

Interventions in response to computerized decision support alerts on antithrombotics: a nationwide flashmob study in Dutch hospital-based outpatient and community pharmacies

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Background & importance



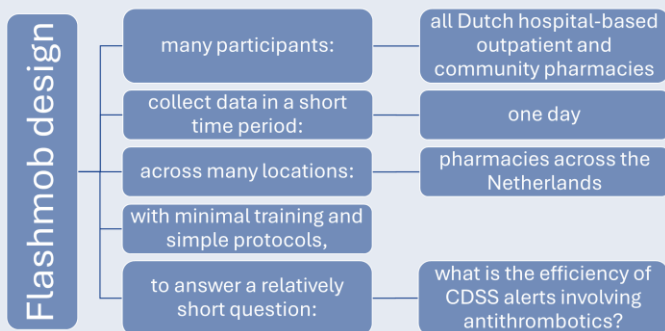
- Medication safety is a critical aspect of healthcare
 - Adverse drug events (ADEs) can result in severe patient harm or even death
 - Antithrombotics: frequently implicated in (fatal) ADEs
- Computerized decision support systems (CDSS) generate medication safety alerts to help prevent ADEs
- Past studies report low efficiency of CDSS, but for current CDSS the exact efficiency is unknown
 - Efficiency = proportion of alerts that result in an intervention

Objective

To determine the efficiency of CDSS alerts on antithrombotics and on any medication in Dutch hospital-based outpatient and community pharmacies.

Materials & methods

Study design



Data collection

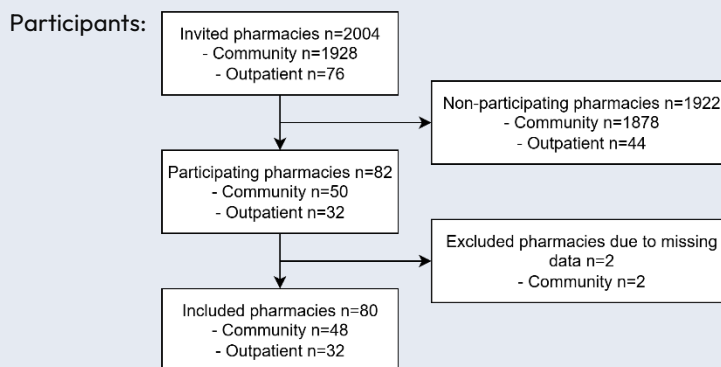
- Pharmacy participants collected data via an online questionnaire
- Data collection included:
 - Number and type of CDSS alerts (e.g. drug-drug interactions) on antithrombotics and on any medication
 - Number of interventions
 - Estimated time spent on assessing alert relevance

Definition intervention = giving advice (to a prescriber or a patient) as a result of checking a medication safety alert

Study outcomes

- Primary outcome: efficiency of CDSS alerts on antithrombotics
- Secondary outcomes
 - Efficiency of alerts on any medication
 - Estimated time spent on assessing alert relevance

Results



Overall response rate of pharmacies: 4.1%

Number of alerts and interventions on the study day:

	Number of alerts		Number of interventions	
	Median (IQR)	Total	Median (IQR)	Total
Antithrombotics	25 (42)	2,463	0 (1)	67
Any medication	382 (369)	36,508	7 (12)	875

Median efficiency of alerts on antithrombotics | any medication:
0.0% (IQR 2.4%) | 1.9% (IQR 2.9%)

Time needed to assess all alerts:
01:54h per day (IQR 01:38h)

Conclusions & relevance

- Efficiency of CDSS alerts is very low in hospital-based outpatient and community pharmacies:
 - antithrombotics (0.0%, IQR 2.4%)
 - any medication (1.9%, IQR 2.9%),
- Estimated time needed to assess the relevance of the alerts was almost 2 hours per pharmacy (01:54h, IQR 01:38h).
- A similar study in hospital pharmacies showed a slightly higher efficiency for antithrombotic alerts (i.e. 4.0% for basic alerts, 14.3% for clinical rule alerts) and any medication (i.e. 1.8% for basic alerts, 13.4% for clinical rule alerts) [1]. Overall the efficiency percentages are low in both settings.
- Optimization of CDSS is necessary to improve efficiency of the alerts. In the near future, developing toolboxes based on best practices might help. On the longer term larger studies are needed to optimize CDSS efficiency, e.g. on the application of AI in CDSS alerts.

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References: [1] Graafsma, J., van de Garde, E. M. W., Derijks, H. J., Hoge, R. H. L., Klopowska, J. E., Karapinar-Carkit, F., van den Bemt, P. M. L. A., & Dutch CDSS-efficiency study group (2025). Efficiency of computerized clinical decision support systems involving anticoagulants: A flashmob study in Dutch hospital pharmacies. *British journal of clinical pharmacology*, 91(1), 157-165. <https://doi.org/10.1111/bcp.16236>

