

# The Role of Antibiotic Prophylaxis for Prevention of Infection in Patients With Simple Hand Lacerations

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**Study objective:** The use of prophylactic antibiotics in patients with simple hand lacerations is controversial. This evidence-based emergency medicine review evaluates the existing evidence about the utility of prophylactic systemic antibiotics for prevention of infection in patients with simple hand lacerations.

**Methods:** MEDLINE, EMBASE, the Cochrane Library, and other databases were searched. Studies were selected for possible inclusion in the review if the authors stated that they had randomly assigned patients to an antibiotic treatment group or a control group and if they followed them up for the occurrence of infection. They also had to describe a reasonable method of wound cleaning for all subjects, repair the wounds, and exclude hand lacerations that involved special tissues such as bone, tendons, nerves, or large vessels. Standard criteria to appraise the quality of published trials were used.

**Results:** Four randomized trials met the inclusion criteria, of which 3 met minimally acceptable quality standards. Relative risks of infection after antibiotic use were 1.05 (95% confidence interval [CI] 0.09 to 11.38), 0.73 (95% CI 0.37 to 1.46), and 1.07 (95% CI 0.07 to 16.80) for the 3 included studies. In these trials, the differences in infection rates between antibiotic and control groups failed to reach statistical significance.

**Conclusion:** No convincing trend toward either benefit or harm from administration of antibiotics for uncomplicated hand lacerations is apparent. Clinical judgment based on individual cases should be used in such settings. [Ann Emerg Med. 2007;49:682-689.]

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## SEE EDITORIAL, P. 690.

### CLINICAL SCENARIO

You are the attending physician in a community emergency department (ED). During the sign-out round at the end of your shift, you tell your colleague about a 45-year-old man who cut the palm of his hand by a broken window glass about 3 hours ago. His wound is 3.5 cm long and quite deep but does not involve any of the special structures such as nerves, bones, tendons, or large vessels. There is no indication of infection or contamination on physical examination. The patient has no active medical problems. He is awaiting radiograph of the involved hand. You have irrigated the wound copiously and anticipate that the radiograph will reveal no foreign bodies or fracture. Your colleague taking the sign-out asks whether you have given or prescribed any prophylactic antibiotics for this patient. He mentions that he listened to a recent emergency medicine abstract review on tape<sup>1</sup> that discussed an article<sup>2</sup>

about the possible efficacy of antibiotics in preventing wound infections and expresses his concern about the length and depth of the wound. He also notes that “a friend of mine was just sued because of an infection after a hand laceration that he did not treat with prophylactic antibiotics.” You decide to examine the evidence favoring the use of prophylactic antibiotics for simple hand lacerations.

The following evidence-based emergency medicine review seeks an answer to the question posed by this scenario.

### FORMULATING THE QUESTION

The research question is the following: Does the use of prophylactic antibiotics after repair of uncomplicated hand lacerations lead to a reduced incidence of wound infection? The author considered lacerations distal to the radiocarpal joint as hand lacerations. “Uncomplicated” or “simple” is defined as lacerations not caused by a bite (human or animal) or burn; not communicating with a fractured bone or a joint; not involving tendons, nerves, or large vessels; not having severe surrounding

soft-tissue damage and maceration; and requiring closure. Studies that compared the effectiveness of a systemic antibiotic regimen to placebo for patients with wounds meeting these descriptions were considered for the review.

Patients consider prevention of wound infection, achievement of complete wound healing, and proper cosmetic results the most important clinical outcomes.<sup>3</sup> Therefore, these were considered outcome measures for this review. "Wound infection" was defined as purulent discharge from the wound or a painful spreading erythema indicative of cellulitis.<sup>4</sup> "Complete wound healing" was defined as complete epithelialization of the wound. "Cosmetic outcome" was assessed by any measure provided by trials such as cosmetic scale or simply the patients' satisfaction with the scar appearance.

Consequently, the reformulated question of this review is: Do prophylactic antibiotics lower infection rates in patients with hand lacerations that are managed by proper wound cleaning and closure techniques, do not involve special structures, are repaired within 12 hours of injury, and whose repair is within the scope of practice of emergency physicians?

## SEARCHING FOR AND SELECTING THE BEST EVIDENCE

The author confined this review to controlled trials that compared administration of systemic antibiotics of any type for any duration—in addition to standard wound care—to standard wound care alone for ED patients with simple hand lacerations presenting within 12 hours of injury. Studies that included patients with bite and burn wounds or wounds involving special structures (ie, tendons, bones, large vessels, and nerves) were excluded. Lacerations that contained foreign bodies easily removed in the ED were considered uncomplicated.

Patients with lacerations repaired by surgical consultations and subspecialists might constitute a population having injuries particularly susceptible to infection and who might uniquely benefit from antibiotics. To ensure that studies remained within the scope of emergency medicine practice, the author excluded studies in which subjects were largely treated by surgical specialties or subspecialties.

The author searched the MEDLINE database with the OVID interface from 1966 to December 2005 and EMBASE from 1980 to December 2005, using search terms "wound," "laceration," "injury," "hand," "fingers," "antibiotics," "antibacterial agents," and "prophylaxis." (For detailed search strategy, see Appendix E1, available online at <http://www.annemergmed.com>). The MEDLINE search, but not other searches, was limited to randomized trials or systematic reviews using prophylactic antibiotics to prevent infection in hand lacerations. The author also scanned the databases of the Cochrane Library<sup>5</sup> through 2005, Emergency Medical Abstracts<sup>1</sup> from 1977 through December 2005, and online resources including BestBETS,<sup>6</sup> using the search words "hand laceration," "hand wound," and "antibiotic prophylaxis." He reviewed the bibliographies of the eligible trials for citations of additional eligible studies.

These databases yielded a total of 103 results. Of these 103 citations, 32 studies were excluded solely according to their titles (study subjects not relevant to hand or lacerations or mentioning topics outside the scope of this review, such as compound hand fractures). The author reviewed the abstracts of all the remaining citations. A total of 51 citations were excluded because of obvious violations of the inclusion or exclusion criteria (eg, studies that clearly stated inclusion of bite wounds or involvement of special structures). Retrospective studies and review articles were also excluded at this stage of the screening process. Twenty-one abstracts appeared to be relevant to the search topic. These articles were reviewed in their entirety. The author excluded 17 articles because they were not controlled, included wounds of other body parts without providing information about hand wounds separately, or included lacerations involving special structures. One trial in which the lacerations were managed predominantly by subspecialties was also excluded.<sup>2</sup> This study included patients with lacerations involving special structures as well. After applying the selection criteria, 4 randomized trials were chosen for the final review.<sup>7-10</sup>

The author also identified 1 brief review in the BestBETS database,<sup>11</sup> 1 protocol in the Cochrane database,<sup>4</sup> and 1 meta-analysis.<sup>12</sup> All 4 trials selected for inclusion in this review were also identified by each of these references.<sup>7-10</sup> The meta-analysis by Cummings et al<sup>12</sup> was not restricted to hand wounds but instead reviewed the use of antibiotic prophylaxis for all simple lacerations, including upper and lower extremities. Although these investigators reported a pooled result for hand lacerations as a separate subgroup analysis, they included lacerations involving tendons, nerves, bones, or joints in this analysis.<sup>12</sup> Therefore, this meta-analysis did not meet the inclusion criteria for this review.

## ANALYZING THE EVIDENCE

### Description of the Trials

Table 1 summarizes the key features of the 4 trials. Two of the studies<sup>7,8</sup> were conducted in EDs in the United States, and the other 2<sup>9,10</sup> were conducted in EDs in England. All 4 trials tested the use of prophylactic antibiotics for prevention of simple hand lacerations compared to a control group (placebo or no intervention). All excluded bite wounds and lacerations involving special structures, such as bone, nerve, large vessels, and tendons, and described a reasonable method of wound care (eg, irrigation and debridement) and closure technique (suturing) for all the study subjects. All 4 trials used wound infection as their outcome, and 3 of the 4 defined criteria for judging wound infection (Beesley et al<sup>10</sup> did not). These studies assessed self-reported compliance with therapy, and one<sup>8</sup> included complete wound healing as an outcome measure.

Three trials document the period from injury to evaluation in the ED. One trial<sup>8</sup> excluded lacerations that were evaluated and treated more than 12 hours after injury. Two other trials<sup>7,9</sup> did not apply this exclusion but reported in their results sections an average injury-to-treatment time as much less than 12 hours.

**Table 1.** Characteristics of 4 randomized trials evaluating the use of antibiotics in simple hand lacerations.

Study	Patients	Interventions	Comparisons	Outcomes
Grossman et al, 1981	280 Adult ED patients with uncomplicated hand lacerations requiring suture. Age cutoff not specified. Excluded patients with nerve and tendon involvement, fractures, diabetes, steroid dependence, or penicillin allergy.	(1) Single dose of IM cefazolin (1 g) or (2) oral cephalexin 250 mg every 6 h for 6 days	Single IM dose of placebo	Presence of infection or incomplete healing at suture removal
Haughey et al, 1981	394 ED patients of all ages with uncomplicated hand wounds, presenting within 12 h of initial injury. Excluded wounds involving tendon, periosteum, fractured bone, or a joint space.	Oral cephalexin for 5 days (250 mg every 6 h for adults and 6.25 mg/kg/d for children)	No treatment	Infection within 7-10 days postinjury
Roberts and Teddy, 1977	368 Patients with uncomplicated hand lacerations requiring suture. Excluded patients with nerve and tendon involvement, allergy to penicillin, and wounds not suitable for primary closure. 36% Of wounds were contaminated. All patients were treated in the ED. All ages (pediatric and adults) were included.	Two intervention groups: 7-day course of oral flucloxacillin (1 g/d for adults and 0.5 g/d for children <5 y, divided in 4 doses/day) or single IM dose (1 vial for adults, ½ vial for children 2–10 y, and ¼ vial for children <2 y) of a combination of procaine, benethamine, and benzyl penicillin patients.	No treatment	Infection or imperfect healing 7 days postinjury
Beesley et al, 1975	145 Patients with uncomplicated hand lacerations. Excluded injuries that involved tendon, bone, or joint or were obviously contaminated. All patients treated in the ED. All patients >5 y were included.	5-Day course of oral Magnapen (flucloxacillin and ampicillin), 500 mg 4 times a day for 5 days	Placebo capsules 4 times a day for 5 days	Infection and healing stage 5 days postinjury

Beesley et al<sup>10</sup> included subjects 5 years old and older. No age limit is mentioned and no age data are offered in the Grossman et al<sup>7</sup> study. Other trials explicitly included subjects of all ages.<sup>8,9</sup> Only 1 study<sup>7</sup> excluded subjects with diabetes, an issue unaddressed by the remaining 3 trials.

The trials were assessed for validity and the likelihood of bias using published criteria (Table 2).<sup>13,14</sup> The validity assessment included evaluations of randomization technique, concealment, intention to treat, comparison of baseline characteristics, blinding, follow-up, and cointerventions.

According to this assessment, the author excluded the study by Haughey et al<sup>8</sup> from the final analysis. This trial was highly susceptible to bias because of use of pseudorandomization according to medical record number. There was also a complete absence of concealment of randomization and of blinding, the lack of the use of a placebo, and a clear violation of intention-

to-treat phenomenon involving 20% of the patients initially assigned to active therapy. Furthermore, patients who were lost to follow-up were simply excluded from the study and their numbers were not reported, rendering it impossible to assess the impact of this potential source of bias. These factors make the validity of this trial highly questionable.

Weaknesses of the remaining 3 trials are summarized in Table 2 and include vulnerable randomization techniques, a lack of appropriate allocation concealment,<sup>7,9</sup> a violation of the intention-to-treat phenomenon,<sup>10</sup> inadequate comparison of baseline variables,<sup>7,10</sup> and a lack of appropriate blinding.<sup>7,9,10</sup> The randomization method was not mentioned in 2 trials,<sup>7,9</sup> and the other used a pseudorandomization method.<sup>10</sup>

Beesley et al<sup>10</sup> used medical record numbers as a substitute for true randomization. They initially used labeled containers to conceal the allocation and to secure blinding. However, a

**Table 2.** Assessment of susceptibility to important bias in the selected trials.

Criteria	Grossman et al, 1981 (n=265)	Haughey et al, 1981 (n=394)	Roberts and Teddy, 1977 (n=368)	Beesley et al, 1975 (n=145)
Randomization	Method of randomization not stated	Randomization based on medical record number (pseudorandomization)	Method of randomization not stated	Randomization based on registration number (pseudorandomization)
Concealment	Not stated	Not concealed	Not stated	Vulnerable concealment
Intention to treat analysis	Yes	No. Patients initially assigned to antibiotic group who took none of their antibiotics were assigned to the control group. Up to 19% of patients allocated to active treatment were analyzed as part of the control arm.	Not reported, no obvious violation	No. Between 2 and 15 patients who stopped taking their antibiotics were removed from the final analysis.
Baseline comparisons	Similarity of populations with regard to age, sex, and injury is reported, no data provided	Not reported	Provided in a table; no obvious mismatch between the treatment and control groups	Not reported
Blinding	Incompletely blinded. Control group received placebo injection but no pills; treatment groups received either injection or pills without reciprocal placebo.	Not blinded	Not blinded. No placebo used.	Yes, but with highly vulnerable protocol using "A" and "B" medication containers
Follow-up	15 Patients (5%) lost to follow-up; these patients were equally distributed among the 3 groups.	Patients who failed the follow-up procedure were dropped from the study. The authors do not report their numbers or distribution between the study groups.	63 Patients (17%) were excluded because of loss to follow-up (33) or incomplete or mislaid notes (30). The distribution of patients with missing notes between the groups is incompletely reported.	Up to 13 patients failed to report for follow-up.
Cointervention (wound care)	Standard wound care with saline irrigation, Betadine preparation, and sterile surgical techniques for both study and control groups.	Wound care including mechanical scrub with iodophor sponge, high-pressure saline irrigation, and debridement for both study and control groups.	Wound preparation with chlorhexidine and cetrimide for both study and control groups.	Wound care including cleansing with cetrimide and debridement for both study and control groups.

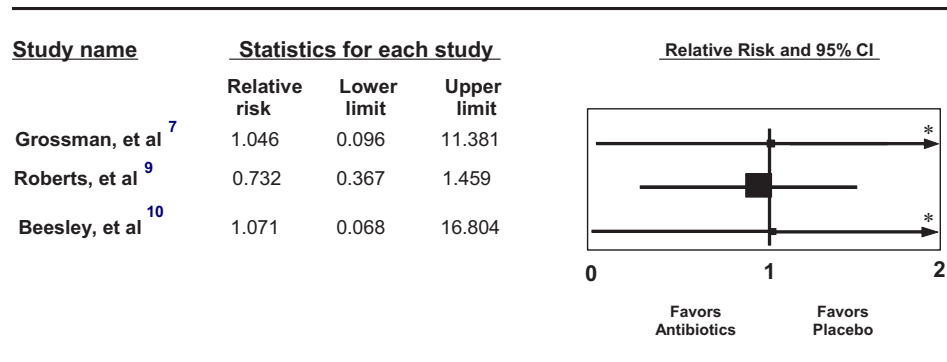
disproportionate incidence of adverse reactions, such as diarrhea, in the active treatment group could have threatened both concealment and blinding in this trial.

## RESULTS OF THE TRIALS

The results of the 3 trials selected for the final analysis are presented in Table 3 and the Figure. To simplify the comparisons, if trials had more than 1 antibiotic arm, the author combined the antibiotic groups and calculated the relative risks (RR) by comparing the infection rate among all patients receiving antibiotics to those receiving placebo. The RRs of infection in all 3 trials had overlapping confidence

**Table 3.** Measurement of outcome (wound infection) in the included studies.

Studies	Infection Rate		
	Antibiotic Combined	Placebo	RR (95% CI)
Grossman et al <sup>7</sup>	1.15% (n = 174)	1.10% (n = 91)	1.05 (0.09-11.38)
Roberts and Teddy <sup>9</sup>	8.80% (n = 205)	12.0% (n = 100)	0.73 (0.37-1.46)
Beesley et al <sup>10</sup>	1.40% (n = 70)	1.30% (n = 75)	1.07 (0.07-16.80)



\* Arrow indicates the extension of the confidence interval beyond the scale

**Figure.** Outcome of wound infection in the 3 trials. For each trial, the square corresponds to the observed RR of infection, and the horizontal line defines the 95% CI. An RR of 1, identified by the vertical line in the middle, would reflect an identical infection rate in patients receiving antibiotics and placebo. The size of the square reflects the number of patients enrolled in the respective trial.

intervals (CIs) that included values corresponding to both clinically significant benefit and harm. The rate of infection in placebo groups in studies by Grossman et al,<sup>7</sup> Roberts and Teddy,<sup>9</sup> and Beesley et al<sup>10</sup> were 1.10% (95% CI 0.2% to 5.9%), 12.00% (95% CI 7.0% to 19.8%), and 1.30% (95% CI 0.3% to 8.1%), respectively. Roberts and Teddy<sup>9</sup> reported an RR of 0.77 (95% CI 0.52 to 1.15) for imperfect wound healing with use of prophylactic antibiotics. None of the included trials assessed the cosmetic outcomes of the hand lacerations. The Figure illustrates the RRs of infection in the included trials.

Several studies used more than 1 antibiotic regimen. Grossman et al<sup>7</sup> randomized the study subjects to one of 3 regimens: cephalexin, 250 mg orally every 6 hours for 6 days; intramuscular cefazolin, 1-g single dose; or the control group, who received a single intramuscular injection of a placebo. The rates of infection in these 3 groups were reported as 2.5%, 0%, and 1.1%, respectively.<sup>7</sup> In the Roberts and Teddy<sup>9</sup> study, the 3 study groups consisted of (1) Triplopen (combination of benethamine penicillin, procaine penicillin, and benzyl penicillin), 1 vial, single intramuscular injection (1/2 vial for subjects 2 to 10 years old and 1/4 vial for children younger than 2 years); (2) flucloxacillin 4 times a day for 7 days (1 g per 24 hours in adults and 0.5 g per 24 hours for children <5 years); and (3) control group (no antibiotics). The infection rates in these 3 groups were reported as 8%, 9.5%, and 12%, respectively.<sup>9</sup> Beesley et al<sup>10</sup> studied only 2 groups of patients. The subjects in the antibiotic group received Magnapen (combination of ampicillin and flucloxacillin), 1 capsule 4 times a day for 5 days. The control group received a placebo in the same manner. The rate of wound infection in this study was 1.4% for the antibiotic group and 1.3% for the placebo group.<sup>10</sup> The differences in infection rates between the study groups in each trial did not reach statistical significance.

## APPLYING THE EVIDENCE

In the scenario that preceded this review, the clinician wondered whether prophylactic antibiotics are useful in

reducing the risk of infection after simple hand lacerations. Rationally, the benefits of prophylactic antibiotics should outweigh the harm of administering them. The harm includes, but is not limited to, development of resistance, altering the normal bacterial flora, adverse effects, allergies, and related costs. On the other hand, infection of a hand wound could result in devastating consequences.

Review of the existing evidence revealed that 4 published randomized clinical trials have tested the ability of antibiotics to prevent infection of uncomplicated hand lacerations that are managed in the ED, of which 3 were of adequate methodologic rigor for their results to be considered. These 3 trials had methodologic flaws and also entailed a poorly described definition of wound infection and wound healing. None of them reported cosmetic outcomes. In addition to avoidance of wound infection, patients consider the proper cosmetic results the most important outcome.<sup>3</sup>

These trials failed to demonstrate any statistically or clinically significant benefit to antibiotics among 778 total subjects. The rate of wound infection in the study by Roberts and Teddy<sup>9</sup> (8.8% and 12% in antibiotic and control groups, respectively) was remarkably higher than in other studies (Table 3). These investigators did not explore the reason for such high infection rates. However, it appears that a high number of contaminated lacerations (36% contaminated, 46% clean, and 18% not reported) could be why patients responded differently to antibiotics in this study.

According to the selected trials, there was no statistically significant difference in the rate of infection among the groups, regardless of the choice or route of antibiotic administration. None of the specific antibiotics or regimens was superior to others in achieving the level of significance.

All the studies that met the selection criteria for this review were relatively old. More recent studies, such as the one by Whittaker et al,<sup>2</sup> included patients for whom the effectiveness of antibiotics might be very different. Whittaker et al<sup>2</sup> reported a trend favoring antibiotic use. This study did not meet our

inclusion criteria because it included patients with wounds involving special structures whose injuries were repaired in the operating room of a plastic surgery unit. Such patients might be more susceptible to infection and might respond differently to prophylactic antibiotics.

A potential drawback of routine administration of prophylactic antibiotics for simple hand lacerations is the potential for underestimating the importance of basic wound care. Neglecting the role of standard wound care such as aggressive irrigation and debridement in preventing wound infection and replacing it with antibiotic prescription may, in fact, result in an increased infection rate. Crowding of EDs and the tremendous increase in the workload of emergency physicians pave the way for such a "quick fix." Whether or not antibiotic prophylaxis is warranted in the management of simple hand lacerations, it is clear that nothing should supersede rigorous and high-quality wound care and closure techniques.

Going back to the opening scenario, how do the results of this review help the clinician decide whether to offer prophylactic antibiotics to this patient? At least 2 considerations other than evidence from clinical trials contribute to any decision about a therapeutic intervention: the clinical circumstances and patient values and preferences.<sup>15</sup> The patient in the scenario had an uncomplicated fresh wound with no evidence of contamination. He had no relevant medical conditions such as diabetes that would predispose his wound to infection. The trials you have identified do not indicate any important trend in the direction of benefit of prophylactic antibiotics in such a patient. On the other hand, the evidence is not strong enough to exclude a possible benefit. Should the patient express a strong fear of infection or special reason for concern about cosmetic outcome, the practitioner might be reasonably swayed in the direction of recommending antibiotic prophylaxis. In the absence of such a preference or circumstance, the practitioner might be persuaded to withhold such a recommendation in the interest of avoiding antibiotic resistance in the community.

Finally, fear of a lawsuit is frequently cited by practitioners as a reason for prescribing otherwise unnecessary antibiotics.<sup>16</sup> The use of scientific evidence in practice cannot guarantee protection from litigation or its outcome.

## PATIENT COMMUNICATION

Patients are becoming increasingly more informed about medical interventions and frequently ask about issues of safety and benefit. The following is an example of how an emergency physician might convey what is known about the risks and benefits of antibiotic treatment to avoid infection in patients with uncomplicated hand lacerations. The details will, of course, be characteristically modified to reflect the actual clinical circumstances:

"We have closed your laceration after cleaning and examining it carefully. We have determined that you have not had any damage to the special structures that affect your hand function such as nerves, bones, or the ligaments. There is only a

small amount of scientific evidence on whether taking antibiotics affects the likelihood of infection and none on whether they influence the visibility of the final scar. The evidence suggests no difference for uncomplicated wounds and a possible benefit in patients whose wounds are contaminated. On the other hand, antibiotics may cause uncomfortable adverse effects such as diarrhea and rash. Physicians are being asked to decrease the use of antibiotics for conditions in which they are not mandatory, because of concern for increasing antibiotic resistance of common bacteria."

## LIMITATION

This review is subject to the limitations inherent in shortcut reviews<sup>17</sup> and lacks the benefits of a rigorous meta-analysis.

## CONCLUSIONS

In conclusion, 4 controlled trials published between 1975 and 2006 studied the efficacy of antibiotics in reducing wound infection in patients with uncomplicated hand lacerations. Three trials, representing a total of 778 enrolled subjects, met the minimum standards and eligibility criteria for this review. Of these, 1 study that enrolled a large number of contaminated wounds showed a nonstatistically significant trend, suggesting a benefit from the administration of antibiotics. The other 2 suggested no effect on the outcome. Overall, no convincing trend toward either benefit or harm from the administration of antibiotics for uncomplicated hand lacerations is apparent. Patient circumstances, preferences, and concerns will lead to variable decisions about their recommendations.

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**Critically Appraised Topic (CAT):****Does the use of prophylactic antibiotics reduce the incidence of wound infection in patients with a simple hand laceration?**

<b>Question</b>	Do prophylactic antibiotics lower infection rates in patients with hand lacerations that are managed by proper wound cleaning and closure techniques, do not involve special structures, are repaired within 12 hours of injury, and whose repair is within the scope of practice of emergency physicians?	
<b>Reviewed by</b>	Shahriar Zehtabchi, MD	
<b>Date</b>	December 2, 2006	
<b>Expiration date</b>	December 2, 2008	
<b>Clinical bottom line</b>	There is no convincing trend toward either benefit or harm for routine administration of antibiotics to prevent infection in patients with uncomplicated hand lacerations. The existing evidence does not support the idea that such practice is superior to standard wound cleaning techniques alone.	
<b>Search strategy</b>	The search for randomized trials included OVID, MEDLINE, EMBASE, the Cochrane Library from the date of origin through December of 2005, Emergency Medical Abstracts from 1977 to December 2005, and BestBETS from March 2000 through December 2005. The MEDLINE search was limited to randomized trials or systematic reviews using prophylactic antibiotics to prevent infection in hand lacerations.	
<b>Citations</b>	<ol style="list-style-type: none"> <li>Grossman JA, Adams JP, Kunec J. Prophylactic antibiotics in simple hand lacerations. <i>JAMA</i>. 1981;245:1055-1056. (G)</li> <li>Roberts AH, Teddy PJ. A prospective trial of prophylactic antibiotics in hand lacerations. <i>Br J Surg</i>. 1977;64:394-396. (R)</li> <li>Beesley JR, Bowden G, Hardy RH, et al. Prophylactic antibiotics in minor hand injuries. <i>Injury</i>. 1975;6:366.1. (B)</li> </ol>	
<b>Primary study characteristics</b>	<p><b>Study Population</b> 793 Patients from 2 EDs in the United States and 1 ED in England were studied in 3 trials. One trial (G) did not mention any age limit. The other (B) excluded subjects younger than 5 years. The third trial (R) included subjects of all ages. All 3 trials excluded bite wounds and lacerations involving special structures, such as bone, nerve, large vessels, and tendons.</p> <p><b>Interventions</b> All 3 trials tested the use of prophylactic antibiotics for prevention of simple hand lacerations compared to a control group. They all described a wound care protocol including irrigation or debridement and the closure technique (suturing) for all the study subjects.</p> <p>The trials used the following regimens: Single intramuscular dose of cefazolin or a 6-day course of oral cephalexin compared to a single intramuscular dose of placebo (G); a 7-day course of oral flucloxacillin or a single intramuscular dose of a combination antibiotic containing procaine, benethamine, and benzyl penicillin compared to no treatment (R); and a 5-day course of an oral combination of flucloxacillin and ampicillin, compared to a 5-day course of oral placebo (B).</p> <p><b>Outcome Measures</b> All 3 trials used wound infection as the main outcome measure. One trial (R) assessed wound healing. None reported cosmetic results.</p>	
<b>Critical appraisal</b>	The 3 trials were susceptible to bias because of vulnerable randomization techniques (G, R, B), lack of allocation concealment (G, R), failure to follow intention to treat (B), inadequate reporting of baseline variables (G, B), and potential lack of blinding (G, R, B).	
<b>Results</b>	<b>Trial</b>	<b>RR (95% CI)</b>
	<b>Primary outcome: wound infection</b>	
	Grossman et al	1.05 (0.09-11.38)
	Roberts and Teddy	0.73 (0.37-1.46)
	Beesley et al	1.07 (0.07-16.80)
	<b>Secondary outcome: imperfect healing</b>	
	Roberts et al	0.77 (0.52-1.15)

## Appendix E1.

### Designed Search Strategy

- #1 (“anti-bacterial agents”[TIAB] NOT Medline[SB]) OR “anti-bacterial agents”[MeSH Terms] OR “anti-bacterial agents”[Pharmacological Action] OR antibiotic\*[Text Word]
- #2 “hand”[MeSH Terms] OR Hand\*[Text Word]
- #3 (“fingers”[TIAB] NOT Medline[SB]) OR “fingers”[MeSH Terms] OR Finger\*[Text Word]
- #4 “lacerations”[MeSH Terms] OR laceration\*[Text Word]
- #5 “injuries”[Subheading] OR (“wounds and injuries”[TIAB] NOT Medline[SB]) OR “wounds and injuries”[MeSH Terms] OR wound\*[Text Word]
- #6 #2 or #3
- #7 #4 or #5
- #8 #6 and #7
- #9 #8 and #1
- #10 “randomized controlled trial”[Publication Type] OR “randomized controlled trials”[MeSH Terms]
- #11 random\*
- #12 placebo\*
- #13 (sing\* or doubl\* or tripl\*) next (masked or blind\*)
- #14 sham
- #15 #11 or #12 or #13 or #14
- #16 #9 and #15