A computer-based decision support system and risk chart did not reduce cardiovascular risk or blood pressure in hypertension


Question
In patients with hypertension, do a computer-based clinical decision support system (CDSS) and a cardiovascular risk chart help reduce absolute cardiovascular risk and blood pressure?

Design
Cluster-randomized (allocation concealed*), unblinded,* controlled trial with 1-year follow-up.

Setting
27 general practices in Avon, England, United Kingdom.

Patients
614 patients who were 60 to 80 years of age (mean age 71 y, 54% women), had a diagnosis of hypertension, and were prescribed antihypertensive drugs in the previous year. Follow-up was 86% at 1 year.

Intervention
General practices were allocated to a CDSS plus a risk chart (10 practices, 229 patients); a risk chart only (10 practices, 228 patients); or usual care (7 practices, 157 patients). The CDSS required patient information to be entered; the patient’s 5-year absolute risk for a cardiovascular event was calculated and presented numerically. The risk chart showed a color-coded grid of the ranges of absolute risks for cardiovascular events corresponding to patient risk factors.

Main outcome measures
The proportion of patients with 5-year cardiovascular risk ≥10%. Secondary outcomes included blood pressure levels.

Main results
Analysis was by intention to treat. After adjustment for type of computer system and baseline absolute risk, more patients in the CDSS group than in the chart-only group were at high risk for a cardiovascular event at 12 months (P = 0.02); no differences existed between the intervention groups and usual care (Table). After adjustment for type of computer system and baseline blood pressure, the chart-only group had a lower mean systolic blood pressure than did the usual-care group (mean difference 4.6 mm Hg, 95% CI 0.8 to 8.4, P = 0.02).

Conclusions
In patients with hypertension, a computer-based clinical decision support system did not reduce the 5-year absolute risk for cardiovascular events or elevated blood pressure levels. The use of a risk chart alone reduced systolic blood pressure.

Source of funding: NHS Wales Office of Research and Development.

For correspondence: Dr. T. Fahy, Division of Primary Health Care, University of Bristol, Bristol BS8 2PR, England, UK. FAX 44-117-928-7340.

*See Glossary.

Computer-based decision support system plus risk chart (CDSS), risk chart alone, and usual care for hypertension†

<table>
<thead>
<tr>
<th>Outcome at 12 mo</th>
<th>Comparisons</th>
<th>Event rates</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At high risk for cardiovascular events</td>
<td>CDSS vs chart</td>
<td>89% vs 85%</td>
<td>9% (1 to 13)</td>
<td>13 (9 to 86)</td>
</tr>
<tr>
<td></td>
<td>CDSS vs usual care</td>
<td>89% vs 88%</td>
<td>5% (–5 to 10)</td>
<td>Not significant</td>
</tr>
<tr>
<td>Chart vs usual care</td>
<td>85% vs 88%</td>
<td>5% (–5 to 8)</td>
<td>Not significant</td>
<td></td>
</tr>
</tbody>
</table>

† Abbreviations defined in Glossary; RRI, RRR, NNH, NNT, and CI calculated from adjusted odds ratios in article. Adjustment was made for computer system and baseline cardiovascular risk.

Commentary
CDSSs facilitate the integration of health-related information for individuals with an underlying knowledge base so that patient-specific recommendations can be provided to health care practitioners to assist with their decision making. These systems are beneficial when used to facilitate preventive health care delivery and to assist with the dosing of medications with narrow therapeutic windows. The potential for these systems to improve outcomes in other aspects of health care, however, remains unclear: Some studies have shown a benefit while others have not.

The study by Montgomery and colleagues is an important contribution to this area. The trial was well designed and included clinically important end points. The study also included a non–computer-based decision aid that was used by itself in 1 of the study groups. The results, including the finding that the CDSS did not lead to improved cardiovascular risk profiles or blood pressure control and that a simple cardiovascular risk chart used alone led to an improvement in systolic blood pressure, have implications for both clinical practice and future research on CDSSs. For clinicians, it is clear that CDSSs designed to assist with the management of complex medical conditions still require additional development and evaluation before being introduced into routine clinical practice. Inexpensive, non–computer-based approaches that can be easily integrated into a clinic should also be considered. For researchers, increasing efforts should now focus on identifying those factors that predict whether a CDSS will have a clinically important effect when introduced into clinical practice.

Derek L. Hunt, MD
McMaster University
Hamilton, Ontario, Canada

Reference