CRD summary
The review concluded that although Caesarean section can reduce the occurrence of postpartum stress urinary incontinence, there were no differences by mode of birth for severe symptoms. Given the methodological weaknesses of the review, in particular the possibility of publication and language bias and the failure to assess study quality, the authors' conclusions may not be reliable.

Authors' objectives
To determine whether Caesarean section leads to a decreased postpartum prevalence of urinary incontinence (UI) compared with vaginal birth.

Searching
MEDLINE (1966 to 2005) and CINAHL (1982 to 2005) were searched for articles published in English; the search terms were reported. The reference lists of relevant review articles were also screened.

Study selection
Study designs of evaluations included in the review
Inclusion criteria were not defined in terms of the study design; studies with a sample size of less than 50 were excluded. Cohort (prospective and retrospective) and cross-sectional studies were included in the review.

Specific interventions included in the review
Studies assessing Caesarean section (elective or in labour) compared with spontaneous vaginal birth or instrumental vaginal delivery (using vacuum or forceps) were eligible for inclusion. Studies that only evaluated one mode of delivery were excluded. The included studies evaluated Caesarean section and vaginal birth, including elective Caesarean only.

Participants included in the review
Inclusion criteria were not defined in terms of the participants. The participants included primaparous and multiparous women.

Outcomes assessed in the review
Studies reporting prevalence or incidence of postpartum UI that reported the number of women experiencing postpartum symptoms by mode of delivery were eligible for inclusion. Studies which did not report numerical values for outcomes were excluded, as were studies of less than 3 month post-delivery follow-up. The included studies assessed stress UI, urge UI, unspecified UI or mixed UI. Severity of symptoms was assessed using the Sandvik scale in most studies. Other measures of severity included frequency of pad usage, or on precipitating event. The duration of follow-up ranged from 3 to 48 months.

How were decisions on the relevance of primary studies made?
Three reviewers selected the studies; it is unclear whether they did this independently.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how many reviewers performed the data extraction. Data were extracted on rate of postpartum UI according to mode of delivery, and on severity of symptoms based on the authors' definitions of severe symptoms. Authors were contacted for additional data where necessary.

Methods of synthesis
How were the studies combined?
The results from individual studies were combined using a fixed-effect model. The absolute risk of postpartum UI was calculated, together with the odds ratio (OR) and 95% confidence interval (CI). The number-needed-to-prevent (NNP) was also calculated. Studies were grouped and analysed by study design. Subgroup analyses were conducted on elective Caesarean sections compared with planned vaginal births, primiparous women only, multiparous women only, severe symptoms only, and all Caesarean sections versus spontaneous vaginal births only (with instrumental deliveries excluded from the analysis).

How were differences between studies investigated?
Heterogeneity was not formally assessed. The studies were pooled separately according to study design (cohort with more than 1 year follow-up, cohort with less than 1 year follow-up, and cross-sectional). Other subgroup analyses included elective Caesarean sections compared with planned vaginal births (labour Caesarean section or spontaneous vaginal birth or instrumental delivery), primiparous women only (including all Caesarean sections versus spontaneous vaginal birth or instrumental delivery), multiparous women only (Caesarean section versus spontaneous vaginal birth or instrumental delivery), severe symptoms only (Caesarean section compared with spontaneous vaginal birth or instrumental delivery), and all Caesarean sections compared with spontaneous vaginal births only (excluding instrumental delivery).

Results of the review
Eighteen studies (n=27,427) were included in the review: 12 cohort studies (n=8,727) and 6 cross-sectional studies (n=18,700).

Nine cohort studies assessed stress UI. There was a significant reduction in risk after Caesarean section compared with vaginal birth: 10% versus 22%; the OR was 0.48 (95% CI: 0.39, 0.58) and the NNP was 10 (95% CI: 8, 13). Similar results were found for urge UI (4 studies) with a significant reduction for Caesarean section compared with vaginal birth: 5% versus 13%; the OR was 0.42 (95% CI: 0.26, 0.66) and the NNP was 14 (95% CI: 11, 25). Mixed UI was assessed in one study and similar results were found (OR 0.41, 95% CI: 0.20, 0.85). Two studies assessed unspecified UI and found a borderline association with mode of delivery (OR 0.74, 95% CI: 0.54, 1.01).

Restricting the analysis to cohort studies with greater than 1 year follow-up showed that the association between stress UI and mode of delivery remained (OR 0.44, 95% CI: 0.33, 0.60; 3 studies). One study reported no association with urge UI (OR 0.90, 95% CI: 0.35, 2.30), while another reported that the association remained for unspecified UI (OR 0.58, 95% CI: 0.41, 0.80).

Subgroup analyses of all cohort studies and cohort studies with greater than 1 year follow-up showed no association between mode of delivery and any form of severe UI.

In cross-sectional studies, the risk of developing any degree of stress UI was reduced after a Caesarean section compared with vaginal birth (4 studies): 16% versus 9.8%; the OR was 0.56 (95% CI: 0.45, 0.68) and the NNP was 15 (95% CI: 12, 22). When women with severe symptoms only were included (3 studies), there was a small difference between groups: Caesarean section 1.3% versus vaginal birth 2.1%; the OR was 0.56 (95% CI: 0.32, 0.98) and the NNP was 110 (95% CI: 71, 2440). Other results were also reported for cross-sectional studies.

Authors' conclusions
Although Caesarean section can reduce the occurrence of postpartum stress UI, there were no differences by mode of birth for severe symptoms.

CRD commentary
The review addressed a focused question that was supported by inclusion criteria defined in terms of the intervention and outcome. Only two databases were searched and the review was limited to published English language studies; this might have resulted in relevant studies being missed and there is a possibility of language and publication bias. It is unclear if appropriate review methods were used to minimise error and bias in the study selection and data extraction processes. Study validity was not assessed, thus the reliability of the primary studies remains unclear. The authors stated that the studies were heterogeneous, although no formal assessment was made. Some appropriate subgroup analyses were carried out, but it is unclear whether heterogeneity remained after these stratifications. Very few details were...
provided about the included studies, so the generalisability of the review findings is unclear. The limitations highlighted, in particular the potential for publication and language bias and the lack of a quality assessment, mean that the reliability of the authors’ conclusions is unclear.

**Implications of the review for practice and research**

**Practice:** The authors stated that women should be informed of the increased risk of UI associated with vaginal delivery, but they should be reassured that the likelihood of developing severe stress UI is low and equivalent regardless of mode of birth.

**Research:** The authors stated the need for further well-designed studies to determine the influence of delivery mode on UI. Such studies should document characteristics of delivery, such as vaginal birthing techniques, timing of Caesarean section and difficulty of instrumental delivery. Also required are detailed assessments of outcome, including standardised analysis of symptom severity and impact on quality of life.

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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.