RWTH AACHEN
Medizinische Informatik

Mobile Decision Support for Paediatric Therapy Planning

C.Spreckelsen, C. Lethen, K. Pfeil, I. Heeskens, K.Spitzer

Problem

Therapy planning and medication in paediatrics relies heavily on local clinical experience. Only few studies and official recommendations are available referring to the dosage of drugs (which have often been designed for adults, originally). Decision support systems are able to improve the quality of medication [Rind et al. 94] [Milstein et al. 94], but their lack of integration into the clinical routine is a well-known problem [Lucas 97].

Objective

The aim of our work is to implement a therapy planning assistant for paediatrics using handheld computers, i.e. Personal Digital Assistants (PDA). Starting from actually acquired patient data (diagnosis, risk group, age etc.) the assistant offers a choice of applicable therapeutic steps, including dosage recommendation, general drug information and warnings.

Methods

The memory of actual available PDAs is limited to only few MB. As a consequence a lean and modular knowledge representation has been chosen. Drug information, medication schemes and parameters for the dosage calculation are represented in a relational database. Figure 2 shows a part of the data model as an Enity-Relationship Diagram

Patients are assigned to risk groups and general patient categories. Applicable medication schemes are selected by matching the actual diagnosis with the indications and contraindications of therapeutic steps. Additionally the risk group and patient category is taken into account.

Fig. 1: Startmenu of the Therapy Assistant

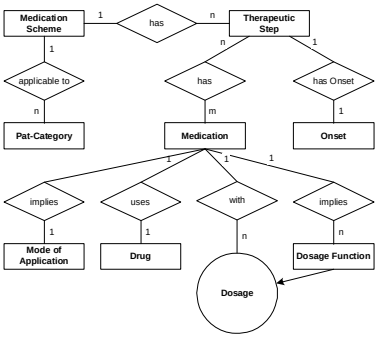

Fig. 2: Fragment of the Entity-Relationship Diagram concerning the Medication

Functional dependencies between patient data and dosage recommendation are represented in a declarative manner as far as possible (see figure 3): for each medication step a set of para-meters and an identifier of a generic parameter function is given, from which a special functional dependency can be derived. This approach enables an easy and transparent knowledge update.

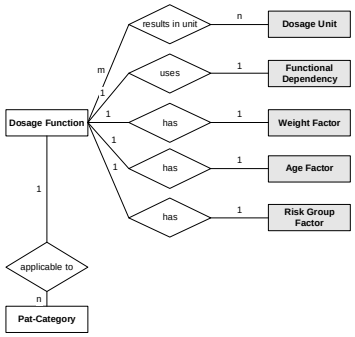

Fig. 3: Declarative representation of functional parameters for the dosage calculation

Case Study

A knowledge base for paediatric medication has been acquired from the clinical partners. It comprises local clinical experience in how to chose the dosage with respect to the patients individual constitution. General information on the drugs is included (and checked against the 'Rote Liste' [RLS 99]). The graphical user interface on the PDA uses frame-like data input and report forms. A Palm III PDA is used as hardware platform. The application has been developed using SatelliteForms.

Conclusion

Mobile decision support by PDAs is a promising approach to improve the clinical integration of decision support systems. It fills the role of Vademecum-Booklets, but enhances them with knowledge processing and a flexible choice of content. The method of acquiring lean and modular knowledge bases can be applied to other domains. For the paediatric module a comparison with drug lists and recommended dosages from other German clinics is on the way.

References

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