Prevention strategies for medication errors – which one to pick?

Hanna M Seidling[1,2,3], Dr. sc. hum., David W Bates[4], MD, MSc, Walter E Haefeli[3], MD, Christian Lovis[2], MD, MPH, Pascal Bonnabry[1], PhD

[1]Pharmacy, [2]Service of Medical Information Sciences Geneva University Hospitals, Switzerland, [3]Department of Clinical Pharmacology and Pharmacoepidemiology, University of Heidelberg, Germany, [4]Division of General Medicine and Primary Care, Brigham and Women's Hospital and Harvard Medical School, MA, USA

Background and purpose

To minimize patient harm resulting from medication errors, many interventions have been developed. However, these strategies show variable impacts on prevention of medication errors.

We aimed to assess

- **which strategies have been implemented and evaluated**
- **which outcomes have been achieved**
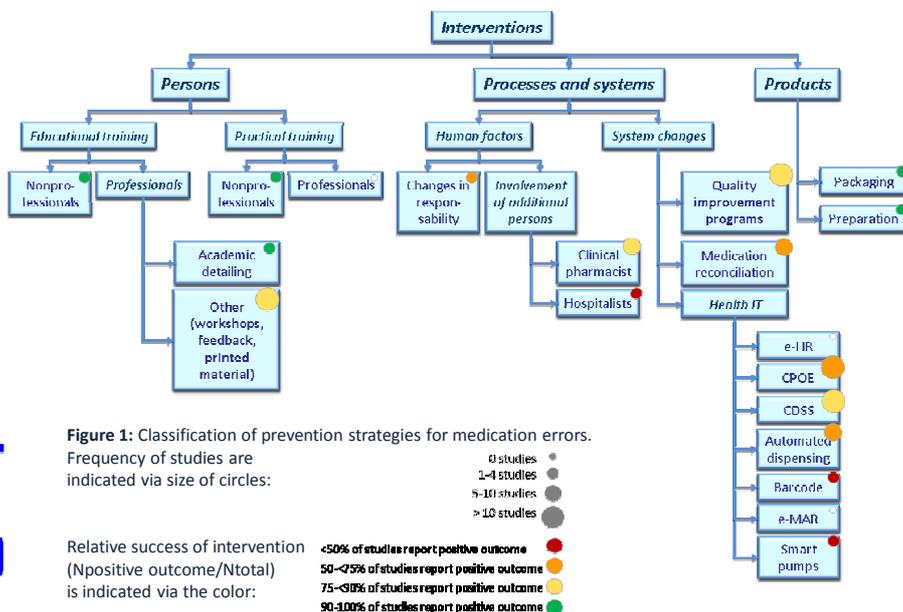- **which strategies have been found to be most useful with regard to different constraints**

Materials and methods

A) Development of a classification of prevention strategies for medication errors by a Pubmed search including the MeSH term « Medication Errors/prevention and control »

B) Characterization of distinct studies that assessed the impact of prevention strategies on medication errors by targeted literature search in Pubmed (until June 2010).
Inclusion criteria:
- Controlled or quasi-controlled (before-after) design
- Assessment (namely) of medication error as primary outcome.

Results

A)   Development of a classification of prevention strategies

We allocated described interventions (N=383) to three major categories: Strategies that targeted the person involved in the error (category 1), strategies aiming to optimize processes that facilitate error occurrence (category 2) , and strategies targeting the product itself that is subject to the error (category 3). (Figure 1)

Figure 1: Classification of prevention strategies for medication errors.
Frequency of studies are indicated via size of circles:
- 0 studies
- 1-4 studies
- 5-10 studies
- > 10 studies

Relative success of intervention (Npositive outcome/Ntotal) is indicated via the color:
- <50% of studies report positive outcome
- 50-<75% of studies report positive outcome
- 75-<90% of studies report positive outcome
- 90-100% of studies report positive outcome

B)   Characterization of studies assessing the impact of prevention strategies on medication errors

Distinct literature searches for each type of prevention strategy revealed 621 studies, of which 105 were included after assessment. Most studies were published in category 2 (N=76), with implementation of computerized physician order entry as most frequently studied prevention strategy (N=23). However, many interventions also combined several strategies (N=16).

Most studies were conducted with inpatients (N=60). Interfaces of care, especially patient discharge (N=4) was barely studied.

Comparison of reported outcomes on medication errors:

- Positive effects on medication errors were reported in N=73, negative effects in N=3, no effects in N=10, and contradictory effects in N=19.
- 29 studies evaluated additional outcomes, predominantly adverse drug events, in 11 cases the qualitative outcome was concordant.
- Quality improvement programs, education of professionals, clinical decision support and computerized physician order entry (in particular in pediatric patients) were the intervention strategies that most often showed positive effects on medication errors.

Discussion

- Studies varied considerably in methodology (including definition, exact outcome measure, and duration).
- Due to the strict inclusion criteria, many studies that assessed quality of care but not medication errors were excluded (this refers especially to interventions targeting persons, for instance academic detailing), as well as studies lacking a controlled design (typically studies describing the ability of clinical pharmacist services to detect medication errors).

Conclusion

- Prevention strategies for medication errors are diversely studied. For some approaches, studies are missing, e.g. electronic health records or optimization of drug products.
- Published studies vary immensely in terms of definitions, exact outcome measure and hence prohibit a sound comparison.

Ecole de Pharmacie
EPGL
Genève – Lausanne
Authors report no conflict of interest

Vienna
eahp
european association of hospital pharmacists 2011

HUG
Hôpitaux Universitaires de Genève
http://pharmacie.hug-ge.ch/rd/posters.html