Implementation and Evaluation of an On-line Prescription Check System using a Database of Drug Indications

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Abstract

Medical incidents related the drugs, which have similar names but different effects, are occasionally reported in Japan. Thus we develop an on-line prescription check system using a database of drug indications. After implementation, we surveyed the rate of alerts and physicians' responses. 38,780 prescriptions were checked by our system in 1 month. The rate of alerts is 5% of total prescriptions and PPV is 65%.. 44 prescriptions were revised or canceled by physicians after alerting. It may prevent medication error. We concluded that On-line prescription check system using a database of drug indications is potentially effective in prevention of medication error.

Keywords:

Clinical decision support systems, Medical order entry systems, Medication errors, Prescriptions, Drug

Background and Motivation

Medical incidents related the drugs, which have similar names but different effects, are occasionally reported in Japan. One example is the case of drugs named 'SAKUSHIZON' and 'SAKUSHIN'. The former is a muscle relaxant and the later is an anti-inflammatory drug. A physician's wrong prescription would led to the death of a patient

Current CPOE systems in Japan have rich patient data. They can handle not only order data, but various patient's information, such as patient demographic data, disease names and so far. If we use database of drug indications, we can produce a real-time alert for physician's prescriptions by using a combination of these data. In this point of view, we implemented an on-line prescription check system using a database of drug indications in our university hospital's CPOE system.

System Design and Evaluation Method

The system works as follows. 1) A physician inputs a prescription for his patient 2) The system checks whether the patient's disease names are correspond to the indications of ordered drugs. 3) If they are corresponding, the prescription is issued and printed. 4) If not, a physician must revises the prescription or add a new diagnose to the patient. This system also can alert for dose of drugs in a prescription.

For system evaluation, we surveyed the rate of alerts, positive predictive value, and physicians' responses after alerting in March 2007.

Results

38,780 prescriptions were checked by our system in 1 month. Responses of users are shown in Table 1.

Table 1- User Responses against alerts

	Number of Alerts	Physicians' Responses		
		Correct Diseases	Correct Prescriptions	Ignore Alerts
Indications Alerts	1,520	1,185 (78.0%)	25 (1.6%)	310 (20.4%)
Dose Alerts	433	41 (9.5%)	19 (4.4%)	373 (86.1%)

Discussion and Conclusion

The rate of alerts is 5% of total prescriptions and PPV (correction / ignorance) is 65%. The causes of alerts are almost inappropriate diagnostic input. However, 44 prescriptions (0.1% of total prescriptions) were revised or canceled by physicians after alerting. It may prevent medication error. On the other hand, about 80% of dose alerts is ignored by physicians. One supposed reason is that physicians treat many patients whose cases run counter to standard treatment in the university hospital. This result shows one of the limitations of our approach.

We concluded that On-line prescription check system using a database of drug indications is potentially effective in prevention of medication error.

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