapy* 1985;**27**(4):652–4. [MEDLINE: 3890732]
- Rubin 1980** *{published data only}*
Rubin RH, Fang LST, Jones SR, Munford RS, Slepach JM, Varga PA, et al. Single-dose amoxicillin therapy for urinary tract infection. Multicenter trial using antibody-coated bacteria localization technique. *JAMA* 1980;**244**(6):561–4. [MEDLINE: 6993706]
- Russ 1980** *{published and unpublished data}*
Russ GR, Mathew TH, Caon A. Single day or single dose treatment of urinary tract infection with co-trimoxazole. *Australian & New Zealand Journal of Medicine* 1980;**10**(6):604–7. [MEDLINE: 7011293]
- Saginur 1992** *{published data only}*
Saginur R, Nicolle LE. Single-dose compared with 3-day norfloxacin treatment of uncomplicated urinary tract infection in women. Canadian Infectious Diseases Society Clinical Trials Study Group. *Archives of Internal Medicine* 1992;**152**(6):1233–7. [MEDLINE: 1599352]
- Sanchez 1988** *{published data only}*
Sanchez IM. Treatment of acute urinary infection with the usual regimen and a single dose of antibiotic [Tratamiento de la infeccion urinaria aguda con esquema habitual y con dosis unica de antibiotico]. *Revista Medica de Chile* 1988;**116**(2):184–6. [MEDLINE: 3068759]
- Sandberg 1985** *{published data only}*
Sandberg T, Henning C, Iwarson S, Paulsen O. Cefadroxil once daily for three or seven days versus amoxycillin for seven days in uncomplicated urinary tract infections in women. *Scandinavian Journal of Infectious Diseases* 1985;**17**(1):83–7. [MEDLINE: 3887560]
- Savard-Fenton 1982** *{published data only}*
Savard-Fenton M, Fenton BW, Reller LB, Lauer BA, Byyny RL. Single-dose amoxicillin therapy with follow-up urine culture. Effective initial management for acute uncomplicated urinary tract infections. *American Journal of Medicine* 1982;**73**(6):808–13. [MEDLINE: 6924538]
- Schultz 1984** *{published data only}*
Schultz JH, McCaffrey LA, Keys TF, Nobrega FT. Acute cystitis: A prospective study of laboratory tests and duration of therapy. *Mayo Clinic Proceedings* 1984;**59**(6):391–7. [MEDLINE: 6427533]
- Sigurdsson 1983** *{published data only}*
Sigurdsson Jam Ahlmen J, Berglund L, Jerneck M, Larsson L, Lincoln K, Wohrm A, et al. Three-day treatment of acute lower urinary tract

- infections in women. A double-blind study with amoxicillin and cotrimazine. *Acta Medica Scandinavica* 1983;**213**(1):55–60. [MEDLINE: 6829321]
- Slade 1972** *{published data only}*
Slade N, Crowther ST. Multicentre survey of urinary tract infections in general practice. Clinical trial of single dose treatment with sulfametyprazine (Kelfizine-W). *British Journal of Urology* 1972;**44**(1):105–9. [MEDLINE: 4556420]
- Staszewska 1995** *{published data only}*
Staszewska Pistoni M, Dontas AS, Giamarellou H, Petrikkos G, Zorbas P. Effectiveness of ofloxacin therapy in preventing functional impairment and increased mortality in elderly patients with bacteriuria. *Drugs* 1995;**49** Suppl(2):374–5. [MEDLINE: 8549366]
- Stein 1987** *{published and unpublished data}*
Stein GE, Mummaw N, Goldstein EJC, Boyko EJ, Reller LB, Kurtz TO, et al. A multicenter comparative trial of three-day norfloxacin vs ten-day sulfamethoxazole and trimethoprim for the treatment of uncomplicated urinary tract infections. *Archives of Internal Medicine* 1987;**147**(10):1760–2. [MEDLINE: 3310941]
- Sturm 1984** *{published data only}*
Sturm AW. Trimethoprim in acute uncomplicated urinary tract infections; a single-dose administration or a 7-day course [Trimethoprim bij acute ongecompliceerde urineweginfecties; eenmaal toedienen of een kuur van zeven dagen]. *Nederlands Tijdschrift voor Geneeskunde* 1984;**128**(12):534–6. [MEDLINE: 6717617]
- Sutcliffe 1982** *{published data only}*
Sutcliffe PA. A comparison between a 3-day and a 5-day course of pivmecillinam as a treatment for acute lower urinary tract infections in general practice. *Current Medical Research & Opinion* 1982;**7**(9):563–8. [MEDLINE: 1982133536]
- Tolkoff-Rubin 1982** *{published data only}*
Tolkoff-Rubin NE, Weber D, Fang LST, Kelly M, Wilkinson R, Rubin RH. Single-dose therapy with trimethoprim-sulfamethoxazole for urinary tract infection in women. *Reviews of Infectious Diseases* 1982;**4**(2):444–8. [MEDLINE: 6981162]
- Trienekens 1993** *{published data only}*
Trienekens TAM, London NHHJ, Houben AW, Dejong RAM, Stobberingh EE. Treating acute urinary tract infections. An RCT of 3-day versus 7-day norfloxacin. *Canadian Family Physician* 1993;**39**:514–8. [MEDLINE: 8471899]
- UTI Study Group 1987** *{published data only}*
Anonymous. Coordinated multicenter study of norfloxacin versus trimethoprim-sulfamethoxazole treatment or symptomatic urinary tract infections. The Urinary Tract Infection Study Group. *Journal of Infectious Diseases* 1987;**155**(2):170–7. [MEDLINE: 2879872]
- van Balen 1990** *{published data only}*
van Balen FAM, Touw-Otten FWMM, de Melker RA. Single-dose pefloxacin versus five-days treatment with norfloxacin in uncomplicated cystitis in women. *Journal of Antimicrobial Chemotherapy* 1990;**26** Suppl(B):153–60. [MEDLINE: 2258342]
- van Pienbroek 1993** *{published data only}*
Van Pienbroek E, Hermans J, Kaptein AA, Mulder JD. Fosfomycin trometamol in a single dose versus seven days nitrofurantoin in the treatment of acute uncomplicated urinary tract infections in women. *Pharmacy World & Science* 1993;**15**(6):257–62. [MEDLINE: 8298585]
- Vogel 1984** *{published data only}*
Vogel R, Deane NB, Round EM, VandenBurg MJ, Currie WJC. Norfloxacin, amoxicillin, cotrimoxazole and nalidixic acid. A summary of 3-day and 7-day therapy studies in the treatment of urinary tract infections. *Journal of Antimicrobial Chemotherapy* 1984;**13** Suppl(B):113–20. [MEDLINE: 6234271]
- Winwick 1981** *{published data only}*
Winwick JG, Savage SJ. A comparison of a 3-day course of Mictral with a 7-day course of ampicillin in the treatment of urinary tract infection. *Journal of International Medical Research* 1981;**9**(1):58–61. [MEDLINE: 7202832]
- Zorbas 1995** *{published data only}*
Zorbas P, Giamarellou H, Staszewska-Pistoni M, Petrikkos G, Grammatikou M, Dontas AJ. Comparison of 2 oral ofloxacin regimens for the treatment of bacteriuria in elderly subjects. *Drugs* 1995;**49** Suppl(2):384–6. [MEDLINE: 8549370]

Additional references

- Abrutyn 1991**
Abrutyn E, Mossey J, Boscia J, Pitsakis P, Kaye D. Epidemiology of asymptomatic bacteriuria in elderly women. *Journal of the American Geriatrics Society* 1991;**39**(4):388–93. [MEDLINE: 2010589]
- Baldassarre 1991**
Baldassarre JS, Kaye D. Special problems of urinary tract infection in the elderly. *Medical Clinics of North America* 1991;**75**(2):375–90. [MEDLINE: 1996040]
- Berlin 1997**
Berlin JA. Does blinding of readers affect the results of meta-analyses?. *Lancet* 1997;**350**(9072):185–6. [MEDLINE: 9250191]
- Borrego 1997**
Borrego F, Gleckman R. Principles of antibiotic prescribing in the elderly. *Drugs & Aging* 1997;**11**(1):7–18. [MEDLINE: 9237037]
- Childs 1996**
Childs SJ, Egan RJ. Bacteriuria and urinary infections in the elderly. *Urologic Clinics of North America* 1996;**23**(1):43–54. [MEDLINE: 8677536]
- Compendium 1998**
Anonymous. *Compendium Suisse des Médicaments*. Basel: Documed, 1998.
- Dickersin 1994**
Dickersin K, Scherer R, Lefebvre C. Identifying relevant studies for systematic reviews. *BMJ* 1994;**309**(6964):1286–91. [MEDLINE: 7718048]
- Emori 1991**
Emori TG, Banerjee SN, Culver DH, Gaynes RP, Horan TC, Edwards JR, et al. Nosocomial Infections in elderly patients in the United States, 1986-1990. *American Journal of Medicine* 1991;**91** Suppl(3B):289–93. [MEDLINE: 1928180]
- Ewer 1988**
Ewer TC, Bailey RR, Gilchrist NL, Aitken JM, Sainsbury R. Comparative study of norfloxacin and trimethoprim for the treatment of elderly patients with urinary tract infection. *New Zealand Medical Journal* 1988;**1101**(852):537–9. [MEDLINE: 3045717]

Gallacher 1986

Gallacher G, Erwin L, Scott PJ, Sleigh JD. Augmentin (amoxicillin-clavulanic acid) compared with amoxicillin alone in the treatment of urinary tract infections in the elderly. *Journal of Infection* 1986;**12**(3):229–33. [MEDLINE: 3522749]

Goessens 2007

Goessens WH, Verbrugh HA. Antibiotic resistance: epidemiological developments and preventive measures. *Ned Tijdschr Geneesk* 2007;**151**(13):748–52. [MEDLINE: 17471776]

Harding 1991

Harding GK, Nicolle LE, Ronald AR, Preiksaitis JK, Forward KR, Low DE, et al. How long should catheter-acquired urinary tract infection in women be treated? A randomized controlled study. *Annals of Internal Medicine* 1991;**114**(9):713–9. [MEDLINE: 2012351]

Higgins 2003

Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ* 2003;**327**(7414):557–60. [MEDLINE: 12958120]

Hooton 1995

Hooton TM, Winter C, Tiu F, Stamm WE. Randomized comparative trial and cost analysis of 3-day antimicrobial regimens for treatment of acute cystitis in women. *JAMA* 1995;**273**(1):41–5. [MEDLINE: 7654268]

Humbert 1992

Humbert G. French consensus on antibiotherapy of urinary tract infections. *Infection* 1992;**20 Suppl**(3):171–2. [MEDLINE: 1490744]

Jonsson 1990

Jonsson M, Englund G, Norgard K. Norfloxacin vs. pivmecillinam in the treatment of uncomplicated lower urinary tract infections in hospitalized elderly patients. *Scandinavian Journal of Infectious Diseases* 1990;**22**(3):339–44. [MEDLINE: 2196670]

Kasviki-Charvati 1982

Kasviki-Charvati P, Drolette-Kefakis B, Papanayiotou PC, Dontas AS. Turnover of bacteriuria in old age. *Age & Ageing* 1982;**11**(3):169–74. [MEDLINE: 6981920]

Kaye 1980

Kaye D. Urinary tract infections in the elderly. *Bulletin of the New York Academy of Medicine* 1980;**56**(2):209–20. [MEDLINE: 6929194]

Kunin 1987

Kunin MC. *Detection, prevention and management of urinary tract infections*. Philadelphia: Lea & Febiger, 1987.

Lutters 2000

Lutters M, Vogt N. What's the basis for treating infections your way? Quality assessment of review articles on the treatment of urinary and respiratory tract infections in older people. *Journal of the American Geriatrics Society* 2000;**48**(11):1454–61. [MEDLINE: 1108323]

McCue 1992

McCue JD. Antimicrobial therapy. *Clinics in Geriatric Medicine* 1992;**8**(4):925–45. [MEDLINE: 1423144]

Michel 1991

Michel JP, Lesourd B, Conne P, Richard D, Rapin CH. Prevalence of infections and their risk factors in geriatric institutions: a one-day multicentre survey. *Bulletin of the World Health Organization* 1991;**69**(1):35–41. [MEDLINE: 1905207]

Mulrow 1994

Mulrow CD, Oxman AD. *The Cochrane Handbook*. Vol. **Issue 4**, Oxford: The Cochrane Collaboration, 1997.

Naber 1990

Naber KG, Kumamoto Y. Summary of discussion for acute uncomplicated cystitis. Clinical evaluation of drug efficacy in UTI. Proceedings of the First International Symposium, 27–28 October 1989, Tokyo, Japan. International Congress Series 938. Amsterdam: Excerpta Medica, 1990:230.

Nicolle 1983

Nicolle LE, Bjornson J, Harding GK, MacDonell JA. Bacteriuria in elderly institutionalized men. *New England Journal of Medicine* 1983;**309**(23):1420–5. [MEDLINE: 6633618]

Nicolle 1992

Nicolle LE. Urinary tract infection in the elderly. How to treat and when?. *Infection* 1992;**20 Suppl**(4):261–4.

Nicolle 1993

Nicolle LE. Urinary tract infections in long-term care facilities. *Infection Control & Hospital Epidemiology* 1993;**14**(4):220–5. [MEDLINE: 8478544]

Nicolle 1994

Nicolle LE. Urinary tract infection in the elderly. *Journal of Antimicrobial Chemotherapy* 1994;**33 Suppl**(A):99–109. [MEDLINE: 7928842]

Nolan 1988

Nolan L, O'Malley K. Prescribing for the elderly. Part I: Sensitivity of the elderly to adverse drug reactions. *Journal of the American Geriatrics Society* 1988;**36**(2):142–9. [MEDLINE: 3276767]

Norrby 1990

Norrby SR. Short-term treatment of uncomplicated lower urinary tract infections in women. *Reviews of Infectious Diseases* 1990;**12**(3):458–67. [MEDLINE: 2193352]

Norrby 1992

Norrby SR. Design of clinical trials in patients with urinary tract infections. *Infection* 1992;**20 Suppl**(3):181–8. [MEDLINE: 1490745]

Nygaard 1996

Nygaard IE, Johnson JM. Urinary tract infections in elderly women. *American Family Physician* 1996;**53**(1):175–82. [MEDLINE: 8546044]

Reid 1984

Reid G, Zorzotto ML, Bruce AW, et al. Pathogenesis of urinary tract infection in the elderly: The role of bacterial adherence to uroepithelial cells. *Current Microbiology* 1984;**11**(2):67–72. [EMBASE: 1985159608]

Rubin 1992

Rubin RH, Shapiro ED, Andriole VT, Davis RJ, Stamm WE. Evaluation of new anti-infective drugs for the treatment of urinary tract infection. *Clinical Infectious Diseases* 1992;**15 Suppl**(1):216–27. [MEDLINE: 1477233]

Sant 1987

Sant GR. Urinary tract infection in the elderly. *Seminars in Urology* 1987;**5**(2):126–33. [MEDLINE: 3296082]

Smith 1994

Smith MA, Duke WM. A retrospective review of nosocomial infections in an acute rehabilitative and chronic population at a large

skilled nursing facility. *Journal of the American Geriatrics Society* 1994;
42(1):45–9. [MEDLINE: 8277114]

Sobel 1990

Sobel JD, Kaye D. Urinary tract infections. In: Mandell GI, Douglas RG Jr, Bennett JE editor(s). *Principles and practice of infectious diseases*. New York: Churchill Livingstone, 1990:582–611.

Sourander 1972

Sourander LB, Kasanen A. A 5-year follow-up of bacteriuria in the aged. *Gerontologia Clinica* 1972;14(5):274–81. [MEDLINE: 4571598]

Stamm 1992

Stamm WE. Criteria for the diagnosis of urinary tract infection and for the assessment of therapeutic effectiveness. *Infection* 1992;20 Suppl(3):151–4. [MEDLINE: 1490740]

Stamm 1993

Stamm WE, Hooton TM. Management of urinary tract infections in adults. *New England Journal of Medicine* 1993;329(18):1328–34. [MEDLINE: 8413414]

Tam 2007

Tam VH, Fritsche TR, Deziel M, Liu W, Brown DL, Deshpande L, et al. Impact of drug-exposure intensity and duration of therapy

on the emergence of *Staphylococcus aureus* resistance to a quinolone antimicrobial. *Journal of Infectious Diseases* 2007;195(12):1818–27. [MEDLINE: 17492598]

Warren 1999

Warren JW, Abrutyn E, Hebel JR, Johnson JR, Schaeffer AJ, Stamm WE. Guidelines for antimicrobial treatment of uncomplicated acute bacterial cystitis and acute pyelonephritis in women. Infectious Diseases Society of America (IDSA). *Clinical Infectious Diseases* 1999;29(4):745–58. [MEDLINE: 10589881]

Winickoff 1981

Winickoff RN, Wilner SI, Gall G, Laage T, Barnett GO. Urine culture after treatment of uncomplicated cystitis in women. *Southern Medical Journal* 1981;74(2):165–9. [MEDLINE: 6781071]

Wood 1996

Wood CA, Abrutyn E. Optimal treatment of urinary tract infections in elderly patients. *Drugs & Aging* 1996;9(5):352–62. [MEDLINE: 8922562]

* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Andersen 1986

Methods	Multicentre, double-blind RCT
Participants	Ambulatory patients >15 years old with symptoms of lower UTI and significant bacteriuria
Interventions	Sulfamethizole 3 g single dose versus 2 x 1 g for 6 days
Outcomes	For subgroup ≥ 60: bacterial eradication after 8 days
Notes	Subgroup of patients > 60 years old

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Ferraro 1990

Methods	Open RCT Method of randomisation not specified
---------	---------------------------------------------------

Ferraro 1990 (Continued)

Participants	Age: > 50 Uncomplicated symptomatic lower UTI with $\geq 100,000$ bacteria/mL of germs susceptible to study drugs. Gender: 5/60 (25%) men
Interventions	Fosfomycin trometamol single dose 3 g versus norfloxacin 2 x 400 mg for 7 days
Outcomes	1. Bacterial eradication 2. Side effects

Notes

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Flanagan 1991

Methods	Open, single centre RCT
Participants	Hospitalised elderly women, with significant bacteriuria, without catheter
Interventions	single dose versus 7-10 days Various AB, if resistance \geq other antibiotic
Outcomes	1. Bacterial eradication rate for subgroup with urinary symptoms available 2. No clinical outcome

Notes

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	No	C - Inadequate

Gellermann 1988

Methods	Multicentre, open RCT
Participants	Women, outpatients, with acute lower uncomplicated UTI
Interventions	Ciprofloxacin single dose 1 x 250 mg versus 2 x 250 mg for 3 days
Outcomes	Bacterial eradication and clinical cure after 1 week and 4 weeks
Notes	Subgroup of patients > 65 years old

Gellermann 1988 (Continued)**Risk of bias**

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Guibert 1993

Methods	Multicentre, open RCT
Participants	Ambulatory women age > 50 with acute uncomplicated bacterial cystitis and positive dipstick test
Interventions	Pefloxacin 1 x 800 mg single dose versus 10 days norfloxacin 2 x 400 mg
Outcomes	<ol style="list-style-type: none"> 1. Bacterial eradication rate 2. Clinical cure 3. Side effects 4. Acceptability
Notes	Also data for patients over 75 years available, resistant bacteria excluded from efficacy evaluation

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Guibert 1996

Methods	Multicentre, open RCT Concealment by telephone
Participants	Ambulatory women > 18, with acute uncomplicated cystitis + positive dipstick test and urinary culture
Interventions	Pefloxacin 800 mg single dose versus 3-day lomefloxacin, 1 x 400 mg
Outcomes	For subgroup ≥ 50 <ol style="list-style-type: none"> 1. Bacterial eradication 2. acceptability 3. Side effects
Notes	Subgroup of patients ≥ 50 years old

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Yes	A - Adequate

Guibert 1997

Methods	Multicentre, open RCT Concealment by telephone
Participants	Ambulatory women > 18, with acute recurrent uncomplicated cystitis + positive dipstick test
Interventions	Lomefloxacin 1x 400mg 3 days versus norfloxacin 2x 400mg, 10 days
Outcomes	for subgroup ≥ 50 : acceptability
Notes	Subgroup of patients ≥ 50 years old

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Yes	A - Adequate

Jardin 1990

Methods	Multicentre, open RCT
Participants	Women, outpatients, with symptoms of uncomplicated lower UTI and significant bacteriuria
Interventions	Fosfomycin trometamol 3 g single dose versus pipemidic acid 2 x 400 mg 5 days
Outcomes	Bacterial eradication at 5-10 days and 28 days post treatment
Notes	Subgroup of patients ≥ 58 years old

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Lacey 1981

Methods	Multicentre single-blind RCT
Participants	Elderly patients (age 63-97, men: 33/96), with UTI: 2 urine cultures with significant bacteriuria, susceptible to trimethoprim, and significant pyuria (> 100 pus cells /mm ³)
Interventions	Trimethoprim 2 x 100 mg single dose versus 2 x 200 mg for 5 days
Outcomes	1. Bacterial eradication rate 2. Side effects 3. Selection of resistance Time points: 1 and 2 weeks post treatment

Lacey 1981 (Continued)

Notes	Catheter 35% symptoms ? Complicated UTI?
-------	---------------------------------------------

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Matsumoto 1994

Methods	Open RCT
Participants	Women, 18-69, with acute uncomplicated cystitis
Interventions	Isepamicin 400mg single dose versus ofloxacin 2x 200mg for 3 days
Outcomes	Clinical cure at 5 days post treatment
Notes	Subgroup of patients ≥ 50 or postmenopausal women

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Piipo 1990

Methods	Double blind RCT, 2 centres
Participants	Female outpatients, 18-80 years old, with acute lower uncomplicated UTI ($\geq 100,000$ cfu/mL)
Interventions	Norfloxacin 2 x 400 mg for 3 days versus 7 days
Outcomes	Accumulated bacterial eradication rate (day 3 to day 45)
Notes	Subgroup of patients > 65 years All initial bacteria sensitive to norfloxacin.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Yes	A - Adequate

Raz 1996

Methods	Single centre, open RCT
Participants	Postmenopausal ambulatory women with lower UTI: pyuria (> 8 WBC/field) + positive urine culture (\geq 100,000 cfu/mL) sensitive to antibiotics. Mean age: 66
Interventions	Ofloxacin 1 x 200 mg 3 days versus cefalexin 4 x 500 mg 7 days
Outcomes	<ol style="list-style-type: none">1. Bacterial eradication2. Short/long term3. Resolution of symptoms4. Adverse drug reactions
Notes	Age range unknown

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Stein 1992

Methods	Multicentre double-blind RCT
Participants	Ambulatory women \geq 18 years, with symptoms of lower UTI, pyuria (> 5 WBC/field), \geq 10,000 cfu/mL susceptible to both drugs
Interventions	Temafloxacin 1 x 400 mg 3 days versus ciprofloxacin 2 x 250 mg for 7 days
Outcomes	<ol style="list-style-type: none">1. Bacterial eradication2. Clinical cure3. Side effects
Notes	Clinical cure rate subgroup of patients \geq 65 years, no raw data available, resistant bacteria excluded from efficacy analysis Clinical cure rate subgroup of patients 65 years, no raw data available, resistant bacteria excluded from efficacy analysis

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Yes	A - Adequate

van Merode 2005

Methods	Multicentre single-blind (physicians) RCT
Participants	Ambulatory women (GPs) 13-77 years with symptoms of lower UTI
Interventions	Trimethoprim (dosage?) 3 days versus 5 days
Outcomes	<ol style="list-style-type: none">1. Bacterial cure2. Self-stated clinical cure rate3. Trimethoprim-resistant bacteria
Notes	Subgroup of patients 60 years old

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Unclear	B - Unclear

Vogel 2004

Methods	Multicentre double-blind RCT
Participants	Hospitalised and ambulatory women ≥ 65 years with at least 1 symptom of lower UTI and bacteriuria $\geq 100,000$ cfu/mL
Interventions	Ciprofloxacin 2 x 250 mg P.O. 3 days versus 7 days
Outcomes	<ol style="list-style-type: none">1. Bacterial eradication at 2 days after end of treatment and at 6 weeks2. Clinical cure3. Side effects
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment??	Yes	A - Adequate

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Abadi 1986	Unable to separate/determine population group/s included in this study
Abadi 1987	Unable to separate/determine population group/s included in this study
Abbas 1984	No control group
Allgulander 1979	All groups 14-day treatment
Ancill 1987	Both groups 7-day treatment
Anderson 1979	Unable to separate/determine population group/s included in this study
Anderson 1980	Leading article, no trial
Andrewes 1981	All groups 7-day treatment
Aragones 1990	Unable to separate/determine population group/s included in this study
Arredondo 2004	Pre-menopausal women
Auquer 2002	Two different antibiotics, two different treatment durations, population ranged from 18-65 years and unable to separate data
Backhouse 1989	Unable to separate/determine population group/s included in this study
Bailey 1977	Age 16-56
Bailey 1978	Age 17-55, not only symptomatic lower UTI, but also asymptomatic and upper UTI
Bailey 1980	Age 17-64, majority < 21 years old
Bailey 1982	Unable to separate/determine population group/s included in this study
Bailey 1984	Age 18-55
Bailey 1985a	Not RCT
Bailey 1985b	Unable to separate/determine population group/s included in this study
Basista 1991	Unable to separate/determine population group/s included in this study
Bergan 1990	Healthy volunteers, no control
Bitsch 1985	Unable to separate/determine population group/s included in this study
Boerema 1990	Age 16-50
Bordier 1978	All groups 10-day treatment
Brosof 1980	Unable to separate/determine population group/s included in this study
Brouhard 1981	Not RCT
Brumfitt 1993	The trial included only 10 patients over 50 years old. Details on these patients were not available

(Continued)

Study	Reason for exclusion
Buckwold 1982	All groups single dose
Capalbi 1987	All groups 7-day treatment, age 16-63
Capri 1991	Not RCT
Carmignani 2005	Complicated UTI, mixed population
Charlton 1976	Not RCT, treatment assigned according to the month (odd- or even-numbered) the patient attended the doctor
Charlton 1981	Not RCT, treatment assigned according to the month (odd- or even-numbered) the patient attended the doctor
Cheung 1988	Not RCT, both groups 7-day treatment
Compton 1983	Not RCT "Treatment was alternated from one woman to the next as the woman entered the study".
Cooper 1990a	Unable to separate/determine population group/s included in this study
Cooper 1990b	Unable to separate/determine population group/s included in this study
Cosmi 1996	Unable to separate/determine population group/s included in this study
Counts 1982	Unable to separate/determine population group/s included in this study
Cox 1992	Unable to separate/determine population group/s included in this study
Craft 1991	Unable to separate/determine population group/s included in this study
Crocchiolo 1990	Unable to separate/determine population group/s included in this study
Daengsvang 1990	Unable to separate/determine population group/s included in this study
de Almeida 1994	Unable to separate/determine population group/s included in this study
de Jong 1991	Unable to separate/determine population group/s included in this study
del Rio 1996	Unable to separate/determine population group/s included in this study
Dickie 1986	No control group
Dickreuter 1984	Unable to separate/determine population group/s included in this study
Dubois 1984	Age 18-45
Elhanan 1994	Unable to separate/determine population group/s included in this study
Fair 1980	Unable to separate/determine population group/s included in this study
Fairley 1970	Recurrent UTI, age 18-65
Falck 1984	All groups 3 days, not different duration
Falck 1988	Unable to separate/determine population group/s included in this study
Fang 1978	Age 18-54

(Continued)

Study	Reason for exclusion
Ferry 2007	Different durations with different doses (200mg x 3 x 7days versus 200mg x 2 x 7 days versus 400mg x 2 x 7 days)
Fihn 1988	None of the participants were over age of 65 (email from the author)
Fischer 1982	Both groups 10-day treatment
Flavell-Matts 1985	Both groups 7-day treatment
Fünfstück 1990	Chronic pyelonephritis
Gallego Gomez 1987	Both groups 10-day treatment
Gippert 1981	All groups 7-day treatment
Gordin 1987	Age 17-63, mostly young women
Gordon 1978	Both groups same treatment duration (≥ 5 days)
Gossius 1984a	Age 16-60
Gossius 1984b	Age 16-60
Gossius 1986	Age 16-60
Goto 1999	Unable to separate/determine population group/s included in this study
Greenberg 1981	Trial included mostly young adult females who were sexually active, most patients were less than 60 years (author's information)
Greenberg 1986	Trial included mostly young adult females who were sexually active, most patients were less than 60 years (author's information)
Greenwood 1994	Not RCT
Grüneberg 1967	Unable to separate/determine population group/s included in this study
Hansen 1981	Unable to separate/determine population group/s included in this study
Heer 1980	No control group
Henning 1981	Age 16-65, inclusion criteria: significant bacteriuria $\geq 10^8$
Henry 1999	Age range 18-64, mean age 34
Hill 1985	Both groups 10-day treatment
Hinnah 1991	Both groups single dose
Hoigne 1977	All groups ≥ 14 -day treatment
Hooton 1985	Age 18-56, all groups single dose
Hooton 1989	Unable to separate/determine population group/s included in this study
Hooton 1991	Students, mean age 25
Hoover 1982	Only young women
Hoyme 1993	Unable to separate/determine population group/s included in this study
Huang 2002	Study is not on uncomplicated UTI or treatment duration
Humbert 1987	Review article
Iravani 1985	College women, mean age 22

Iravani 1989	College women, mean age 22 and 23 respectively
Iravani 1991a	Unable to separate/determine population group/s included in this study
Iravani 1991b	Unable to separate/determine population group/s included in this study
Iravani 1993	Unable to separate/determine population group/s included in this study
Iravani 1995	Unable to separate/determine population group/s included in this study
Iravani 1999	Unable to separate/determine population group/s included in this study
Ishihara 1998	Unable to separate/determine population group/s included in this study
Johansen 1981	All groups 10-day treatment
Jones 1983	Unable to separate/determine population group/s included in this study
Jordan 1986	Not RCT
Khatib 1981	Age 14-57
Kirby 1984	No control group
Kiyota 1992	Unable to separate/determine population group/s included in this study
Kosmidis 1988	Both groups single dose, age 18-50
Koyama 2000	Unable to separate/determine population group/s included in this study
Kumamoto 1992	No control groups, 5 trials, all single dose
Källenius 1979	Girls 6-14 years
Lecomte 1991	Review article
Leelarasamee 1995	No patients > 60 included (email from the author)
Leigh 1980	Unable to separate/determine population group/s included in this study
Lewis 1980	Dose comparison, same treatment duration, also patients with upper UTI
Lightstone 1988	Unable to separate/determine population group/s included in this study
Lockey 1980	Unable to separate/determine population group/s included in this study
Ludwig 1987	Unable to separate/determine population group/s included in this study
Mabeck 1980a	All groups same duration
Mabeck 1980b	All groups 1-week treatment
Mallo 1979	No control group
Marsh 1980	Age 15-55
Martin 1983	Both groups 7-day treatment
Masterton 1995	Unable to separate/determine population group/s included in this study
Matsumoto 1991	Unable to separate/determine population group/s included in this study

(Continued)

Study	Reason for exclusion
Menday 2000	Unable to separate/determine population group/s included in this study
Minassian 1998	Age 18-65, mean age 40
Mompo 1986	Both groups single dose
Musierowicz 1980	No control group
Naber 2004	Population of women > 18 years, no separation based on age
Neringer 1992	Age 18-65, mean age 39
Neu 1990	All groups single dose, no duration trial
Norrby 1993	Unable to separate/determine population group/s included in this study
Ode 1987	Unable to separate/determine population group/s included in this study
Olsovsky 1988	Unable to separate/determine population group/s included in this study
Onodera 1980	No control group (7-day treatment)
Oosterlinck 1980	All groups 15-day treatment, recurrent UTI
Osterberg 1990	Unable to separate/determine population group/s included in this study
Otieno 1988	All groups 7-day treatment, age 20-57
Patrick 1991	Unable to separate/determine population group/s included in this study
Pawelczyk 2002	Does not look at duration of antibiotics
Peddie 1981	Both groups 5-day treatment, age ?
Petersen 1990	Unable to separate/determine population group/s included in this study
Pfau 1984	Unable to separate/determine population group/s included in this study
Pitkääjärvi 1990	Age range 18-65, mean age 35
Polubiec 1988	All groups 10-day treatment
Pontzer 1983	Age 19-49 and 18-62 respectively
Porpaczy 1984	Unable to separate/determine population group/s included in this study
Prat 1986	No control group
Prentice 1985	Age 18-65, mean 27.2 years
Ranno 1986	No control group
Rapoport 1981	Letter from Dr Slack: elderly patients were excluded and the majority of patients were under 65 years
Raz 1991	Unable to separate/determine population group/s included in this study
Reeves 1981	Not RCT
Reynaert 1990	Unable to separate/determine population group/s included in this study
Richard 2002	Age group 18-88 years, unable to separate/obtain data on women over 60 years
Richards 1984	Age 18-55
Rosenstock 1985	Unable to separate/determine population group/s included in this study

Rubin 1980	Age 18-55
Russ 1980	Patients included without symptoms of UTI and with renalkidney transplantation, mean age unknown, raw data not available
Sagunur 1992	Unable to separate/determine population group/s included in this study
Sanchez 1988	Probably not randomised (randomisation not mentioned, both groups same size), very small subgroup of elderly patients (11)
Sandberg 1985	Unable to separate/determine population group/s included in this study
Savard-Fenton 1982	Unable to separate/determine population group/s included in this study
Schultz 1984	Age 18-55
Sigurdsson 1983	Both groups 3-day treatment
Slade 1972	Unable to separate/determine population group/s included in this study
Staszewska 1995	Duration > 14 days (3, 6, and 18 months), no information if patients had symptoms of UTI
Stein 1987	Unable to separate/determine population group/s included in this study
Sturm 1984	Only 2 patients > 60 years
Sutlieff 1982	Age 18-55
Tolkoff-Rubin 1982	Age 18-55
Trienekens 1993	Age 18-65
UTI Study Group 1987	All groups 7-day treatment
van Balen 1990	Unable to separate/determine population group/s included in this study
van Pienbroek 1993	Unable to separate/determine population group/s included in this study
Vogel 1984	Four trials: one: no control group, others: both groups same treatment duration
Winwick 1981	Age 18-65, mean age 38 and 30 respectively
Zorbas 1995	Only patients with asymptomatic bacteriuria included

DATA AND ANALYSES

Comparison 1. Single dose versus short-course treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Persistent UTI: short-term	5	356	Risk Ratio (M-H, Random, 95% CI)	2.01 [1.05, 3.84]
2 Persistent UTI: long-term	3	95	Risk Ratio (M-H, Random, 95% CI)	1.18 [0.59, 2.32]
3 Clinical failure (persistence of symptoms): short-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
4 Clinical failure (persistence of symptoms): long-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
5 Adverse drug reactions			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
6 Discontinuation due to adverse reactions			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
7 Reinfection rate: short-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
8 Reinfection rate: long-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
9 Acceptability (little or not satisfied with treatment)			Risk Ratio (M-H, Random, 95% CI)	Totals not selected

Comparison 2. Single dose versus long-course treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Persistent UTI: short-term	6	628	Risk Ratio (M-H, Random, 95% CI)	1.93 [1.01, 3.70]
2 Persistent UTI: long-term	5	523	Risk Ratio (M-H, Random, 95% CI)	1.28 [0.89, 1.84]
3 Clinical failure (persistence of symptoms): short-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
4 Clinical failure (persistence of symptoms): long-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
5 Adverse drug reactions	3	595	Risk Ratio (M-H, Random, 95% CI)	0.80 [0.45, 1.41]
6 Discontinuation due to adverse reactions	3	595	Risk Ratio (M-H, Random, 95% CI)	0.33 [0.01, 7.87]
7 Acceptability (little or not satisfied with treatment)			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
8 Reinfection rate: short-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
9 Reinfection rate: long-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected

Comparison 3. Short-course versus long-course treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Persistent UTI: short-term			Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 All trials	3	431	Risk Ratio (M-H, Random, 95% CI)	0.85 [0.29, 2.47]
1.2 Trials comparing the same antibiotic in each group	2	208	Risk Ratio (M-H, Random, 95% CI)	1.00 [0.12, 8.57]
2 Persistent UTI: long-term			Risk Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 All trials	3	470	Risk Ratio (M-H, Random, 95% CI)	0.85 [0.54, 1.32]
2.2 Trials comparing the same antibiotic in each group	2	247	Risk Ratio (M-H, Random, 95% CI)	1.18 [0.50, 2.81]
3 Clinical failure (persistence of symptoms): short-term			Risk Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 All trials	4	395	Risk Ratio (M-H, Random, 95% CI)	0.98 [0.62, 1.54]
3.2 Trials comparing the same antibiotic in each group	2	91	Risk Ratio (M-H, Random, 95% CI)	0.96 [0.27, 3.47]
4 Clinical failure (persistence of symptoms): long-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
5 Adverse drug reactions			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
6 Discontinuation due to adverse reactions	2	406	Risk Ratio (M-H, Random, 95% CI)	0.11 [0.01, 1.97]
7 Reinfection rate: short-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
8 Reinfection rate: long-term	2	405	Risk Ratio (M-H, Random, 95% CI)	1.30 [0.42, 4.01]
9 Acceptability (little or not satisfied with treatment)			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
10 Mean number of adverse events/patient (day 5)			Mean Difference (IV, Random, 95% CI)	Totals not selected
11 Mean number of adverse events/patient (day 9)			Mean Difference (IV, Random, 95% CI)	Totals not selected

Comparison 4. Single dose versus short-course or long-course treatment (3 to 14 days)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Persistent UTI: short-term			Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 All trials	8	809	Risk Ratio (M-H, Random, 95% CI)	1.51 [0.92, 2.49]
1.2 Trials comparing the same antibiotic in each group	4	162	Risk Ratio (M-H, Random, 95% CI)	1.87 [0.91, 3.83]
1.3 Hospital setting	2	114	Risk Ratio (M-H, Random, 95% CI)	2.57 [0.64, 10.37]
1.4 Ambulatory patients	2	48	Risk Ratio (M-H, Random, 95% CI)	1.35 [0.64, 2.86]
2 Persistent UTI: long-term			Risk Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 All trials	5	521	Risk Ratio (M-H, Random, 95% CI)	1.14 [0.80, 1.63]
2.2 Trials comparing the same antibiotic in each group	2	39	Risk Ratio (M-H, Random, 95% CI)	1.06 [0.50, 2.24]
3 Clinical failure (persistence of symptoms): short-term	2	411	Risk Ratio (M-H, Random, 95% CI)	1.91 [0.70, 5.19]

4 Clinical failure (persistence of symptoms): long-term			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
5 Adverse drug reactions	3	595	Risk Ratio (M-H, Random, 95% CI)	0.80 [0.45, 1.41]
6 Discontinuations due to adverse reactions	3	595	Risk Ratio (M-H, Random, 95% CI)	0.33 [0.01, 7.87]
7 Acceptability (little or not satisfied with treatment)	2	546	Risk Ratio (M-H, Random, 95% CI)	0.58 [0.27, 1.25]

Comparison 5. 3 days versus 5 days

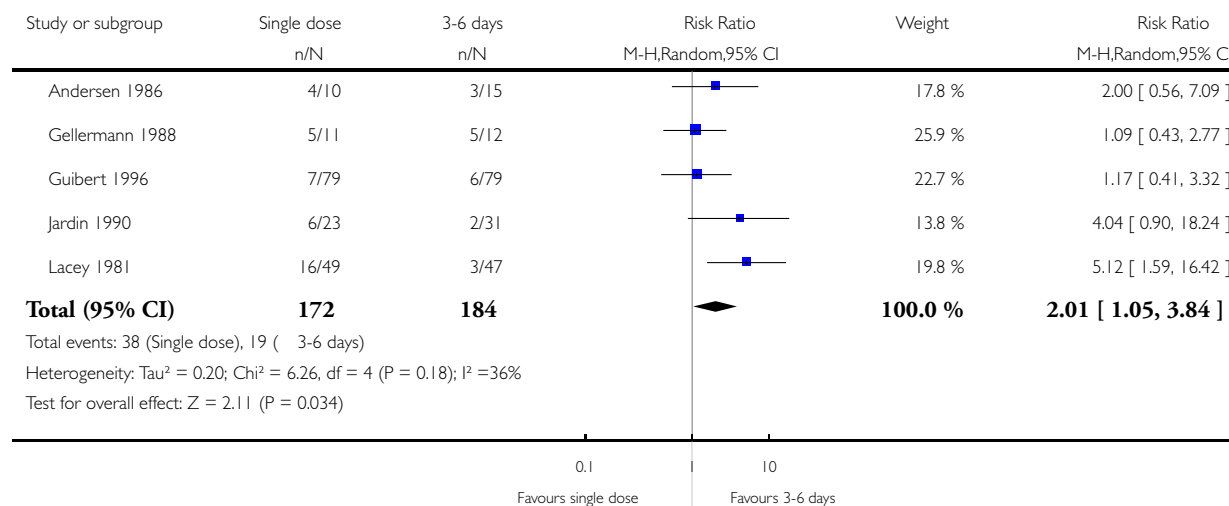
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Persistent UTI: short term (3 days after treatment)			Risk Ratio (M-H, Random, 95% CI)	Totals not selected
2 Clinical failure (not recovered): short term (3 days after treatment)			Risk Ratio (M-H, Random, 95% CI)	Totals not selected

Analysis 1.1. Comparison 1 Single dose versus short-course treatment, Outcome 1 Persistent UTI: short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 1 Single dose versus short-course treatment

Outcome: 1 Persistent UTI: short-term

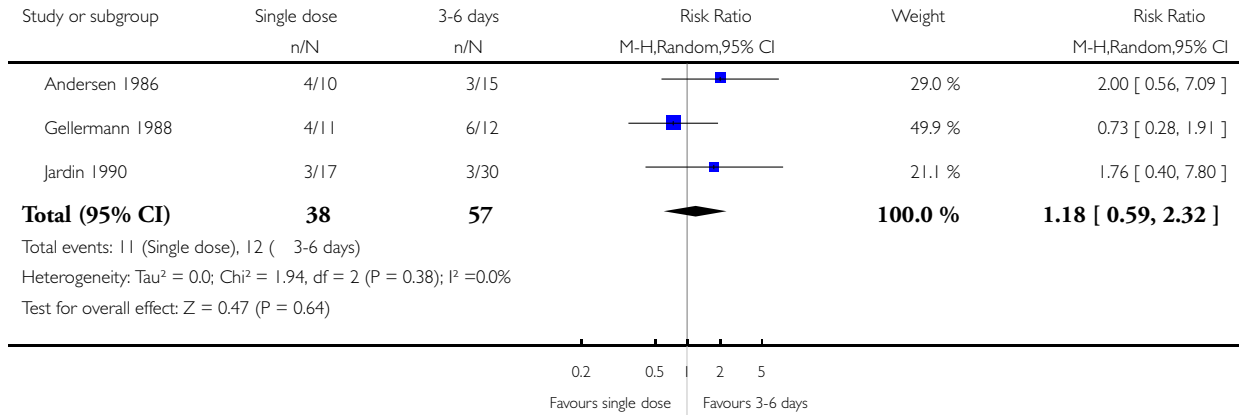


Analysis 1.2. Comparison 1 Single dose versus short-course treatment, Outcome 2 Persistent UTI: long-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 1 Single dose versus short-course treatment

Outcome: 2 Persistent UTI: long-term

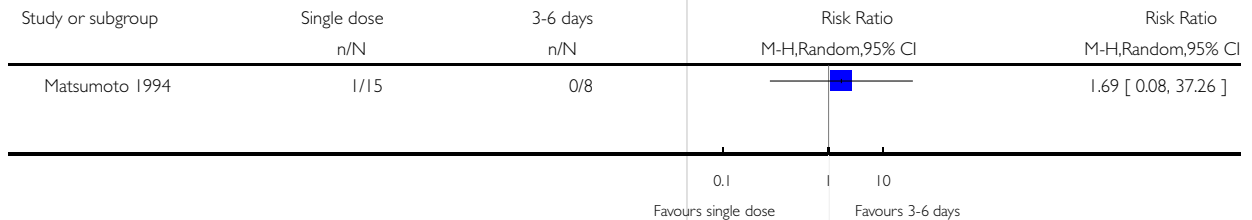


Analysis 1.3. Comparison 1 Single dose versus short-course treatment, Outcome 3 Clinical failure (persistence of symptoms): short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 1 Single dose versus short-course treatment

Outcome: 3 Clinical failure (persistence of symptoms): short-term

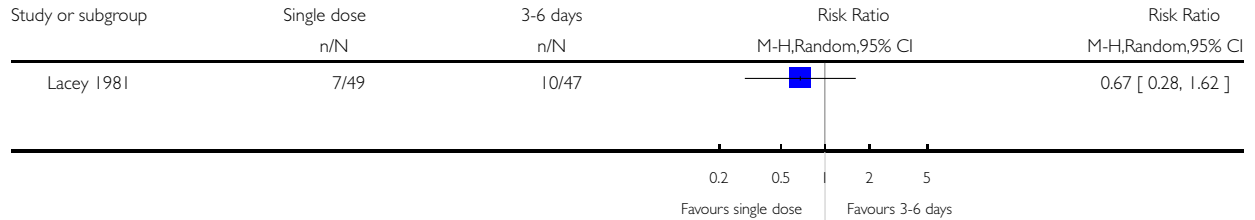


Analysis 1.7. Comparison 1 Single dose versus short-course treatment, Outcome 7 Reinfection rate: short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 1 Single dose versus short-course treatment

Outcome: 7 Reinfection rate: short-term

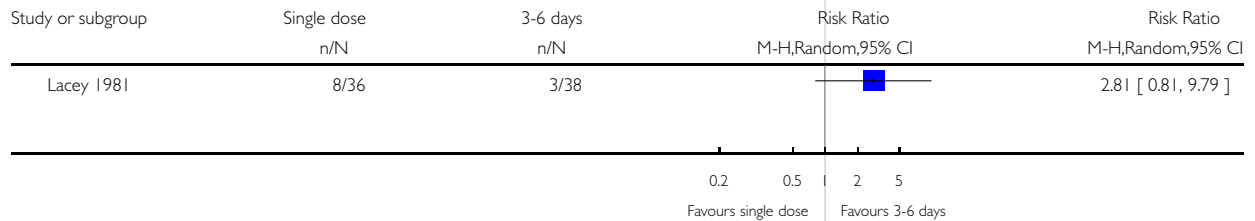


Analysis 1.8. Comparison 1 Single dose versus short-course treatment, Outcome 8 Reinfection rate: long-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 1 Single dose versus short-course treatment

Outcome: 8 Reinfection rate: long-term

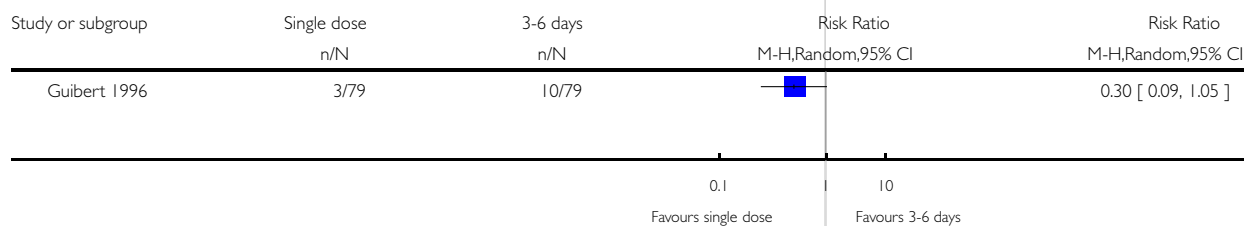


Analysis 1.9. Comparison 1 Single dose versus short-course treatment, Outcome 9 Acceptability (little or not satisfied with treatment).

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 1 Single dose versus short-course treatment

Outcome: 9 Acceptability (little or not satisfied with treatment)

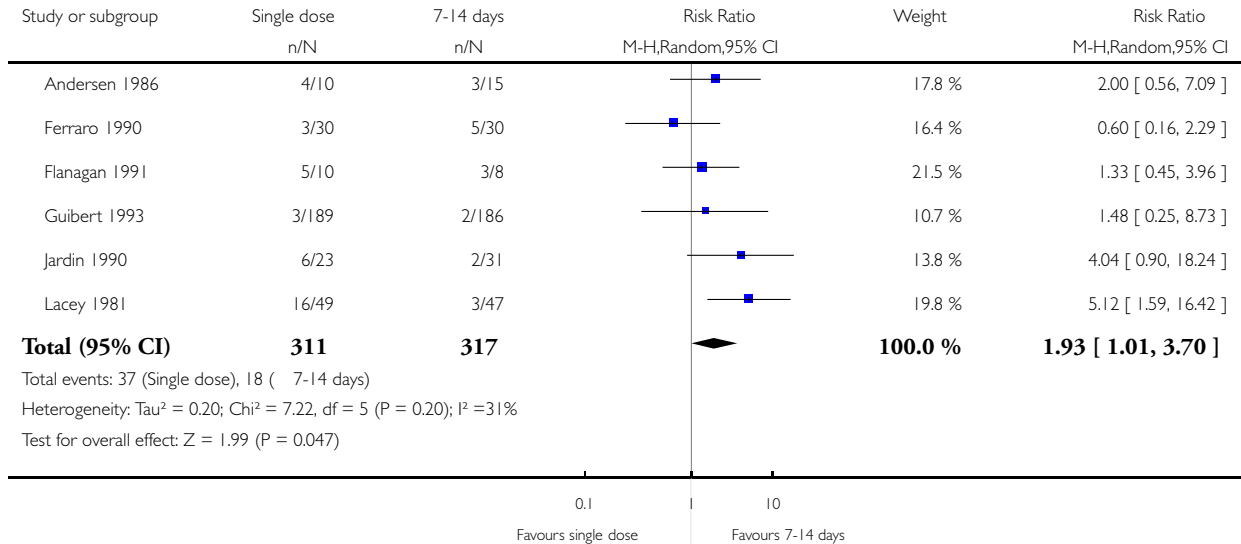


Analysis 2.1. Comparison 2 Single dose versus long-course treatment, Outcome 1 Persistent UTI: short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 2 Single dose versus long-course treatment

Outcome: 1 Persistent UTI: short-term

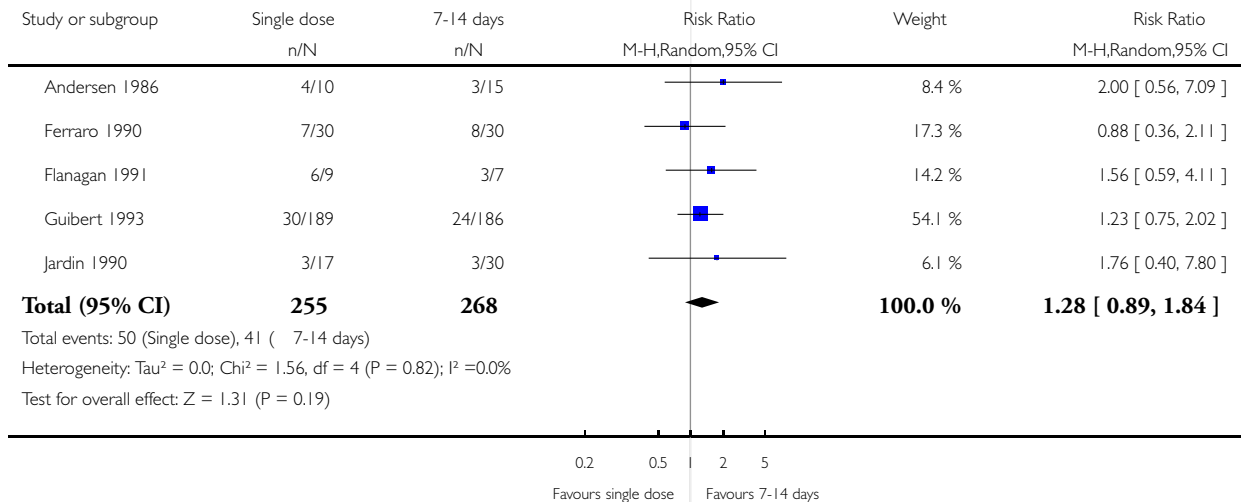


Analysis 2.2. Comparison 2 Single dose versus long-course treatment, Outcome 2 Persistent UTI: long-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 2 Single dose versus long-course treatment

Outcome: 2 Persistent UTI: long-term

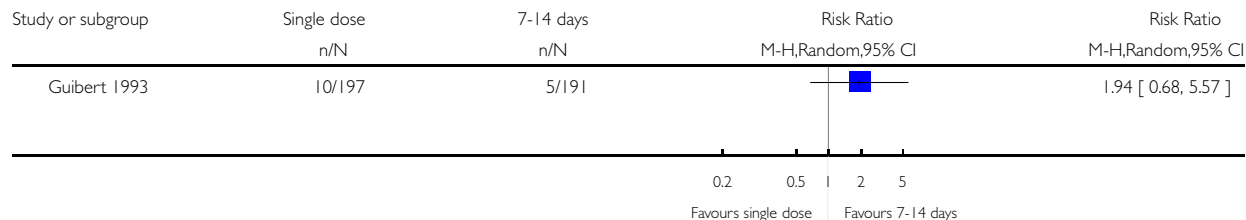


Analysis 2.3. Comparison 2 Single dose versus long-course treatment, Outcome 3 Clinical failure (persistence of symptoms): short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 2 Single dose versus long-course treatment

Outcome: 3 Clinical failure (persistence of symptoms): short-term

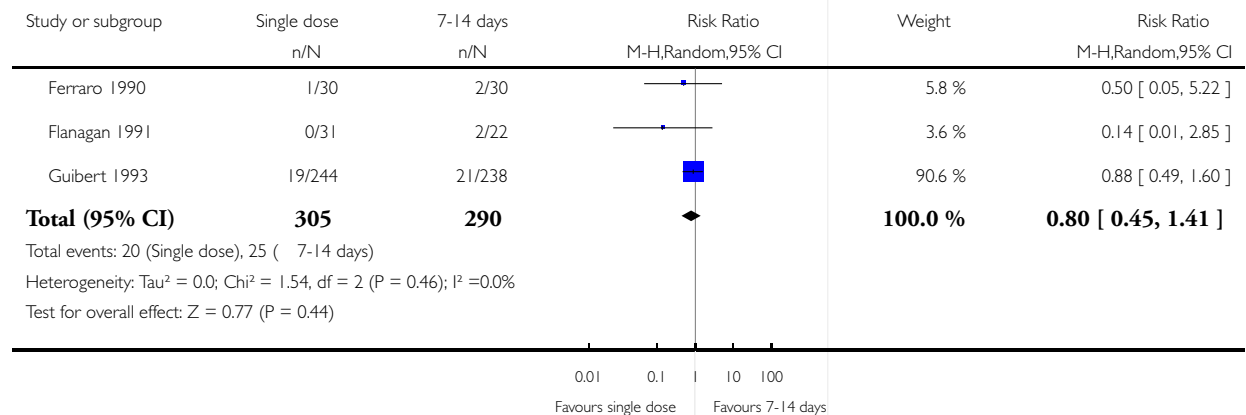


Analysis 2.5. Comparison 2 Single dose versus long-course treatment, Outcome 5 Adverse drug reactions.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 2 Single dose versus long-course treatment

Outcome: 5 Adverse drug reactions

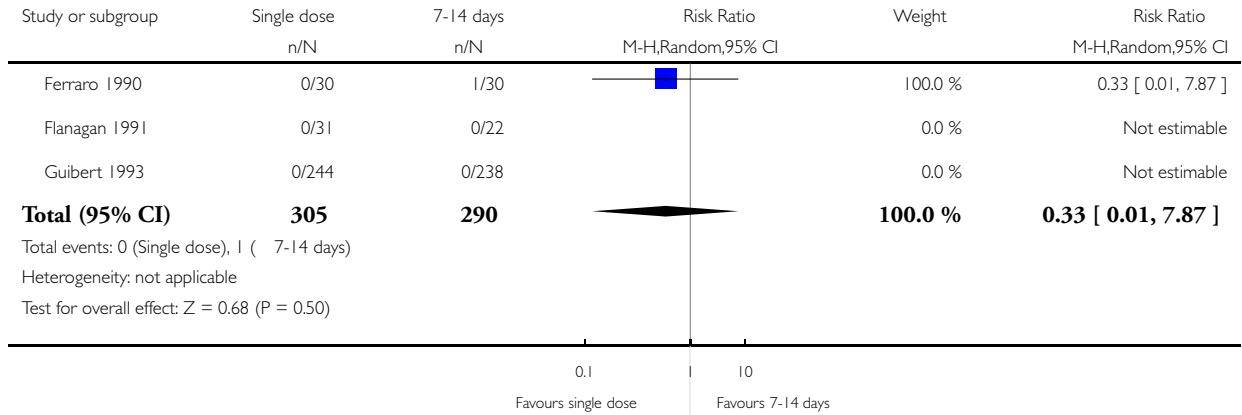


Analysis 2.6. Comparison 2 Single dose versus long-course treatment, Outcome 6 Discontinuation due to adverse reactions.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 2 Single dose versus long-course treatment

Outcome: 6 Discontinuation due to adverse reactions

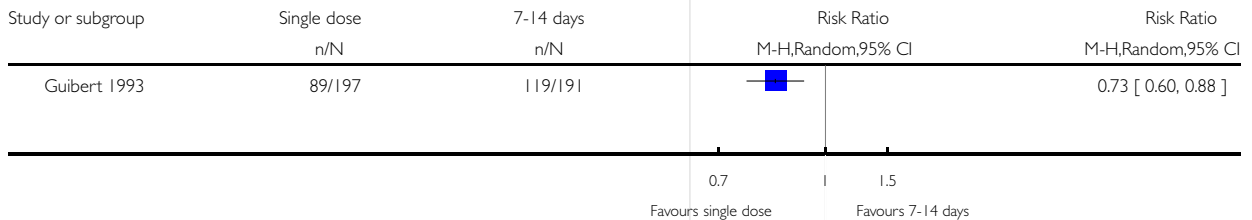


Analysis 2.7. Comparison 2 Single dose versus long-course treatment, Outcome 7 Acceptability (little or not satisfied with treatment).

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 2 Single dose versus long-course treatment

Outcome: 7 Acceptability (little or not satisfied with treatment)

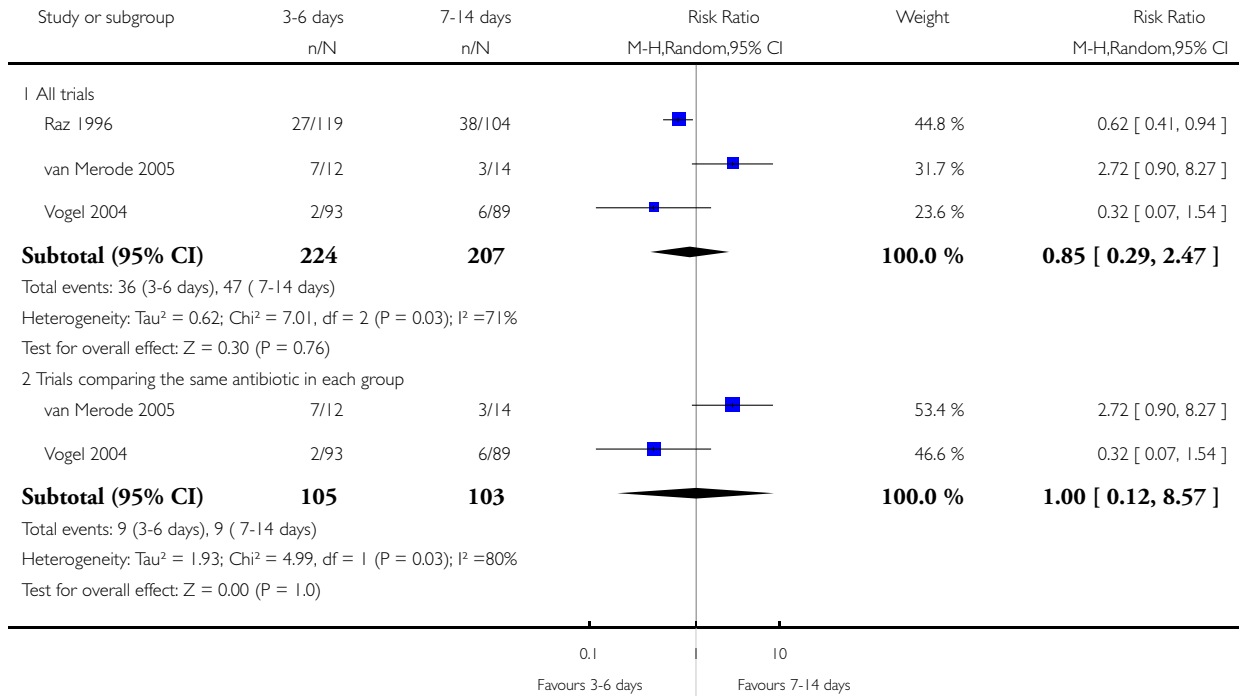


Analysis 3.1. Comparison 3 Short-course versus long-course treatment, Outcome 1 Persistent UTI: short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

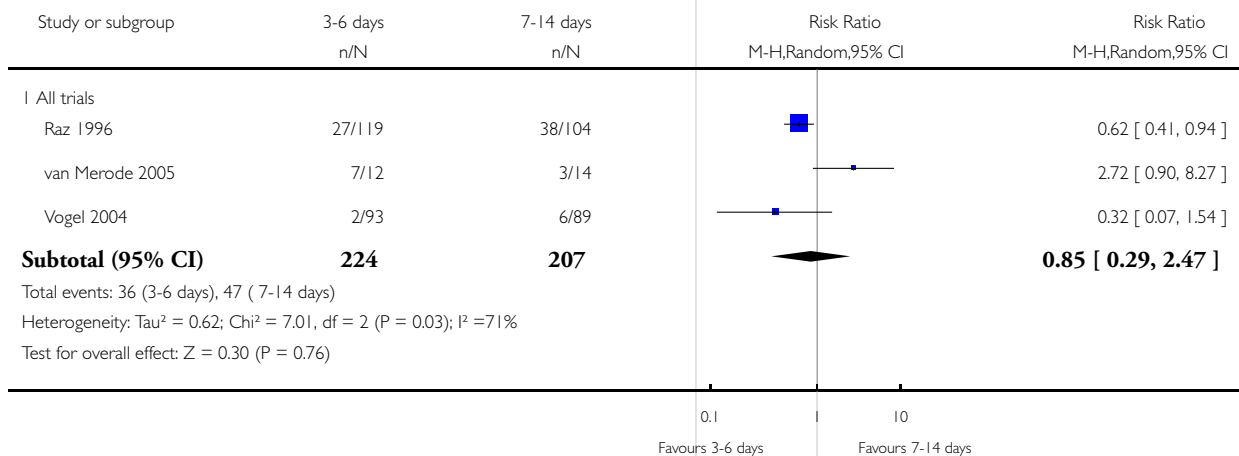
Outcome: 1 Persistent UTI: short-term



Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

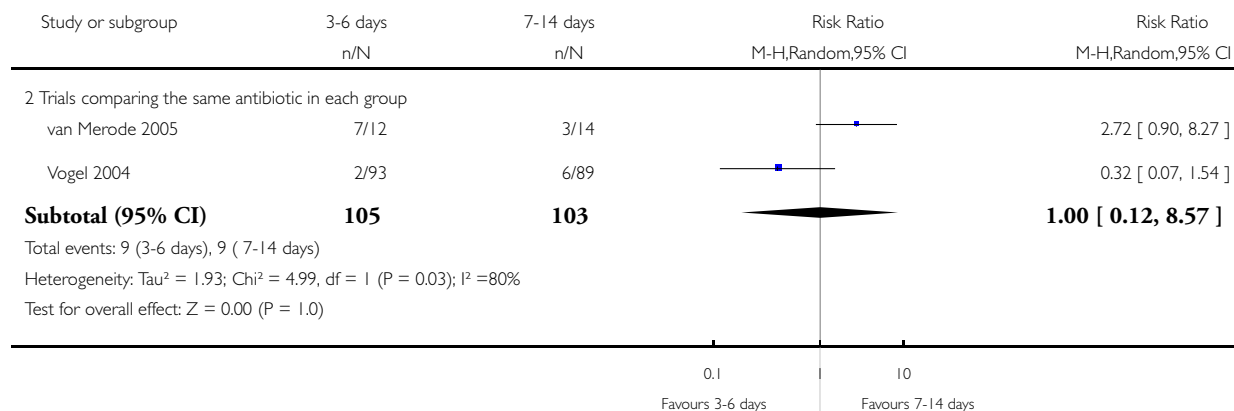
Outcome: 1 Persistent UTI: short-term



Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

Outcome: 1 Persistent UTI: short-term

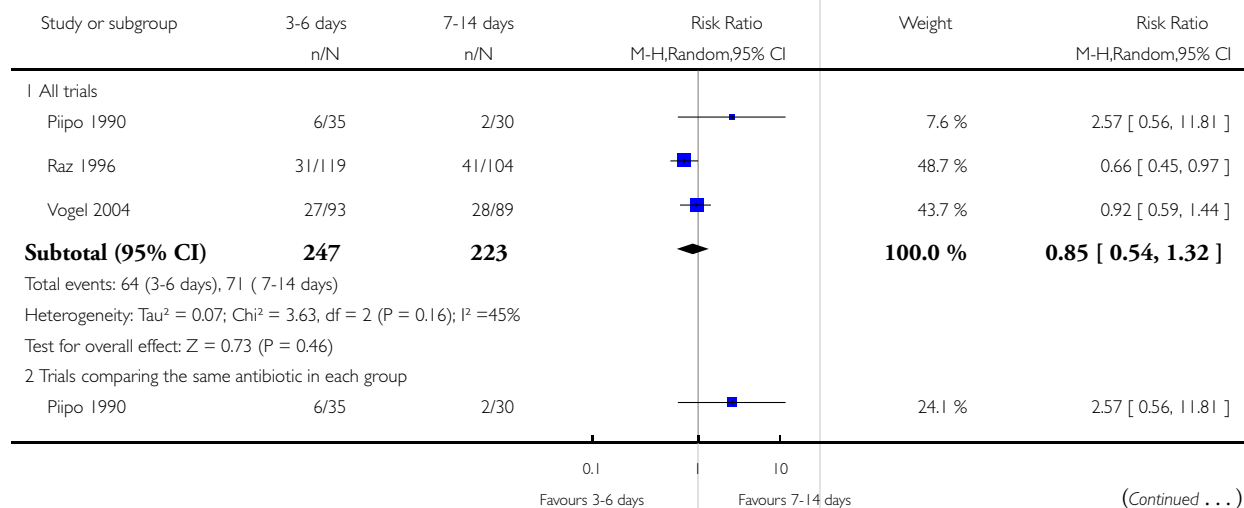


Analysis 3.2. Comparison 3 Short-course versus long-course treatment, Outcome 2 Persistent UTI: long-term.

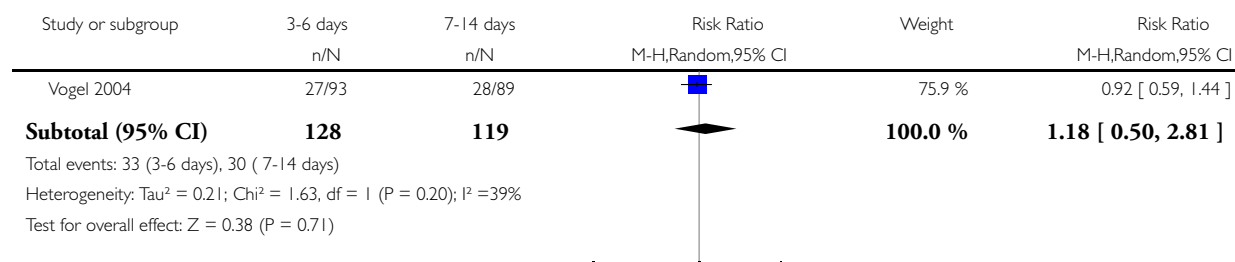
Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

Outcome: 2 Persistent UTI: long-term

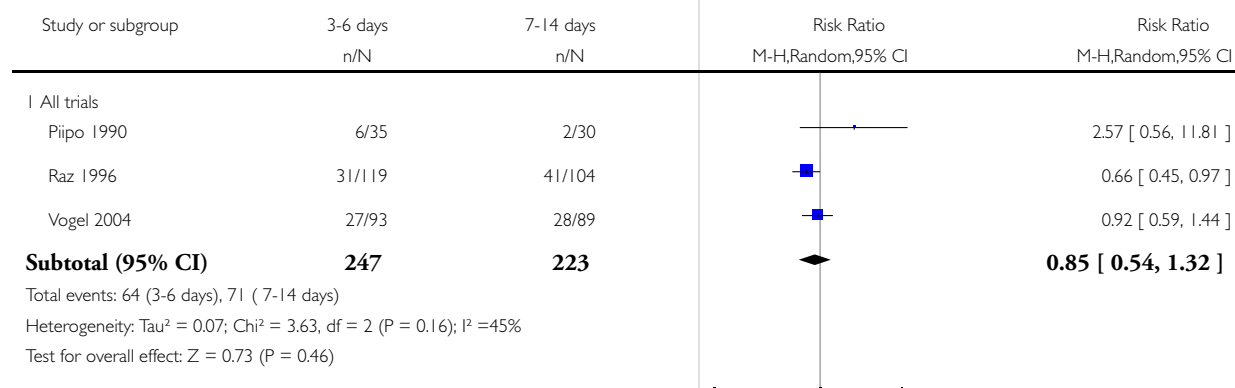


(... Continued)



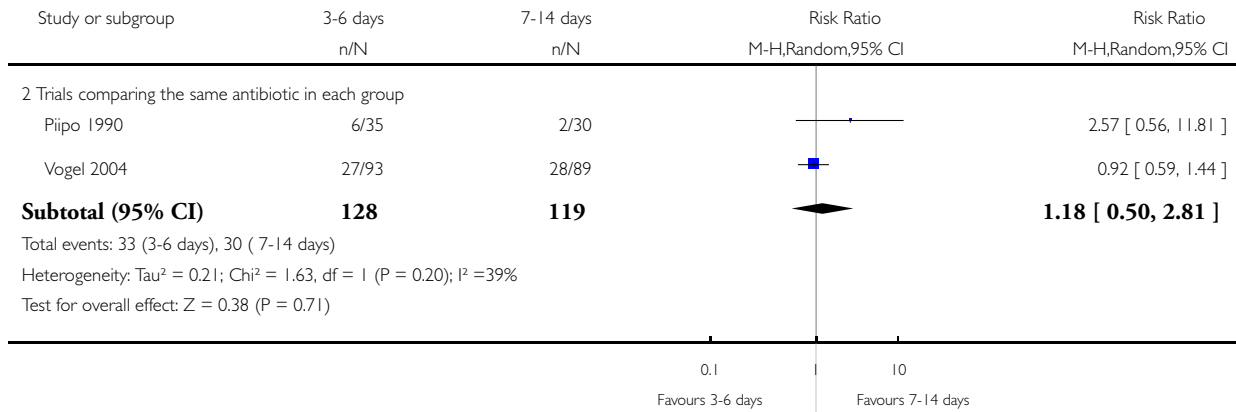
0.1 Favours 3-6 days | 10 Favours 7-14 days

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
Comparison: 3 Short-course versus long-course treatment
Outcome: 2 Persistent UTI: long-term



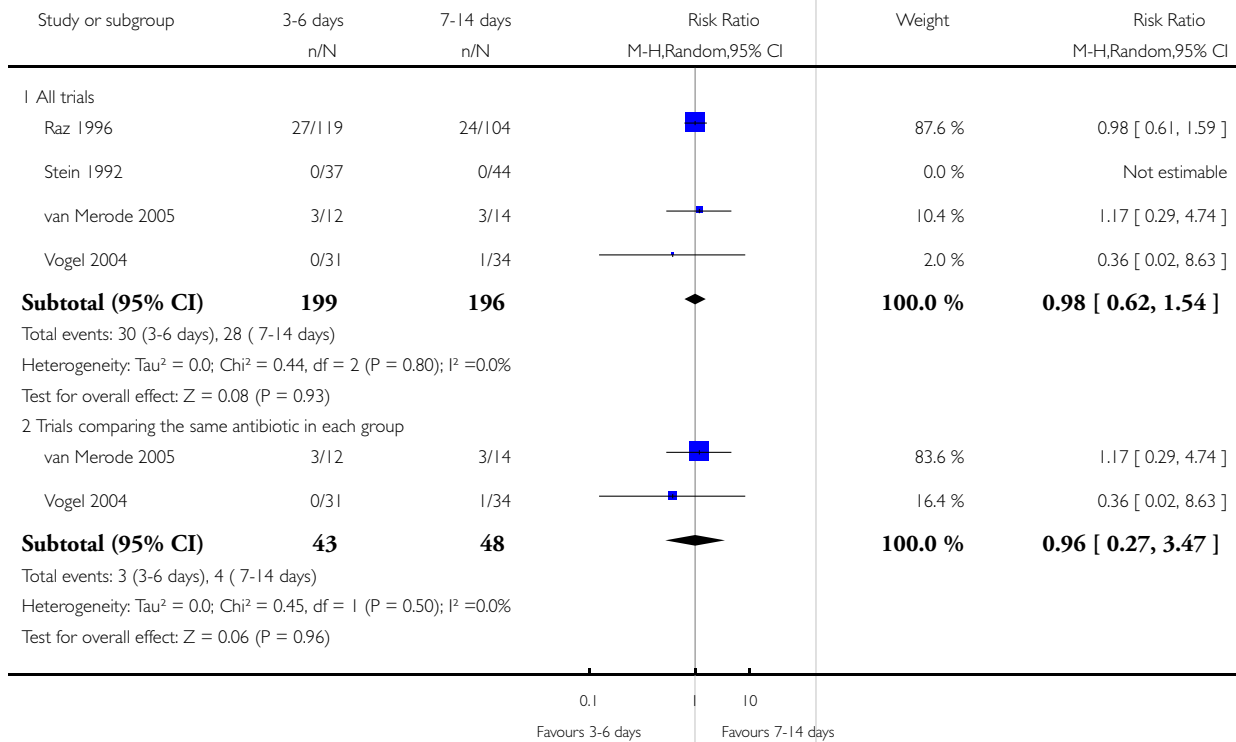
0.1 Favours 3-6 days | 10 Favours 7-14 days

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 3 Short-course versus long-course treatment
 Outcome: 2 Persistent UTI: long-term



Analysis 3.3. Comparison 3 Short-course versus long-course treatment, Outcome 3 Clinical failure (persistence of symptoms): short-term.

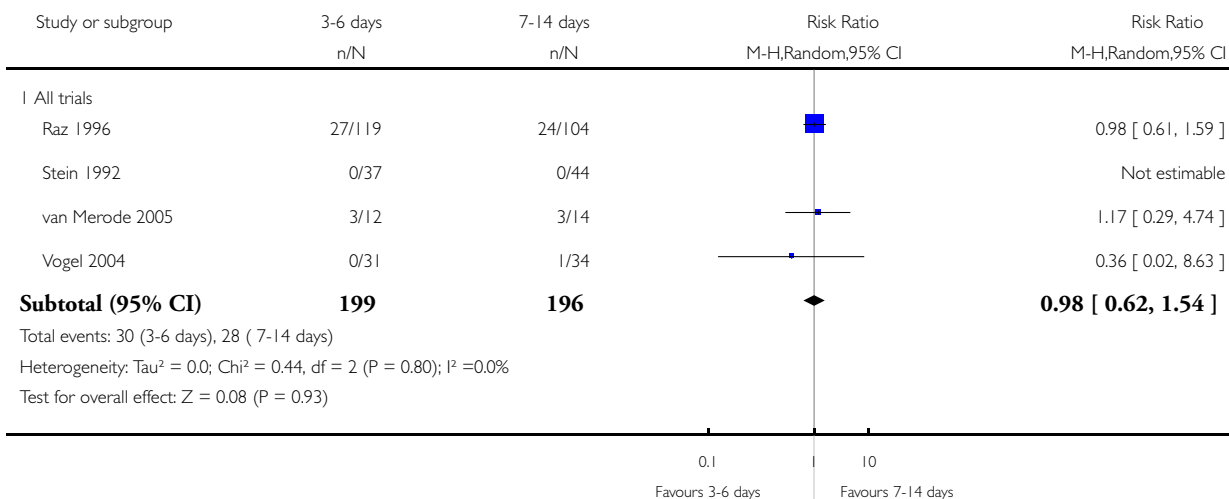
Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 3 Short-course versus long-course treatment
 Outcome: 3 Clinical failure (persistence of symptoms): short-term



Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

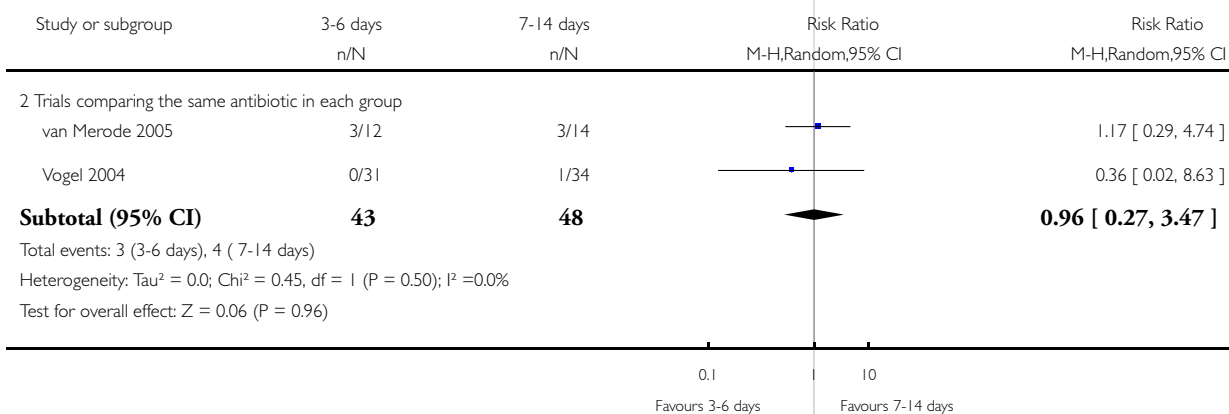
Outcome: 3 Clinical failure (persistence of symptoms): short-term



Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

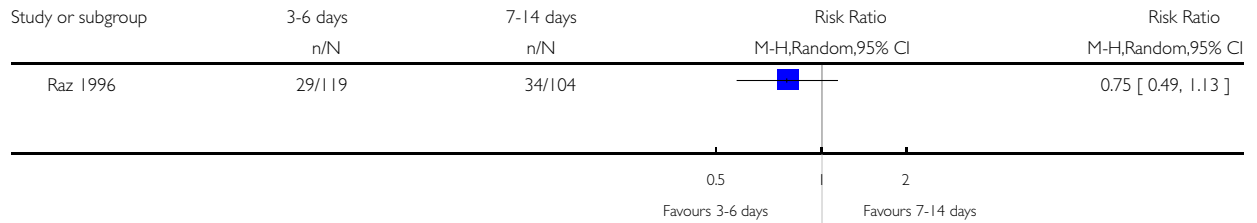
Comparison: 3 Short-course versus long-course treatment

Outcome: 3 Clinical failure (persistence of symptoms): short-term



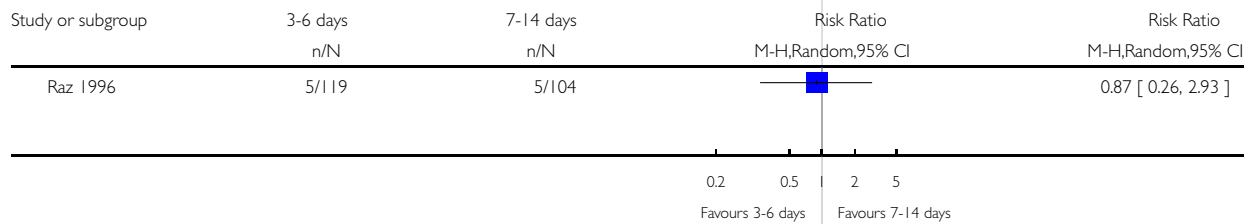
Analysis 3.4. Comparison 3 Short-course versus long-course treatment, Outcome 4 Clinical failure (persistence of symptoms): long-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 3 Short-course versus long-course treatment
 Outcome: 4 Clinical failure (persistence of symptoms): long-term



Analysis 3.5. Comparison 3 Short-course versus long-course treatment, Outcome 5 Adverse drug reactions.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 3 Short-course versus long-course treatment
 Outcome: 5 Adverse drug reactions

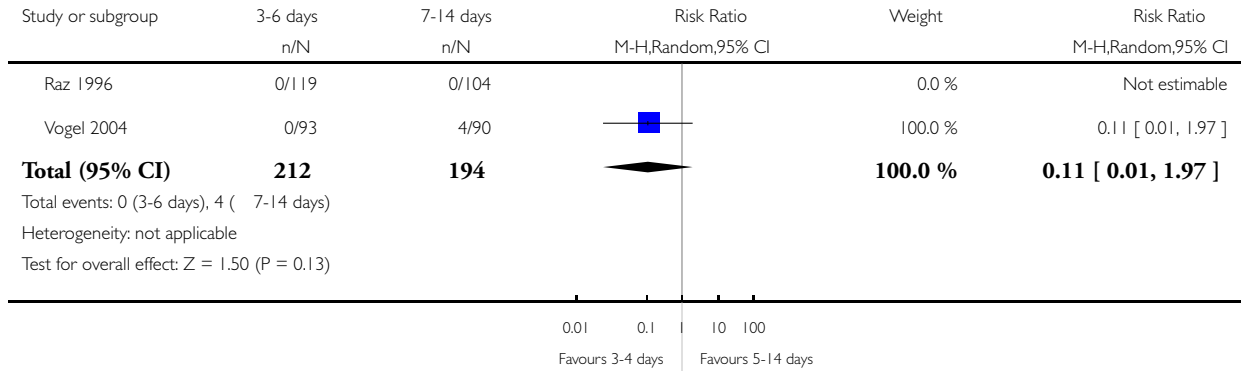


Analysis 3.6. Comparison 3 Short-course versus long-course treatment, Outcome 6 Discontinuation due to adverse reactions.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

Outcome: 6 Discontinuation due to adverse reactions

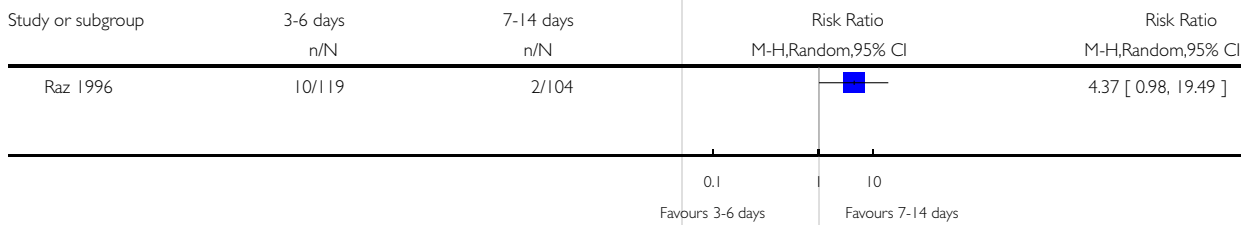


Analysis 3.7. Comparison 3 Short-course versus long-course treatment, Outcome 7 Reinfection rate: short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

Outcome: 7 Reinfection rate: short-term

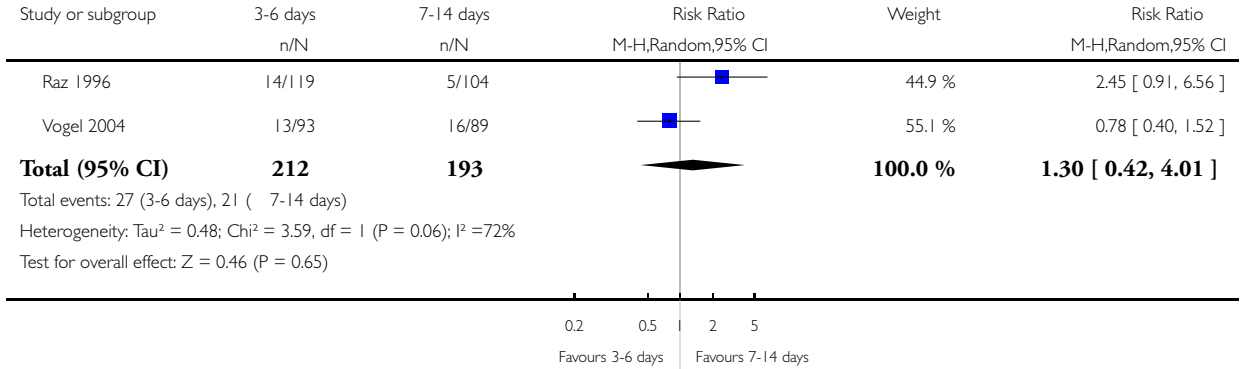


Analysis 3.8. Comparison 3 Short-course versus long-course treatment, Outcome 8 Reinfection rate: long-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

Outcome: 8 Reinfection rate: long-term

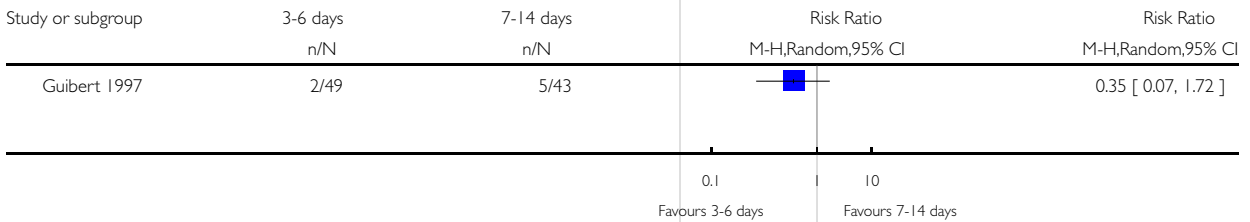


Analysis 3.9. Comparison 3 Short-course versus long-course treatment, Outcome 9 Acceptability (little or not satisfied with treatment).

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

Outcome: 9 Acceptability (little or not satisfied with treatment)

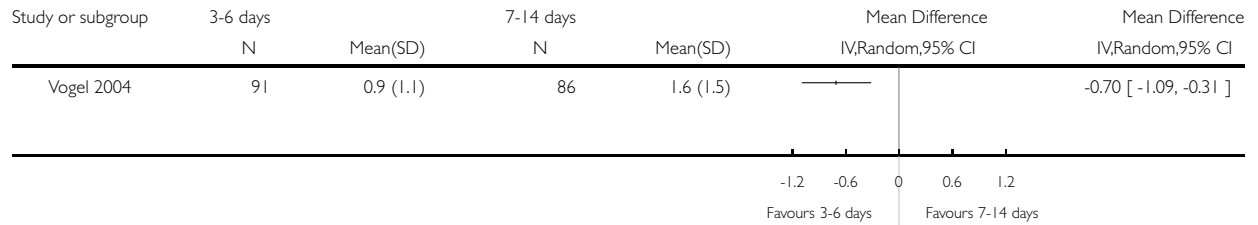


Analysis 3.10. Comparison 3 Short-course versus long-course treatment, Outcome 10 Mean number of adverse events/patient (day 5).

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

Outcome: 10 Mean number of adverse events/patient (day 5)

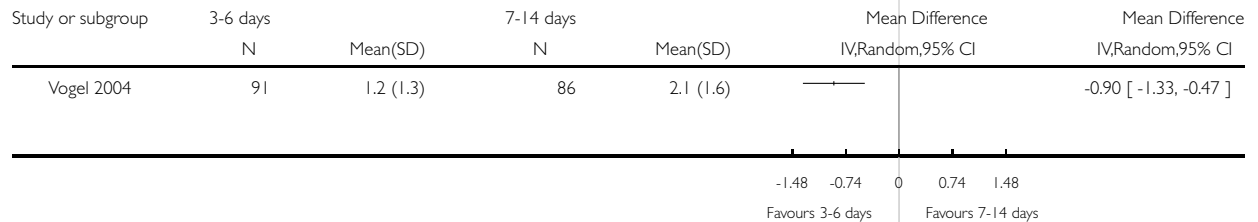


Analysis 3.11. Comparison 3 Short-course versus long-course treatment, Outcome 11 Mean number of adverse events/patient (day 9).

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 3 Short-course versus long-course treatment

Outcome: 11 Mean number of adverse events/patient (day 9)

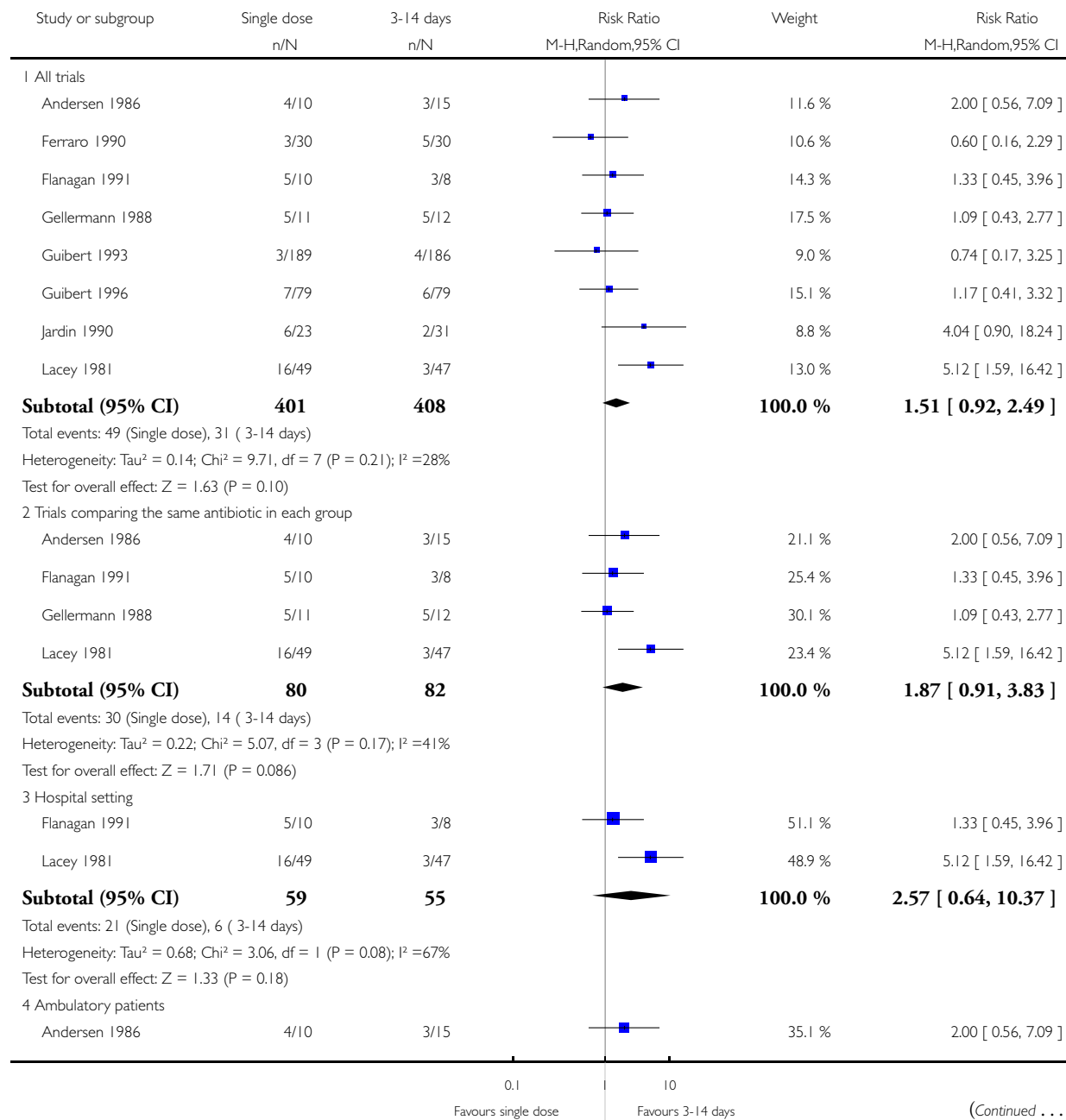


Analysis 4.1. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 1 Persistent UTI: short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)

Outcome: 1 Persistent UTI: short-term



(... Continued)

Study or subgroup	Single dose n/N	3-14 days n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Gellemann 1988	5/11	5/12		64.9 %	1.09 [0.43, 2.77]
Subtotal (95% CI)	21	27		100.0 %	1.35 [0.64, 2.86]

Total events: 9 (Single dose), 8 (3-14 days)
Heterogeneity: Tau² = 0.0; Chi² = 0.58, df = 1 (P = 0.45); I² = 0.0%
Test for overall effect: Z = 0.78 (P = 0.43)

0.1 10
Favours single dose Favours 3-14 days

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)
Outcome: 1 Persistent UTI: short-term

Study or subgroup	Single dose n/N	3-14 days n/N	Risk Ratio M-H,Random,95% CI	Risk Ratio M-H,Random,95% CI
I All trials				
Andersen 1986	4/10	3/15		2.00 [0.56, 7.09]
Ferraro 1990	3/30	5/30		0.60 [0.16, 2.29]
Flanagan 1991	5/10	3/8		1.33 [0.45, 3.96]
Gellemann 1988	5/11	5/12		1.09 [0.43, 2.77]
Guibert 1993	3/189	4/186		0.74 [0.17, 3.25]
Guibert 1996	7/79	6/79		1.17 [0.41, 3.32]
Jardin 1990	6/23	2/31		4.04 [0.90, 18.24]
Lacey 1981	16/49	3/47		5.12 [1.59, 16.42]
Subtotal (95% CI)	401	408		1.51 [0.92, 2.49]

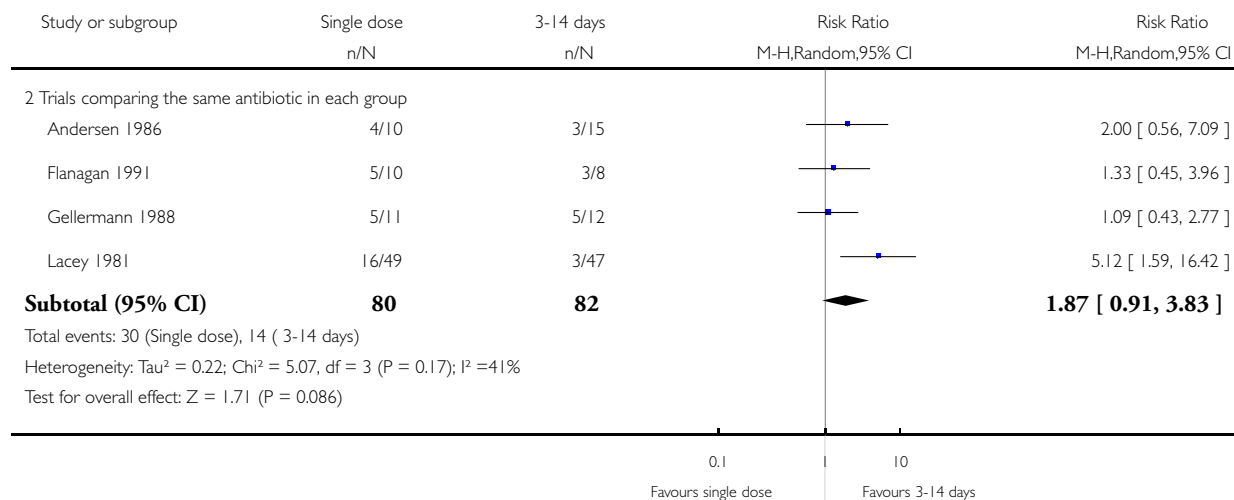
Total events: 49 (Single dose), 31 (3-14 days)
Heterogeneity: Tau² = 0.14; Chi² = 9.71, df = 7 (P = 0.21); I² = 28%
Test for overall effect: Z = 1.63 (P = 0.10)

0.1 10
Favours single dose Favours 3-14 days

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)

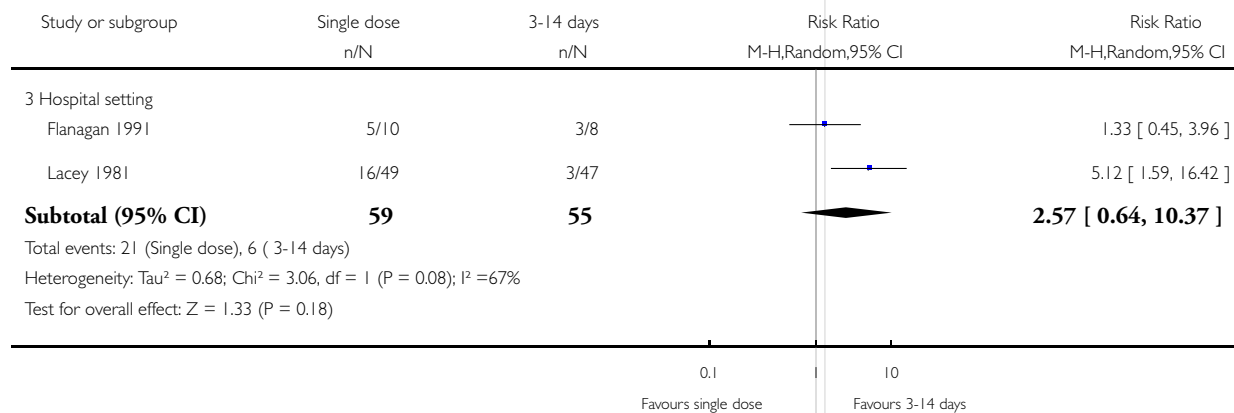
Outcome: 1 Persistent UTI: short-term



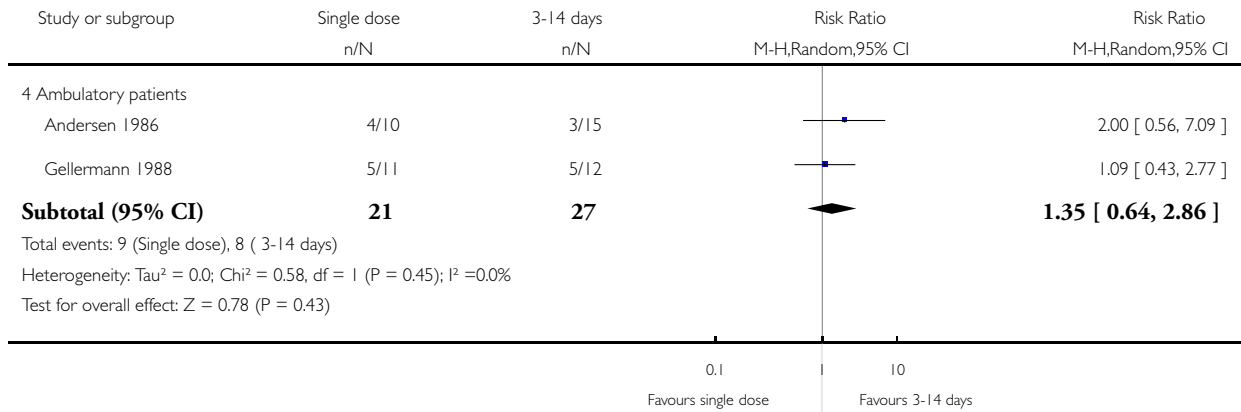
Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)

Outcome: 1 Persistent UTI: short-term

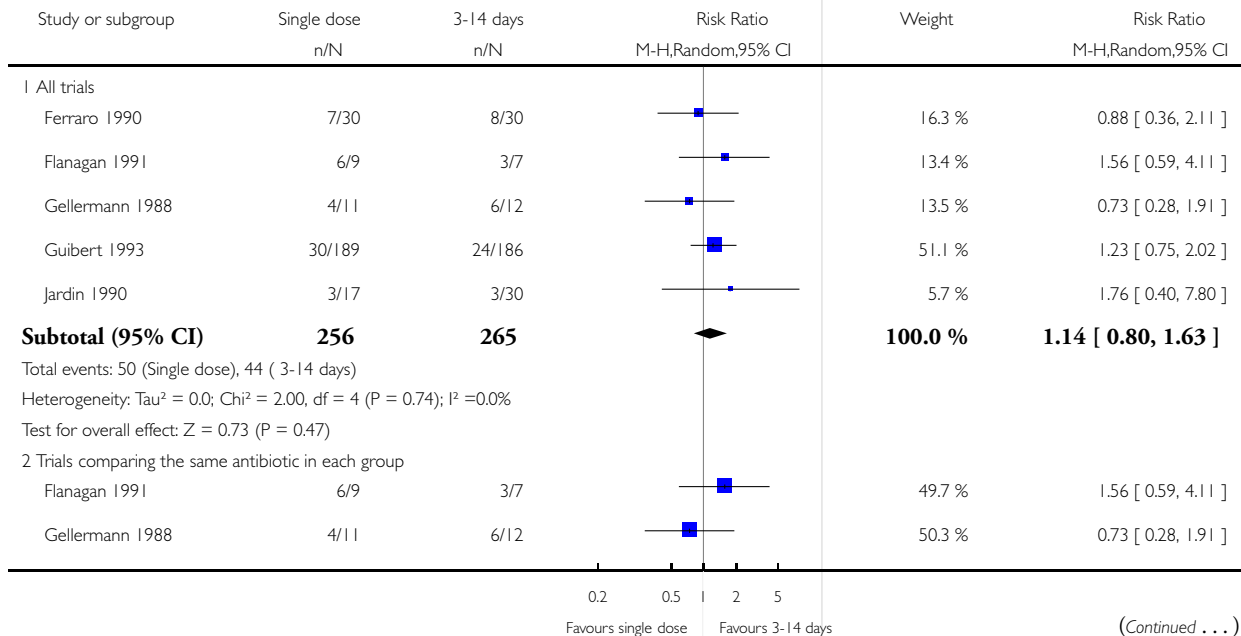


Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)
 Outcome: 1 Persistent UTI: short-term

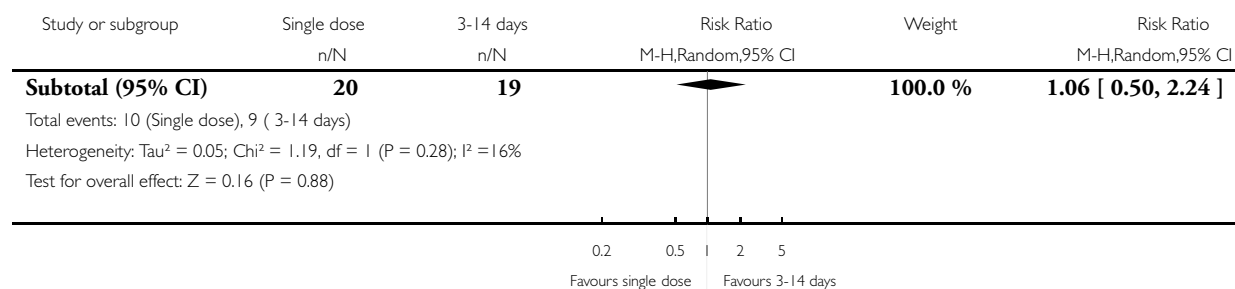


Analysis 4.2. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 2 Persistent UTI: long-term.

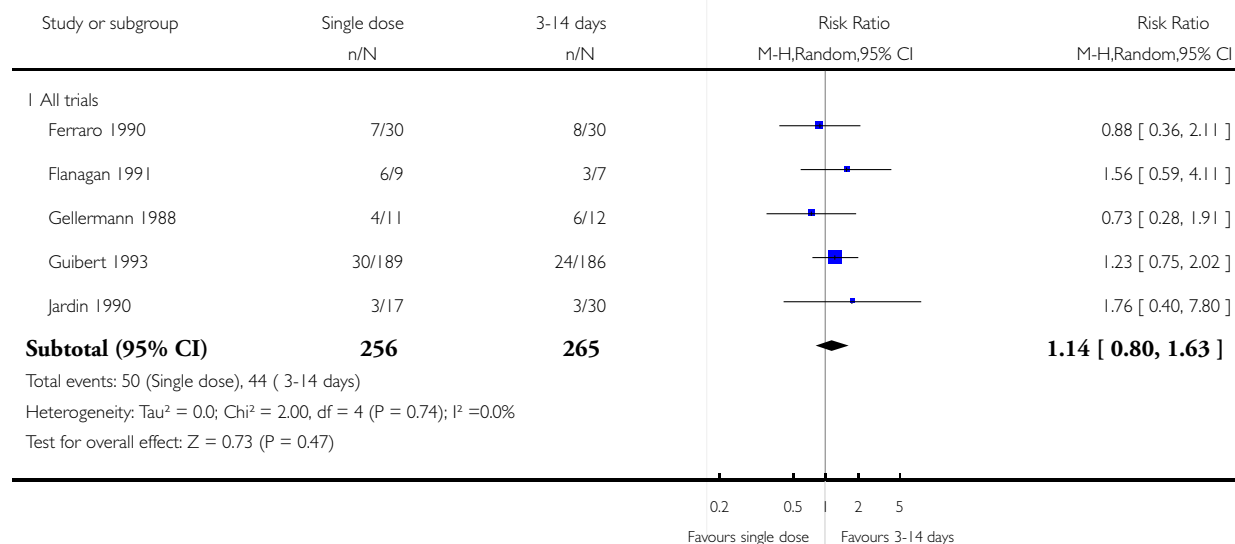
Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)
 Outcome: 2 Persistent UTI: long-term



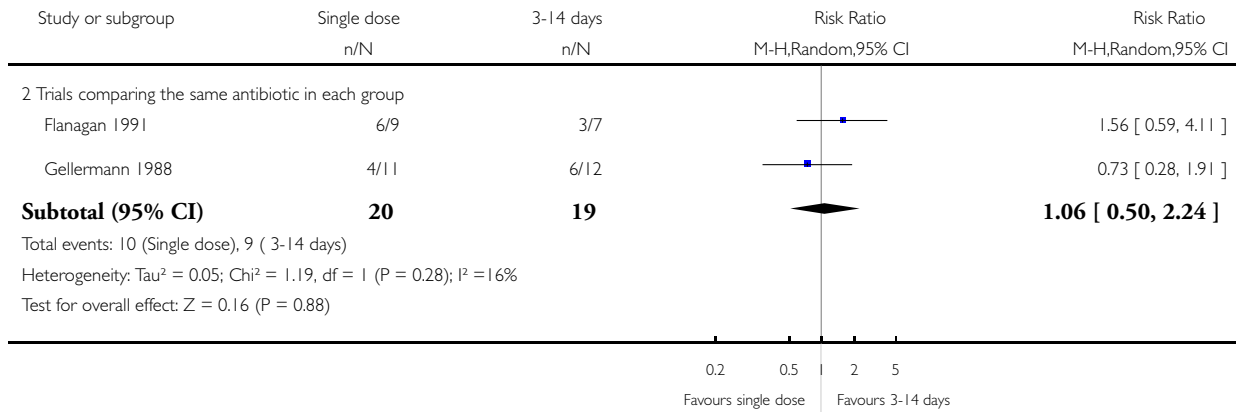
(... Continued)



Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)
 Outcome: 2 Persistent UTI: long-term

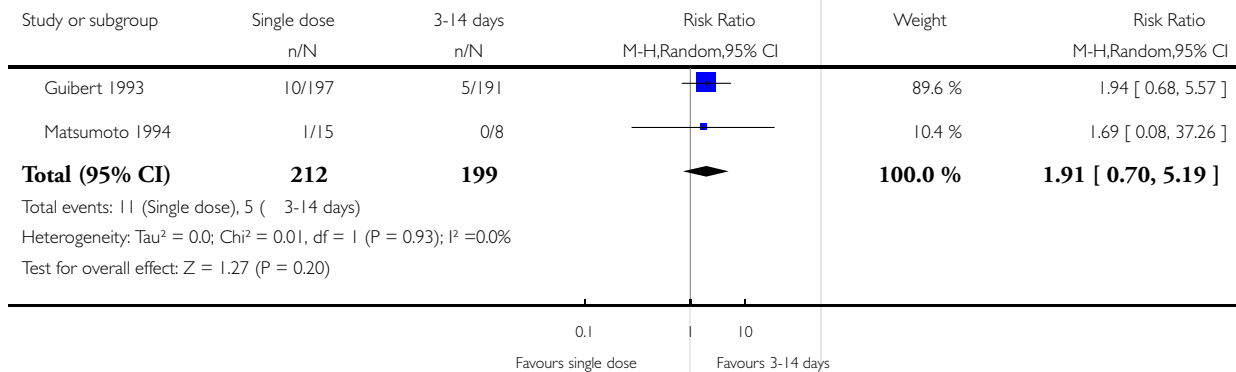


Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)
 Outcome: 2 Persistent UTI: long-term



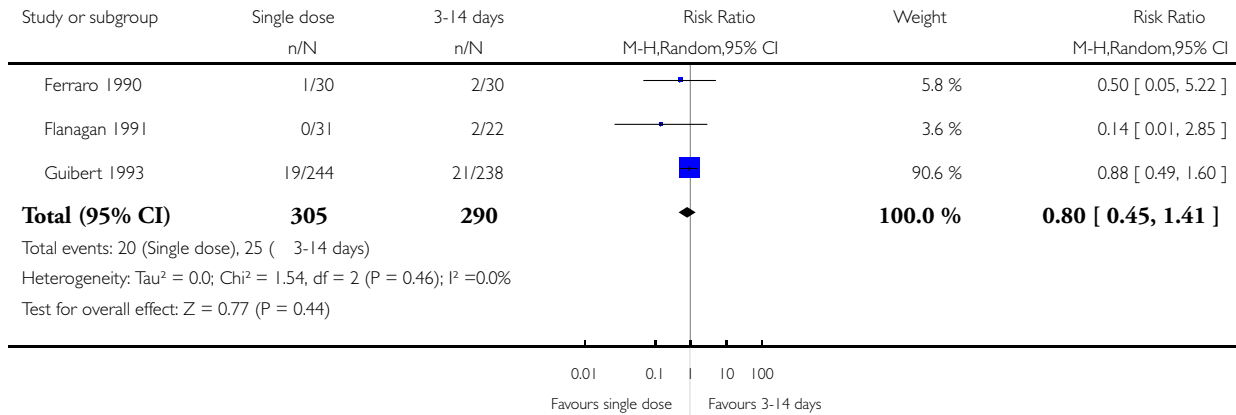
Analysis 4.3. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 3 Clinical failure (persistence of symptoms): short-term.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)
 Outcome: 3 Clinical failure (persistence of symptoms): short-term



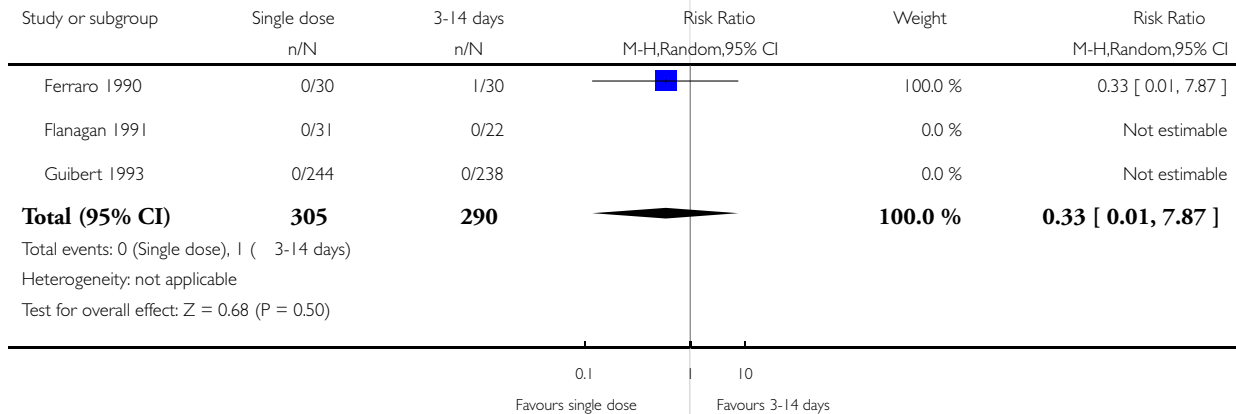
Analysis 4.5. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 5 Adverse drug reactions.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)
 Outcome: 5 Adverse drug reactions



Analysis 4.6. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 6 Discontinuations due to adverse reactions.

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women
 Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)
 Outcome: 6 Discontinuations due to adverse reactions

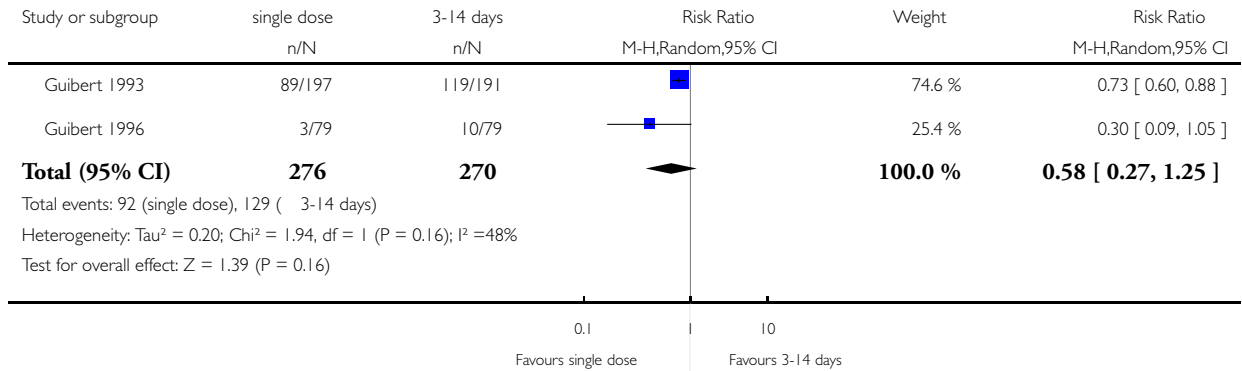


Analysis 4.7. Comparison 4 Single dose versus short-course or long-course treatment (3 to 14 days), Outcome 7 Acceptability (little or not satisfied with treatment).

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 4 Single dose versus short-course or long-course treatment (3 to 14 days)

Outcome: 7 Acceptability (little or not satisfied with treatment)

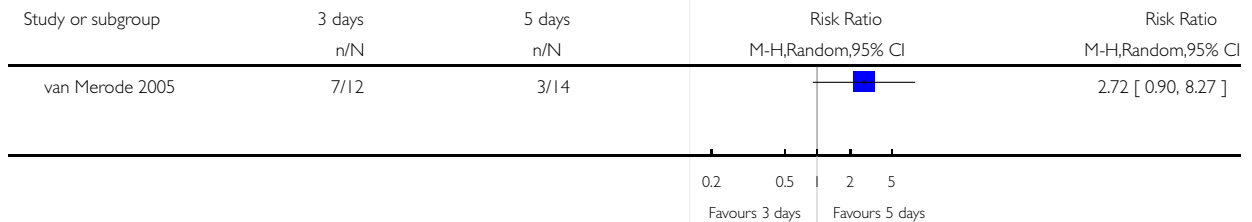


Analysis 5.1. Comparison 5 3 days versus 5 days, Outcome 1 Persistent UTI: short term (3 days after treatment).

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 5 3 days versus 5 days

Outcome: 1 Persistent UTI: short term (3 days after treatment)

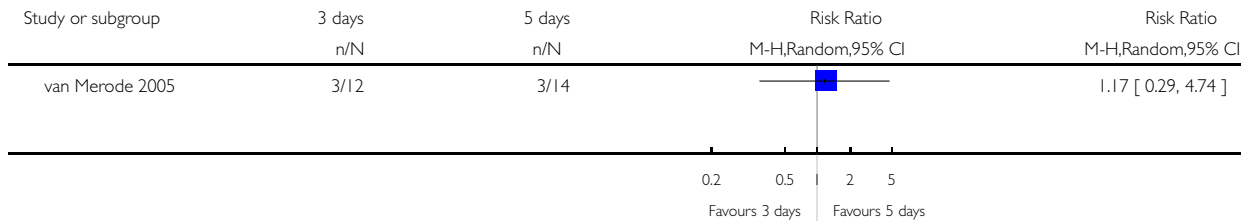


Analysis 5.2. Comparison 5 3 days versus 5 days, Outcome 2 Clinical failure (not recovered): short term (3 days after treatment).

Review: Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women

Comparison: 5 3 days versus 5 days

Outcome: 2 Clinical failure (not recovered): short term (3 days after treatment)



APPENDICES

Appendix I. Electronic search strategies

Database searched Search terms

- MEDLINE
1. elderly
 2. explode "AGED"/ all subheadings
 3. explode "AGED, 80 AND OVER"/ all subheadings
 4. old*
 5. geriatric*
 6. nursing home
 7. #1 or #2 or #3 or #4 or #5 or #6
 8. urinary tract infection*
 9. explode "URINARY TRACT INFECTIONS"/ all subheadings
 10. cystitis
 11. explode "CYSTITIS"/ all subheadings
 12. UTI
 13. bacteriuria
 14. explode "BACTERIURIA"/ all subheadings
 15. #8 or #9 or #10 or #11 or #12 or #13 or #14
 16. explode "ANTI-INFECTIVE AGENTS"/ all subheadings
 17. explode "ANTIBIOTICS"/ all subheadings
 18. antibiotic*
 19. #16 or #17 or #18
 20. #7 and #15 and #19

- EMBASE
1. RANDOMIZED ADJ CONTROLLED ADJ TRIAL\$1
 2. RANDOM ADJ ALLOCAT\$5
 3. (SINGL\$ DOUBL\$ TREBL\$ TRIPL\$) WITH (BLIND\$4 MASK\$4)
 4. PLACEBO\$1.TI,DE,AB.
 5. 1 2 3 4
 6. ELDERLY AGED# AGED GERIATRIC\$ OLD
 7. NURSING WITH HOME

(Continued)

- 8. 5 AND (6 7)
- 9. URINARY-TRACT-INFECTION#
- 10. URINARY WITH INFECTION\$1
- 11. CYSTITIS
- 12. BACTERIURIA
- 13. 8 AND (9 10 11 12)
- 14. ANTI ADJ INFECTI\$5
- 15. ANTIBIOTIC\$4
- 16. 13 AND (14 15)

CENTRAL

- #1. AGED
- #2. elderly
- #3. old*
- #4. geriatric
- #5. GERIATRICS
- #6. NURSING HOMES
- #7. HOMES FOR THE AGED
- #8. (#1 or #2 or #3 or #4 or #5 or #6 or #7)
- #9. URINARY TRACT INFECTIONS
- #10. (urinary next tract next infection*)
- #11. uti*
- #12. CYSTITIS
- #13. cystitis
- #14. BACTERIURIA
- #15. bacteriuria
- #16. (#9 or #10 or #11 or #12 or #13 or #14 or #15)
- #17. ANTI-INFECTIVE AGENTS
- #18. anti-infective*
- #19. antibiotic*
- #20. (#17 or #18 or #19)
- #21. (#8 and #16 and #20)

Appendix 2. Results of initial literature search

Database	System	Identified reference	Included references
MEDLINE	Knowledge Finder	2923	10
MEDLINE	Ovid	4115	10
MEDLINE	Grateful Med	5533	10
MEDLINE	PubMed	3098	10
EMBASE	Datastar	110	4
EMBASE Geriatrics	1989-99	219	1
Gerolit	DIMDI	12	0
Healthstar	DIMDI	1128	
Bioethics Line	DIMDI	0	0
Popline	GratefulMed	1	0
Cochrane CCRT		377	
ISTP 1978-95 (Index to Scientific & Technical Proceedings)	Printed index		
DAI 1991-1995 (Dissertation abstracts international)	Printed index		1
Authors and investigators	13 were contacted by letter or e-mail, 6 responded	17	0
Pharmaceutical companies	17 were contacted by letter of e-mail, 5 responded	106	2
References	Trial articles		1
References	Review articles		3

Appendix 3. Inter-individual variability of study selection

Abstract/articles	Total number	% of screened record	Different selections
Abstracts	262	ca. 5%	17 (6.5%)
Articles	166	79%	10 (6.1%)
Total	427		27 (6.3%)

Appendix 4. Sources of included studies

Trials	MEDLINE	EMBASE	Industry	Theses	References - reviews	References - trials
Andersen 1986	+					
Ferraro 1990	+	+				
Flanagan 1991	+	+	+	+	+	+
Gellermann 1988			+		+	
Guibert 1993	+	+				
Guibert 1996	+	+	+			
Guibert 1997	+		+			
Jardin 1990	+					
Lacey 1981	+	+			+	
Matsumoto 1994		+				
Piipo 1990						+
Raz 1996	+	+				
Stein 1992	+	+	+			
van Merode 2005	+					
Vogel 2004	+	+	-	-		

Appendix 5. Quality of included studies

Trial	Allocation concealment	Blinding	Randomization method	Baseline characteristics	Power calculation	Sample size (old pt)	Excluded patients	Intention to treat	Overall quality
Andersen 1986	B	Double	NS	Yes ?	No	287	23, not described	No	C
Ferraro 1990	B	None	NS	NS	NS	60			C
Flanagan 1991	C (open lists)	None	Yes (random lists)	Yes, difference in mean number of drugs	No	81	30, reason described	No	C
Gellermann 1988	B	None	Yes (random list)	Yes (in detail), no difference	No	90	0	Yes (2 analyses)	C
Guibert 1993	B (NS)	None	Yes (random number table)	Yes, no difference	Yes	482	94 / 110, reasons described	No	C
Guibert 1996	A (telephone)	None	NS	Yes, no difference	Yes	595	213 / 219, reasons described	No (efficacy), yes (ADRs)	C
Guibert 1997	A (telephone)	None	NS	Yes, no difference	Yes	421	81, reasons described	No (efficacy), yes (ADRs)	C
Jardin 1990	B (NS)	None	NS	Yes, difference in biochemical parameters	Yes (200)	386	90, reasons only partially described	No	C
Lacey 1981	B (NS)	Single (outcome assessment)	NS	Yes, no difference	NS	100	4, reasons described	No	C

(Continued)

Matsumoto	B (NS)	None	NS	NS					C
Piipo 1990	A (numbered boxes)	Double	NS	No	NS	400	73, reasons described	No	C
Raz 1996	B	None	NS	Yes (difference ?)	Yes	223	27, reasons described	No	C
Stein 1992	A (numbered boxes)	Double	Yes (computer random number generator)	Yes (difference ?)	Yes	404	184, reasons described	No	C
van Merode 2005	B (not specified envelopes)	Single (Physician)	Yes (computer generated)	No	Yes	26	205/324 (all patients), reasons described	No	C
Vogel 2004	A (numbered sealed envelopes)	Double	Yes (computer generated randomization list, stratified by hospital laboratories)	Yes (only significant difference for suprapubic pain)	Yes	183	1	Yes	A

WHAT'S NEW

Last assessed as up-to-date: 6 May 2008

Date	Event	Description
7 May 2008	New citation required and conclusions have changed	2 new studies added, new outcomes.
27 March 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 2, 1999

Review first published: Issue 3, 2002

Date	Event	Description
8 January 2004	New search has been performed	New search, no new trials

CONTRIBUTIONS OF AUTHORS

NV - study selection, data extraction, review writing

ML - study selection, data extraction, data analysis, review writing

DECLARATIONS OF INTEREST

None known

INDEX TERMS

Medical Subject Headings (MeSH)

Anti-Infective Agents, Urinary [*administration & dosage]; Randomized Controlled Trials as Topic; Time Factors; Treatment Outcome; Urinary Tract Infections [*drug therapy]

MeSH check words

Aged; Female; Humans; Middle Aged