CHALLENGES IN EVALUATION OF ELECTRONIC SWITCH-MODULES FOR HOME MEDICATION

Claudia Langebrake[1], Martin J. Hug[2], Gesche Först[2], Kim Green[3,4], Tanja Mayer[4,5], Christian Sommer[1], Hanna M. Seidling[4,5]

1 University Medical Centre Hamburg-Eppendorf, Pharmacy, 2 University Medical Centre Freiburg, Pharmacy, 3 University Hospital Heidelberg, Pharmacy, 4 University Hospital Heidelberg, Cooperation Unit Clinical Pharmacy, 5 University Hospital Heidelberg, Dep. of Clinical Pharmacology and Pharmacoepidemiology

Background

Most clinical decision support systems (CDSS) offer the opportunity to automatically switch patients' home medication to drugs listed in the hospital formulary. Only limited data are available regarding the quality of those automatic switches in clinical practice.

Purpose

Evaluation of a methodology for the comparison of electronic switch modules implemented in hospital CDSS.

Method

A classification model with 13 categories and a six-item scale was developed to determine the quality of switches from home to hospital medication. This model was applied to 250 different drugs and three different CDSS, implemented in the respective university hospitals. Electronic switches were compared to manual switches by two experienced clinical pharmacists for each hospital. The functionalities of the systems were assessed by a questionnaire.

Functionalities of the systems

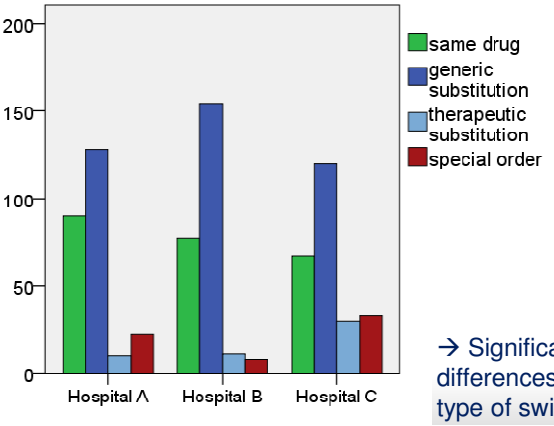
In theory, all types of switches were possible with each system; however, the algorithms and the considered co-variates to suggest an appropriate drug were different. Each system had different functionalities with none of which showing top scores in all aspects.

		A	B	C
Generic substitution	based on active substance and pharmaceutical form	✓	✓	✓
	dosage suggestion for differing strength	✓	✓	✓
	dosage suggestion for differing concentrations and/or conversion		✓	
Therapeutic substitution	based on ATC-Code and pharmaceutical form	✓	✓	✓
	Dosage suggestion according to equivalence factors on file	✓	✓	✓
	Individualisation of preferred active substances			✓
Special order	Automatic switch (remark: „special order necessary")	✓		
	Automatic switch can be suppressed		✓	
Drug combinations	Same strengths	✓	✓	✓
	Same strengths' ratio		✓	✓
	Split into single pharmaceutical products	✓		✓
Medication safety issues	Divisibility considered	✓	✓	✓
	Interactions			
	Maximum dosage			
	Age considered	✓		

Table 1: Selected switch functionalities of the CDSS.

Type of switch

The type of switches differed significantly within the three hospitals: same drug: 36,0 vs. 30,8 vs. 26,8 %, generic substitution: 51,2 vs. 61,6 vs. 48,0 %, therapeutic substitution: 4,0 vs. 4,4 vs. 12,0 %, special order: 8,8 vs. 3,2 vs. 13,2 %.



→ Significant differences regarding type of switch

Figure 1: Types of switches.

Evaluation of electronic switches

Although the majority of switches was conducted correctly in all three hospitals (figure 2), the ranking of the switch-quality differed between the three CDSS, especially in case of therapeutic substitutions and special order, although the numbers of those switches were low. Incorrect and/or incomplete switches were caused either by missing alternatives in the hospital formulary and/or scarce functionality of the software in terms of customisation.

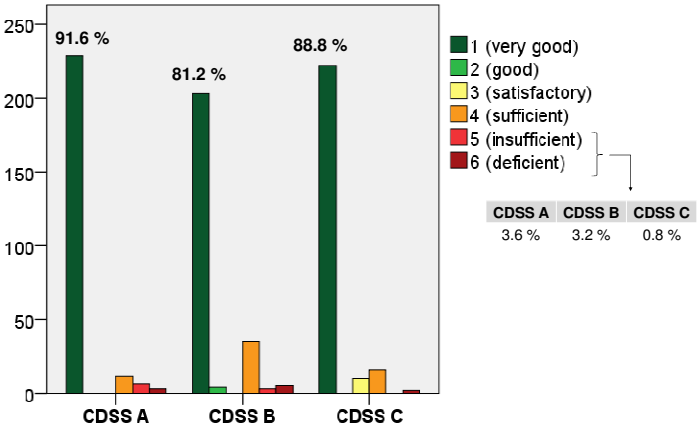


Figure 2: Evaluation of electronic switches.

Conclusions

Lessons learnt:
What should be done in further studies?

- ✓ *narrow the drug list to therapeutic-substitution-switches*
- ✓ *assess inter-hospital variablility in scoring the switches*
- ✓ *perform thorough error analysis in cases of incorrect switches*

In this pilot study it could be shown that the assessment of switch-quality seems to depend on the diversity of the hospital formulary and on the possibility to implement hospital-individual policies. Furthermore, if the selection of drugs that are used to test the feasibility of electronic systems, was narrowed to therapeutic-substitution-switches, potential limitations of such systems could be assessed more thoroughly.

20th EAHP Congress, 25.-27.3.2015, Hamburg, Germany (Abstract Number: PS-120)

Contact: c.langebrake@uke.de