Patient-Specific Computerized Outpatient Reminders to Improve Physician Compliance with Clinical Guidelines

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Introduction
Clinical guidelines have been developed to assist physician clinical decision making in many areas of care. However, even generally accepted guidelines are often not followed.\textsuperscript{1} In order to improve adherence to guidelines we developed, implemented, and assessed the impact of a patient-specific computerized outpatient reminder system.

Methods
Using existing well-accepted evidence-based national clinical guidelines, a multidisciplinary team created 16 specific reminders within 4 clinical categories: (1) diabetes care (eye exams, HbA1C and cholesterol studies, nursing education visits); (2) therapeutic recommendations (ACE-inhibitor (ACEI) use in diabetic hypertensives; aspirin, beta-blocker, and statin use in patients with coronary artery disease (CAD)); (3) expensive medication substitution suggestions (for patients on expensive NSAIDs, H2-blockers, statins, ACEIs); and (4) health maintenance (Pap smear, mammogram, cholesterol, Pneumovax).

Primary care providers (PCPs) participated in the study if they were active PCPs at our tertiary care institution for the entire 1-year study period (9/98-9/99). For reminder categories (1)-(3) the PCPs were randomized into control and intervention groups; control groups did not get reminders. For category (4) all PCPs received reminders. Patients were included in the study if they were members of any study PCP's panel for the entire study period.

Reminders were generated just prior to office visits and were printed on face-sheets (summaries of patient clinical information) that PCPs receive at the time of patient office visits. The reminders were based on data from our clinical information system and ambulatory electronic medical record, including patient age, gender, problem list, medication list, laboratory data, radiology reports, and visit details.

For reminders in categories (1)-(3), we compared, using generalized estimating equations, how often patients received the recommended care items after office visits with intervention versus control PCPs. For reminders in category (4) we compared, using t-tests, the percentage of patients in compliance with guidelines at the beginning versus the end of the study.

Results
The study included 197 PCPs and 30,625 patients. Including all 16 types of reminders, 55,215 individual reminders were delivered. In category (1), diabetic patients seeing intervention PCPs more often received overdue HbA1C studies (60 vs. 46%, p<0.0001), cholesterol studies (39 vs. 20%, p<0.0001), eye exams (17 vs. 10%, p<0.04), and nursing visits (3.1 vs. 1.4%, p=0.64). In category (2), diabetic hypertensive patients seeing intervention PCPs were started on ACEIs more frequently (14 vs. 8%, p<0.01). CAD reminders did not lead to statistically significant differences between groups. In category (3), reminders led to switching expensive medications to lower cost alternatives in the ACEI (4.9 vs 2.7%, p=0.04), H2-blocker (5.4 vs. 0.8%, p<0.001) and statin (7.3 vs 4.4% p=0.15) classes. Expensive NSAIDs were not switched to inexpensive NSAIDs at a significantly increased rate however they were discontinued more often in the intervention group (10.9 vs 6.0%, p<0.02). In Category (4), health maintenance reminders led to increased compliance rates in all areas studied (all p<0.001).

Conclusion
Patient-specific computerized outpatient reminders significantly improved physician compliance with many recommended guidelines in ambulatory care. Patterns of adherence varied by guideline and reminders for lab tests and ophthalmology referrals were followed more often than those related to medication prescribing. Patient-specific computerized outpatient reminder systems can help narrow the gap between knowledge and practice.

Reference