



**TITLE:** The Timing of Prophylactic Antibiotics for Surgery: Clinical Evidence

**DATE:** 20 February 2015

## **RESEARCH QUESTION**

What is the clinical evidence regarding prophylactic treatment with antibiotics at 0 to 14 minutes, 15 to 60 minutes, and 61 to 120 minutes prior to incision during surgery?

## **KEY FINDINGS**

Seven randomized controlled trials and three non-randomized studies regarding the timing of prophylactic antibiotics for surgery were identified.

## **METHODS**

A limited literature search was conducted on key resources including PubMed, Ovid Medline, Ovid Embase, The Cochrane Library (2015, Issue 2), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and February 13, 2015. Internet links were provided, where available.

## **SELECTION CRITERIA**

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

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**Table 1: Selection Criteria**

<b>Population</b>	Patients undergoing surgery (i.e. abdominal surgery, orthopedic surgery)
<b>Intervention</b>	Cefazolin, cefuroxime, vancomycin, ciprofloxacin, levofloxacin
<b>Comparator</b>	Compared with each other No comparator
<b>Outcomes</b>	Infection rate
<b>Study Designs</b>	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies

## RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials and non-randomized studies.

Seven randomized controlled trials and three non-randomized studies regarding the timing of prophylactic antibiotics for surgery were identified. No relevant health technology assessments, systematic reviews, or meta-analyses were identified.

Additional references of potential interest are also provided in the appendix.

### Health Technology Assessments

No literature identified.

### Systematic Reviews and Meta-analyses

No literature identified.

### Randomized Controlled Trials

1. Mazaki T, Mado K, Masuda H, Shiono M, Tochikura N, Kaburagi M. A randomized trial of antibiotic prophylaxis for the prevention of surgical site infection after open mesh-plug hernia repair. *Am J Surg.* 2014 Apr;207(4):476-84.  
[PubMed: PM24674827](#)
2. Cabaluna ND, Uy GB, Galicia RM, Cortez SC, Yray MD, Buckley BS. A randomized, double-blinded placebo-controlled clinical trial of the routine use of preoperative antibiotic prophylaxis in modified radical mastectomy. *World J Surg.* 2013 Jan;37(1):59-66.  
[PubMed: PM23052809](#)
3. Al-Qahtani HH. The impact of antibiotics prophylaxis in elective laparoscopic cholecystectomy: a prospective randomized study. *Journal of Taibah University Medical Sciences.* 2011;6(2):132-8.
4. Lilja M, Makitie AA, Anttila VJ, Kuusela P, Pietola M, Hytonen M. Cefuroxime as a prophylactic preoperative antibiotic in septoplasty. A double blind randomized placebo controlled study. *Rhinology.* 2011 Mar;49(1):58-63.  
[PubMed: PM21468376](#)

5. Witt A, Doner M, Petricevic L, Berger A, Germann P, Heinze G, et al. Antibiotic prophylaxis before surgery vs after cord clamping in elective cesarean delivery: a double-blind, prospective, randomized, placebo-controlled trial. Arch Surg. 2011 Dec;146(12):1404-9.  
[PubMed: PM22184305](#)
6. Inoshita A, Yokoi H, Matsumoto F, Yao T, Kawano K, Furukawa M, et al. A randomized prospective study of oral levofloxacin vs intravenous flomoxef prophylaxis in postoperative infection after endoscopic sinus surgery. Am J Otolaryngol. 2010 Sep-Oct;31(5):360-3.  
[PubMed: PM20015788](#)
7. Shetty J, Vyas NM, Kumar P, Kamath A. Antibiotic prophylaxis for hysterectomy and cesarean section: amoxicillin-clavulanic acid versus cefazolin. J Obstet Gynecol India. 2010 Sep-Oct;60(5):419-23.

#### **Non-randomized Studies**

8. Hawn MT, Richman JS, Vick CC, Deierhoi RJ, Graham LA, Henderson WG, et al. Timing of surgical antibiotic prophylaxis and the risk of surgical site infection. JAMA Surg. 2013 Jul;148(7):649-57.  
[PubMed: PM23552769](#)
9. Koch CG, Nowicki ER, Rajeswaran J, Gordon SM, Sabik JF 3rd, Blackstone EH. When the timing is right: antibiotic timing and infection after cardiac surgery. J Thorac Cardiovasc Surg. 2012 Oct;144(4):931-7.  
[PubMed: PM22608676](#)
10. Litta P, Sacco G, Tsiroglou D, Cosmi E, Ciavattini A. Is antibiotic prophylaxis necessary in elective laparoscopic surgery for benign gynecologic conditions? Gynecol Obstet Invest. 2010;69(2):136-9.  
[PubMed: PM20029222](#)

#### **PREPARED BY:**

Canadian Agency for Drugs and Technologies in Health

Tel: 1-866-898-8439

[www.cadth.ca](http://www.cadth.ca)

**APPENDIX – FURTHER INFORMATION:**

**Systematic Reviews – Antibiotics Not Specified**

11. Mackeen AD, Packard RE, Ota E, Berghella V, Baxter JK. Timing of intravenous prophylactic antibiotics for preventing postpartum infectious morbidity in women undergoing cesarean delivery. *Cochrane Database Syst Rev.* 2014 Dec 5;12:CD009516. [PubMed: PM25479008](#)
12. Systematic review and evidence-based guidance on perioperative antibiotic prophylaxis [Internet]. Stockholm (SE): European Centre for Disease Prevention and Control (ECDC); 2013 Jun [cited 2015 Feb 18]. Available from: <http://www.ecdc.europa.eu/en/publications/Publications/Perioperative%20antibiotic%20prophylaxis%20-%20June%202013.pdf>  
*See: Paragraph 6, page 14*
13. Darouiche R, Mosier M, Voigt J. Antibiotics and antiseptics to prevent infection in cardiac rhythm management device implantation surgery. *Pacing Clin Electrophysiol.* 2012 Nov;35(11):1348-60. [PubMed: PM22946683](#)

**Randomized Controlled Trials – Antibiotics Not Specified**

14. Mujagic E, Zwimpfer T, Marti WR, Zwahlen M, Hoffmann H, Kindler C, et al. Evaluating the optimal timing of surgical antimicrobial prophylaxis: study protocol for a randomized controlled trial. *Trials* [Internet]. 2014 May 24 [cited 2015 Feb 18];15:188. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4040488>  
[PubMed: PM24885132](#)
15. Nishant, Kailash KK, Vijayraghavan PV. Prospective randomized study for antibiotic prophylaxis in spine surgery: choice of drug, dosage, and timing. *Asian Spine J* [Internet]. 2013 Sep [cited 2015 Feb 18];7(3):196-203. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3779771>  
[PubMed: PM24066215](#)