CRD summary
The authors concluded that there was no evidence that pharmacist-led medication review reduced hospital admissions or mortality in older people. This was a well-conducted and clearly reported review, and the authors’ conclusions are likely to be reliable.

Authors’ objectives
To evaluate the effects of pharmacist-led medication review on hospital admissions and deaths in older people.

Searching
MEDLINE, EMBASE, CINAHL, AMED, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Web of Science, Pharm-line, International Pharmaceutical Abstracts, Royal Society’s Electronic Pharmacy Information Coverage database and DARE were searched from inception to September 2005. Search terms were reported. In addition, reference lists of reviews and included studies were screened and citations of key papers were tracked. Only studies published in English were included.

Study selection
Randomised controlled trials that evaluated the effect of pharmacist-led medication review in older people (mean age >60 years) with a range of diseases were eligible for inclusion. Trials had to be delivered by a pharmacist and have a follow-up period of one month or more. The primary review outcome was the proportion of patients with one or more hospital emergency admissions for any cause. Secondary outcomes were all-cause mortality and the mean number of drugs prescribed.

Most trials were conducted in hospital or clinic/primary care settings and most were conducted in the UK or USA. Trials involved a variety of different types of pharmacist (hospital or clinical, specialist or research and community). Half of the trials involved a single pharmacist.

Two reviewers independently selected studies and resolved disagreements by discussion with the help of a third reviewer if required.

Assessment of study quality
The following ten validity-related items were extracted by one reviewer and checked by a second reviewer: allocation concealment; intention-to-treat analysis; outcome data verified using more than one source; inclusion criteria explicitly defined; baseline comparability of treatment groups; clearly defined primary outcome; sample size calculation; length of follow-up at least six months; over 80% of patients retained; and training and selection of pharmacists reported.

Data extraction
Outcome data were extracted at the last pre-specified follow-up point by one reviewer and checked by a second reviewer. Data included the number of events in each group for dichotomous outcomes and means and standard deviations for continuous outcomes.

Methods of synthesis
Pooled relative risks and weighted mean differences with 95% confidence intervals for pharmacist-led interventions compared with usual care were calculated using random-effects models. Heterogeneity was assessed using the $\chi^2$ and the I$^2$ statistics. If significant heterogeneity was present, analyses were repeated using a fixed-effect model. Sensitivity analysis was undertaken by excluding poorer quality trials and by examining the effect of intervention characteristics (type of pharmacist, level of patient contact and intensity of intervention). Publication bias was assessed using a funnel plot.
Results of the review
Thirty-two randomised controlled trials (RCTs) were included (n=18,896 participants). Eighteen RCTs reported allocation concealment, 15 RCTs used intention-to-treat analysis, and 12 RCTs used some form of data checking. Flaws included lack of sample size calculation and lack of definition of a primary outcome.

All-cause hospital admission: There was no statistically significant difference in all-cause hospital admission between pharmacist-led intervention and usual care (relative risk 0.99, 95% confidence interval (CI): 0.87 to 1.14; p=0.91; 17 RCTs). Significant heterogeneity was found (p=0.01, $I^2$ 49.5). Two trials reported significant effects of the pharmacist-led intervention. One trial significantly favoured the control group. Results were similar for all the sensitivity analysis apart from trial quality (lower quality trials showed increased intervention effects than higher quality ones but confidence intervals overlapped).

All-cause mortality: There was no statistically significant difference in all-cause mortality between pharmacist-led intervention and usual care (relative risk 0.96, 95% CI: 0.82 to 1.13; p=0.65; 22 RCTs). No significant heterogeneity was found.

Prescribing: The intervention was associated with a statistically significant reduction in the number of drugs prescribed but significant heterogeneity was found (weighted mean difference -0.48, 95% CI: -0.89 to -0.07; 15 RCTs; heterogeneity $p<0.001$, $I^2$ 85.9%).

Results for other outcomes were also reported in a narrative synthesis.

Cost information
Nine of eleven trials reporting simple cost analysis based on prescribing costs reported a positive or nonsignificantly positive intervention benefit. The only trial assessing the incremental cost per quality adjusted life year found high costs.

Authors' conclusions
There was no evidence that pharmacist-led medication review reduced hospital admissions or mortality in older people.

CRD commentary
The review question was clearly stated and inclusion criteria were specified. Several relevant sources were searched but no attempts were made to minimise either publication or language bias; publication bias was assessed. Appropriate methods were used to minimise reviewer error and bias during the review process. Only randomised controlled trials were included, study validity was assessed and results were reported. Appropriate methods were used for the meta-analyses, heterogeneity was assessed and various predefined sensitivity analyses were conducted. This was a well-conducted and clearly reported review, and the authors’ conclusions are likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated the lack of evidence supporting pharmacist-led medication reviews has major implications for the healthcare of older people. Health services may feel that resources would be better directed at cost-effective interventions that reduce hospital admissions and death.

Research: The authors did not state any implications for further research.

Funding
Not stated.

Bibliographic details
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.