

# Electronic screening of medical records to detect patients at risk of drug related problems

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## 1. Introduction

Clinical pharmacists (CP) of our institution participate weekly or bimonthly in different ward rounds. Access to the complete electronic medical records (EMR) including computerized physician orders allows them to analyze patients' records before the round. Queries in the EMR were developed to detect patients at risk of drug related problems (DRP) and to optimize the CP's workload.

## 2. Objective

The objective of our study was to validate this screening tool.

## 3. Study design

Prospective, observational, comparative study.

Queries in EMR, identifying patients with potential DRP and/or needing a medication review were compared with the manual check of all EMR by CP. CP were blinded to the results of the queries.

Queries :

- Patients receiving one of the targeted medications like cytochrome P450 inducers (phenytoin, phenobarbital, primidone, carbamazepine, St John's Wort, isoniazid, rifampin), cytochrome P450 inhibitors (clarithromycin, erythromycin, fluconazole), oral anticoagulant therapy (acenocoumarol, phenprocoumon) or high risk medication (methotrexate)
- Patients with renal impairment (creatinine clearance<sub>Cockcroft-Gault</sub> < 60 ml/min)
- Patients receiving digoxin and having low serum potassium ( $\leq 3.5$  mmol/l)
- Patients with intravenous anti-infective or intravenous acetaminophen treatment for more than three days
- Aged patients with poly medication ( $\geq 80$  years &  $>10$  drugs).

## 4. Setting

Internal medicine and geriatric wards using EMR in the hospital network of Valais RSV.

## 8. Conclusion

This tool allows an efficient and rapid screening of patients at risk of DRP for the preparation of the ward visit. It helps CP to prioritize their medication reviews and to optimize their workload.

This tool will be further refined to reach a higher sensitivity. To detect situations of underuse, "proxies" could be used in queries: e.g. prescription of insulin and/or oral antidiabetics could be used to detect diabetic patients who may need (in case of microalbuminuria) an ACE-inhibitor or an ATII receptor blocker.

## 5. Main outcome measures

Sensitivity and specificity of the screening.

## 6. Results

501 patients were seen by 4 CP in 36 ward visits. Queries identified 64.7% of all patients, CP detected a DRP in 64.9% of all patients.

The following distribution of categories was found:

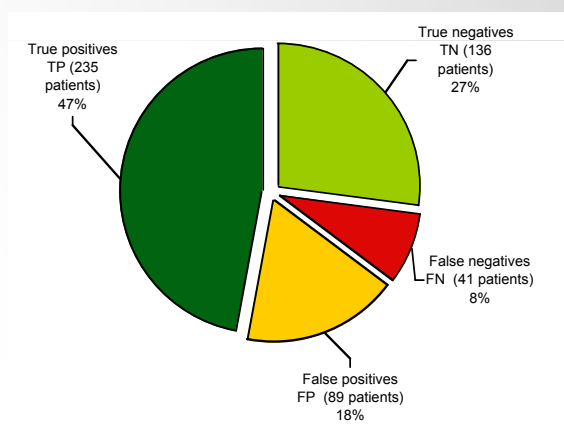


Figure 1. Distribution of categories, see examples below

### Descriptions and examples of categories

TN	Patients neither identified by queries nor by pharmacists
FN	Patients not identified by queries, but by pharmacists Example: diabetic patient with heart failure having a pioglitazone treatment
TP	Patients identified both by queries and pharmacists
FP	Patients identified by queries, but not by pharmacists Example: Clcr = 35 ml/min, drugs are already adjusted to renal function

Table 1 – Categories & examples

$$\text{Sensitivity} = \text{TP} / [(\text{TP} + \text{FN}) * 0.01] = \mathbf{85.1\%}$$

$$\text{Specificity} = \text{TN} / [(\text{TN} + \text{FP}) * 0.01] = \mathbf{60.4\%}$$

## 7. Discussion

Queries identified patients with situations of miss - and overuse. Underuse problems could not be detected, since disease information is not structured and therefore not extractable in EMR. This had an impact on sensitivity.