Use of computer decision support interventions to improve medication prescribing in older adults: a systematic review
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CRD summary
This review evaluated the impact of computer decision support (CDS) interventions to improve the quality of medication prescribing in older adults. The authors concluded that various types of CDS may be effective in improving prescribing but data on clinical outcomes were limited. The review had methodological limitations, but the authors’ cautious conclusions were reasonable given the evidence presented.

Authors’ objectives
To describe the impact of computer decision support (CDS) interventions designed to improve the quality of medication prescribing in older adults.

Searching
English language studies were identified through a computerised bibliographic search of PubMed and EMBASE from January 1980 to July 2007. Search terms were reported. The references of retrieved articles were searched for additional studies.

Study selection
Prospective observational or experimental studies investigating a CDS for physicians that aimed to improve the quality of medication prescribing for older patients (aged over 60 years) were eligible for inclusion. Studies had to include ≥1 process or clinical outcome measurement related to medication prescribing. Process measures were defined as medication-related outcomes that assess the type, quantity or characteristics of individual drugs prescribed. Clinical outcomes related to prescribing included death or morbidity related outcomes (including falls, delirium, length of stay or other clinical variables). Studies that assessed a CDS intervention’s effect on patient knowledge only, or on the method for making decisions about medications, were excluded.

Of the 10 included studies, three were conducted in inpatient settings and seven in outpatient settings. Eight studies reported process or medication-related outcomes and used age or drug specific alerts sent directly to the physician at the point of care. Two studies reported clinical outcomes and provided a CDS intervention to a pharmacist, who then conveyed data to a physician.

Two reviewers independently assessed eligibility and disagreements were resolved by consensus.

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

Data extraction
The main outcome measures in each study were used to calculate the absolute risk reduction (ARR) – the difference in outcome rates between the control and treatment groups. The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
The results of the included studies were used to calculate the number needed to treat (NNT) by dividing 1 by the ARR. The studies were then combined using a narrative synthesis and grouped by outcome (process or clinical).

Results of the review
Ten studies were included in the review. Nine studies included more than 176,000 participants and numbers for the other study were not reported. The trial designs included five randomised controlled trials (RCTs), three interrupted time-series, one pre/post study and one cohort study. The number of participants in included studies ranged from 311 to
Medication-related measures

Eight of the 10 included studies showed improved medication-related process measures with NNTs ranging from five to 1,960 (median 33). Of these, six studies using CDS directly at the point of care each found that prescribing outcomes in response to computerised real-time recommendations were associated with improved medication use. The other two studies which indirectly used a CDS through a pharmacist showed that physicians were more likely to rewrite prescriptions in accordance with CDS recommendations.

Clinical outcomes

Two studies reported clinical outcomes. A US study to improve psychotropic drug prescribing in hospitalised older patients showed a lower in-hospital fall rate, but no effect for length of stay or days of altered mental status in intervention patients. An RCT conducted in the UK to improve cardiovascular risk assessment and antihypertensive treatment found that older patients were no more likely to have reduced cardiovascular risk or lower systolic or diastolic blood pressure after physicians participated in a CDS intervention than usual care patients.

Authors’ conclusions

Various types of CDS interventions may be effective in improving medication prescribing in older adults, but few studies reported clinical outcomes related to changes in medication prescribing.

CRD commentary

This review had broad but generally clear inclusion criteria. To be included, studies had to address one outcome that related to either the prescribing process or the clinical outcome. Relevant medical databases were searched and search terms were reported, however, it did not appear that any attempts were made to identify unpublished studies and the inclusion of only English language studies may mean that important information was missed. Appropriate steps were taken to ensure review error and bias were minimised in the study selection process.

The authors did not appear to have considered the validity of included studies. The authors reported that they categorised studies into a hierarchy based on the strength of evidence (RCTs, observational studies, pre/post intervention studies and interrupted time series). However, categories did not appear to be reported in hierarchical order in the text, and nor were the included studies ordered by hierarchy in the table. Data from a large outpatient study (n>50,000) were reported in two papers and both were included in the review.

The decision to present included studies narratively and not to pool studies in a meta-analysis was appropriate given the heterogeneity between studies. This review's methodological deficiencies raised serious concerns, particularly the lack of validity assessment. However, the authors acknowledged that the effect on patient outcomes was unclear and their cautious conclusions were reasonable given the evidence presented.

Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated that future research should focus on developing better ways of measuring the effectiveness of CDS interventions on improving clinical outcomes in older adults.

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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.