



Using secure messaging to update medications list in ambulatory care setting



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ABSTRACT

This study analyzed patient adoption of secure messaging to update medication list in an ambulatory care setting. The objective was to establish demographic differences between users and non-users of secure messaging for medications list update. Efficiency of secure messaging for the updates was compared to fax and telephone based updates.

Methods: The study used a retrospective, cross-sectional study of patient medical records and pharmacy call logs at Mayo Clinic, Arizona from December 2012 to May 2013, approximately one year after organizing a pharmacy call center for medication updates. A subgroup analysis during a 2-week period was used to measure time to complete update.

Main measures: Main dependent variable is the frequency of medication list updates over the study duration. Technician time required for the update was also utilized.

Results: A total of 22,495 outpatient visits were drawn and 18,702 unique patients were included in the primary analysis. A total of 402 unique patients were included in sub-group analysis. Secure message response rate (49.5%) was statistically significantly lower than that for phone calls (54.8%, $p < 0.001$). Time to complete the update was significantly higher for faxed medication lists (Wilcoxon rank-sum tests, $p < 0.001$) when compared to those for secure message or phone.

Conclusions: Around 50% of the patients respond to medication update requests before office visit when contacted using phone calls and secure messages. Given the demographic differences between users and non-users of patient portal, mixed mode communication with patients is likely to be the norm for the foreseeable future in outpatient settings.

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1. Introduction

Medication related complications, including adverse drug-related events, are a major driver of costs in the U.S. healthcare system [1]. Errors in medication list can be a major contributor to adverse drug-related events. Following the publication of the Institute of Medicine study on quality issues in healthcare system and drug-related complications, a majority of studies have focused

on examining medication use and discrepancies in in-patient settings. Medication discrepancies in in-patient settings can be as high as 70% at the time of admission or discharge [2,3,4]. Outpatient settings may also be equally vulnerable to medication errors as they account for most prescriptions. A recent study based on the National Ambulatory Medical Care Survey and the National Hospital and Ambulatory Medical Care Survey estimated that nearly 72% of all adverse drug events occurred in outpatient settings [5].

It is particularly hard to track medication information in outpatient settings. Patients may visit multiple providers and may obtain medications from multiple pharmacies. Given the hurried nature of outpatient office visit in both primary and specialist care settings,

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there is often no time for providers to obtain a complete medication list. An aging patient population with comorbidities can place a significant burden on ambulatory care providers in performing medication reconciliation.

In this study, we describe how the secure messaging feature in the patient portal was used as an additional patient communication channel in a large group practice setting. Secure messaging is a common feature in patient portals that allows private and secure communications between patients and providers.

2. Background and significance

A complete medication list includes prescription medications, over-the-counter medicines, herbal and other supplements. Often, there is very little agreement between medication lists and what the patient actually is consuming [6]. Few studies have documented the process of updating medication lists in ambulatory care settings and there is very little information on how well emerging health information technologies can mitigate the outpatient process burden in medication reconciliation. A recent study conducted at Mayo Clinic concluded that reminding patients to bring all the current medications and supplements over mail improved medication list accuracy by over 50% [7]. Collective effort of physician, staff, pharmacy and patient will be critical in supporting medication reconciliation process in the high-volume ambulatory care setting.

Initial physician perceptions of using secure messaging for medication reconciliation is generally favorable. For instance, based on the favorable perceptions of participating physicians in a single clinic, Heyworth et al. [8] call for more focused studies examining the design and implementation of secure messaging based medication reconciliation process. Secure messaging offers an asynchronous channel to improve communication convenience and increases the perceived value of healthcare services among patients [9]. Recent systematic reviews, however, have indicated slow uptake of secure messaging among consumers and limited evidence on efficiency improvements [10,11]. To our knowledge, there has been no analysis of the use of secure messaging in the medication reconciliation process in outpatient settings. Previous studies have shown that demographic characteristics of patient portal users can differ from that of non-users based on age, gender, insurance and clinical needs [12,13,14]. Different rates of patient portal uptake and usage in demographic groups can result in systematic differences in how patients respond to medication update requests. As a consequence, providers may need to use multiple communication modes to maximize their reach. This study therefore presents a comparative analysis of the use of phone calls and secure messaging to update medication lists for outpatients in a large ambulatory care setting. The key research objective was to establish key demographic differences between patient groups – (a) with/without patient portal account, (b) that respond/do not respond to medication list update request through secure messaging, (c) updating medication list over phone v/s secure messaging. We also set out to evaluate the time required for pharmacy technicians to update medication lists obtained via phone, fax and secure messages.

3. Methods

3.1. Study design

We performed a retrospective cross-sectional study of medication list updates performed through the pharmacy call center at Mayo Clinic, Arizona from December 2012 to May 2013. Institutional Review Board approval was obtained for accessing the patient records. A total of 22,495 potential observations were

drawn from outpatient visits during the study period. As some patients had more than one appointment, the data is limited to those who received the medication update message request before the appointment. Since the unit of analysis was patient, the latest appointment date was used for patients who had multiple visits so that there was one record for each patient. The sample for the main analysis included 18,702 eligible records. All responses were classified by the initial mode of request (phone call or secure message). Patients responded in one of three response modes – phone call, secure message or fax. The time to complete medication list update by mode of response was measured on a subgroup of 402 patients over a two-week period.

3.2. Setting

Mayo Clinic in Arizona serves more than 90,000 patients each year. The clinical practice focuses on adult specialty and surgical care. Mayo Clinic, Arizona organized a pharmacy call center in July 2008 to contact patients by telephone for medication list updates. The clinic began offering secure messaging capability to patients in April 2010. In September 2012, the pharmacy call center began to use secure messages as an additional communication mode for patients with portal account. The pharmacy department updates the medication list for all outpatient clinics included in the study. The medication list update process is outlined in Fig. 1. The pharmacy call center generated a list of patient call list each day (in a spreadsheet format) that included all outpatient appointments scheduled within the next five business days. The patient call list identified whether a patient has a patient portal account or not. Secure messages were sent to each patient with a patient portal account (this takes the pharmacy tech less than 2 min per patient). For those patients without patient portal account, an outbound call was placed at least 2 business days prior to the appointment. On average, about 30% of outbound calls lead to successful update of medication list. In rest of the cases, a voice mail was left for the patient with instructions to call back. In addition to outbound calls, pharmacy technicians received inbound calls from patients for medication updates. Historically, inbound calls were highly correlated with outbound calls. On average, each day the pharmacy department makes about 400 outbound calls and receives 100 inbound calls. Patients had the option of responding to the phone call and secure message request by phone, fax or secure message. All responses were classified by initial mode of request. A small percentage of responses by patients were by fax in either group (< 5% of the total response).

At the time of the appointment, the medication list was verified by a Medical Assistant/Nurse Practitioner/Physician. Final verification of the medication list by the physician was required for completion of the medication reconciliation process. When medication list was not updated through the pharmacy call center, the clinical department took responsibility for updating the medication list. The study data is limited to updates completed by the pharmacy call center.

3.3. Data sources

Demographic information available in the patient record included age, gender, health plan, and ethnicity. In addition, the following clinically relevant patient characteristics were included in the study: number of appointments in the previous six months, number of prescriptions, number of ED visits in the previous six months, and number of inpatient admissions in the previous six months. Appointment type was classified based on whether the visit was to a primary care/internal medicine office or to a specialist office. The pharmacy call center logs phone calls made to patients in the patient record. This information was utilized to assess response

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