CRD summary
The review concluded that intensity-modulated radiotherapy was recommended over three-dimensional conformal radiotherapy in prostate cancer patients where a higher dose (over 70 gray) was required, but there was insufficient evidence in the postoperative setting. The differences across studies, potential quality issues, poor reporting and lack of data for some outcomes mean the authors' conclusions are unlikely to be reliable.

Authors' objectives
To compare three-dimensional conformal radiotherapy with intensity-modulated radiotherapy in men with prostate cancer.

Searching
EMBASE and MEDLINE were searched from 2000 to March 2009 for articles in English. Search terms were reported. Clinical guidelines, conference proceedings, health technology assessments and systematic reviews were also sought.

Study selection
Studies of three-dimensional conformal radiotherapy compared with intensity-modulated radiotherapy in adult men with prostate cancer who were being considered for radiation treatment were eligible for inclusion.

The included studies considered treatment with intensity-modulated radiotherapy, three-dimensional conformal radiotherapy, tomotherapy, or high-dose intensity-modulated radiotherapy. The dose of intensity-modulated radiotherapy varied from 70 to 81 gray (GY) and 1.8 to 2.55 fractions. The dose of three-dimensional conformal radiotherapy varied from 66 to 81GY and 1.8 to 2 fractions. The disease stage ranged from T1 to T4, where reported. Studies were conducted from 1988 up to 2008.

The authors did not state how many reviewers undertook study selection.

Assessment of study quality
Quality assessment was undertaken for randomised controlled trials (RCTs) according to randomisation, blinding, analysis details, funding source, power calculation, length of follow-up and differences in patient characteristics.

Quality assessment was undertaken for retrospective cohort studies according to balance between the treatment groups and other factors that could affect reliability of study findings.

The authors did not state how many reviewers performed quality assessment.

Data extraction
Data were extracted on disease-related outcomes (numbers with biomechanical freedom from failure at five years and five-year recurrence-free survival), adverse effects (numbers of acute and late gastrointestinal and genitourinary toxicities) and quality of life.

The authors did not state how many reviewers extracted the data.

Methods of synthesis
A narrative synthesis was presented.

Results of the review
Eleven studies were included in the review (4,559 patients) comprising two RCTs and nine retrospective cohort studies. The study sample size ranged from 78 to 1,417 patients. Neither of the RCTs reported blinding. Four of the cohort studies had imbalances between groups. The median follow-up ranged from 12 to 120 months, where reported.
**Disease related outcomes**: One trial showed a benefit of intensity-modulated radiotherapy for biochemical freedom from failure at five years and clinical recurrence-free survival at five years, but the results were not statistically significant. One cohort study showed a statistically significant improvement in biochemical freedom from failure at five years with intensity-modulated radiotherapy versus three-dimensional conformal radiotherapy (74% versus 60%; p<0.0001).

**Adverse events**: Nine studies reported on acute and late adverse events. Results were mixed, with no clear pattern in favour of either treatment. Most results were not statistically significant. Full results were presented in the review.

**Quality of life**: Two cohort studies reported quality of life data. Differences between treatments were generally not statistically significant. Full results were presented in the review.

**Authors' conclusions**
Intensity-modulated radiotherapy was recommended over three-dimensional conformal radiotherapy in patients with prostate cancer where an escalated radiation dose (over 70Gy) was required. There were insufficient data to recommend intensity-modulated radiotherapy over three-dimensional conformal radiotherapy in patients with prostate cancer in the postoperative setting.

**CRD commentary**
Inclusion criteria for the review were broadly defined. Two relevant databases were searched. There may have been the potential for language bias as only articles in English were included. Publication bias was not assessed and could not be ruled out. The review process was generally poorly reported, so it was unclear if any attempts were made to reduce reviewer error and bias during the review.

Quality assessment was undertaken, which indicated the quality of the evidence base (included studies) was variable. There were differences across the studies in dose of radiation and stage of patient. A narrative synthesis was used to report results, without statistical synthesis. It was unclear how some of the conclusions were reached based on this synthesis.

The differences across studies, potential quality issues, poor reporting, and lack of data for some outcomes limit the reliability of the evidence base. For all these reasons, the authors’ conclusions and recommendations are unlikely to be reliable.

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

**Practice**: The authors stated that intensity-modulated radiotherapy was recommended over three-dimensional conformal radiotherapy for the radical treatment of localised prostate cancer where an escalated radiation dose (over 70Gy) was required. There was no evidence to support or refute offering intensity-modulated radiotherapy over three-dimensional conformal radiotherapy to patients in the postoperative setting.

**Research**: The authors stated that future research should examine image-guided intensity-modulated radiotherapy in the post-prostatectomy setting, with altered fractionation, and in combination with hormone and chemotherapy. The authors identified five ongoing trials.

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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.