Statement from the Regional HTA Centre of Region Västra Götaland, Sweden

Effects on adherence to clinical guidelines by active 'on screen' computer-based clinical decision support systems

Question at issue:

Do computer-based active (on screen) clinical decision support systems (CDSS) improve adherence to clinical guidelines?

PICO (Patient, Intervention, Comparison, Outcome)

P =	MDs in clinical practice.
I =	Use of computer-based, active (on screen) clinical decision support systems, connected to electronic medical records or similar.
C =	No use of computer-based clinical decision support systems.
O1 =	Adherence to clinical guidelines (process adherence) that are integrated in the decision support system.
O2=	Adherence to clinical guidelines, with particular reference to prescription or non-prescription of drugs where deviations from the guidelines may cause serious consequences for patients.
O3=	Risks related to CDSS.

Summary of the health technology assessment:

Method and target group:
A gap exists between best available knowledge, mainly evidence-based clinical guidelines, and care practices. Evidence-based care may improve the results of care. By improving adherence to CDSS the proportion of evidence-based care could increase, and thereby improve patient outcomes.

We have used the following definition of CDSS: 'A software that integrates information on the characteristics of individual patients with a computerized knowledge base for the purpose of generating patient-specific assessments or recommendations designed to aid clinicians and/or patients in making clinical decisions'.
CDSS are divided into two main categories:

- 'Interruptive' and 'non-interruptive' alerts. The former require that in order to move on, the user needs to react, e.g. change the treatment plan or state the reasons (e.g. contraindications) for a deviation from the recommended treatment plan. The 'non-interruptive' system gives a warning to the system when deviations from the recommendations occur, which can be ignored by the user. In the present HTA, active 'on screen' alerts, which are automatically displayed on screen, were studied.
- Electronic leaflets/standardized care plans that are integrated in the decision support system.

Level of evidence:
The current HTA-report is based on a recent (2010) Cochrane Collaboration report, supplemented with relevant RCTs published after the latest literature search (7/2008) in the Cochrane report. The Cochrane report and 13 RCTs, 10 of which were published after July 2008, form the basis for this report. Due to significant heterogeneity (various CDSS, patient groups, diseases and outcomes), the authors of the Cochrane report chose to report median values for changes in adherence to clinical guidelines. We chose to use ranges for description of the effects in the current HTA.

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Primary outcome: The Cochrane report (high quality, AMSTAR criteria) was based on 28 RCT including 32 comparisons of adherence to clinical quidelines. The Cochrane report concludes: Clinical decision support systems achieved a low to moderate improvement (median 4.2%) in adherence to clinical guidelines.

Of the 10 new RCT (high quality, n=2; medium quality, n=4; low quality, n=4), five reported significantly improved adherence to CDSS, wheras five failed to detect any significant difference. The ten new RCTs support the conclusion of the Cochrane report.
The use of CDSS results in a low to moderate improvement in adherence to clinical guidelines (GRADE ⊕⊕⊕, moderate level of evidence).

Secondary outcome: Adherence to clinical guidelines, specifically with respect to prescription or non-prescription of drugs where deviations from the guidelines may cause serious consequences for the patients. Seven RCT (four published after July 2008, and three included in the Cochrane review) were in line with the PICO for this outcome. Five of these RCTs were of high or medium quality, and were included in the evidence grading for this outcome.
CDSS improves adherence to guidelines, an effect ranging from small (1.3%) to large (50.4%), regarding prescription or non-prescription of drugs where deviations from the guidelines may cause serious consequences for the patients (GRADE ⊕⊕⊕, moderate level of evidence).

Risks
A risk with 'interruptive alerts' was reported in one of the studies. The study was terminated early, since the CDSS gave warnings for prescription of a drug due to a potential risk of interaction, in contradiction to current guidelines. These warnings resulted in inadequate medication for four patients.

Ethical aspects:
The present HTA shows that CDSS may improve the adherence to clinical guidelines, but generalizability of these results is unclear. Introduction of a technology with insufficient evidence regarding specific applications is ethically problematic.

Economical aspects
The costs are not clarified, but are dependent on the decision support system, and the care process/patient category.

Concluding remarks
Use of CDSS leads to some improvement in adherence to clinical guidelines for the studied outcomes: drug prescription, vaccination, and ordering of laboratory samples/tests. Patient-related outcomes have not been studied in this report. There is a vast variation in the magnitude of the reported improvement, ranging from no effect to a large improvement. Due to the vast variation, CDSS need to be evaluated separately. Regarding prescription or non-prescription of drugs, where deviations from the guidelines may cause serious consequences for the patients, there is moderate quality of evidence for a small to large improvement in adherence to clinical guidelines. Current knowledge about how CDSS design, delivery, studied health problem, and outcomes influence the efficiency of CDSS, is insufficient. Cost-effectiveness is unknown.

On behalf of the Regional HTA Centre of Region Västra Götaland in Sweden

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