How Do Physicians Conduct Medication Reviews?

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BACKGROUND: Medication reviews are recommended annually for older patients. A medication review is a discussion of a patient’s complete set of medications, but the actual content of a review is not well specified. The medical literature suggests that it is an exhaustive evaluation, but what physicians actually ask about their patients’ medication regimens has been little studied.

OBJECTIVE: To describe what physicians do when they review medications in the office setting.

METHODS: Qualitative content analysis of audio-taped encounters between 100 patients aged 65 and older and 28 primary care physicians in two health care systems in Sacramento, California.

RESULTS: Physicians use a combination of non-mutually exclusive strategies when reviewing chronic medications that include: (1) efforts to obtain a complete list of patient medications (36% of visits), (2) discussion of a topic related to the management of each of a patient’s chronic medications (47% of visits), and (3) sequential discussion of the majority of a patient’s medications without intervening discussion (45% of visits). Of 10 medication management topics that were discussed in medication reviews, a mean of 1.5 topics (SD=1.7, range 0–7) were mentioned for each medication, with efficacy and directions being most common. Physicians conducted a sequential discussion that included discussion of each of a patient’s medications in only 32% of visits.

CONCLUSIONS: Comprehensive discussions about chronic medications are uncommon in routine practice. Practical conceptualization of what constitutes a physician-conducted medication review is needed.

KEY WORDS: medication review; drug therapy management; pharmaceutical care; physician-patient communication; qualitative methods.

INTRODUCTION

Prescription medication use in the United States is increasing, with the average person filling over 12 pharmacy prescriptions per year in 2006.1 Older patients, who fill a mean of 30 prescriptions each year,2 are particularly susceptible to medication-related problems associated with polypharmacy and multiple prescribing physicians.3 In addition, older patients frequently take their medications differently from the way they are prescribed, often take medications of which their physicians are unaware,4–6 and are commonly nonadherent to their medication regimens.7 Some of these discrepancies arise due to confusion about how to take medications or are related to patient-experienced adverse effects.8 Because of this, it is important for clinicians to conduct medication reviews.

A medication review is a discussion of a patient’s complete medication list. Studies have found that pharmacist-led medication reviews can correct some medication-related discrepancies, lower medication costs, and decrease the number of drugs prescribed.9–12 However, meta-analyses and systematic reviews have found no association between pharmacist-led medication reviews and lower hospital admission rates or mortality in older patients,10,13 perhaps because some patients prefer physician-led discussions.14 Physician-conducted medication reviews can result in more appropriate patient medication use,15 but clinical outcomes of reviews have not been studied.

Quality measures and guidelines recommend that physicians conduct medication reviews at least yearly with all older patients,16,17 but do not specify the content of these reviews or the manner in which they should occur. National quality and safety measures specify that medication reconciliation should occur after a hospitalization and across the continuum of care.18–20 These measures suggest that providers should obtain a list of all of a patient’s medications, and also review the medication dose, frequency, route of administration, and indication for each medicine.19,21 The pharmacy literature describes different types of medication review: a prescription review to address technical issues related to prescriptions, a concordance and compliance review to address issues related to patient medication-taking behavior, and a clinical medication review that addresses medication issues in the context of a patient’s clinical condition.22 Comprehensive medication reviews9,22,23 may require 30–45 min to complete, and are infeasible for physicians to perform in busy primary care settings.

Currently, there are no empirically based recommendations concerning how physicians should conduct medication reviews.
reviews, and few studies have examined how physicians approach the content of a medication review.24,25 To complicate the issue, health care providers have mixed opinions about the purpose of a medication review, which may result in different ideas about what to do when conducting a review. Little is known about how physicians solicit information about chronic medications, what the discussions consist of, and how they are integrated into an office visit. An understanding of these strategies could lead to recommendations to optimize communication. The goal of this study was to describe how physicians conduct medication reviews when seeing older patients in the office setting.

METHODS

The investigators analyzed the Physician Patient Communication Project, a study conducted between January and November 1999 in two health care systems in Sacramento, California. Patients and physicians were surveyed prior to and immediately after office visits, and visits were audio-taped and transcribed. Full study details have been described.26 The study was approved by the UC-Davis and UCLA Institutional Review Boards.

Physician and Patient Samples

Physicians were recruited from the UC-Davis Medical Group and Kaiser Permanente. Eleven family physicians and 17 internists had patients included in this analysis. Research assistants randomly sampled physician appointment books prior to patient visits and telephoned patients aged 18 years or older. Eligible patients had to speak English and reported having a new or worsening medical problem, or being at least “somewhat concerned” about their health or about having a potentially serious undiagnosed condition.

Of the 4,560 patients selected for contact, 1,332 patients were eligible for the study, and 909 (68%) were enrolled. Audiobooks of 632 visits were transcribed. We selected 122 visits in which patients aged 65 and older saw a primary care provider previously known to them, for either a follow-up visit (118 encounters) or a comprehensive physical examination (4 encounters). After reviewing the audiobooks and transcripts, we dropped 7 visits where the tape ended prior to the end of the visit. 7 where the patient was asked to return to the office the same day after a diagnostic test, and 8 in which transcript review and physician report indicated that the patient was not taking any chronic medications, leaving a total of 100 visits containing potential medication review conversations.

Patient and Physician Surveys

Patients were asked about demographics, amount of time since they last saw any physician, and about their physical functioning at the time of the visit (36-item Short-Form Health Survey physical functioning scale, version 1, range from 0–100, with 100 indicating maximum function; α=0.9327). Physicians were queried about their demographics and specialty, and were asked about the number of chronic medications continued for each patient. We used STATA statistical software, version 10.0 (StataCorp, College Station, TX) to tabulate descriptive statistics for patient, physician, visit and medication characteristics.

Determination of Whether All Chronic Medications Were Mentioned During Visit

To identify office visits in which each medication was mentioned, the investigators first reviewed audio tapes and transcripts to determine the number of chronic medications, vitamins, and herbal supplements that were mentioned by name, class, or purpose during the visit. Next, we compared the number of medications actually mentioned during the visit to the number of chronic patient medications physicians reported they had the patient continue on a post-visit questionnaire. If results from the transcript and survey differed, we used the larger number as the total number of chronic medications. If the number of medications discussed during the visit was equal to or greater than the number reported by the physician, or if the physician did not respond to the survey question (three visits), we gave credit for mentioning all patient medications during the visit.

Qualitative Analysis: Approach, Topics, and Sequential Versus Non-Sequential Discussion

The goals of this analysis were to explore how physicians approached chronic medication discussions during an office visit, to determine the topics discussed, and to assess the sequence in which medications were broached. To do so, the investigators examined conversations about all chronic prescription medications, vitamins and herbal supplements, over-the-counter (OTC) and pro re nata (PRN, as needed) medications that patients were taking at the time of the visit. Conversations about medications used for acute conditions, such as antibiotics and cough preparations, were not assessed, nor were new medication prescriptions, previously discontinued patient medications, or medications discussed but not prescribed.

We employed an iterative qualitative approach to transcript analysis using a form of qualitative content analysis,28,29 and analyzed transcripts inductively using the communication recorded in the transcripts to understand physician behavior patterns.29 The analysis was performed at both the visit and the medication level. Whether and how physicians introduced a medication review was explored. For each chronic medication or supplement mentioned during a visit, the topics brought up in the conversation concerning the medication were noted.

In addition, we investigated the sequence in which medications were mentioned during the visit. In “sequential” discussions, medications were mentioned in an uninterrupted fashion, without intervening non-medications discussion. Non-sequential medication references occurred when the medications were mentioned in the context of discussing other care (e.g., a recent hospitalization or side effect) or when a discussion focused on a single medication. An office visit was defined as containing a sequential discussion of medications if half or more of the medications discussed during the visit were considered in this manner. For patients taking only one prescription medication, a discussion was considered sequential if the patient was given the opportunity to list other medications or supplements, since this could lead to a sequential discussion of additional medications. Four investigators participated in the qualitative analysis. Two of them (DMT, NSW) together identified recurring topics...
and developed a system to codify them. A preliminary codebook was established with topics, definitions, and examples of each code. A third investigator (SF) reviewed 25% of the transcripts to help refine the coding system and definitions and to ensure validity of the codes. Through this process, we merged and adjusted codes and revised the codebook accordingly. One of the investigators (DMT) reviewed and coded all of the transcripts using the final codes, and another (DAP) double-coded 25% of the transcripts, achieving a kappa coefficient with omission calculation of 0.86. Disagreements were resolved by consensus among the four investigators.

RESULTS

The 100 patients in the study had a mean age of 73.6 (SD=5.9, range 65–89). About half were female, most were Caucasian, and two-thirds had at least some college education. The mean number of chronic medications based on physician report was 3.6 (SD=2.8), and the mean number of prescription medications discussed during the visit was 2.6 (SD=2.1) (Table 1). Fifteen of the physicians practiced at Kaiser Permanente and 13 at UC-Davis Medical Group. Sixty-eight percent of physicians were male.

Based on transcripts and surveys, the 100 patients were taking 410 medications. In 54% of visits, a patient’s full set of medications was mentioned by name, class, or purpose. Of the 410 medications, there were 275 chronic prescription medications and 54 vitamins or over-the-counter medications. The other 81 medications cannot be characterized because they were not explicitly mentioned during the office visit.

Table 1. Patient, Visit, and Medication Characteristics

| Characteristic                        | n*  | Percent |
|---------------------------------------|-----|---------|
| Female                                | 100 | 53      |
| Caucasian                             | 100 | 93      |
| Educational level                     |     |         |
| High school or less                   | 99  | 32      |
| Some college education                | 100 | 40      |
| College graduate                      | 99  | 27      |
| Greater than 2 months since last visit with any medical doctor | 99  | 33      |
| Visit to a male physician             | 100 | 80      |
| Visit to an internist                 | 100 | 64      |
| UC-Davis patient                      | 100 | 42      |
| Age                                   |     |         |
| Physical functioning at time of visit | 100 | 73.6 (5.9) |
| Mean (SD)                             |     | 65–89   |
| Range                                 |     |         |
| No. of chronic meds taken by patient  | 99  | 54.0 (25.5) |
| Mean (SD)                             |     | 0–100   |
| No. of prescription meds discussed during visit | 97  | 3.6 (2.8) |
| Mean (SD)                             |     | 0–12    |
| No. of vitamins/supplements discussed during visit | 100 | 2.6 (2.1) |
| Mean (SD)                             |     | 0–8     |
| No. of new medications prescribed during visit | 100 | 0.6 (1.3) |
| Mean (SD)                             |     | 0–7     |

*Variation in n is due to missing observations

The qualitative analysis revealed two major categories of discussion about chronic medications. One type of discussion relates to obtaining a complete list of patient medications. The second type of discussion is a set of specific topics related to managing chronic medications. Below we describe these two major categories. Then we consider the sequence in which medications are mentioned during visits.

Qualitative Analysis

The qualitative analysis identified four types of efforts to obtain a complete list of patient medications. At least one of these approaches was found in 36% of office visits. The approaches consist of: (1) discussion about a patient’s medication bottles or a patient-generated list of medications, (2) broad questions assessing patient medications, (3) questions ensuring that a patient’s entire medication list had been captured during the visit, and (4) explicit review (statements in which physicians stated their intention to go over all of a patient’s medications). Table 2 contains examples describing each approach.

| Characteristic                        | n*  | Percent |
|---------------------------------------|-----|---------|
| Visit to a male physician             | 100 | 80      |
| Visit to an internist                  | 100 | 64      |
| UC-Davis patient                      | 100 | 42      |
| Age                                   |     |         |
| Physical functioning at time of visit | 100 | 73.6 (5.9) |
| Mean (SD)                             |     | 65–89   |
| Range                                 |     |         |
| No. of chronic meds taken by patient  | 99  | 54.0 (25.5) |
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| No. of prescription meds discussed during visit | 97  | 3.6 (2.8) |
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| No. of vitamins/supplements discussed during visit | 100 | 2.6 (2.1) |
| Mean (SD)                             |     | 0–8     |
| No. of new medications prescribed during visit | 100 | 0.6 (1.3) |
| Mean (SD)                             |     | 0–7     |

*Variation in n is due to missing observations

Below is an example of a physician ensuring that a patient’s complete medication list was captured during the visit. This physician verified an 82-year-old patient’s medication list with his daughter by naming the medications and asking for her agreement about the drugs mentioned:

| Characteristic                        | n*  | Percent |
|---------------------------------------|-----|---------|
| Visit to a male physician             | 100 | 80      |
| Visit to an internist                  | 100 | 64      |
| UC-Davis patient                      | 100 | 42      |
| Age                                   |     |         |
| Physical functioning at time of visit | 100 | 73.6 (5.9) |
| Mean (SD)                             |     | 65–89   |
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| No. of chronic meds taken by patient  | 99  | 54.0 (25.5) |
| Mean (SD)                             |     | 0–100   |
| No. of prescription meds discussed during visit | 97  | 3.6 (2.8) |
| Mean (SD)                             |     | 0–12    |
| No. of vitamins/supplements discussed during visit | 100 | 2.6 (2.1) |
| Mean (SD)                             |     | 0–8     |
| No. of new medications prescribed during visit | 100 | 0.6 (1.3) |
| Mean (SD)                             |     | 0–7     |
Though the patient’s daughter contributed to the conversation by telling the physician about the Cardizem, this type of query requires little from the patient outside of tacit agreement.

Another physician, who reported on the physician survey that his 75-year-old patient was taking five medications, asked a broad question about whether the patient’s medication list had recently changed, and followed the question with an explicit review statement concerning his plans to review the patient’s medications: Doctor: “Have you started any new medicines lately?” Patient: “Nope.” Doctor: “Because I was going to review them.” Patient: “Same thing. The only one I don’t take anymore was that capsule, oh I can’t think of the name now…it’s brown pills.” These types of statements can set the stage for a complete discussion of a patient’s medications.

**Topics Related to Management of Chronic Medications.** We identified ten topics of discussion about specific chronic medications related to medication management (Table 2): (1) medication efficacy, (2) directions for use, (3) potential side effects or adverse events, (4) medication adherence, (5) laboratory or other monitoring of medications, (6) medication supply or refills, (7) directions for changing or adjusting chronic medications, (8) directions for continuing chronic medications, (9) medication dose, and (10) medication cost or insurance issues.

Frequency of discussion about each of the topics ranged from 12% of encounters for cost issues to 66% for efficacy discussion. In other words, specific medications were most often discussed in terms of their effect on symptoms or a disease process. Medication directions were commonly noted

![Table 2. Frequency of Discussion and Examples of Approaches to Obtaining a Patient’s Complete Medication List and Topics Related to Management of Chronic Medications](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAAEAAAAAAgCA...)

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**Table 2. Frequency of Discussion and Examples of Approaches to Obtaining a Patient’s Complete Medication List and Topics Related to Management of Chronic Medications**

| Approach to obtaining a patient’s complete medication list | Percent of encounters (n=100) | Example |
|----------------------------------------------------------|-------------------------------|---------|
| Medication list/bottles                                  | 14                            | “I got these medicines here” |
| Patient brought medication bottles/list to visit        |                               |         |
| Broad question                                           | 11                            | “What medicines are you taking now?” |
| Physician asked broad question assessing medications     |                               | “You are on basically two medicines?” |
| Ensure capture                                          | 9                             | “Have you started any new medicines lately?” |
| Physician ensured all medications captured               |                               | “What else are you taking?” |
| Explicit review                                          | 7                             | “Let’s review your medicines right now” |
| Physician stated intention to go over all medications    |                               |         |

| Topics related to management of chronic medications      | Percent of encounters (n=100) | Percent of medications (n=410) | Example |
|----------------------------------------------------------|-------------------------------|-------------------------------|---------|
| Efficacy                                                 | 66                            | 31                            | “…the Tagament seems to be working fine” |
| Medication directions                                    | 59                            | 27                            | “Does that help when you take it?” |
| Side effects                                             | 37                            | 13                            | “Well, your blood pressure looks really good” |
| Adherence                                                | 35                            | 13                            | “You take it three times a day?” |
| Monitoring                                               | 33                            | 12                            | “You only take two at night” |
| Medication supply/refills                                | 32                            | 20                            | “You see, the blood pressure pill expands my ankles” |
| Medication changed/adjusted                              | 32                            | 9                             | “Do you think the Cardizem gives you any side effects? Does it bother you any?” |
| Patient told to continue meds                            | 32                            | 17                            | “I think part of that is the trazodone. Dry mouth” |
| Medication dose                                           | 30                            | 10                            | “…I haven’t been taking my pills” |
| Medication changed/adjusted                              | 32                            | 9                             | “It doesn’t look in the last year like you have gotten anything filled for cholesterol” |
| Medication supply/refills                                | 32                            | 20                            | “And you should make sure you take that Fosamax every day…” |
| Medication cost/insurance issues                         | 12                            | 4                             | “Well, we need to check your potassium again” |
| Monitoring                                               | 33                            | 12                            | “Oh I do need a prescription, before I forget, 90 days of the Pravachol, 40 mg” |
| Medication supply/refills                                | 32                            | 20                            | “Do you need any refills on anything?” |
| Medication changed/adjusted                              | 32                            | 9                             | “So, stop the Nitro-Bid and a couple of days later stop the atenolol and see how you do” |
| Patient told to continue meds                            | 32                            | 17                            | “Keep all the same medicines going, okay?” |
| Medication dose                                           | 30                            | 10                            | “That was the 1 mg, right?” |
| Medication cost/insurance issues                         | 12                            | 4                             | “And the Lotensin 10 mg” |
| Monitoring                                               | 33                            | 12                            | MD: “The Xanax is no longer formulary” |
| Medication supply/refills                                | 32                            | 20                            | Pat: “That doesn’t cost much, but the others are high” |

*One or more of these topics were addressed in 36 of 100 encounters*
which medications were mentioned or discussed without visits, the majority of the patient interspersed throughout the office visit. In 45 of the 100 a combination of sequential and sporadic discussions conversation. Most frequently medications were mentioned in patient medications was not always delimited to a single discussion topics ranged from 4% (cost) to 31% (efficacy) (Table 2). Forty-two percent of chronic medications had no medication management topics discussed, 45% had between one and three topics discussed, and 13% had four or more topics discussed (Fig. 1).

Patients contributed to the content of the medication discussions by asking questions or making comments. Patients brought up medication adherence (particularly problems with adherence) during 25% of the encounters, while physicians initiated adherence discussions for 10%. Similarly, patients brought up medication refills or commented about their supply of medications more frequently (21% of visits) than physicians (15% of visits).

Sequential Versus Non-Sequential Discussion. Discussion of patient medications was not always delimited to a single conversation. Most frequently medications were mentioned in a combination of sequential and sporadic discussions interspersed throughout the office visit. In 45 of the 100 visits, the majority of the patient’s medications discussed during the visit were reviewed as a sequential discussion in which medications were mentioned or discussed without intervening conversation. Medications were more likely to be mentioned sequentially when physicians made efforts to obtain a complete list of patient medications (29 of 36 visits; 81%), compared to visits in which no efforts were made (16 of 64 visits; 25%).

Visits in which all of a patient’s medications were explicitly mentioned by name, medication class, or purpose were more likely to contain sequential discussion of chronic medications than those in which not all of a patient’s medications were named. Among the 54 visits in which all medications were specifically named, the majority of medications were brought up sequentially in 32 (59%) visits. In these visits, 167 medications were mentioned (mean 3.1/visit). In contrast, in the 46 visits in which not all of the chronic medications were specifically named, the medications were mentioned sequentially in 13 (28%) visits. Only 93 of 243 medications (mean 2.0/visit) were brought up during these visits with non-sequential discussions.

Overall Physician Approach to Medication Review
Merging the quantitative with the qualitative findings, in 67 of the 100 office visits, either each of a patient’s medications was touched on or the physician attempted to obtain a complete medication list (but did not specifically name each medication). Of these 67 visits, sequential discussions occurred in 41 visits (61%): 32 in which all medications were specifically named, and 9 in which there was an effort to obtain the patient’s complete medication list (but not all medications were specifically mentioned). Of these 41 visits, there were 28 in which at least one medication management topic was raised for each of the patient’s medications. As a result, a systematic discussion that touched on at least one topic for each medication the patient was taking occurred in only 28% of visits.

DISCUSSION
For countless years, physicians have performed the fundamental tasks associated with medication review on a daily basis. Guidelines and quality measures have now canonized these tasks as required elements of care. This study teases out what physicians discuss during office visits about a patient’s medication regimen and shows that most physicians do not come close to conducting all elements of a medication review.

Comprehensive evaluation of chronic medications was rare in the visits studied. Specific details about a medication were discussed for just over half of the medications the patients were taking, and none of the 100 continuity office visits in this study included a comprehensive consideration of dosing, adherence, efficacy, and side effects.

This analysis identified three distinct aspects of the way that physicians operationalize medication review during office visits: efforts aimed at obtaining a patient’s complete medication list, discussion of topics about medication management, and sequential versus non-sequential discussion of medications. These topics are similar to those included in detailed pharmacist medication reviews, but are targeted in clinically relevant ways and often to particular medications or clinical issues. The elements of physician-conducted medication review identified in this study may constitute an empiri-
Physicians endeavored to conduct a comprehensive accounting of a patient’s medications in several ways. Some were time-consuming, such as when physicians queried patients about each of their medications in a systematic fashion. However, this style may lead to recognition of discrepancies between what a patient is taking and what the physician believes the patient is taking. Others, such as asking if any medications have changed without specifically touching on each individual medication, could serve to verify a medication list, but required less participation from the patient. In a setting in which a patient may have frequent office visits or in which electronic medical records are accurately maintained, asking about changes may afford an efficient mechanism for medication review.

Due to time constraints during office visits, comprehensive medication review may best be performed by a non-physician health care provider, such as a nurse or pharmacist. While pharmacist-led medication-related interventions can improve patient health outcomes, pharmacist medication reviews in older patients have met with less success. Other pharmacist reviews may be limited because they are not directly linked to changes in clinical care, and physicians do not always implement pharmacists’ suggestions. Older patients may be reticent to accept pharmacist suggestions and may prefer to have their medications reviewed by their physician. Although not a panacea, medication reconciliation features incorporated into many electronic health record systems may allow physicians to implement medication review more easily.

This study is limited by the nature of the office visits captured. Few visits were comprehensive examinations, which we hypothesize would be more likely to contain a medication review. Physicians may not regularly perform medication reviews during follow-up visits, and patients may have had another visit during the year in which their physician performed a medication review. Physicians who have a reliable nurse or medical assistant collecting information about patient medication regimens may not repeat the process. We do not know whether this occurred prior to the physician-patient encounter.

This study was also limited because we did not have access to patient medical records, and instead relied on physician reports in determining the total number of patient medications. When the number of medications touched upon during the visit exceeded the physician’s reported number, we considered the larger number of medications to reflect the regimen. This may have resulted in an overestimate of physician completeness, but does not affect the description of the topics addressed. Furthermore, we did not require dietary supplements, over-the-counter, or as needed (PRN) medications to be assessed, and have no relevant outcome data to assess the effect of the medication reviews performed. Other limitations include the potential effect of having a tape recorder in the room, which may alter physician and patient behavior. If anything, the Hawthorne effect may have enhanced physician communication about medications. The patients in this study were mostly white and well-educated, and most visited a male physician. In addition, the study focused on older patients in a single city.

It is increasingly recognized that medication review is a critical aspect of the clinical encounter. A practical definition of medication review is needed to monitor performance and guide interventions. While medication review likely will become more efficient as physicians adopt electronic medical record systems, this study illustrates that, at least among the physicians studied, medication review is not carried out and needs substantial improvement.

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