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BACKGROUND

Medication errors are a major safety issue for hospital patients. An error occurs in at least 5% of drug administrations during inpatient stays.¹

Especially critical are medication errors with high risk drugs, defined as medications potentially causing substantial harm in case of an error.

Among them, parenteral drugs are known to lead to substantial damage more frequently than drugs applied through an alternative route.²

To systematically assess the risk of handling of parenteral drugs, the Swiss Association of Public Health Administration & Hospital Pharmacists GSASA created the "Parenteralia Self Assessment Tool" PSAT.³

OBJECTIVE

In order to precisely reduce risks associated with the handling of parenteral drugs in Switzerland

1. hotspots in the medication process were identified and
2. specific interventions elicited.

METHODS

1. The PSAT was rolled-out to every interested hospital in Switzerland by electronically contacting the directors of pharmacy.
 - The PSAT was applied to one or several individual departments or clinics of participating hospitals, rating 53 criteria in an interdisciplinary team, applying a score from "1=no activity" to "4=fully implemented".
 - Returned PSAT forms were analyzed in a standardized form using an Excel® spreadsheet.
 - Hotspots were defined as criteria rated as "1=no activity" or "2=not yet implemented" in half or more of the returned forms.
2. Interventions were identified based on a systematic literature review of PubMed, Embase and CINAHL databases. Studies of the past five years with a quantitative medication error-related outcome were included.

Literature

1. A. Krähenbühl-Melcher et al. Drug Saf. 2007;30(5):379-407.
2. Institute for Safe Medication Practices, "ISMP Medication Safety Self Assessment for Hospitals, 2011. www.ismp.org
3. GSASA. Parenteralia Self Assessment Tool, www.gsasa.ch

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RESULTS

1. Nationwide medication use hotspots based on the "Parenteralia Self Assessment Tool"

10 forms, derived from 8 hospitals were returned (response rate: 14%), identifying 6 safety hotspots (see table 1).

Table 1: Swiss hotspots and their frequency rated as "not implemented" (=score 1 or 2)

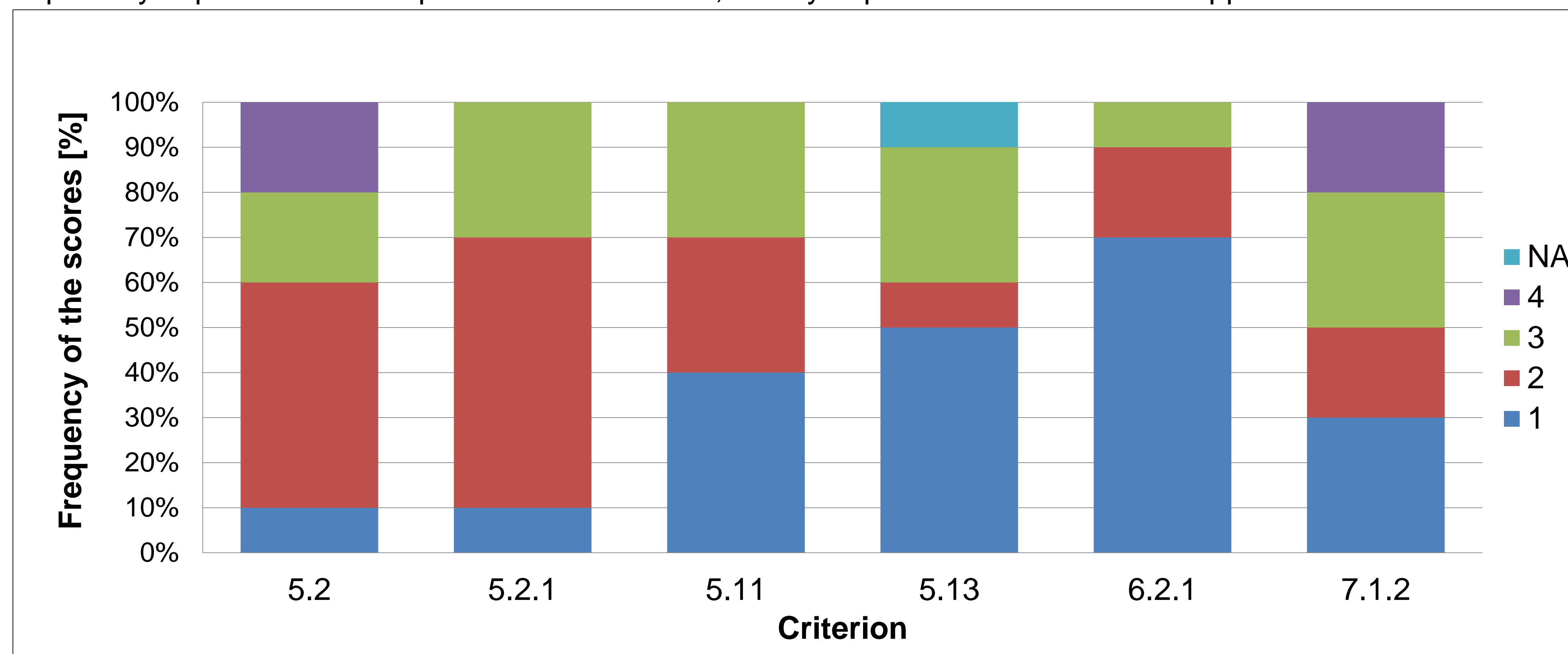
Criterion	"not implemented" [%]
5.2 Areas on the wards, where drugs are prepared, are detached and tidy.	60
5.2.1 The acoustic level on ward pharmacies allows focused working.	70
5.11 For high-risk drugs a threshold for minimal and maximal dosage and appropriate safety barriers are established.	70
5.13 Pump-programing for high-risk drugs is double checked.	60
6.2.1 Clinical pharmacists' interventions are documented in the patient record in a standardized format.	90
7.1.2 New personnel has to complete an introductory program before being independently involved in the medication use process.	50

The 6 hotspots identified showed a considerably different distribution of rating scores (see figure 1), allowing for the following interpretation regarding implementation level:

- Every hotspot is at least partially implemented in minimum one institution.
- Hotspots 5.2 and 5.2.1 are only rated in 10% of the returned forms with "no activity".
- Hotspot 6.2.1 is in 70% of the returned forms rated with "no activity" and only partially implemented in one institution.

Figure 1: Score distribution of the 6 hotspots

1: no activity, 2: discussed and evaluated but not implemented, 3: partially implemented or in parts of the institution, 4: fully implemented and NA: not applicable



Systematic literature review

The following 8 intervention types were identified in 49 studies included in the literature review

- training and education
- standardization
- pharmaceutical activities
- medication reconciliation
- "sterile cockpit" principle
- CPOE / electronic health record
- automated drug dispensing cabinet
- bar-code assisted administration

Although the interventions showed potential in reducing medication errors, the impact of implementation in different settings is unclear due to the heterogeneity of the studies, warranting further testing.

CONCLUSIONS

- Even though only a limited number of "Parenteralia Self Assessment Tools" were returned; 6 hotspots could be identified, which are also common in the international literature.
- Therefore, the tool was a valuable instrument to assess risks in conjunction with parenteral drug use.
- The analysis showed that every hotspot is at least successfully addressed in one institution. This finding may help, when nationwide interventions for Switzerland are planned with successful hospitals taking the lead in implementing medication-error reducing interventions.
- The systematic literature review showed a lack of homogenous data to systematically compare interventions. Therefore, interventions need further testing before a nation-wide roll-out.