An Infrastructure for the Online Presentation of Practice Guidelines integrated into the Clinical Workflow

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Introduction. Clinical practice guidelines (CPGs) are becoming more and more important in daily clinical routine. Their success is strongly dependent on their availability and presentation. Electronic distribution of guidelines and implementation using active reminder systems have been described as successful tools.1 In a survey conducted 1998 in Germany among 102 surgeons in university hospitals we found 66% of participants in favor of integrating CPG-based decision support into the clinical workflow.2 Improved IT infrastructure and the advent of Hospital Information Systems (HIS) provide a promising platform for the integrated presentation of CPGs. A basic requirement for this approach is a database of guidelines containing meta-information that can be used to create links to specific clinical circumstances. Together with other decision support methodologies like scores and algorithms, an integrated clinical knowledge-library can be achieved. Our study describes a system for the maintenance, description and retrieval of CPGs, which will provide the infrastructure for their integration into the forthcoming HIS at Muenster University Medical School.

Methods. An inventory of guidelines was compiled by collecting locally available printed documents, electronic files from the typing pool as well as pages from the intranet server. The documents were studied for relevant criteria that could be used for grouping. An adaptation of the classification scheme described by Helou et al.3 was used to categorize the documents by orientation towards symptoms, diagnosis, procedures or organizational matters. Additionally, guidelines were differentiated from compulsory directives and non-committal publications. Target audiences (doctors, nurses and patients) and the documents’ sources (internal, external) were noted. Keywords describing relevant concepts were added to each document using standardized MeSH terminology.

System description. A MySQL database running on a Linux intranet web server was accessed using an MS Access™-based frontend. A main 'documents' table contained the guideline title, text, hyperlink (where applicable) and status information. Guideline orientation, publication type and source were referenced using 1:n links to the respective tables. Authors, source institutions, target audiences and keywords were referenced using m:n bridge tables. Keywords could be stored either as MeSH treecodes or as free text. Access to the stored documents was possible using two separate routes: (1) a VBA™ script was used to export the complete set of documents as static HTML files along with an index hyperlinking each file and (2) a set of PHP-scripts on the intranet web server, which allowed direct access to the database and dynamic creation of the respective HTML pages. Using the MeSH-keywords associated with each document, hyperlinks to the NLM's PubMed service were generated which allowed the users to directly trigger Medline queries from the CPGs using either single or combined terms.

Results. A total of 155 documents were added to the database (143 guidelines, 10 directives and 2 non-committal information texts). 149 documents were coming from internal and 6 from external authorities. 135 documents were procedure-oriented, 10 were oriented towards diagnosis and 10 towards organizational matters. The documents have been made available on the intranet web server and can be retrieved using standard web browsers from clinical workstations throughout the Department of Surgery. Keyword management and integration with PubMed are working successfully.

Discussion and Conclusions. A platform for the online entry, management and retrieval of CPGs and related documents was successfully implemented. Based on a workflow analysis it is planned to trigger the context-sensitive display of relevant documents during clinical documentation and order entry processes within the HIS. Providing integrated decision support may prove to be a decisive factor in doctors’ acceptance of the HIS itself. Matters that so far have not been addressed in the project are the proof-of-authenticity of CPGs and the interchange of CPGs between institutions. It is planned to address these features using public-key signature algorithms and the Guideline Interchange Format (GLIF). GLIF may also allow to reference sub-steps of CPGs within the clinical workflow.

References