Antibiotic prophylaxis regimens and drugs for cesarean section (Review)

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This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2007, Issue 4

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This record should be cited as:
Hopkins L, Smaill F. Antibiotic prophylaxis regimens and drugs for cesarean section. *Cochrane Database of Systematic Reviews* 1999, Issue 2. Art. No.: CD001136. DOI: 10.1002/14651858.CD001136.

This version first published online: 26 April 1999 in Issue 2, 1999.
Date of most recent substantive amendment: 01 January 1999

ABSTRACT

Background
Prophylactic antibiotics for cesarean section have been shown to reduce the incidence of maternal postoperative infectious morbidity. Many different antibiotic regimens have been reported to be effective.

Objectives
The objective of this review was to determine which antibiotic regimen is most effective in reducing the incidence of infectious morbidity in women undergoing cesarean section.

Search strategy
We searched the Cochrane Pregnancy and Childbirth Group trials register and the Cochrane Controlled Trials Register. The date of the most recent search was October 1998.

Selection criteria
Randomized trials that included women undergoing cesarean section were included. Trials were required to compare at least two different antibiotic regimens. Trials that compared placebo with a single antibiotic regimen were not included as these are studies which have been analyzed in another Cochrane review.

Data collection and analysis
Data were extracted from each publication independently by the reviewers. Reviewers were not blinded to the authors or sources of the articles. The primary outcome variable was endometritis but data on other infectious complications were collected where provided.

Main results
Fifty-one trials published between 1979 and 1994 were included in the review and four were excluded from the review. The following results refer to reductions in the incidence of endometritis. Both ampicillin and first generation cephalosporins have similar efficacy with an odds ratio (OR) of 1.27 (95% confidence interval (CI): 0.84-1.93). In comparing ampicillin with second or third generation cephalosporins the odds ratio was 0.83 (95% CI 0.54-1.26) and in comparing a first generation cephalosporin with a second or third generation agent the odds ratio was 1.21 (95% CI 0.97-1.51). A multiple dose regimen for prophylaxis appears to offer no added benefit over a single dose regimen; OR 0.92 (95% CI 0.70-1.23). Systemic and lavage routes of administration appear to have no difference in effect; OR 1.19 (95% CI 0.81-1.73). There was no significant heterogeneity between the trials contained in the various sub-group analyses, although confidence intervals were sometimes wide.

Authors' conclusions
Both ampicillin and first generation cephalosporins have similar efficacy in reducing postoperative endometritis. There does not appear to be added benefit in utilizing a more broad spectrum agent or a multiple dose regimen. There is a need for an appropriately designed randomized trial to test the optimal timing of administration (immediately after the cord is clamped versus pre-operative).

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BACKGROUND

The potential for prophylactic antibiotics to decrease the incidence of maternal infectious morbidity following cesarean section has now been systematically investigated (Duff 1982; Gibbs 1972; Polk 1982; Harger 1981; Padilla 1983). Although clear evidence exists to support this practice, it appears that in clinical practice antibiotic prophylaxis for Cesarean section is utilized in an inconsistent manner. Both the rate of utilization and the choice of agent for prophylaxis are known to vary (Pedersen 1996).

Antibiotic prophylaxis has been shown to reduce the risk of febrile morbidity, endometritis, wound infection, urinary tract infection (Gibbs 1980; Leigh 1990; Boggess 1996) and other serious post-operative complications (including septic shock, pelvic abscess, and septic pelvic vein thrombophlebitis). It has been demonstrated that there is a reduction in the relative risk of endometritis and wound infection for women having elective (planned) cesarean section as well as those having emergency procedures (Padilla 1983; Mohamed 1988).

While it is clear that women undergoing cesarean section benefit from prophylactic antibiotics, it is not clear whether any one particular agent is the drug of choice. Many different drug regimens have been reported to be effective in decreasing post-operative infectious morbidity. To date, penicillin, ampicillin, ticarcillin, mezlocillin, piperacillin, imipenam, metronidazole, clindamycin, gentamicin, tobramycin, cefazolin, cephalothin, ceforanide, cefonicid, cefuroxime, ceftazidime, cefoxitin, cefamandole, cephradine, cefotetan and cefotaxime have been used for cesarean section prophylaxis and all have demonstrated efficacy either alone or in combination with another drug. Some of these drugs have activity against a narrow range of potential pathogens (eg metronidazole, gentamicin), others specifically have additional anaerobic activity (eg cefoxitin and cefotetan) and yet others have very broad-spectrum coverage (imipenem). Their pharmacokinetic properties (eg serum half life) also differ.

Since there are an overwhelming number of effective drugs available attempts to define an antibiotic regimen of choice have been problematic. Ideally, such a drug regimen should be: (1) proven effective in well-designed prospective, randomized, double-blind clinical trials, (2) active against the majority of pathogens likely to be involved, (3) attain adequate serum and tissue levels throughout the procedure, (4) not associated with the development of antimicrobial resistance, (5) inexpensive and (6) well-tolerated. In many respects, penicillins and cephalosporins meet these criteria. Many investigators have used these drugs and have recommended that drugs from these classes represent the antibiotics of choice for cesarean section prophylaxis (Cartwright 1984).

In addition to the choice of drug, there are differences in the route of administration and the timing of administration of prophylactic antibiotics. As well as the systemic administration of antibiotics, use of intra-operative irrigation of the uterus and peritoneal cavity with an antibiotic solution has been reported. While some guidelines recommend multiple doses of antibiotics, a single dose at the time of the procedure may be adequate.

The past several decades have seen an increase in the incidence of cesarean section, associated with an increase in maternal post-operative infection. Reports indicate a range of 18 to 83% in the incidence of post-operative infectious complications where prophylactic antibiotics have not been utilized. Therefore, infectious complications that occur following cesarean section are an important contributor to maternal morbidity and mortality (Henderson 1995). Such complications are also an important source of increased hospital stay and consumption of financial resources. Prophylactic antibiotics for cesarean section can be expected to result in a major reduction in post-operative infectious morbidity. The question that remains, therefore, is not whether to use an agent for prophylaxis but rather, which regimen to use.

OBJECTIVES

To determine, from the best available evidence, which antibiotic regimen is most effective in reducing the incidence of febrile morbidity, wound infection, endometritis, urinary tract infection or any other serious infectious complication in women undergoing cesarean section.

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

Types of studies

All trials were considered where the intention was to allocate participants randomly to one of at least two alternative regimens of antibiotic prophylaxis for cesarean section.

Types of participants

Women undergoing cesarean section, both elective and non-elective.

Types of intervention

Trials were considered if they compared at least two different prophylactic antibiotic regimens. In addition to the comparison of different antimicrobial agents, studies were included where there was a comparison between the route of administration (whether systemic or lavage), the timing of administration and the number of doses of drugs given.

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Types of outcome measures

Trials were considered as long as they described some form of infectious morbidity following cesarean section. Data on the following outcome variable of interest were collected:
(i) fever
(ii) wound infection
(iii) urinary tract infection
(iv) other serious infectious complications (such as bacteremia, septic shock, septic pelvic vein thrombophlebitis, necrotizing fasciitis, or death attributed to infection).

In addition, data were collected (where available) on adverse events of treatment (eg allergic and other toxic reactions, antibiotic associated diarrhoea, development of bacterial resistance), maternal length of stay and costs, and neonatal outcomes.

SEARCH METHODS FOR IDENTIFICATION OF STUDIES

See: methods used in reviews.

This review has drawn on the search strategy developed by the Pregnancy and Childbirth Group as a whole. The primary source of studies was the review group's trials register - the Pregnancy and Childbirth Group's Specialized Register of controlled trials. See Review Group's details for more information. In addition, the Cochrane Controlled Trials Register was searched. The date of last search was October 1998.

METHODS OF THE REVIEW

All potential trials were selected for eligibility according to the criteria specified in the protocol and data were extracted from each publication by two reviewers. Any discrepancies were resolved by discussion. In addition to the main outcome measures listed above, information on the setting of the study (country, type of population, socioeconomic status), a detailed description of the antibiotic regimen used (drug, dose, frequency and timing), and definitions of the outcomes (if provided) were collected. An intent to treat analysis was performed where possible.

Trials were assessed for methodological quality using the standard Cochrane criteria of adequacy of allocation concealment: adequate (A), unclear (B), inadequate (C), or that allocation concealment was not used (D). Information on blinding of outcome assessment and loss to follow-up were collected.

The main comparison of any treatment versus another treatment will not be stratified according to the indication for cesarean section.

Separate comparisons of different antimicrobial regimens, grouped where appropriate by spectrum of activity, were made. If there were sufficient trials, separate comparisons were made between the timing of antibiotic administration, the number of doses given and the route of administration (whether systemic or lavage).

Summary relative risks were calculated using a fixed effects model (if there is no significant heterogeneity between trials).

DESCRIPTION OF STUDIES

For a detailed description of studies see table of ' Characteristics of included studies'.

All fifty-one trials included in the review were conducted in industrialized countries (United States, Canada, Israel, Italy, Switzerland or The Netherlands). Criteria listed to define the presence of outcome variables of interest (eg endometritis) were remarkably consistent across trials. Antibiotics for prophylaxis were administered after the cord was clamped in all but three of the trials. The antimicrobial agents used in the trials included ampicillin, penicillin, imipenem, cefazolin, cephalothin, cephapirin, cefotetan, cefamandole, cefuroxime, cefmetazole, cefoxitin, piperacillin, cefotaxime, ceftazidime, ceftriaxone, mezlocillin, moxalactam, cefonicid, ceftizoxime, ticarcillin, gentamicin, clindamycin, ceforanide, and metronidazole. Two studies were published in the 1970s, thirty-seven in the 1980s and twelve in the 1990s. Only three studies could be found that were eligible for inclusion where prophylactic antibiotics were administered pre-operatively. The vast majority of studies that administered prophylactic antibiotics pre-operatively were placebo-control trials with no additional treatment arms. Therefore, these studies were not eligible for inclusion.

METHODOLOGICAL QUALITY

For detailed information on methods, see table of 'Characteristics of included studies'.

The methodological quality of the studies overall was excellent. Almost all of the studies were intention to treat analyses and for some, it was possible to convert them where necessary data was included.

RESULTS

The results of the meta-analysis indicate that both ampicillin and first generation cephalosporins have similar efficacy in the reduction of maternal infectious morbidity following cesarean section. Further, it is not only the relatively minor outcomes of febrile morbidity and endometritis that are equivalent with the different antibiotic regimens, but serious infections as well. There is no evidence that a more broad-spectrum agent produces greater efficacy

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in the reduction of infectious morbidity following cesarean section. There is no evidence from this meta-analysis to recommend multiple doses of antibiotics. There appears to be no difference in efficacy based on whether the antibiotic is administered systemically or by a lavage route. There is insufficient evidence upon which to base a recommendation regarding the optimal timing of administration.

DISCUSSION

Antibiotic prophylaxis can be expected to produce a significant reduction in the incidence of maternal infectious morbidity. The type of agent used prophylactically as well as the optimal timing of administration have been widely studied and discussed in the literature. It is interesting to note that very few trials have been published since the late 1980s on this subject.

The results of this review indicate that both ampicillin and first generation cephalosporins are appropriate choices for antibiotic prophylaxis for cesarean section. Systemic administration of these agents is recommended based on the results of this review.

The results indicate that a multiple dose regimen does not offer any added benefit when compared with single dose regimens. Furthermore, single dose regimens are likely to be less expensive. The advantages of a single dose regimen are obvious and might ensure universal utilization of prophylactic antibiotics for cesarean section, especially in under-resourced countries.

There is insufficient data upon which to offer a recommendation concerning timing of administration (preoperative versus after cord clamping) of prophylactic antibiotics for cesarean section. Nearly all published trials since 1978 have administered the antimicrobial agent immediately after the cord is clamped. Prior to this, prophylactic agents were administered pre-operatively. This rather abrupt change in practice followed the publication of prospective randomized, placebo controlled trial demonstrating that prophylactic ampicillin administered after the cord was clamped was as effective in decreasing maternal morbidity as ampicillin given prior to the procedure (Gordon 1979). Unfortunately, no study of sufficient size has yet been published indicating whether pre-operative administration or administration after the cord is clamped is more effective. Until more evidence is available, timing of administration may remain discretionary. The most important goal should be to ensure that all women undergoing cesarean section receive prophylactic antibiotics and the agent of choice should be either ampicillin or a first generation cephalosporin. Clindamycin is an appropriate alternate choice for penicillin-allergic women.

AUTHORS' CONCLUSIONS

Implications for practice

Both ampicillin and first generation cephalosporins represent good choices for prophylaxis in women undergoing cesarean section. More costly extended-spectrum penicillins, second- or third- generation cephalosporins and combination regimens have not been demonstrated to be more effective. There is no evidence to suggest that a multiple dose regimen is of greater benefit to the woman than a single-dose regimen.

Implications for research

There will continue to be debate both in the literature and in clinical practice regarding the optimal time for administration of prophylactic antibiotics. There is currently insufficient evidence upon which to base a recommendation regarding the optimal timing of antibiotic administration. This question will not be resolved until a randomized trial of sufficient size is completed comparing preoperative administration versus administration immediately after the cord is clamped.

POTENTIAL CONFLICT OF INTEREST

None known.

ACKNOWLEDGEMENTS

None.

SOURCES OF SUPPORT

External sources of support

- No sources of support supplied

Internal sources of support

- No sources of support supplied

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TABLES

Characteristics of included studies

Study	Benigo 1986
Methods	Randomized, double blind study.
Participants	Women undergoing C/S. N=346 enrolled: Group 1, N=169 vs Group 2, N=177. Total 63 women excluded because of exclusion criteria and loss to follow-up (Group 1, N=33 and Group 2, N=30). Exclusion criteria: antibiotic use in last 7 days, drug allergy, renal or hepatic dysfunction, infection at time of enrollment, intention to breast feed within 24 hours of delivery.
Interventions	Group 1: 2 g iv piperacillin after cord clamped with repeat doses at 4 and 8 hours post -first dose. Group 2: 2 g cefoxitin after cord clamped with repeat doses at 4 and 8 hours post-first dose.
Outcomes	Febrile morbidity (temp >38 x 2 occasions, 6 hours apart, not included first 24 hour post-operation Group 1: 20/136 vs Group 2: 26/147. Wound infection (criteria not specified) Group 1: 14/136 vs Group 2: 10/147.
Notes	Not an intention to treat analysis, cannot convert due to lack of data Cointervention: Additional systemic antibiotics were administered to 7 patients in Group 1 and 9 patients in Group 2 for reasons other than infections at the operative site (Authors stated they repeated the analysis excluded these patients and no significant difference in the results were found). Adverse drug reactions: Group 1: 2 episodes of pruritis and Group 2: 1 case diarrhea and 1 case of dyspnea Country: U.S.
Allocation concealment	A – Adequate

Study	Berkeley 1990
Methods	Randomized trial, not blinded.
Participants	All patients undergoing Cesarean section. N=107, 7 patients excluded from the study because of the following exclusion criteria. Exclusion criteria: age<18, drug allergy, received antibiotics in last 72 hours, received steroids for fetal lung maturity or medical illness, renal or hepatic dysfunction, evidence of IAI.
Interventions	Group 1: 2 g cefotaxime in 1 L NS by uterine lavage. Group 2: 1 g cefotaxime iv after cord clamped with repeat dose at 6 and 12 hours.
Outcomes	Febrile morbidity (temp >38 x 2 occassions 6 hours apart, excluding first 24 hours postpartum. Group 1: 9/50 vs Group 2: 8/50 Infectious morbidity (not specified, included endometritis, UTI) : Group 1: 6/50 vs Group 2: 6/50.
Notes	'Infectious morbidity' as an outcome without specification is not precise enough for our review. Country: U.S.
Allocation concealment	A – Adequate

Study	Bernstein 1994
Methods	Randomized, blinded study. Treatment group formed on a two to one ratio, twice as many in cefotetan group. Randomization stratified according to membrane status.

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Characteristics of included studies (*Continued*)

Participants	Women undergoing non-elective C/S. N=168 enrolled, one excluded because she delivered vaginally Inclusion criteria: age >18, absence of infection prior to C/S. Exclusion criteria: temp >38 within 24 hour surgery, drug allergy, renal impairment, serious medical condition, involvement in another drug trial, IAI, antibiotic use in last 14 days, alcohol or drug abuse.
Interventions	Group 1: 2 g cefotetan iv after cord clamped, two additional doses of either cefotetan or placebo were given at 6 and 12 hours after first injection. Group 2: 2 g cefoxitin as per regimen above.
Outcomes	Failure rate (Infectious morbidity included evidence of any infection including endometritis, wound infection, pelvic abscess and SPVT, fever x2 also included >38) Group 1: 10/111 vs Group 2: 6/56.
Notes	Country: Canada.
Allocation concealment	A – Adequate

Study	**Boothby 1984**
Methods	Randomized trial, table of random numbers used by circulating nurse to allocate patients. Intention to treat analysis.
Participants	All women undergoing primary C/S in a 6 month period. Exclusion criteria: drug allergy, recent use of antibiotics (not specified) or known infectious process.
Interventions	Group 1: Intraoperative irrigation, cefoxitin 2 g in 1L NS, N=53 Group 2: Cefoxitin 2 g iv after cord clamped and repeat doses (2 g iv) at 6, 12 and 18 hours, N=50.
Outcomes	Endometritis (temperature >38, plus uterine tenderness and purulent lochia. Group 1: 2/53 vs Group 2: 2/50 UTI (with fever, positive culture) Group 1: 1/53 vs Group 2: 0/50 Wound infection (criteria not specified) Group 1: 1/53 vs Group 2: 1/50.
Notes	Country: U.S.
Allocation concealment	B – Unclear

Study	**Carlson 1990**
Methods	Randomized, double-blind study.
Participants	All women undergoing nonelective C/S. Exclusion criteria: drug allergy, antibiotics within the last 14 days, clinical evidence of infection.
Interventions	Group 1: Cefazolin 2 g iv after cord clamped, N=192. Group 2: Cefotetan 2 g iv after cord clamped, N=185.
Outcomes	Febrile morbidity (temperature >38 x 2, 4 hours apart, excluding first 24 hours post-operatively: Group 1: 43/192 vs Group 2: 40/185. Endometritis (fever, pelvic pain, uterine tenderness, pelvic irritation, no other obvious cause of fever): Group 1: 37/192 vs Group 2: 39/185. Wound infection (cellulitis and/or purulent drainage): Group 1: 3/192 vs Group 2: 3/185. UTI (10 exp 2 org/mL, cath specimen): Group 1: 6/192 vs Group 2: 12/185 Sepsis (pos blood culture): Group 1: 2/192 vs Group 2: 1/185.
Notes	No data on adverse drug reactions, maternal length of stay or neonatal outcomes Country: U.S.

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Characteristics of included studies (*Continued*)

Allocation concealment	A – Adequate

Study	**Conover 1984**
Methods	'Random' assignment, based on last digit of social security number Study period: March 1982 for 9 months. Placebo groups excluded from this summary.
Participants	Patients undergoing C/S who were in labor and/or had ROM before surgery. Exclusion criteria: drug allergy, antibiotic use in last 48 hours, separate indication for prophylactic antibiotics, positive urinalysis prior to surgery or IAI.
Interventions	Group 2: Irrigation with cefoxitin, 2 g in 500 cc NS (n=37). Group 4: Cefoxitin 2 g iv after cord clamped and again at 8 and 16 hour post-operatively (n=31).
Outcomes	Endometritis (fever plus uterine tenderness , no evidence of other obvious cause for infection): Group 2: 7/37 vs Group 4: 1/31 Wound infection (criteria not specified). Group 2: 2/37 vs Group 4: 0/31 No UTIs , abscess or SPVT in treatment groups.
Notes	Groups 1 and 3 above constitute the placebo arms to complement each above. Country: U.S.
Allocation concealment	C – Inadequate

Study	**Crombleholme 1987**
Methods	Randomized, double-blind, mechanism not stated May 1983 to September 1984 N=117 randomized, 107 analyzed.
Participants	Women undergoing non-elective C/S: in labor or ROM. Exclusion criteria: fever, drug allergy, signs of infection, receiving antibiotics for other reasons, elective repeat C/S.
Interventions	Group 1: Two doses mezlocillin; first dose 4 g iv after cord clamped and another in 4 hour (n=67). Group 2: Three doses mezlocillin; first dose 4 g iv after cord clamped and two others (4g iv) q4h x 2 (n=49).
Outcomes	Febrile morbidity (temp>38 x 2, 4 hours apart, excluding first 24 hours post-operatively. Group 1: 14/67 vs Group 2: 2/49 Wound infection (fever, erythema, induration, tender and/or purulent drainage from wound). Group 1: 2/67 vs Group 2: 0/49 Endometritis (fever or uterine tenderness with/wo foul lochia: Group 1: 6/67 vs Group 2: 3/49 UTI (fever, dysuria and pos culture). Group 1:2/67 vs Group 2: 0/49.
Notes	Converted study to intention to treat model (N=116), outcome of last women not included in study - she underwent Cesarean-hysterectomy. Above UTI, wound infection and endometritis are distinct from 'febrile morbidity'. Country: U.S.
Allocation concealment	B – Unclear

Study	**Dashow 1986**
Methods	Randomized, double-blind control trial. Computer-generated numbers using mixed congruential method. Intention to treat analysis.
Participants	Women undergoing C/S between December 1982 and May 1984, all indications.

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	Excusion criteria: drug allergy, antibiotic therapy, known infectious process.
Interventions	Irrigation solutions: (information from placebo arm excluded). All solutions contained 2 g drug in 800 cc NS with a vitamin added to each for disguise. Group 1: Cephapirin sodium Group 2: Cephamandole nafate Group 3: Moxalactam disodium Group 4: Ampicillin sodium.
Outcomes	Endometritis (temp >37.8, uterine tenderness, pelvic irritation without other localizing signs Group 1: 8/70 vs Group 2: 3/64 vs Group 3: 13/79 vs Group 4: 6/70. UTI (> 100,000 orgs) Group 1:12/70 vs Group 2: 2/64 vs Group 3: 12/79 vs Group 4: 5/70. Wound infection (breakdown, positive culture and/or cellulitis: Group 1: 3/70 vs Group 2: 2/64 vs Group 3: 2/79 vs Group 4: 0/70. Febrile morbidity (temp > 100.4 x 2. 6 hour apart, excluded first 24 hours): Group 1: 15/70 vs Group 2: 12/64 vs Group 3: 16/79 vs Group 4: 10/70.
Notes	Mean duration of hospital stay: Group 1: 4.6 vs Group 2: 4.3 vs Group 3: 4.8 vs Group 4: 4.6. No information on neonatal morbidity or adverse drug reactions. For this review, the data has been grouped according to comparison classification (ie 2nd/3rd generation cephalosporins outcomes added together) and is included in the analysis where relevant. Country: U.S.
Allocation concealment	A – Adequate

Study	**Donnenfeld 1986**
Methods	States randomized, details not provided.
Participants	All women in labor undergoing C/S Exclusion: drug allergy, antibiotic therapy for other indications, those with evidence of infection. N=103 randomized, 3 excluded because of protocol violation.
Interventions	Group 1: 1 g iv cefazolin after cord clamped and two further doses of 1 g iv at 8 hour intervals (n=51). Group 2: 1 g cefazolin in 500 cc NS, irrigation (n=49).
Outcomes	Endometritis (temp >38, purulent lochia, uterine tenderness, no other cause for infection): Group 1: 15/51 vs Group 2: 18/49.
Notes	Not intention to treat, can't convert, details not provided. Country: U.S.
Allocation concealment	B – Unclear

Study	**Duff 1987**
Methods	Randomized, double blind trial. Intention to treat analysis.
Participants	All women undergoing non-elective C/S between August 1985 and June 1986. Exclusion criteria: drug allergy, antibiotic therapy within 14 days, IAI.
Interventions	Group 1: cefazolin 1 g after cord clamped (n=96). Group 2: cefonicid 1 g after cord clamped (n=103).
Outcomes	No wound infections. Febrile morbidity (temp > 37.8 x 2, 4 hour apart, not first 24 hours post-operation or temp >38 first 24 hours) Group 1: 18/96 vs Group 2: 15/103. Endometritis (fever, pelvic pain, uterine tenderness, pelvic irritation, no localizing signs): Group 1: 19/96 vs Group 2: 13/103.

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	Sepsis (positive blood culture): Group 1: 1/96 vs Group 2: 0/103. UTI (culture positive, >10 exp 5 cfu/mL): Group 1: 3/96 vs Group 2: 3/103.
Notes	Hospital stay (mean): Group 1: 4.4 days vs Group 2: 4.2 days. Country: U.S.
Allocation concealment	A – Adequate

Study	**Elliot 1982**
Methods	Randomized, placebo control, blinded (mechanism not specified). Code broken if post-op infection developed. Placebo data excluded from this review. Intention to treat.
Participants	Women undergoing C/S. Inclusion: ROM, at least one SVE Exclusion : drug allergy, temperature >37.6, IAI.
Interventions	Group 1: Ampicillin 2g after cord clamped, then 1g iv q6h until eating, then 500 mg po to complete 3 days (n=37). Group 2: Ampicillin 2 g iv after cord clamped, then 1 g iv q6h x 3doses (n=46).
Outcomes	Febrile morbidity (temp >37.8 x2, 6 hours apart, excluding first 24 hours): Group 1:3/37 vs Group 2: 15/46. Endometritis (fever, uterine tenderness, foul discharge): Group 1: 3/37 vs Group 2: 13/46. UTI (fever, dysuria or pos culture): Group 1: 0/37 vs Group 2: 1/46. Wound infection (fever, cellulitis and exudate) Group 1: 0/37 vs Group 2: 1/46. Other serious infection (SPVT, sepsis): Group 1: 0/37 vs Group 2: 2/46.
Notes	Mean duration of hospital stay: Group 1: 4.41 days vs Group 2: 5.52 days. No data on neonatal morbidity or adverse drug reactions. Country: U.S.
Allocation concealment	B – Unclear

Study	**Elliot 1986**
Methods	Randomized control trial, not blind (mechanism not specified). Data from no treatment arm excluded for purpose of this review. Intention to treat analysis.
Participants	Women in labor or who had ROM undergoing C/S. Exclusion criteria: drug allergy, IAI antibiotic therapy in last 14 days, febrile.
Interventions	Group 1: cefoxitin 2 g iv after cord clamped plus 7 add'l doses (2g iv) q 6 hours. Group 2: cefoxitin 2 g in 1L NS, irrigation. Group 3: combination of above two regimens.
Outcomes	Febrile morbidity (temp >38 x2, 6 hours apart, excluding first 24 hours post-operation): Group 1: 2/39 vs Group 2: 3/42 vs Group 3: 2/38. No wound infections, or cases of sepsis. Endometritis (fever, uterine tenderness, foul discharge, no other etiology apparent): Group 1: 2/39 vs Group 2: 2/42 vs Group 3: 2/38 UTI (fever, urinary symptoms or positive culture):

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Characteristics of included studies (*Continued*)

	Group 1: 0/39 vs Group 2: 1/42 vs Group 3: 0/38.
Notes	Country: U.S.
Allocation concealment	B – Unclear

Study	**Faro 1990**
Methods	Randomized trial. Numbers in each treatment group unbalanced, reason given: study is ongoing, randomization not yet complete. Intention to treat analysis.
Participants	Women for C/S, indigent population, Harris county, Texas Inclusion: labor >2 hours, afebrile, no antibiotic therapy in previous 7 days. Exclusion: drug allergy N=1580.
Interventions	Control group: Cefazolin 1g iv x 3 doses (first after cord clamped) 9 other groups (all single dose iv after cord clamped): Group 1(cefazolin 1g/n=217), Group 2 (cephazolin 2g/n=161), Group 3 (ceftizoxime 1g/n=145), Group 4 (cefonicid 1g/n=147), Group 5 (cefotetan 1g/n=148), Group 6 (cefoxitin 1g/n=155), Group 7 (cefoxitin 2g/n=162), Group 8 (ampicillin 2g/n=148) and Group 9 (piperacillin 4 g/n=155).
Outcomes	Endometritis (temp >37.8 x2, 4 hours apart, excluding 24 hours after delivery plus tachycardia, wbc > 14, uterine tenderness): Control: 32/142 vs Group 1: 44/217 vs Group 2: 17/161 vs Group 3:24/155 vs Group 4: 27/162 vs Group 5: 9/148 vs Group 6: 26/145 vs Group 7: 22/146 vs Group 8: 19/148 vs Group 9: 13/155.
Notes	No outcomes re neonatal morbidity, drug reaction, maternal length of stay. Data are grouped and combined as they fit into the various subgroups for comparison. Country: U.S.
Allocation concealment	A – Adequate

Study	**Ford 1986**
Methods	Randomized, mechanism not specified. Intention to treat analysis. Primarily indigent population at UCLA Medical Centre.
Participants	Women undergoing C/S (n=263). Exclusion: drug allergy, antibiotics within 7 days, infection at time of enrollment, renal or hepatic dysfunction.
Interventions	Group 1: Piperacillin 2 g iv after cord clamped plus 2 additional doses (2g iv) q4h. Group 2: Cefoxitin (same dose and route as above).
Outcomes	Endometritis (criteria not specified): Group 1: 3/132 vs Group 2: 12/131.
Notes	Adverse drug reaction: Group 1: single case, no details and Group 2: 2 cases, not specified Country: U.S.
Allocation concealment	B – Unclear

Study	**Fugere 1983**
Methods	Randomized, double-blind, control trial. Placebo group (information not contained in this summary, not relevant to this review). Intention to treat.
Participants	Women undergoing non-elective C/S. Exclusion: absence of labor, mebranes intact, antibiotic therapy in last 48 hours, drug allergy temperature >38 in last 24 hours, ROM >36 hours.

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Characteristics of included studies (*Continued*)

Interventions	Group 1: Cefoxitin, 2 g iv after cord clamped and repeat dose x2 q6h (n=30). Group 2: Cefazolin 1 g iv after cord clamped and repeat dose x2 q6h (n=30).
Outcomes	Endometritis: Group 1: 1/30 vs Group 2: 1/30. Wound Infection: Group 1: 0/30 vs Group 2: 2/30. No UTI or febrile morbidity recorded.
Notes	Language: French. No information on hospital stay, adverse drug reactions or neonatal outcomes. Country: Canada.
Allocation concealment	A – Adequate

Study	**Galask 1988**
Methods	Randomized. Table of random numbers in 2:1 ratio so twice as many participants received cefotetan. Not intention to treat, cannot convert.
Participants	Women for primary or repeat C/S. Inclusion: age 18 - 50, no evidence of infection, willing to forego breastfeeding for 48 hours after drug administration. Exclusion: temp >38 within 24 hours of procedure, drug allergy, renal impairment, IAI, antibiotic therapy in last 14 days, significant medical illness. N=28 lost from analysis due to other antibiotic use, infection prior to surgery, incorrect randomization or dosing schedule
Interventions	Group 1: Cefotetan 2 g iv after cord clamped (n=162). Group 2: Cefoxitin 2 g iv after cord clamped and two further doses (2 g iv) at 6 and 12 hours after the first (n=79).
Outcomes	Endometritis (criteria not specified): Group 1: 19/162 vs Group 2: 4/79. Wound infection (criteria not specified): Group 1: 4/162 vs Group 2: 4/79. UTI (criteria not specified): Group 1: 1/162 vs Group 2: 2/79. Febrile morbidity (criteria not specified): Group 1: 1/162 vs Group 2: 0/79.
Notes	Country: U.S.
Allocation concealment	B – Unclear

Study	**Gall 1987**
Methods	Randomized, double-blind. Not intention to treat, cannot convert due to lack of data.
Participants	Women undergoing primary C/S presumed to be at increased risk. Inclusion: labor or ROM >6 hours, scalp clip >9 hours, IUPC, 3 or more vaginal examinations. N = 13 excluded after randomization due to errors in antibiotic administration.
Interventions	Group 1: Piperacillin 4 g iv after cord clamped (n=60). Group 2: Piperacillin 4 g iv after cord clamped and repeat same dose at 4 and 8 hours post first dose (n=56).
Outcomes	Endometritis - criteria not specified: Group 1: 8/60 vs Group 2: 3/56.
Notes	Country: U.S.

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Characteristics of included studies (*Continued*)

Allocation concealment	A – Adequate

Study	**Gonen 1986**
Methods	Randomized, double-blind study. Not intention to treat, cannot convert, data not supplied.
Participants	Women undergoing C/S. Exclusion: fever, infection in labor, antibiotic therapy in last 48 hours, separate indication for prophylaxis, drug allergy. N= 217 randomized, 9 excluded due to protocol deviation.
Interventions	Group 1: Cefamandole 2 g in 1 l NS, Irrigation (n=101). Group 2: Cefamandole 2 g iv after cord clamped and repeat same dose q6h x 5 doses (n=107).
Outcomes	Endometritis (temperature >38 x 2 days, excluding first 24 hours, uterine tenderness, with or without foul lochia, no other obvious cause for infection): Group 1:11/101 vs Group 2: 15/107. Wound infection (criteria not specified): Group 1: 2/101 vs Group 2: 1/107. UTI (criteria not specified): Group 1: 2/101 vs Group 2: 2/107. Any infection: Group 1: 15/101 vs Group 2: 18/107.
Notes	Country: Israel.
Allocation concealment	A – Adequate

Study	**Gonik 1985**
Methods	Randomized trial.
Participants	Women undergoing C/S. Inclusion (at least one of): labor, ROM, >3 vaginal exams, IUPC. Exclusion: drug allergy, hepatic or renal dysfunction, active infection, underlying chronic disease, antibiotic therapy in last 7 days.
Interventions	Group 1: Cefotaxime 1 g iv after cord clamped (n=50). Group 2: Cefotaxime 1 g iv after cord clamped and 2 additional doses (1 g iv) at 6 and 12 hour post-operation (n=50).
Outcomes	Febrile morbidity (temp >38 x 2 occasions 4 hours apart, excluding first 24 hours post-operation): Group 1: 5/50 vs Group 2: 10/50. Endometritis (fever, uterine tenderness and foul lochia): Group 1:5/50 vs Group 2: 7/50.
Notes	Country: U.S.
Allocation concealment	A – Adequate

Study	**Hager 1991**
Methods	Prospective, randomized, double-blind. Not intention to treat, cannot convert.
Participants	Women undergoing C/S. Inclusion: age >18, no drug allergy, in labor or ROM present. Exclusion: elective C/S, current antibiotic therapy, chronic renal or hepatic disease.
Interventions	Group 1: Cefazolin 1 g iv after cord clamped (N=63). Group 2: Cefoxitin 2 g iv after cord clamped (N=66). Group 3: Cefotaxime 1 g iv after cord clamped (N=60).
Outcomes	Endometritis (temp elevation, uterine tenderness, foul lochia, leukocytosis >15,000):

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	Group 1: 4/63 vs Group 2: 9/66 vs Group 3: 5/60. UTI: (>50,000 CFU/mL): Group 1: 1/63 vs Group 2: 0/66 vs Group 3: 0/60. Bacteremia (criteria not specified): Group 1: 2/63 vs Group 2: 1/63 vs Group 3: 0/60.
Notes	Country: U.S.
Allocation concealment	B – Unclear

Study	**Hartert 1987**
Methods	Randomized. Not intention to treat analysis, cannot convert since data not included.
Participants	Women undergoing C/S. Exclusion: infection, antibiotic therapy in last 24 hours, temperature >38, drug allergy. 158 women enrolled, 19 excluded from analysis due to major protocol violations (n=139).
Interventions	Group 1: Cefonicid 1 g iv after cord clamped (n=81). Group 2: Cefoxitin 2 g iv after cord clamped and again at 6, 12 and 18 hours after first dose (n=58).
Outcomes	Endometritis (fever, uterine tenderness with/without foul lochia: Group 1: 14/81 vs Group 2: 7/58. UTI (symptoms with/without culture): Group 1: 2/81 vs Group 2: 1/58. Wound infection (criteria not specified) Group 1: 1/81 vs Group 2 0/58.
Notes	Study group numbers do not seem balanced. Country: U.S.
Allocation concealment	B – Unclear

Study	**Hawrylyshyn 1983**
Methods	Randomized, double-blind, control trial. Not intention to treat analysis, cannot convert. Placebo arm, data not included due to purpose of this review.
Participants	Woman undergoing C/S, felt to be high-risk. Inclusion: ROM and labor prior to C/S. Exclusion: fever >38 at time of C/S, drug allergy, antibiotic therapy in last 24 hours, hepatic or renal disease. N=189, 58 in placebo arm excluded. N= 7 excluded from analysis due to fever in first 24 hours post-operation, required therapy.
Interventions	Group 1: Cefoxitin 2 g iv after cord clamped (n=64). Group 2: Cefoxitin 2 g iv after cord clamped and two further same doses at 4 and 8 hour post first dose.
Outcomes	Febrile morbidity (temperature >38 x 2, 8 hours apart, excluding first 24 hours post-operation): Group 1: 8/64 vs Group 2: 5/60. Endometritis (fever, foul liquor, or uterine tenderness) Group 1: 6/64 vs Group 2: 3/60. UTI (fever, pos culture, with or without dysuria): Group 1: 4/64 vs Group 2: 2/60. Wound infection (fever, cellulitis, or exudate): Group 1: 1/64 vs Group 2: 1/60.
Notes	Country: Canada.
Allocation concealment	A – Adequate

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Characteristics of included studies (*Continued*)

Study	**Itskovitz 1979**
Methods	State women assigned at random according to day of admission. Three groups of women, one a placebo group. Objective of this review is to compare different regimens, therefore, the data from the placebo arm is excluded.
Participants	Women undergoing C/S for various reasons, N=150. Exclusion criteria: drug allergy, ROM > 24 hours, asymptomatic bacteriuria preoperative.
Interventions	Group 1: n=50. Women given cephalothin 1 g iv within 1 hour post-operation and continued1g iv q6h x 24 hours, then cephalexin 500 mg po q6h until day 5 post-operation. Group 2: n=50. Women given ampicillin 500 mg im within 1 hour post-operation and then 500 mg im q6h x 48 hrs, then ampicillin 500 mg po q6h to day 5 post-op.
Outcomes	Endometritis (fever, uterine tenderness, foul lochia) Group 1: 5/50 vs Group 2: 8/50. UTI (fever, urinary symptoms, positive culture) Group 1:3/50 vs Group 2: 5/50. Wound infection (fever, cellulitis, exudate) Group 1: 0/50 vs Group 2: 1/50. Pneumonitis (fever, abnormal P/E or XR findings) Group 1: 0/50 vs Group 2: 1/50.
Notes	Antibiotics started post-operatively (within first post-op hour). No adverse drug reactions. No report of hospital stay or neonatal morbidity. Country: Israel.
Allocation concealment	B – Unclear

Study	**Jakobi 1988**
Methods	Randomized study. Intention to treat analysis. Placebo arm and related data excluded due to objectives of this review.
Participants	100 women requiring C/S Exclusion: elective C/S, ROM < 3h, 2 or fewer vaginal exams, temperature >38, drug allergy ROM >24 hours.
Interventions	Group 1: Cefazolin 1 g iv after cord clamped (n=50). Group 2: Cefazolin 1 g iv after cord clamped and two additional same doses at 8 and 16 hours post-operation (n=50).
Outcomes	Febrile morbidity (temp >38 x 2, 4 hour apart, excluding first 24 hours post-operation): Group 1: 9/50 vs Group 2:6/50. Endometritis (fever, uterine tenderness, foul lochia): Group 1: 3/50 vs Group 2: 4/50. UTI (fever, with or without dysuria, positive culture): Group 1: 4/50 vs Group 2: 0/50. Wound infection (fever, cellulitis or exudate): Group 1: 0/50 vs Group 2: 1/50.
Notes	Country: Israel.
Allocation concealment	A – Adequate

Study	**Koppel 1992**
Methods	Randomized, double-blind trial. Intention to treat analysis.

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Characteristics of included studies (*Continued*)

Participants	Women undergoing C/S. Switzerland, Cantonal Hospital; Winterthur. Exclusion Criteria: drug allergy, antibiotic therapy in the last 2 weeks.
Interventions	Group 1: Cefotaxime 1 g iv after cord clamped (N=59). Group 2: Ampicillin plus clavulanic acid, 1.2 g iv after cord clamped (N=60).
Outcomes	Endometritis (temperature >37.5, uterine tenderness): Group 1: 1/59 vs Group 2: 1/60. Urinary Tract Infection (>10 exp 4 orgs/mL): Group 1: 1/59 vs Group 2: 2/60. Wound Infection (criteria not specified): Group 1: 0/59 vs Group 2: 3/60. Febrile Morbidity (any cause, temperature >37.5 after 3 days post -operation): Group 1: 7/59 vs Group 2: 8/60.
Notes	Language - German. No data on hospital stay, neonatal morbidity, adverse drug reactions.
Allocation concealment	A – Adequate

Study	**Kreutner 1979**
Methods	Randomized triple-blind allocation, no details given. Three groups, one a placebo arm. As the objective of this review is to study different regimens only the first two groups are compared.
Participants	All women became candidates when the decision was made to perform primary C/S. A few women for repeat C/S became candidates if they presented with SROM, labor, obesity or chronic medical conditions associated with increased infectious risk. Exclusion criteria: signs of infection (temp .38, IAI), allergy to pen/cephalosporin, antibiotic treatment in last 14 days, unable to obtain consent.
Interventions	N=120. Group 1: 1 g cephalothin iv “on call to OR” and again two and eight hours post-operation (n=48). Group 2: 1 g cefamandole iv, timing of administration as above (n=43).
Outcomes	Febrile morbidity (temperature >38 x 2 days, excluding first 24 hours) Group 18/48; Group 2 12/43. Febrile morbidity (above) then broken down by cause: Endometritis (fever, uterine tenderness) Group 1 15/48; Group 2 10/43. UTI (fever, positive urine culture, symptomatic) Group 1 3/48; Group 2 1/43. Wound infection (fever, exudate or cellulitis) Group 1 0/48; Group 2 1/43.
Notes	Imbalance in randomized groups not accounted for: Group 1: 48, Group 2: 43 and their placebo group Group 3, n=29). Mean length of hospital stay: Group 1: 6.2 days vs Group 2: 5.4 days. No data on neonatal morbidity or adverse drug reactions. Country: U.S.
Allocation concealment	B – Unclear

Study	**Lavery 1986**
Methods	Antibiotic administration ’randomized’ by staff who selected unidentified envelopes at surgery. Lavage and intravenous routes combined in this study.

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Characteristics of included studies (*Continued*)

Participants	High risk population, primarily indigent women in urban locale. 212 consecutive women requiring emergency C/S. Exclusion criteria: elective, primary or repeat Cesarean section, signs of infection, allergy to penicillin, antibiotic treatment in the preceding 7 days.
Interventions	Intravenous administration of 4 g mezlocillin after the cord was clamped (n=59, Group1). Irrigation during closure of 4 g mezlocillin in 1 L NS (n= 49, Group2). Intravenous administration of 4 g mezlocillin after the cord was clamped plus 4 g given iv , four and eight hours after the procedure (n = 54, Group3). Irrigation with 2 g mezlocillin in 1L NS and 2 g mezlocillin given iv after the cord was clamped (n=50, Group 4).
Outcomes	Surgically related infection (SRI), including endometritis, wound infection, sepsis and abscess. Endometritis present if uterine tenderness, foul lochia, temp > 38 x 2 occasions (excluding first 24 hours), wbc > 15, and no other identifiable cause. Sepsis required positive blood culture. Group 1 11/59: Group 2 9/49: Group 3 12/54: Group 4 6/50. Total febrile morbidity defined as "other factors associated with fever but not related to the surgical procedure" and requiring additional antibiotics Group 1 12/59: Group 2 10/49: Group 3 10/54: Group 4 7/50
Notes	Data taken for the lavage vs any systemic regimen (Groups 1 and 2 only). Outcome of SRI not specific enough for our review criteria, study only included for its data on febrile morbidity. Country: U.S.
Allocation concealment	B – Unclear

Study	**Leonetti 1989**
Methods	Randomized, blinded, placebo control trial. Placebo arm data excluded from this review. Intention to treat.
Participants	Patients for C/S (primary, after onset of labor). Largely a low socioeconomic, indigent population.
Interventions	Group 1: Piperacillin 4 g iv after cord clamped (N=50). Group 2: Piperacillin 4 g iv after cord clamped, then repeat dose at 4 and 8 hours after first dose (N=50).
Outcomes	Febrile morbidity (temperature >38, 6 hours apart, excluding first 24 hours post-operation): Group 1: 5/50 vs Group 2: 5/50. Endometritis (temp >38, uterine tenderness, foul lochia): Group 1: 5/50 vs Group 2: 5/50. No patients developed UTI or wound infection.
Notes	Mean hospital stay: Group 1: 5.2 days vs Group 2: 5.1 days. Country: U.S.
Allocation concealment	A – Adequate

Study	**Leveno 1984**
Methods	Randomized, double-blind. Intention to treat.
Participants	Women undergoing C/S with ROM > 6 hour, whose indication for C/S was CPD
Interventions	Group 1: Cefamandole 2 g by lavage (N=51). Group 2: Cefamandole 2 g iv after cord clamped and 2 repeat doses q6h (N=52).
Outcomes	Endometritis (criteria not specified) Group 1: 16/51 vs Group 2: 11/52
Notes	Country: U.S.

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Characteristics of included studies (*Continued*)

Allocation concealment	A – Adequate

Study	**Levin 1983**
Methods	Randomized, double-blind control trial. Placebo arm data not included due to objective of this review. Not intention to treat, cannot convert.
Participants	Women undergoing C/S. Exclusion: fever, evidence of infection, drug allergy. N=132, 4 lost due to deviation from protocol.
Interventions	Group 1: Cefoxitin 2 g in 1L NS by irrigation (N=41). Group 2: Cephapirin 2 g in 1L NS by irrigaiton (N=44).
Outcomes	Endometritis (temp >100.4, uterine tenderness, foul lochia, no other cause for infection): Group 1: 1/41 vs Group 2: 4/44. Wound infection: No cases. UTI (>10 exp 5 orgs/ml): Group 1: 2/41 vs Group 2: 1/44.
Notes	Mean hospital stay: Group 1: 4.9 days vs Group 2: 4.8 days. No information on neonatal morbidity or drug reactions. Country: U.S.
Allocation concealment	A – Adequate

Study	**Lewis 1990**
Methods	Randomized, double-blind, control. Control arm data not included due to objective of review. Not intention to treat (cannot convert).
Participants	Indigent population of women undergoing C/S. N=396, 9 excluded due to incomplete charts. Exclusion: antibiotic therapy in last 14 days, drug allergy.
Interventions	Group 1: Ticarcillin 5 g in 1.2 L NS, by irrigation (N=152). Group 2: Cefoxitin 2 g in 1.5 L NS, by irrigation (N=135).
Outcomes	Endometritis (criteria not specified): Group 1: 35/152 vs Group 2: 30/135. Wound infection (criteria not specified): Group 1: 3/152 vs Group 2: 4/135. UTI (criteria not specified): Group 1: 3/152 vs Group 2: 5/135 No patients with sepsis.
Notes	Mean length of hospital stay: Group 1: 4.5 days vs Group 2: 4.4 days. No measures of neonatal morbidity or adverse drug reactions. Country: U.S.
Allocation concealment	A – Adequate

Study	**Louie 1982**
Methods	Randomized, double-blind, placebo control. Placebo arm data not included Intention to treat.
Participants	All women for non-elective C/S. Inclusion: active labor with ROM, afebrile, no drug allergy, no antibiotic therapy in last 14 days.
Interventions	Group 1: Ampicillin 1 g iv after cord clamped and 2 further doses at 6 and 12 hours post-operation (N=60).

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	Group 2: Cefazolin 1 g iv after cord clamped and 2 further doses at 6 and 12 hours post-operation (N=70). Group 3: Cefotaxime 1 g iv after cord clamped and 2 further doses at 6 and 12 hours post-operation (N= 58).
Outcomes	Endometritis (temperature >38, foul lochia, uterine tenderness): Group 1: 2/60 vs Group 2: 3/70 vs Group 3: 4/58. UTI (>10 exp 5 org/mL w or w/o dysuria, or fever): Group 1: 2/60 vs Group 2: 3/70 vs Group 3: 1/58. Wound Infection: Group 1: 2/60 vs Group 2: 1/70 vs Group 3: 1/58. Febrile morbidity (temp >38 x 2, 6 hr apart, excluding first 24 hr) Group 1: 6/60 vs Group 2: 5/70 vs Group 3: 5/58.
Notes	Mean hospital stay according to 'success -no complications of infectious nature'; Group 1: 7.11 days vs Group 2: 6.5 days vs Group 3: 6/18 days. Also recorded same for 'failure -any infectious complication': Group 1: 8.12 days vs Group 2: 8.71 days vs Group 3: 7.14 days. Country: Canada.
Allocation concealment	A – Adequate

Study	**Mansueto 1989**
Methods	Randomized trial. Intention to treat.
Participants	Non-elective C/S. Exclusion: drug allergy, renal dysfunction, temperature >38, antibiotic therapy in last 48 hours
Interventions	Group 1: Imipenem 500 mg iv after cord clamped (N=22) Group 2: Cefotaxime 1 g iv after cord clamped and 3 additional doses q12h (N=26).
Outcomes	Endometritis (criteria not specified): Group 1: 1/22 vs Group 2: 1/26. Febrile morbidity (criteria not specified): Group 1: 0/22 vs Group 2: 1/26.
Notes	Language: Italian. Country: Italy. No data on hospital stay, neonatal morbidity or drug reactions.
Allocation concealment	A – Adequate

Study	**Masse 1988**
Methods	Patient allocation by hospital ID number. Intention to treat.
Participants	Women for non-elective C/S, labor or ROM, N=255. Exclusion: no labor, intact membranes, antibiotics in last 48 hours, temperature > 38 in last 24 hours, drug allergy.
Interventions	Group 1: Cefoxitin 2 g iv after cord clamped (N=103). Group 2: Cefoxitin 2 g iv after cord clamped, and two additional doses at 6 and 12 hours after first dose (N= 152).
Outcomes	Endometritis (criteria not specified): Group 1: 4/103 vs Group 2: 5/152. Other infectious morbidity (includes UTI, wound infection): Group 1: 4/103 vs Group 2: 7/152.
Notes	Language: French. Country: Canada.
Allocation concealment	C – Inadequate

Study	**Mathelier 1992**
Methods	Subjects alternately assigned to treatment groups. Intention to treat.
Participants	Women for C/S.

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Characteristics of included studies (*Continued*)

	Indigent population. Exclusion: IAI, evidence of other infection.
Interventions	Group 1: Cefazolin 2 g iv after cord clamped and saline irrigation of abdomen (N=154). Group 2: Cefazolin 1 g iv after cord clamped and cefazolin 1 g in 500 cc NS, by irrigation (N=154).
Outcomes	Endometritis and wound infection (grouped together in their analysis - unable to separate): Endo: temp >38, tachycardia, uterine tenderness, foul lochia. Wound: purulent discharge or extensive cellulitis in incision: Group 1: 13/154 vs Group 2: 2/154. UTI (dysuria, urgency, frequency, fever, flank pain or bacteriuria): Group 1: 1/154 vs Group 2: 2/154.
Notes	Country: U.S.
Allocation concealment	C – Inadequate

Study	**McGregor 1986**
Methods	Randomized, blinded. Computer generated randomization schedule; Ratio assigned 2:1 for cefotetan vs cefoxitin). Intention to treat.
Participants	Women undergoing C/S in presence of ROM and/or labor who denied drug allergy. Exclusion: temp >38 within 24 hours of C/S, drug allergy, renal dysfunction, severe medical illness, IAI, antibiotic therapy in last 14 days.
Interventions	Group 1: Cefotetan 2 g iv after cord clamped (N=46). Group 2: Cefoxitin 2 g iv and 2 further doses at 4 and 8 hours post-operatively (N=24).
Outcomes	Endometritis (temp >38, uterine tenderness, positive culture, no other identifiable cause of infection) Group 1: 7/46 vs Group 2: 2/24. Wound infection (no criteria stated) Group 1: 4/46 vs Group 2: 4/24. UTI (no criteria stated) Group 1: 1/46 vs Group 2: 0/24.
Notes	Country: U.S. Mean hospital stay: Group 1: 4.5 days vs Group 2: 4.5 days.
Allocation concealment	A – Adequate

Study	**McGregor 1988**
Methods	Randomized, multi-centre trial. Women assigned in 2:1 ratio for cefotetan according to computer generated randomization codes. Not intention to treat (cannot convert)
Participants	Adults (18 - 50 yr) undergoing C/S, no evidence of infection and willing to forego breastfeeding for 48 hours post-drug administration. Exclusion: temperature >38 within 24 hours of procedure, drug allergy, IAI, renal dysfunction, significant underlying medical disease, antibiotic therapy in last 14 days, UTI as evidenced by positive culture. N=308 randomized, 22 excluded due to protocol violation (n=286 remaining).
Interventions	Group 1: Cefotetan 1g iv after cord clamped (N=195). Group 2: Cefoxitin 2 g iv after cord clamped and two additional doses at time 4 and 8 hours post-operatively (N=91).
Outcomes	Endometritis (criteria not specified): Group 1 8/195 vs Group 2: 10/91. Wound infection (cellulitis with or without exudate): Group 1: 5/195 vs Group 2: 3/91. UTI (criteria not specified): Group 1: 0/195 vs Group 2: 1/91.
Notes	Country: U.S.

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	No data on hospital stay, neonatal outcomes.
Allocation concealment	A – Adequate

Study	**Neuman 1990**
Methods	Randomized study - according to last digit of hospital ID number. Not intention to treat, cannot convert.
Participants	Women undergoing C/S. Exclusion: drug allergy, antibiotic therapy in last 10 days, those requiring SBE prophylaxis, evidence of infection.
Interventions	Group 1: Pen G 10 million units iv after cord clamped and tetracycline 250 mg im after cord clamped. Repeat dose of tetracycline (as above) 12 hours later (N=96). Group 2: As above exactly but with addition of Ampicilin (2 g) and tetracycline (1.5 g) per day, to complete 3 days (N=87).
Outcomes	Febrile morbidity (temperature >38 x2 occasion, 4 hours apart, excluding first 24 hours): Group 1: 14/96 vs Group 2: 11/87. Endometritis: Group 1: 7/96 vs Group 2: 3/87. Wound infection: Group 1: 5/96 vs Group 2: 6/87. UTI: Group 1: 3/96 vs Group 2: 1/87. (No criteria specified for above three) Other serious infection (sepsis, pneumonia): Group 1: 1/96 vs Group 2: 1/87.
Notes	Intervention not clear regarding frequency and route of antibiotics. No data on hospital stay, neonatal morbidity. Country: Israel.
Allocation concealment	C – Inadequate

Study	**O'Leary 1986**
Methods	Randomized, non-blind. Randomization done by hospital number. Intention to treat.
Participants	Women undergoing primary C/S after onset of labor. Indigent population. Exclusion: febrile, drug allergy, infection present.
Interventions	Group 1: Ampicillin 2 g iv 'intraoperatively' and 7 additional doses q6h (N=61). Group 2: Ampicillin 2 g iv as above plus addition of Gentamicin 1mg/kg after cord clamped and q8h x 6 doses (N=62).
Outcomes	Febrile morbidity (temperature >37.9 x2, 6 hours apart, at least 24 hours post-operatively): Group 1: 19/61 vs Group 2: 12/62. Endometritis (tender uterus, foul lochia, temperature >37.9): Group 1: 13/61 vs Group 2: 5/62. Wound infection (no criteria): Group 1: 1/61 vs Group 2: 1/62. UTI (no criteria): Group 1: 1/61 vs Group 2: 1/62.
Notes	Mean hospital stay: Group 1: 6.7 days vs Group 2: 5.3 days. No data on neonatal morbidity or drug reactions. Country: U.S.
Allocation concealment	C – Inadequate

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Characteristics of included studies (*Continued*)

Study	**Parsons 1985**
Methods	Randomized, control trial. Not intention to treat (7 excluded due to protocol violations), cannot convert.
Participants	Women for primary or repeat C/S in presence of one or more risk factors (ROM, obesity, toxemia). Exclusion: age under 18, drug allergy, temperature >38, signs of infection, significant underlying disease that would interfere with evaluation of response, need for prophylaxis for another reason or antibiotic therapy in last 7 days, renal impairment. N=159 (7 excluded as above).
Interventions	Group 1: Cefonicid 1 g iv after cord clamped (N=90). Group 2: Cefoxitin 2 g iv after cord clamped and 4 additional doses (N=62).
Outcomes	Febrile morbidity (temperature >38 x2 occasions, excluding first 24 hours): Group 1: 33/90 vs Group 2: 17/62. Infectious morbidity (endometritis +/- UTI): Group 1: 9/0 vs Group 2: 8/62. Wound infection: Group 1: 0/90 vs Group 2: 1/62.
Notes	Discrepancy in numbers between groups yet state 'randomized'. Country: U.S.
Allocation concealment	B – Unclear

Study	**Peterson 1990**
Methods	Randomized, double-blind. Intention to treat.
Participants	Women undergoing non-elective C/S (defined as in labor with ROM). Exclusion: drug allergy, patient on antibiotics, those with evidence of infection, those requiring SBE prophylaxis.
Interventions	Group 1: Cefazolin 2g iv after cord clamped (N=47). Group 2: Cefamandole 2 g iv after cord clamped (N=59). Group 3: Cefazolin 2 g in 1 L NS by lavage (N=47). Group 4: Cefamandole 2 g in 1 L NS by lavage (N=54).
Outcomes	Endometritis (temperature >38, >24 hour post-operatively, uterine tenderness, absence of other localizing findings): Group 1: 6/47 vs Group 2: 6/59 vs Group 3: 5/47 vs Group 4: 5/54. Wound infection (cellulitis and/or purulent exudate): Group 1: 0/47 vs Group 2: 2/59 vs Group 3: 0/47 vs Group 4: 0/54. UTI (>10 exp 5 orgs/mL): Group 1: 0/47 vs Group 2: 1/59 vs Group 3: 1/47 vs Group 4: 1/54.
Notes	No data on hospital stay, neonatal morbidity or adverse drug reactions. For this review, data from the lavage arms have been compared with the systemic arms. Country: U.S.
Allocation concealment	A – Adequate

Study	**Rehu 1980**
Methods	Four groups of women (first 3 assigned 'at random' - fourth made of women with allergy to medications or undergoing emergency C/S). As groups 3 and 4 were placebo arms, only the first two groups are compared to one another (Double blind analysis).
Participants	All women undergoing C/S between (September 1977 to January 1978). Exclusion criteria: Women already being administered antibiotics for other reasons.
Interventions	Group 1: 10 million units of benzyl penicillin in 1 L of 5% glucose solution (n=46).

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	Group 2: 500 mg clindamycin in 1L of 5% glucose solution and 80 mg of gentamicin (n=42) Solutions were infused starting 30 minutes prior to C/S and the gentamicin in Group 2 was given by im injection 30 minutes prior to the procedure.
Outcomes	Endometritis (Two of: temperature >37.5 x 2 occasions, excluding first 24 hours/foul vaginal discharge/ uterine tenderness): Group 1 3/46 vs Group 2 4/42. Wound infection (criteria of Karl et al. NEJM 1966:275: 305-8) : Group 1 2/46 vs Group 2 2/42.
Notes	Mean duration of hospital stay: Group 1: 7.8 days vs Group 2: 7.6 days. No data on neonatal morbidity or adverse drug reactions. Country: Finland.
Allocation concealment	B – Unclear

Study	**Roex 1987**
Methods	Randomized, double-blind. Not intention to treat, cannot convert.
Participants	All women delivered by C/S. Exclusion: drug allergy, impaired renal or hepatic function, evidence of infection, antibiotic therapy in last 7 days, 'protocol failures'.
Interventions	Group 1: Cefoxitin 2 g iv after cord clamped (N=66). Group 2: Cefoxitin 2 g iv after cord clamped and 2 additional doses of 1g iv at 6 and 12 hours post-operatively (N=72).
Outcomes	Febrile morbidity (temperature >38 for 24 hours, excluding first 24 hours after C/S): Group 1: 19/66 vs Group 2: 11/72. Endometritis (fever, foul lochia, and/or uterine tenderness) Group 1:5/66 vs Group 2: 1/72. Wound infection (palpable induration, wound dehiscence and/or pus): Group 1: 7/66 vs Group 2: 1/72. UTI (>10 exp 5 org/mL): Group 1: 3/66 vs Group 2: 0/72.
Notes	Country: The Netherlands. No data on hospital stay, neonatal outcomes, drug reactions.
Allocation concealment	A – Adequate

Study	**Saltzman 1986**
Methods	Randomized double blind study, mechanism not stated.
Participants	151 women undergoing primary C/S who were in active labor and/or had ROM longer than 6 hours. Exclusion criteria: temperature >38, signs of active infection, antimicrobial use within last 72 hours, drug allergy.
Interventions	Group 1: Mezlocillin 4 g iv after cord clamped (single drug dose), n=51. Group 2: Mezlocillin 4 g iv after cord clamped and two additional doses (4g iv) q 4 h, n=51. Group 3: Cefoxitin 2 g iv after cord clamped and two additional doses (2 g iv) q 4 h, n=49.
Outcomes	Febrile morbidity (temperature >38 x 2, 8 hours apart, excluding first 24 hours post-operatively: Group 1: 3/51 vs Group 2: 1/51 vs Group 3: 3/49. Endometritis (temperature >38 plus foul lochia or uterine tenderness: Group 1: 3/51 vs Group 2: 2/51 vs Group 3: 2/49. Wound infection (wound surrounded by cellulitis and/or draining purulent material: Group 1: 0/51 vs Group 2: 1/51 vs Group 3: 3/49. Urinary tract infection (>10 exp 5 orgs/mL in culture): Group 1: 6/51 vs Group 2: 4/51 vs Group 3: 9/49

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Characteristics of included studies (*Continued*)

Notes	For the subgroup analysis 'Any single dose regimen vs multiple dose regimen', outcomes for groups 2 and 3 were combined. Country: U.S. No data on hospital stay, neonatal outcomes, drug reactions.
Allocation concealment	B – Unclear

Study	**Saravolatz 1985**
Methods	Randomized, double-blind. Not intention to treat, cannot convert.
Participants	All women undergoing C/S with ROM for 3 hours or more, all were >18 years of age. Exclusion: drug allergy, antibiotic therapy in last 72 hours, women were 'likely' to receive other antibiotics, evidence of intrapartum infection.
Interventions	Group 1: Ceforanide 2 g iv after cord clamped (N=34). Group 2: Ceforanide 2 g in 1L NS by irrigation (N=27).
Outcomes	Endometritis (purulent cervical discharge, uterine tenderness, temperature >38): Group 1: 4/34 vs Group 2: 3/27. Wound infection (purulent drainage from wound) Group 1: 0/34 vs Group 2: 1/27. UTI (>10 exp 5 org/mL with fever, dysuria, frequency or CVA tenderness): Group 1: 2/34 vs Group 2: 1/27. Febrile morbidity (temperature >38 x2 days consecutively, excluding first 24 hours): Group 1: 7/34 vs Group 2: 6/27.
Notes	Country: U.S. Mean hospital stay: Group 1: 7.7 days vs Group 2: 6.55 days.
Allocation concealment	A – Adequate

Study	**Scarpignato 1982**
Methods	Randomized placebo-control trial. Placebo arm data excluded due to objective of this review.
Participants	Women undergoing non-elective C/S. Exclusion: drug allergy, severe renal disease, history of pelvic infections.
Interventions	Group 1: Cefuroxime 750 mg im 30 to 60 minutes pre-op and again post-operatively at 8 and 16 hour (N= 19). Group 2: Cefuroxime 750 mg im tid to complete 5 days of therapy, First dose post-operatively after return of patient to the ward (N=20).
Outcomes	Endometritis (criteria not defined): Group 1: 0/19 vs Group 2: 2/20 Febrile morbidity (temperature >38 x 2 occasions, 6 hours apart, excluding first 24 hours post-operation): Group 1: 0/19 vs Group 2 2/20.
Notes	Country: Italy. Mean hospital stay: Group 1: 7.0 days vs Group 2: 7.2 days.
Allocation concealment	A – Adequate

Study	**Stiver 1983**
Methods	Randomized double-blind, placebo-control trial. Not intention to treat. Placebo arm data excluded.
Participants	All women undergoing non-elective C/S.

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Characteristics of included studies (*Continued*)

	Inclusion: labor or ROM or both undergoing primary or repeat C/S.
Interventions	Group 1: Cefoxitin 2g iv after cord clamped (N=124). Group 2: Cefazolin1g iv after cord clamped (N=119).
Outcomes	Endometritis (uterine and/or adnexal tenderness, accompanied by fever with or without purulent vaginal discharge: Group 1: 5/124 vs Group 2: 3/119. Wound infection (redness, induration, tenderness, and/or purulent discharge from incision line): Group 1: 2/124 vs Group 2: 4/119. Septic Shock: Group 1: 0/124 vs Group 2: 1/119.
Notes	Mean duration of hospital stay: Group 1: 7.3 days vs Group 2: 7.4 days. No data on adverse drug reaction or neonatal morbidity. Country: Canada.
Allocation concealment	A – Adequate

Study	**Tassi 1987**
Methods	Randomized study. Intention to treat.
Participants	Women undergoing non-elective C/S. Exclusion: evidence of infection/fever, antibiotic therapy in last 14 days, drug allergy, intraoperative use of antibiotics.
Interventions	Group 1: Ceftazidime 2 g im 1 hour pre-op (N=100). Group 2: Ceftazidine 1 g im 1 hour pre-op and 2 additional doses q6h (N=100).
Outcomes	No cases of endometritis. Wound infection (infiltrated suture, possibly with serous or purulent drainage): Group 1: 3/100 vs Group 2: 1/100. UTI (suggestive signs and symptoms in presence of positive culture): Group 1: 0/100 vs Group 2: 1/100. Febrile morbidity (temperature >38, persisting beyond post-op day 2 with a continuous or remittent course, but no local general or other evidence of infection): Group 1: 1/100 vs Group 2: 3/100.
Notes	Country: Italy.
Allocation concealment	A – Adequate

Study	**Varner 1986**
Methods	State women were randomized, allocation schedule provided by Stuart Pharmaceuticals. Total 36 women randomized to cefotetan or cefoxitin in a 2:1 ratio (7 women excluded as per exclusion criteria after randomization).
Participants	Women scheduled for primary or repeat C/S. Exclusion criteria: temperature >38 within 24 hours of surgery, drug allergy, renal impairment (serum creatinine of 2.5 mg/100 ml or greater), serious underlying disease, IAI, patients receiving antibiotics within last 14 days.
Interventions	Group 1: 2 g cefotetan iv after cord clamping (n=20). Group 2: 2 g cefoxitin iv after cord clamping and 2g iv at time 4 and 8 hours post-operatively (n=9)
Outcomes	Wound infection (method of Karl et al. NEJM 1966:275:305-8) Group 1: 3/20 vs Group 2: 1/9. Bacteriologic Failure (positive post-operatively endometrial culture) Group 1: 2/20 vs Group 2: 0/9
Notes	Country: U.S. Mean hospital stay: Group 1: 6.1 days vs Group 2: 6.4 days.

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Characteristics of included studies (*Continued*)

Allocation concealment	B – Unclear

Study	**Wells 1994**
Methods	Randomized trial, placebo control. Placebo data excluded due to objective of this review. Intention to treat.
Participants	Women undergoing non-elective C/S.
Interventions	Group 1: Metronidazole 1 g pr after cord clamped (N=28). Group 2: Metronidazole 1 g pr after cord clamped and Cefuroxime 750 mg iv after cord clamped.
Outcomes	Infectious morbidity (temperature >38, 24 hours post-operatively, endometritis, wound infection, and UTI): Group 1: 5/28 vs Group 2: 1/28.
Notes	Abstract only. Country: England.
Allocation concealment	A – Adequate

Study	**von Mandach 1993**
Methods	Randomized study - according to first letter of surname. Intention to treat.
Participants	Women for C/S. Exclusion: antibiotics in last 14 days.
Interventions	Group 1: Ceftriaxone 1 g iv after cord clamped (N=536). Group 2: Cefoxitin 1 g if after cord clamped and 2 additional doses at 8 and 16 hours after first dose (N= 516).
Outcomes	Febrile morbidity (temperature >38 x 2 occasions, excluding first 24 hours post-operation). Group 1: 14/536 vs Group 2: 10/516. Endometritis: fever, foul lochia, tender uterus Group 1: 4/536 vs Group 2: 3/516. Wound infection: infected operative site with purulent drainage and positive bacteriology Group 1: 17/536 vs Group 2: 20/516. UTI: >10 exp 4 organisms/mL, positive culture Group 1: 52/536 vs Group 2: 92/516.
Notes	Mean length of hospital stay: Group 1: 11.33 days vs Group 2: 11.47 days. Adverse drug reactions: Group 1: 11/536 vs Group 2: 10/516 includes rash, pruritis. There were 3 cases of C.diff colitis in the ceftriaxone group Country: Switzerland
Allocation concealment	C – Inadequate

Cdiff = clostridia difficile
CPD = cephalopelvic disproportion
C/S = cesarean section
IAI = intra-amniotic infection
ID = identity
IL = one litre
IUPC -intrauterine pressure catheter
IV = intravenous
NS = normal saline
PO = by mouth
Q4H = every four hours
ROM = rupture of membranes
SBE = subacute bacterial endocarditis

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SPVT = septic pelvic vein thrombophlebitis
SRI = surgically related infection
SROM = spontaneous rupture of membranes
SVE = spontaneous vaginal examination
UCLA = university of California at Los Angeles
UTI = urinary tract infection
WBC = white blood cell count
YR = year

Characteristics of excluded studies

Study	Reason for exclusion
D'Angelo 1980	Comparison of short versus long-course prophylactic antibiotic treatment: Authors do not list dose of drug at time of first administration, nor do they indicate the time of administration (pre-operative, cord clamp) The authors are not even clear about the identity of the drug which begins the prophylactic regimen. They state that it is a random study but provide no details of mechanism.
DePalma 1980	At the start of the study, two arms; one a no treatment arm, the other composed of women given either cefamandole or penicillin plus gentamicin. It would have been possible to try and dissect important information from the study except that they changed the antibiotic regimen after treating 57/105 women in the cefamandole subgroup. A cointervention (addition of chloramphenicol) was also applied to 3/105 women in the cefamandole subgroup and 4/104 women in the pen/gent arm.
DePalma 1982	Timing of delivery of antibiotics for prophylaxis not specified. Authors state antibiotics given within 90 minutes of delivery with no indication as to whether these might have been given pre-, post or intraoperatively. Mechanism of randomization clearly inadequate.
Flaherty 1983	Comparison of pharmacokinetics of cefoxitin when administered by intravenous versus intraperitoneal lavage. Outcome variable of interest: concentration of drug in decidua. No outcomes of interest in our review are listed or were collected (ie febrile morbidity, endometritis, etc).

ANALYSES

Comparison 02. 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Febrile Morbidity	5	1008	Peto Odds Ratio 95% CI	1.15 [0.84, 1.58]
02 Endometritis	10	2778	Peto Odds Ratio 95% CI	1.21 [0.97, 1.51]
03 Wound Infection	7	1218	Peto Odds Ratio 95% CI	1.21 [0.55, 2.67]
04 Urinary Tract Infection	8	1284	Peto Odds Ratio 95% CI	1.35 [0.78, 2.35]
05 Other serious infection (septic shock, abscess, septic pelvic vein thrombophlebitis)	3	819	Peto Odds Ratio 95% CI	3.34 [0.58, 19.31]

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Comparison 03. Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Febrile Morbidity	2	383	Peto Odds Ratio 95% CI	0.74 [0.41, 1.36]
02 Endometritis	5	1848	Peto Odds Ratio 95% CI	0.78 [0.58, 1.05]
03 Wound Infection	4	957	Peto Odds Ratio 95% CI	1.00 [0.54, 1.87]
04 Urinary Tract Infection	3	674	Peto Odds Ratio 95% CI	0.38 [0.17, 0.83]

Comparison 04. 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Febrile Morbidity	2	1195	Peto Odds Ratio 95% CI	0.82 [0.46, 1.46]
02 Endometritis	3	1841	Peto Odds Ratio 95% CI	0.74 [0.48, 1.13]
03 Wound Infection	2	1195	Peto Odds Ratio 95% CI	1.23 [0.66, 2.30]
04 Urinary Tract Infection	2	1195	Peto Odds Ratio 95% CI	1.65 [1.18, 2.30]

Comparison 05. Penicillin vs Lincosinide and Aminoglycoside

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Wound Infection	1	88	Peto Odds Ratio 95% CI	0.91 [0.12, 6.70]
02 Endometritis	1	88	Peto Odds Ratio 95% CI	0.67 [0.14, 3.10]

Comparison 07. 1st Generation Cephalosporin vs Ampicillin

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
02 Endometritis	3	908	Peto Odds Ratio 95% CI	1.27 [0.84, 1.93]
03 Wound Infection	2	240	Peto Odds Ratio 95% CI	2.75 [0.38, 19.72]
04 Urinary Tract Infection	2	240	Peto Odds Ratio 95% CI	1.56 [0.68, 3.57]
05 Other serious Infection (ie pneumonitis)	1	100	Peto Odds Ratio 95% CI	0.14 [0.00, 6.82]
06 Febrile Morbidity	1	140	Peto Odds Ratio 95% CI	1.62 [0.68, 3.84]

Comparison 08. Ampicillin vs Ampicillin and Aminoglycoside

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Febrile Morbidity	1	123	Peto Odds Ratio 95% CI	1.86 [0.83, 4.18]
02 Endometritis	1	123	Peto Odds Ratio 95% CI	2.86 [1.06, 7.75]
03 Wound Infection	1	123	Peto Odds Ratio 95% CI	1.02 [0.06, 16.44]
04 Urinary Tract Infection	1	123	Peto Odds Ratio 95% CI	1.02 [0.06, 16.44]

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Comparison 09. Carbapenem vs 2nd/3rd Generation Cephalosporin

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Febrile Morbidity	1	48	Peto Odds Ratio 95% CI	0.16 [0.00, 8.06]
02 Endometritis	1	48	Peto Odds Ratio 95% CI	1.19 [0.07, 19.75]

Comparison 10. Ampicillin vs 2nd/3rd Generation Cephalosporin

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Febrile Morbidity	3	450	Peto Odds Ratio 95% CI	0.88 [0.51, 1.52]
02 Endometritis	4	1354	Peto Odds Ratio 95% CI	0.83 [0.54, 1.26]
03 Wound Infection	3	450	Peto Odds Ratio 95% CI	1.32 [0.37, 4.74]
04 Urinary Tract Infection	3	450	Peto Odds Ratio 95% CI	0.95 [0.41, 2.22]

Comparison 11. Any lavage vs any systemic regimen

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Febrile Morbidity	4	350	Peto Odds Ratio 95% CI	1.11 [0.62, 1.96]
02 Endometritis	8	931	Peto Odds Ratio 95% CI	1.19 [0.81, 1.73]
03 Wound Infection	5	647	Peto Odds Ratio 95% CI	1.50 [0.43, 5.23]
04 Urinary Tract Infection	5	660	Peto Odds Ratio 95% CI	1.52 [0.49, 4.77]

Comparison 12. Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Febrile Morbidity	11	2406	Peto Odds Ratio 95% CI	1.32 [0.95, 1.84]
02 Endometritis	14	4348	Peto Odds Ratio 95% CI	0.92 [0.70, 1.23]
03 Wound Infection	11	2531	Peto Odds Ratio 95% CI	0.91 [0.58, 1.43]
04 Urinary Tract Infection	9	2350	Peto Odds Ratio 95% CI	0.60 [0.43, 0.83]

INDEX TERMS

Medical Subject Headings (MeSH)

*Antibiotic Prophylaxis; *Cesarean Section

MeSH check words

Female; Humans; Pregnancy

COVER SHEET

Title	Antibiotic prophylaxis regimens and drugs for cesarean section
Authors	Hopkins L, Smaill F
Contribution of author(s)	Information not supplied by author
Issue protocol first published	1998/3
Review first published	1999/2
Date of most recent amendment	19 August 2005

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Date of most recent SUBSTANTIVE amendment	01 January 1999
What's New	Information not supplied by author
Date new studies sought but none found	Information not supplied by author
Date new studies found but not yet included/excluded	Information not supplied by author
Date new studies found and included/excluded	Information not supplied by author
Date authors' conclusions section amended	Information not supplied by author
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DOI	10.1002/14651858.CD001136
Cochrane Library number	CD001136
Editorial group	Cochrane Pregnancy and Childbirth Group
Editorial group code	HM-PREG

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Analysis 02.01. Comparison 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin, Outcome 01 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin

Outcome: 01 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Kreutner 1979	18/48	12/43		13.3	1.54 [0.64, 3.67]
Carlson 1990	43/192	40/185		42.6	1.05 [0.64, 1.70]
Duff 1987	18/96	15/103		18.1	1.35 [0.64, 2.85]
Louie 1982	5/70	5/58		6.0	0.82 [0.22, 2.97]
Dashow 1986	15/70	28/143		20.0	1.12 [0.55, 2.28]
Total (95% CI)	476	532		100.0	1.15 [0.84, 1.58]

Total events: 99 (Treatment), 100 (Control)

Test for heterogeneity chi-square=1.03 df=4 p=0.91 I^2 =0.0%

Test for overall effect z=0.87 p=0.4

Analysis 02.02. Comparison 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Kreutner 1979	15/48	10/43		5.7	1.49 [0.59, 3.72]
Stiver 1983	3/119	5/124		2.4	0.62 [0.15, 2.54]
Peterson 1990	6/47	6/59		3.3	1.29 [0.39, 4.31]
Fugere 1983	1/30	1/30		0.6	1.00 [0.06, 16.37]
Carlson 1990	37/192	39/185		19.0	0.89 [0.54, 1.48]
Duff 1987	19/96	13/103		8.4	1.70 [0.80, 3.61]
Louie 1982	3/70	4/58		2.1	0.61 [0.13, 2.78]
Dashow 1986	8/70	16/143		5.9	1.02 [0.42, 2.52]
Faro 1990	93/520	108/756		51.1	1.31 [0.97, 1.78]
Lewis 1990	4/44	1/41		1.5	3.28 [0.54, 19.78]

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(. . . *Continued*)

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Total (95% CI)	1236	1542		100.0	1.21 [0.97, 1.51]
Total events: 189 (Treatment), 203 (Control)					
Test for heterogeneity chi-square=5.61 df=9 p=0.78 I^2 =0.0%					
Test for overall effect z=1.70 p=0.09					

Analysis 02.03. Comparison 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin, Outcome 03 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin

Outcome: 03 Wound Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Kreutner 1979	0/48	1/43		4.0	0.12 [0.00, 6.11]
Stiver 1983	4/119	2/124		23.8	2.06 [0.41, 10.39]
Peterson 1990	0/47	2/59		7.9	0.16 [0.01, 2.69]
Fugere 1983	2/30	0/30		8.0	7.65 [0.47, 125.22]
Carlson 1990	3/192	3/185		24.0	0.96 [0.19, 4.82]
Louie 1982	1/70	1/58		8.0	0.83 [0.05, 13.52]
Dashow 1986	3/70	4/143		24.3	1.59 [0.32, 7.89]
Total (95% CI)	576	642		100.0	1.21 [0.55, 2.67]
Total events: 13 (Treatment), 13 (Control)					
Test for heterogeneity chi-square=5.64 df=6 p=0.46 I^2 =0.0%					
Test for overall effect z=0.48 p=0.6					

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Analysis 02.04. Comparison 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin, Outcome 04 Urinary Tract Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin

Outcome: 04 Urinary Tract Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Kreutner 1979	3/48	1/43		7.6	2.52 [0.34, 18.54]
Peterson 1990	0/47	1/59		1.9	0.17 [0.00, 8.57]
Levin 1983	1/44	2/41		5.8	0.47 [0.05, 4.65]
Carlson 1990	6/192	12/185		33.9	0.48 [0.19, 1.23]
Duff 1987	3/96	3/103		11.5	1.07 [0.21, 5.44]
Louie 1982	3/70	1/58		7.6	2.32 [0.32, 16.98]
Dashow 1986	12/70	4/143		25.9	7.81 [2.65, 23.04]
Lewis 1990	1/44	2/41		5.8	0.47 [0.05, 4.65]
Total (95% CI)	611	673		100.0	1.35 [0.78, 2.35]

Total events: 29 (Treatment), 26 (Control)

Test for heterogeneity chi-square=18.18 df=7 p=0.01 I^2 =61.5%

Test for overall effect z=1.08 p=0.3

Analysis 02.05. Comparison 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin, Outcome 05 Other serious infection (septic shock, abscess, septic pelvic vein thrombophlebitis)

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 02 1st Generation Cephalosporin vs 2nd/3rd Generation Cephalosporin

Outcome: 05 Other serious infection (septic shock, abscess, septic pelvic vein thrombophlebitis)

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Stiver 1983	1/119	0/124		20.1	7.71 [0.15, 388.69]
Carlson 1990	2/192	1/185		59.9	1.88 [0.19, 18.22]
Duff 1987	1/96	0/103		20.1	7.95 [0.16, 401.53]
Total (95% CI)	407	412		100.0	3.34 [0.58, 19.31]

Total events: 4 (Treatment), 1 (Control)

Test for heterogeneity chi-square=0.61 df=2 p=0.74 I^2 =0.0%

Test for overall effect z=1.34 p=0.2

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Analysis 03.01. Comparison 03 Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin, Outcome 01 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 03 Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin

Outcome: 01 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Benigo 1986	20/136	26/147		90.9	0.80 [0.43, 1.51]
Saltzman 1986	1/51	3/49		9.1	0.34 [0.05, 2.50]
Total (95% CI)	187	196		100.0	0.74 [0.41, 1.36]

Total events: 21 (Treatment), 29 (Control)

Test for heterogeneity chi-square=0.64 df=1 p=0.42 I^2 =0.0%

Test for overall effect z=0.97 p=0.3

Analysis 03.02. Comparison 03 Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 03 Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Ford 1986	3/132	12/131		8.0	0.28 [0.10, 0.79]
Lewis 1990	35/152	30/135		28.3	1.05 [0.60, 1.82]
Saltzman 1986	2/51	2/49		2.2	0.96 [0.13, 7.03]
Faro 1990	13/155	108/756		33.3	0.60 [0.36, 1.00]
Levin 1983	35/152	30/135		28.3	1.05 [0.60, 1.82]
Total (95% CI)	642	1206		100.0	0.78 [0.58, 1.05]

Total events: 88 (Treatment), 182 (Control)

Test for heterogeneity chi-square=6.99 df=4 p=0.14 I^2 =42.8%

Test for overall effect z=1.65 p=0.1

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Analysis 03.03. Comparison 03 Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin, Outcome 03 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 03 Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin

Outcome: 03 Wound Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Lewis 1990	3/152	4/135		17.3	0.66 [0.15, 2.96]
Benigo 1986	14/136	10/147		55.7	1.57 [0.68, 3.61]
Saltzman 1986	1/51	3/49		9.8	0.34 [0.05, 2.50]
Levin 1983	3/152	4/135		17.3	0.66 [0.15, 2.96]
Total (95% CI)	491	466		100.0	1.00 [0.54, 1.87]

Total events: 21 (Treatment), 21 (Control)

Test for heterogeneity chi-square=2.81 df=3 p=0.42 I^2 =0.0%

Test for overall effect z=0.00 p=1

Analysis 03.04. Comparison 03 Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin, Outcome 04 Urinary Tract Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 03 Extended spectrum penicillin vs 2nd/3rd Generation Cephalosporin

Outcome: 04 Urinary Tract Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Lewis 1990	1/152	5/135		23.4	0.23 [0.05, 1.14]
Saltzman 1986	4/51	9/49		45.5	0.40 [0.12, 1.27]
Levin 1983	3/152	5/135		31.0	0.53 [0.13, 2.16]
Total (95% CI)	355	319		100.0	0.38 [0.17, 0.83]

Total events: 8 (Treatment), 19 (Control)

Test for heterogeneity chi-square=0.61 df=2 p=0.74 I^2 =0.0%

Test for overall effect z=2.41 p=0.02

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Analysis 04.01. Comparison 04 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin, Outcome 01 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 04 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin

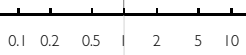
Outcome: 01 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
von Mandach 1993	10/516	14/536		51.1	0.74 [0.33, 1.66]
Dashow 1986	12/64	16/79		48.9	0.91 [0.40, 2.08]
Total (95% CI)	580	615		100.0	0.82 [0.46, 1.46]

Total events: 22 (Treatment), 30 (Control)

Test for heterogeneity chi-square=0.12 df=1 p=0.73 I^2 =0.0%

Test for overall effect z=0.68 p=0.5



Analysis 04.02. Comparison 04 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 04 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
von Mandach 1993	3/516	4/536		8.3	0.78 [0.18, 3.44]
Dashow 1986	3/64	13/79		16.9	0.31 [0.11, 0.87]
Faro 1990	82/501	26/145		74.8	0.89 [0.54, 1.47]
Total (95% CI)	1081	760		100.0	0.74 [0.48, 1.13]

Total events: 88 (Treatment), 43 (Control)

Test for heterogeneity chi-square=3.27 df=2 p=0.19 I^2 =38.9%

Test for overall effect z=1.39 p=0.2

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Analysis 04.03. Comparison 04 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin, Outcome 03 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 04 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin

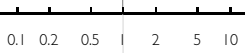
Outcome: 03 Wound Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
von Mandach 1993	20/516	17/536		90.2	1.23 [0.64, 2.37]
Dashow 1986	2/64	2/79		9.8	1.24 [0.17, 9.10]
Total (95% CI)	580	615		100.0	1.23 [0.66, 2.30]

Total events: 22 (Treatment), 19 (Control)

Test for heterogeneity chi-square=0.00 df=1 p=0.99 I^2 =0.0%

Test for overall effect z=0.66 p=0.5



Analysis 04.04. Comparison 04 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin, Outcome 04 Urinary Tract Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 04 2nd Generation Cephalosporin vs 3rd Generation Cephalosporin

Outcome: 04 Urinary Tract Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
von Mandach 1993	92/516	52/536		90.8	1.99 [1.40, 2.83]
Dashow 1986	2/64	12/79		9.2	0.26 [0.09, 0.78]
Total (95% CI)	580	615		100.0	1.65 [1.18, 2.30]

Total events: 94 (Treatment), 64 (Control)

Test for heterogeneity chi-square=11.93 df=1 p=0.0006 I^2 =91.6%

Test for overall effect z=2.92 p=0.003

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Analysis 05.01. Comparison 05 Penicillin vs Lincosinide and Aminoglycoside, Outcome 01 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 05 Penicillin vs Lincosinide and Aminoglycoside

Outcome: 01 Wound Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Rehu 1980	2/46	2/42		100.0	0.91 [0.12, 6.70]
Total (95% CI)	46	42		100.0	0.91 [0.12, 6.70]
Total events: 2 (Treatment), 2 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.09 p=0.9					

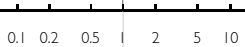
Analysis 05.02. Comparison 05 Penicillin vs Lincosinide and Aminoglycoside, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 05 Penicillin vs Lincosinide and Aminoglycoside

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Rehu 1980	3/46	4/42		100.0	0.67 [0.14, 3.10]
Total (95% CI)	46	42		100.0	0.67 [0.14, 3.10]
Total events: 3 (Treatment), 4 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.52 p=0.6					



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Analysis 07.02. Comparison 07 1st Generation Cephalosporin vs Ampicillin, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 07 1st Generation Cephalosporin vs Ampicillin

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Itskovitz 1979	5/50	8/50		12.9	0.59 [0.19, 1.89]
Dashow 1986	8/70	6/70		14.3	1.37 [0.46, 4.12]
Faro 1990	93/520	19/148		72.8	1.43 [0.88, 2.34]
Total (95% CI)	640	268		100.0	1.27 [0.84, 1.93]
Total events: 106 (Treatment), 33 (Control)					
Test for heterogeneity chi-square=1.93 df=2 p=0.38 I^2 =0.0%					
Test for overall effect z=1.13 p=0.3					

Analysis 07.03. Comparison 07 1st Generation Cephalosporin vs Ampicillin, Outcome 03 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 07 1st Generation Cephalosporin vs Ampicillin

Outcome: 03 Wound Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Itskovitz 1979	0/50	1/50		25.3	0.14 [0.00, 6.82]
Dashow 1986	3/70	0/70		74.7	7.61 [0.78, 74.35]
Total (95% CI)	120	120		100.0	2.75 [0.38, 19.72]
Total events: 3 (Treatment), 1 (Control)					
Test for heterogeneity chi-square=3.03 df=1 p=0.08 I^2 =67.0%					
Test for overall effect z=1.01 p=0.3					

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Analysis 07.04. Comparison 07 1st Generation Cephalosporin vs Ampicillin, Outcome 04 Urinary Tract Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 07 1st Generation Cephalosporin vs Ampicillin

Outcome: 04 Urinary Tract Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Itskovitz 1979	3/50	5/50		33.1	0.58 [0.14, 2.46]
Dashow 1986	12/70	5/70		66.9	2.54 [0.92, 6.97]
Total (95% CI)	120	120		100.0	1.56 [0.68, 3.57]
Total events: 15 (Treatment), 10 (Control)					
Test for heterogeneity chi-square=2.68 df=1 p=0.10 I^2 =62.7%					
Test for overall effect z=1.05 p=0.3					

Analysis 07.05. Comparison 07 1st Generation Cephalosporin vs Ampicillin, Outcome 05 Other serious Infection (ie pneumonitis)

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 07 1st Generation Cephalosporin vs Ampicillin

Outcome: 05 Other serious Infection (ie pneumonitis)

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Itskovitz 1979	0/50	1/50		100.0	0.14 [0.00, 6.82]
Total (95% CI)	50	50		100.0	0.14 [0.00, 6.82]
Total events: 0 (Treatment), 1 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.00 p=0.3					

Analysis 07.06. Comparison 07 1st Generation Cephalosporin vs Ampicillin, Outcome 06 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 07 1st Generation Cephalosporin vs Ampicillin

Outcome: 06 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Dashow 1986	15/70	10/70		100.0	1.62 [0.68, 3.84]
Total (95% CI)	70	70		100.0	1.62 [0.68, 3.84]
Total events: 15 (Treatment), 10 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.10 p=0.3					

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Analysis 08.01. Comparison 08 Ampicillin vs Ampicillin and Aminoglycoside, Outcome 01 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 08 Ampicillin vs Ampicillin and Aminoglycoside

Outcome: 01 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
O'Leary 1986	19/61	12/62		100.0	1.86 [0.83, 4.18]
Total (95% CI)	61	62		100.0	1.86 [0.83, 4.18]
Total events: 19 (Treatment), 12 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.50 p=0.1					

Analysis 08.02. Comparison 08 Ampicillin vs Ampicillin and Aminoglycoside, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 08 Ampicillin vs Ampicillin and Aminoglycoside

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
O'Leary 1986	13/61	5/62		100.0	2.86 [1.06, 7.75]
Total (95% CI)	61	62		100.0	2.86 [1.06, 7.75]
Total events: 13 (Treatment), 5 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=2.07 p=0.04					

Analysis 08.03. Comparison 08 Ampicillin vs Ampicillin and Aminoglycoside, Outcome 03 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 08 Ampicillin vs Ampicillin and Aminoglycoside

Outcome: 03 Wound Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
O'Leary 1986	1/61	1/62		100.0	1.02 [0.06, 16.44]
Total (95% CI)	61	62		100.0	1.02 [0.06, 16.44]
Total events: 1 (Treatment), 1 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.01 p=1					

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Analysis 08.04. Comparison 08 Ampicillin vs Ampicillin and Aminoglycoside, Outcome 04 Urinary Tract Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 08 Ampicillin vs Ampicillin and Aminoglycoside

Outcome: 04 Urinary Tract Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
O'Leary 1986	1/61	1/62		100.0	1.02 [0.06, 16.44]
Total (95% CI)	61	62		100.0	1.02 [0.06, 16.44]
Total events: 1 (Treatment), 1 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.01 p=1					

Analysis 09.01. Comparison 09 Carbapenem vs 2nd/3rd Generation Cephalosporin, Outcome 01 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 09 Carbapenem vs 2nd/3rd Generation Cephalosporin

Outcome: 01 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Mansueto 1989	0/22	1/26		100.0	0.16 [0.00, 8.06]
Total (95% CI)	22	26		100.0	0.16 [0.00, 8.06]
Total events: 0 (Treatment), 1 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.92 p=0.4					

Analysis 09.02. Comparison 09 Carbapenem vs 2nd/3rd Generation Cephalosporin, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 09 Carbapenem vs 2nd/3rd Generation Cephalosporin

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Mansueto 1989	1/22	1/26		100.0	1.19 [0.07, 19.75]
Total (95% CI)	22	26		100.0	1.19 [0.07, 19.75]
Total events: 1 (Treatment), 1 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.12 p=0.9					

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Analysis 10.01. Comparison 10 Ampicillin vs 2nd/3rd Generation Cephalosporin, Outcome 01 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 10 Ampicillin vs 2nd/3rd Generation Cephalosporin

Outcome: 01 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Koppel 1992	8/60	7/59		25.9	1.14 [0.39, 3.35]
Dashow 1986	10/70	28/143		54.3	0.70 [0.33, 1.47]
Louie 1982	6/60	5/58		19.7	1.18 [0.34, 4.05]
Total (95% CI)	190	260		100.0	0.88 [0.51, 1.52]

Total events: 24 (Treatment), 40 (Control)

Test for heterogeneity chi-square=0.81 df=2 p=0.67 I^2 =0.0%

Test for overall effect z=0.46 p=0.6

Analysis 10.02. Comparison 10 Ampicillin vs 2nd/3rd Generation Cephalosporin, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 10 Ampicillin vs 2nd/3rd Generation Cephalosporin

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Koppel 1992	1/60	1/59		2.3	0.98 [0.06, 15.91]
Dashow 1986	6/70	16/143		20.6	0.75 [0.30, 1.93]
Louie 1982	2/60	4/58		6.8	0.48 [0.09, 2.47]
Faro 1990	19/148	108/756		70.4	0.89 [0.53, 1.47]
Total (95% CI)	338	1016		100.0	0.83 [0.54, 1.26]

Total events: 28 (Treatment), 129 (Control)

Test for heterogeneity chi-square=0.55 df=3 p=0.91 I^2 =0.0%

Test for overall effect z=0.89 p=0.4

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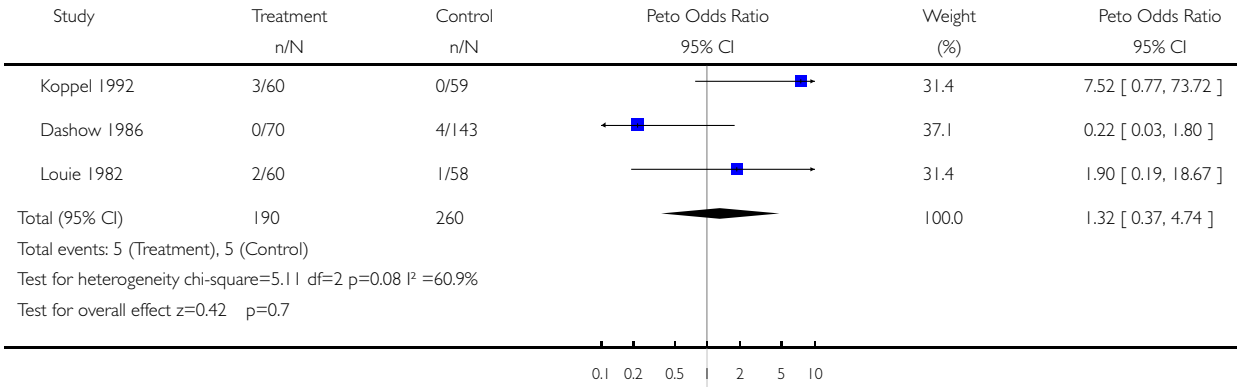
Analysis 10.03. Comparison 10 Ampicillin vs 2nd/3rd Generation Cephalosporin, Outcome 03 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 10 Ampicillin vs 2nd/3rd Generation Cephalosporin

Outcome: 03 Wound Infection

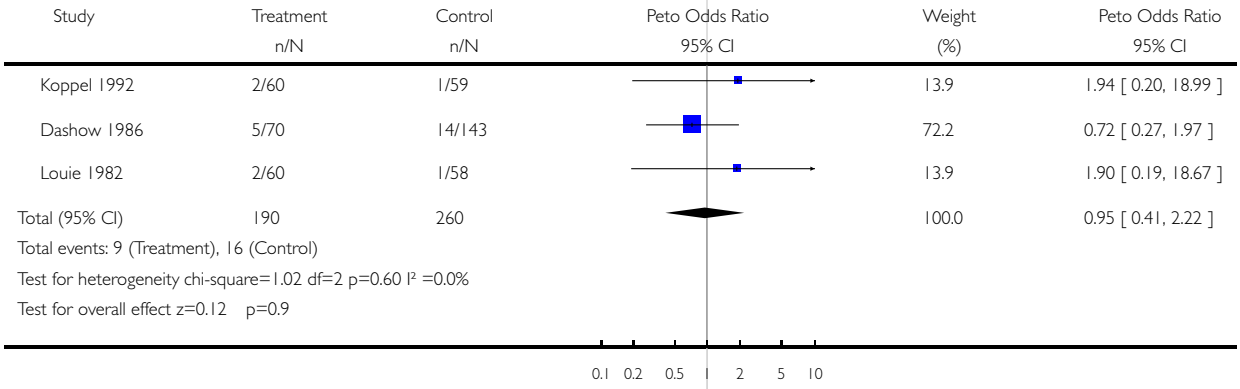


Analysis 10.04. Comparison 10 Ampicillin vs 2nd/3rd Generation Cephalosporin, Outcome 04 Urinary Tract Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 10 Ampicillin vs 2nd/3rd Generation Cephalosporin

Outcome: 04 Urinary Tract Infection



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Analysis 11.01. Comparison 11 Any lavage vs any systemic regimen, Outcome 01 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 11 Any lavage vs any systemic regimen

Outcome: 01 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Saravolatz 1985	6/27	7/34		21.9	1.10 [0.32, 3.74]
Lavery 1986	10/49	12/59		37.5	1.00 [0.39, 2.56]
Berkeley 1990	9/50	8/50		30.5	1.15 [0.41, 3.25]
Elliot 1986	3/42	2/39		10.1	1.41 [0.23, 8.53]
Total (95% CI)	168	182		100.0	1.11 [0.62, 1.96]

Total events: 28 (Treatment), 29 (Control)

Test for heterogeneity chi-square=0.12 df=3 p=0.99 I^2 =0.0%

Test for overall effect z=0.34 p=0.7

Analysis 11.02. Comparison 11 Any lavage vs any systemic regimen, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 11 Any lavage vs any systemic regimen

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Peterson 1990	10/101	12/106		18.6	0.86 [0.36, 2.08]
Saravolatz 1985	3/27	4/34		5.9	0.94 [0.19, 4.52]
Leveno 1984	16/51	11/52		19.0	1.69 [0.70, 4.04]
Boothby 1984	2/53	2/50		3.7	0.94 [0.13, 6.89]
Conover 1984	7/37	1/31		6.7	4.44 [1.02, 19.29]
Donnenfeld 1986	18/49	15/51		21.0	1.39 [0.61, 3.18]
Elliot 1986	2/42	2/39		3.6	0.93 [0.13, 6.84]
Gonen 1986	11/101	15/107		21.5	0.75 [0.33, 1.71]
Total (95% CI)	461	470		100.0	1.19 [0.81, 1.73]

Total events: 69 (Treatment), 62 (Control)

Test for heterogeneity chi-square=5.74 df=7 p=0.57 I^2 =0.0%

Test for overall effect z=0.88 p=0.4

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Analysis 11.03. Comparison 11 Any lavage vs any systemic regimen, Outcome 03 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 11 Any lavage vs any systemic regimen

Outcome: 03 Wound Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Peterson 1990	0/101	2/106		20.1	0.14 [0.01, 2.26]
Saravolatz 1985	1/27	0/34		10.0	9.58 [0.19, 495.35]
Boothby 1984	1/53	1/50		20.0	0.94 [0.06, 15.30]
Conover 1984	2/37	0/31		19.8	6.46 [0.39, 106.63]
Gonen 1986	2/101	1/107		30.1	2.08 [0.21, 20.23]
Total (95% CI)	319	328		100.0	1.50 [0.43, 5.23]

Total events: 6 (Treatment), 4 (Control)

Test for heterogeneity chi-square=4.86 df=4 p=0.30 I^2 =17.8%

Test for overall effect z=0.64 p=0.5

Analysis 11.04. Comparison 11 Any lavage vs any systemic regimen, Outcome 04 Urinary Tract Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 11 Any lavage vs any systemic regimen

Outcome: 04 Urinary Tract Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Peterson 1990	2/101	1/106		25.2	2.06 [0.21, 20.03]
Saravolatz 1985	1/27	2/34		24.3	0.63 [0.06, 6.42]
Boothby 1984	1/53	0/50		8.5	6.98 [0.14, 352.48]
Elliot 1986	1/42	0/39		8.5	6.88 [0.14, 347.65]
Gonen 1986	2/101	2/107		33.5	1.06 [0.15, 7.64]
Total (95% CI)	324	336		100.0	1.52 [0.49, 4.77]

Total events: 7 (Treatment), 5 (Control)

Test for heterogeneity chi-square=1.90 df=4 p=0.75 I^2 =0.0%

Test for overall effect z=0.72 p=0.5

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Analysis 12.01. Comparison 12 Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen, Outcome 01 Febrile Morbidity

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 12 Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen

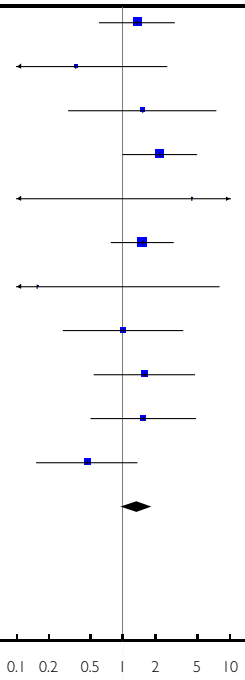
Outcome: 01 Febrile Morbidity

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
von Mandach 1993	14/536	10/516		17.0	1.35 [0.60, 3.04]
Tassi 1987	1/100	3/100		2.9	0.36 [0.05, 2.61]
Saltzman 1986	3/51	4/100		4.4	1.53 [0.31, 7.55]
Roex 1987	19/66	11/72		17.1	2.20 [0.98, 4.93]
Galask 1988	1/162	0/79		0.6	4.43 [0.07, 288.02]
Parsons 1985	33/90	17/62		23.6	1.52 [0.76, 3.01]
Mansueto 1989	0/22	1/26		0.7	0.16 [0.00, 8.06]
Leonetti 1989	5/50	5/50		6.6	1.00 [0.27, 3.67]
Jakobi 1988	9/50	6/50		9.3	1.59 [0.53, 4.75]
Hawrylyshyn 1983	8/64	5/60		8.5	1.55 [0.49, 4.88]
Gonik 1985	5/50	10/50		9.3	0.46 [0.15, 1.37]
Total (95% CI)	1241	1165		100.0	1.32 [0.95, 1.84]

Total events: 98 (Treatment), 72 (Control)

Test for heterogeneity chi-square=8.76 df=10 p=0.55 I^2 =0.0%

Test for overall effect z=1.64 p=0.1



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Analysis 12.02. Comparison 12 Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen, Outcome 02 Endometritis

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 12 Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen

Outcome: 02 Endometritis

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Galask 1988	19/162	4/79		9.7	2.16 [0.87, 5.38]
Gall 1987	8/60	3/56		5.3	2.51 [0.73, 8.66]
Leonetti 1989	5/50	5/50		4.8	1.00 [0.27, 3.67]
Jakobi 1988	3/50	4/50		3.4	0.74 [0.16, 3.40]
Hawrylyshyn 1983	6/64	3/60		4.4	1.91 [0.49, 7.37]
Hartert 1987	14/81	7/58		9.2	1.50 [0.59, 3.83]
Gonik 1985	5/50	7/50		5.6	0.69 [0.21, 2.28]
McGregor 1986	7/46	2/24		3.8	1.83 [0.42, 7.92]
McGregor 1988	8/195	10/91		7.7	0.31 [0.11, 0.87]
Masse 1988	4/103	5/152		4.4	1.19 [0.31, 4.60]
Mansueto 1989	1/22	1/26		1.0	1.19 [0.07, 19.75]
Roex 1987	5/66	1/72		3.0	4.38 [0.86, 22.39]
von Mandach 1993	4/536	3/516		3.6	1.28 [0.29, 5.67]
Faro 1990	201/1437	32/142		34.1	0.51 [0.31, 0.82]
Total (95% CI)	2922	1426		100.0	0.92 [0.70, 1.23]

Total events: 290 (Treatment), 87 (Control)

Test for heterogeneity chi-square=23.13 df=13 p=0.04 I^2 =43.8%

Test for overall effect z=0.54 p=0.6

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Analysis 12.03. Comparison 12 Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen, Outcome 03 Wound Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 12 Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen

Outcome: 03 Wound Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
Galask 1988	4/162	4/79		9.0	0.45 [0.10, 2.00]
Roex 1987	7/66	2/72		11.1	3.58 [0.93, 13.77]
Tassi 1987	3/100	1/100		5.2	2.76 [0.38, 19.89]
Varner 1986	3/20	1/9		4.0	1.37 [0.15, 12.90]
von Mandach 1993	17/536	20/516		46.9	0.81 [0.42, 1.57]
Jakobi 1988	0/50	1/50		1.3	0.14 [0.00, 6.82]
Hawrylyshyn 1983	1/64	1/60		2.6	0.94 [0.06, 15.17]
Hartert 1987	1/81	0/58		1.3	5.56 [0.10, 296.12]
McGregor 1986	4/46	4/24		8.5	0.46 [0.10, 2.15]
McGregor 1988	5/195	3/91		8.9	0.76 [0.17, 3.45]
Parsons 1985	0/90	1/62		1.3	0.09 [0.00, 4.65]
Total (95% CI)	1410	1121		100.0	0.91 [0.58, 1.43]

Total events: 45 (Treatment), 38 (Control)

Test for heterogeneity chi-square=10.13 df=10 p=0.43 I^2 =1.3%

Test for overall effect z=0.39 p=0.7

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Analysis 12.04. Comparison 12 Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen, Outcome 04 Urinary Tract Infection

Review: Antibiotic prophylaxis regimens and drugs for cesarean section

Comparison: 12 Any single dose systemic regimen (pre, post or intra-operative) vs any multiple dose regimen

Outcome: 04 Urinary Tract Infection

Study	Treatment n/N	Control n/N	Peto Odds Ratio 95% CI	Weight (%)	Peto Odds Ratio 95% CI
McGregor 1988	0/195	1/91		0.6	0.04 [0.00, 2.90]
McGregor 1986	1/46	0/24		0.6	4.58 [0.07, 284.55]
Jakobi 1988	4/50	0/50		2.7	7.87 [1.07, 57.56]
Hawrylyshyn 1983	4/64	2/60		4.0	1.87 [0.37, 9.61]
Hartert 1987	2/81	1/58		2.0	1.42 [0.14, 14.32]
Galask 1988	1/162	2/79		1.8	0.21 [0.02, 2.39]
von Mandach 1993	52/536	92/516		85.6	0.50 [0.35, 0.71]
Tassi 1987	0/100	1/100		0.7	0.14 [0.00, 6.82]
Roex 1987	3/66	0/72		2.0	8.35 [0.85, 81.77]
Total (95% CI)	1300	1050		100.0	0.60 [0.43, 0.83]

Total events: 67 (Treatment), 99 (Control)

Test for heterogeneity chi-square=18.60 df=8 p=0.02 I^2 =57.0%

Test for overall effect z=3.07 p=0.002

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