CRD summary
This review assessed the effects of specific types of hair removal in preventing surgical site infections in patients undergoing clean surgery. The authors concluded that there was insufficient evidence to compare different policies of hair removal and that further research is required. This was generally a well-conducted review and the authors’ conclusions are likely to be reliable.

Authors’ objectives
To assess the effects of specific types of hair removal in preventing surgical site infections (SSIs) in patients undergoing clean surgery.

Searching
MEDLINE, the Cochrane Library and EMBASE were searched to February 2005, using the reported search terms, for studies published in any language. The reference lists of identified studies were screened.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs), quasi-RCTs, and systematic reviews and meta-analyses of studies with either of these designs, were eligible for inclusion. No eligible systematic reviews or meta-analyses were identified.

Specific interventions included in the review
Studies of hair removal by razor, clipper or cream on the day before or on the morning of surgery were eligible for inclusion. The review compared the following interventions: no pre-operative hair removal versus pre-operative hair removal; hair removal on the morning of surgery versus the night before surgery; pre-operative hair removal by clipper versus razor; and pre-operative hair removal by cream versus razor. No eligible studies were found that compared pre-operative hair removal by clipper versus cream.

Participants included in the review
Studies of patients undergoing clean surgery were eligible for inclusion. Studies of patients undergoing cranial neurosurgery were excluded. The primary studies included patients undergoing abdominal surgery, elective major surgery and elective inguinal herniorrhaphy.

Outcomes assessed in the review
Studies were eligible if they reported sufficient data to allow calculation of the risk of SSI with each intervention.

How were decisions on the relevance of primary studies made?
Two reviewers independently selected studies. Any disagreements on inclusion were resolved through discussion, or with the aid of a third reviewer if required.

Assessment of study quality
The studies were assessed for adequacy of randomisation, adequacy of allocation concealment and description of drop-outs. The review also assessed the comparability of the treatment groups with respect to type of surgery and gender. Two reviewers independently assessed validity. Any disagreements were resolved with the aid of a third reviewer.

Data extraction
Two reviewers independently extracted the data and cross-checked the results. For each study, the number of patients
with an SSI was extracted for each treatment group and used to calculate the relative risk (RR) and 95% confidence interval (CI).

**Methods of synthesis**

How were the studies combined?
The studies were grouped by type and timing of hair removal and combined in a meta-analysis. Where two or more studies were methodologically, clinically and statistically similar, pooled RRs with 95% CIs were calculated using a random-effects model. The number-needed-to-treat (NNT) was calculated for one statistically significant meta-analysis.

How were differences between studies investigated?
Differences between the studies were discussed in the text.

**Results of the review**

Four parallel-group RCTs (n=1,013) were included.

Two studies described adequate methods of randomisation. One of these trials reported adequate allocation concealment and adequately described drop-outs, while the other reported no drop-outs. In three studies it was unclear if the treatment groups were comparable at baseline with respect to type of surgery or gender.

No pre-operative hair removal versus pre-operative hair removal (1 RCT with 3 treatment arms): there was no statistically significant difference in SSI between hair removal (by razor or cream the day before or the day of surgery) compared with no hair removal. The results for razor favoured no hair removal, while the results for cream favoured hair removal.

Hair removal on the morning of surgery versus the night before surgery (1 RCT with 4 treatment arms): the results for razor showed no difference between timing of removal, whereas the results for clipper almost reached statistical significance favouring removal on the morning of surgery.

Pre-operative hair removal by clipper versus removal by razor (2 RCTs): hair removal (night before or the morning of surgery combined) using clippers was associated with a significantly reduced risk of SSI compared with razor removal (RR 0.29, 95% CI: 0.10, 0.86; NNT 25).

Pre-operative hair removal by cream versus razor (2 RCTs): the findings were inconsistent. One study showed that hair removal using cream (the day before or the day of surgery) was associated with a non-statistically significant reduction in SSI compared with hair removal using razor at the same time. The other study found no significant difference between hair removal using cream the day before surgery and razor removal the day of surgery.

**Authors’ conclusions**

There was insufficient evidence to compare different policies of hair removal in patients undergoing clean surgery. Further research is required.

**CRD commentary**

The review addressed a clear question that was defined in terms of the participants, intervention, outcome and study design. Three relevant databases were searched and attempts were made to minimise language bias. Unpublished studies were not eligible and this raises the possibility of publication bias. Methods were used to minimise reviewer errors and bias in the study selection, validity assessment and data extraction processes. Validity was assessed using specified criteria and the results of this assessment were reported.

There were few details of the participants in the primary studies and definitions for SSI, as used in the primary studies, were not reported; this makes it difficult to judge the generalisibility of the results. The methods used to combine the studies were appropriate, with meta-analysis being reserved for clinically and statistically homogeneous studies. This was generally a well-conducted review and the authors’ conclusions are likely to be reliable.
Implications of the review for practice and research

Practice: The authors stated that, in view of the inconclusive review findings, the Dutch Working Party on Infection Prevention (WIP) recommends that hair not be removed pre-operatively unless the hair in or around the incision site could interfere with the operation. Whilst the WIP did not recommend a time for hair removal, they did recommend that any hair removal should be undertaken by clipper.

Research: The authors stated that there is a need for large RCTs to assess the effectiveness of different policies of hair removal. They stated that studies should enrol patients undergoing the same elective procedure; remove hair at the same time in studies assessing different methods of removal; and use the same removal method when examining different times of removal.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.