



Background and Objective: Our pharmacy takes care of two long term care institutions. While checking all potential drug interactions, we compared two drug interaction programs: *Pharmavista* and *MediQ*. The basic features of both tools are described in figures 1-3.

Methods: For all patients, information was collected on all drugs taken. Then they were checked by both interaction tools. We considered only moderate and severe drugs interactions (*Pharmavista* class 1 to 3 out of 5, *MediQ* class 2 and 3 out of 3, see figure 2). The detected severe drug interactions (*Pharmavista* class 1-2, *MediQ* class 3) were compared in detail.

Results: 417 patients in both homes took 3250 drugs, a mean of 7,8 drugs per patient.

Pharmavista noted at least one potential interaction in 171 of 417 residents, (in total 287 moderate to severe interactions). *MediQ* found at least one clinically relevant interaction in 245 of 417 patients, in total 614, see figure 4.

Pharmavista identified 8 serious drug interactions, whereas *MediQ* found 10. Two of these combinations (two times tizanidine – ciprofloxacin) were classified as severe by both systems, the other interactions by only one of the programs. One combination (mycophenolate – pantoprazole), which was considered as severe by *MediQ* (3/3), was not shown at all by *Pharmavista*. On the other hand, interactions between potassium and potassium-sparing diuretics, a known interaction of commonly prescribed drugs, were not found by *MediQ*. (Remark: After presentation of these results to the *MediQ* team, this has since been changed.)

Discussion: Both programs have a different classification system which makes it difficult to compare the results. Nevertheless the differences shown in our sample are huge.

In practice, many users of drug interaction programs put the filter on moderate to severe (or only severe) interactions in order to retrieve only relevant drug interactions and / or limit the number of results. In this way, relevant drug interactions may be missed.

MediQ is a system which has been developed in a psychiatric clinic and therefore the focus is on psychiatric drugs. This explains why some drug interactions are missing. The *MediQ* team is continuously working on the data base and systematically adding other drugs. If *MediQ* indicates no interaction you can still ask the expert team for a specific check. The findings are then integrated into the database.

In practice *MediQ* has a good search function (completes the word automatically while typing, entry of as many drugs as desired) and is very well documented: links to Pubmed abstracts, pharmacogenetics, dose adaptation, etc. The time to get the results of a query depends on the number of drugs searched, because it works via the Web. It may take more than 2 minutes if you need to check more than 10 drugs, a situation which is not rare in geriatrics. In the meantime the speed has been improved.

Pharmavista is much faster, but the search function is limited to 8 drugs. Moreover you need to type the drug name correctly, because the search function is not fault-tolerant. The results are summarized by drug classes (see figure 3). Differences inside a class are described in the text, but it may be misleading if only the summary of results is viewed. On the other hand, it is easy to find out if there are alternative drugs of the same class. Risk factors and recommended measures are described systematically, see also figure 5.

Conclusion: *Pharmavista* is a commonly used interaction tool that is useful as a screening instrument (e.g. automatic interaction check of prescriptions). A broader and better search function would make it easier to use and save time.

MediQ is not (yet) suitable as a screening instrument. It is appropriate for individual patients (with complex drug therapies or specific risk factors like low metabolizers) and provides a lot of useful background information.

In general, when using a drug interaction program the filter should not be put to narrow (e.g. not only to severe drug interactions).

To judge the relevance of the retrieved interactions it is advisable to read the details of the text.

Corresponding author:

Dr. Monika Lutters
Spitalapotheke
Kantonsspital Baden
5404 Baden
monika.lutters@ksb.ch

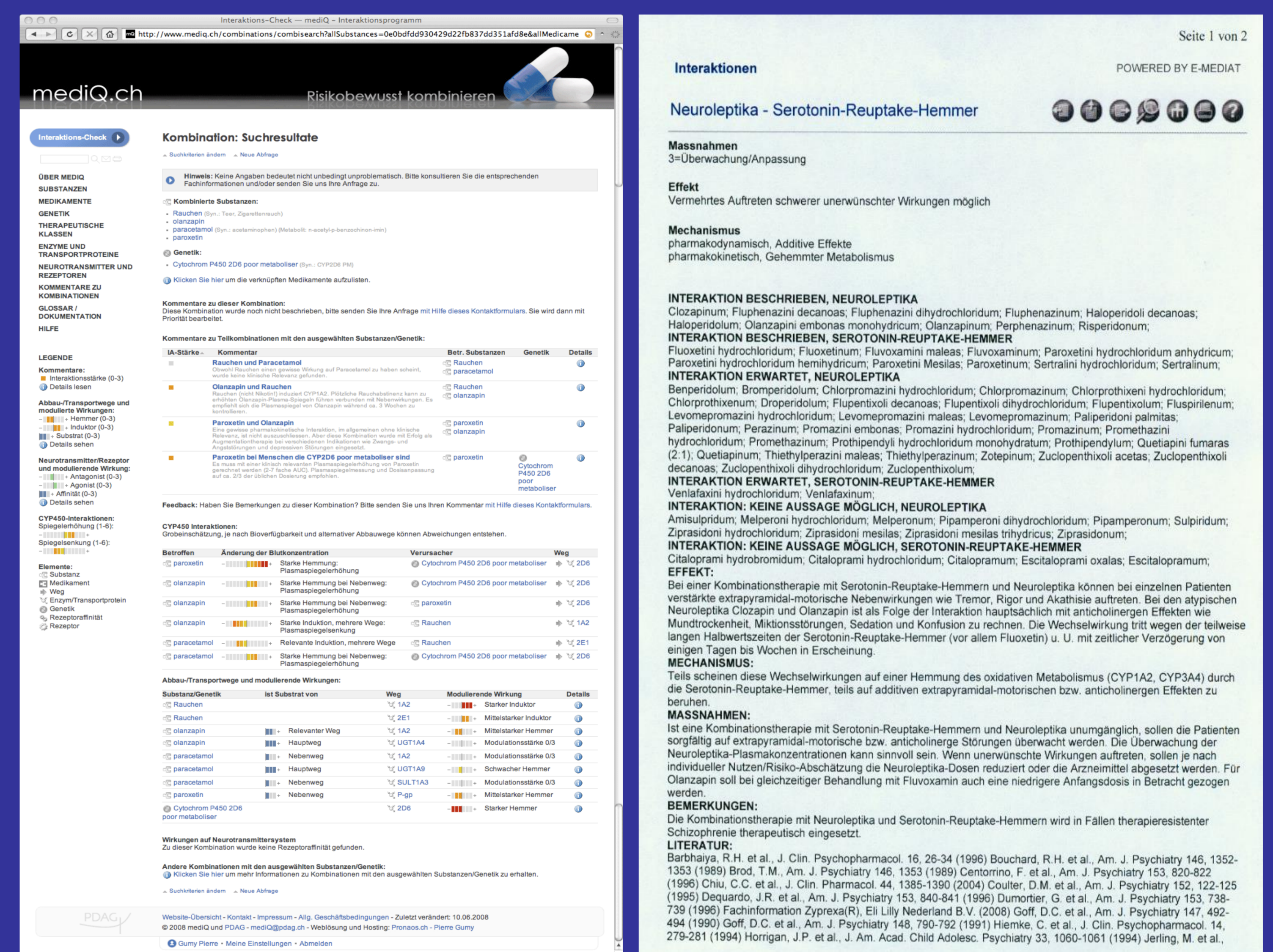
Figure 1. Resources of the two drug interaction tools

Pharmavista	MediQ
E-mediat on the basis of the ABDATA data base: Dr. Petra Zagermann-Muncke ABDATA Pharma-Daten-Service Carl-Mannich-Straße 26 D - 65760 Eschborn/Taunus	developed under the direction of Dr. Eveline Jaquenoud Sirof Klinik Königsfelden Psychiatrische Dienste Aargau AG CH - 5201 Brugg
<ul style="list-style-type: none"> Monthly literature search of data bases like Medline and Embase reference books like Hansten and Stockley 's product informations 	<ul style="list-style-type: none"> data-bases like Medline, Pharmavista, Drugdex reference books (e.g. Stockley's) product informations cytochrome tables

Figure 2. Classification of interactions

Pharmavista	MediQ
<ol style="list-style-type: none"> 1. contraindicated: The two drugs must not be used together, because of severe consequences 2. contraindicated as a precaution: The two drugs must not be taken together, because of severe theoretical consequences 3. monitoring / adaptation: measures required such as alternative drugs, separate administration, dose adaptation, dose limitation, monitoring of adverse drug reactions 4. monitoring / adaptation in certain cases: measures required only in certain circumstances, e.g. risk factors, high dosages, long term therapy 5. monitoring as a precaution: interaction possible, but not documented, or only in rare cases 	<ul style="list-style-type: none"> grey (0): no interaction found yellow (1): low interaction potential, only relevant in special cases like patients with additional risk factors orange (2): interaction clinically relevant, patient needs a specific surveillance, dose adaptation or an alternative drug (see comments) red (3): interaction highly relevant, often absolute or relative contraindications <p>Evaluation by at least two experts („two-man-rule“).</p>

Figure 3. Presentation of results



The figure shows two screenshots of drug interaction software. The left screenshot is from MediQ.ch, showing a search for 'Suchresulfate' and a list of results with various drug classes and their interactions. The right screenshot is from Pharmavista, showing a detailed view of interactions for 'Neuroleptika - Serotonin-Reuptake-Hemmer', including a list of drugs, their mechanisms, and clinical effects.

Figure 4. Results of drug interaction check

	Pharmavista	MediQ
Number of patients with potential drug interactions	171 of 417	245 of 417
Number of moderate to severe drug interactions	287	615
Number of severe drug interactions (not the same except two)	8	10

Figure 5. Pro's and Con's

Pharmavista	MediQ
Advantages: <ul style="list-style-type: none"> fast query indication of measures and risk factors description of other drugs which could interact international classification system based on measures (like Hansten and Horn's Drug Interactions Analysis and Management) 	Advantages: <ul style="list-style-type: none"> entry of as many drugs as desired user-friendly data entry with automatical completion of words information about genetics and elimination pathways, including dose adaptation in hepatic and renal failure link of references to PubMed possibility to ask individual questions to experts
Disadvantages: <ul style="list-style-type: none"> entry of only eight drugs per search search function not fault-tolerant 	Disadvantages: <ul style="list-style-type: none"> important interactions are missing long query time, especially if many drugs need to be checked