Review: Computer-based clinical decision support systems can improve physician performance in some areas


Question
Do computer-based clinical decision support systems (CDSSs) affect physician performance and patient outcomes? (A CDSS was defined as software designed to aid in clinical decision making, with individual patient data matched to a knowledge base to generate patient-specific assessments or recommendations.)

Data sources
This study updates a 1994 review. Trials published from 1974 to March 1998 were identified by searching MEDLINE, EMBASE/Excerpta Medica, INSPEC (International Information Service for the Physics and Engineering Communities), Science Citation Index, the Cochrane Library, bibliographies of relevant studies, and by contacting authors.

Study selection
Studies were included if participants were health professionals in clinical practice or postgraduate training, clinician performance or patient outcomes were assessed, and data were collected prospectively for patient care with a CDSS compared with care without a CDSS.

Main results
68 studies (59 randomized controlled trials) met the inclusion criteria and had sufficient data for analysis. The studies assessed CDSSs related to intravenous medication and warfarin dosing (n = 15), diagnostic aids (e.g., for chest or abdominal pain) (n = 5), preventive care reminders (e.g., vaccinations or cancer screening) (n = 19), and other aspects of medical care (n = 29). Meta-analysis was not possible because of study differences in clinical problems, participants, interventions, and outcomes. The results were presented in terms of whether a statistically significant effect was reported.

Effectiveness of computer-based clinical decision support systems (CDSSs)

<table>
<thead>
<tr>
<th>CDSS topic</th>
<th>Number of studies reporting improved clinician performance</th>
<th>Number of studies reporting improved patient outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug dosing</td>
<td>9/15</td>
<td>1/5</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>1/5</td>
<td>1/1</td>
</tr>
<tr>
<td>Prevention</td>
<td>14/19</td>
<td>0/1</td>
</tr>
<tr>
<td>Other</td>
<td>19/26</td>
<td>4/7</td>
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</tbody>
</table>

Conclusions
Computer-based clinical decision support systems can improve physician performance related to drug dosing, preventive care, and other aspects of medical care. Effects on patient outcomes have not been sufficiently studied.

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References