Medication Adherence Assessment and Management

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Upon successful completion of this article, the pharmacist should be able to:
1. Define the terms compliance, adherence, concordance and persistence.
2. Discuss the prevalence and consequences of medication non-adherence.
3. Identify possible reasons for non-adherence.
4. Describe strategies to assess medication adherence.
5. Given a patient scenario, develop a management plan for suspected non-adherence.

Case Study
LD, a 72-year-old woman, is referred by her physician to you for a comprehensive MTM session. Her physician is having difficulty managing her health conditions and is wondering if medication non-adherence may be contributing to LD’s sub-optimal response to therapy.

During your interview with LD you obtain the following information:

Current Disease states:
diabetes mellitus (type 2) hypertension osteoporosis hyperlipidemia

Current Medications:
metformin 1,000 mg po BID glipizide 10 mg po BID lisinopril 40 mg po daily hydrochlorothiazide 25 mg po daily alendronate 70 mg po weekly rosvastatin 20 mg po daily acetaminophen 500 mg po q6h prn pain calcium carbonate 600 mg po BID

Family History: Father died of complications from diabetes mellitus at age 56, mother died of a stroke at age 82. No siblings.

Social History: Married, lives with her husband of 43 years; has one child aged 39. Denies drinking alcohol; denies tobacco use.

Insurance: Medicare part D prescription drug plan

As LD’s pharmacist, how would you go about identifying her barriers to adherence and how would you address them?

Community pharmacists are increasingly providing medication therapy management (MTM) services. A survey by the American Pharmacists Association reported that 68 percent and 72 percent of respondents were offering MTM services in 2008 and 2009, respectively. Results from the NCPA Digest, sponsored by Cardinal Health, are similar. Another study analyzed MTM services provided by pharmacists in community pharmacies. Initially, MTM interventions consisted of primarily patient education and monitoring for acute drug therapies such as antibiotics. Over seven years, MTM interventions have evolved toward consultation-type services for patients taking chronic medications.

Conversations about adherence take place every day
in the pharmacy. The goals of MTM to optimize medication use, enhance quality of care, and improve patient outcomes while using cost-effective therapies provide an additional setting to discuss adherence. MTM services may include, for example, assessing a patient’s health status, developing a medication treatment plan, monitoring and evaluating the safety and efficacy of an individual’s drug therapy and conducting a complete medication therapy review to identify, resolve, and prevent medication-related problems.

When performing MTM, a critical part of accurately evaluating the effectiveness of therapy is to ascertain to what extent patients are following the directions on their prescription medications. Historically, this variable has been termed compliance. Compliance is defined as “a disposition to yield to others” or “the extent to which the patient’s behavior (in terms of taking medications, following diet, or executing lifestyle changes) coincides with medical or health advice.” Compliance emphasizes the expectation that patients will passively follow recommendations of their health care provider.

Because the term “compliance” suggests that patients aren’t involved in the decision-making process and “non-compliance” implies patient fault, this term has fallen out of favor by some. Adherence, as defined by the World Health Organization, is “the extent to which the patient’s behavior—taking medication, following a diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a health care provider (emphasis added).” Unlike the term compliance, it highlights the need for agreement between patient and health care provider. Hence, adherence has become the preferred term.

Inclusion of the patient’s volition into clinical decision making is not only limited to adherence. Concordance, which is a newer phrase, places more value on coordination and partnership between patient and health care provider. Both patient and health care provider are expected to explore the other’s point of view via mutual sharing of beliefs. Once this occurs, not only is the health care provider able to tailor a regimen to the patient’s expectations and desires but also, the patient is more likely to understand details regarding his or her treatment. Some consider that concordance is a step toward maximum participation by patients in their medical care. Persistence is another terminology; it means long-term adherence or “the length of time from initiation to discontinuation of therapy.”

Medication non-adherence includes a variety of medication-taking behaviors. Failing to fill a new or refill prescription, missing doses, taking more than prescribed, taking someone else’s medication, and stopping therapy early are examples of non-adherence. The purpose of this article is to provide an overview of medication adherence and to suggest practical strategies for assessing and managing medication non-adherence as part of regular patient interaction and MTM services.

**PREVALENCE AND CONSEQUENCES**

The statistics regarding medication non-adherence in the United States are alarming, leading some to describe this issue as America’s “other drug problem.” Although reported estimates vary, the prevalence of medication non-adherence, in general, appears to be high. Adherence to medications for common chronic conditions like hypertension has been reported to be as low as 50 percent to 60 percent. Observed adherence rates, defined as the proportion of patients with >80 percent adherence, ranged from only 55 percent to 73 percent in one study and 30 percent in another study. Salzman and colleagues reported adherence of 40 percent to 70 percent. Moreover, the World Health Organization projects that only 50 percent of patients take their medications as prescribed.

C. Everett Koop, former Surgeon General of the United States, said, “Drugs don’t work in patients who don’t take them.” The consequences of poor medication adherence can be severe. One study evaluated the link between non-adherence and hospital admission. The study investigators interviewed 315 patients who had been admitted to a community teaching hospital’s medical service; approximately 10 percent of hospitalizations were due to non-adherence. In an observational study, high adherence led to a significantly lower risk of hospitalization compared with low adherence. Other studies have shown that non-adherence increases the relative risk of myocardial infarction, coronary heart disease and stroke.
A relationship between non-adherence and mortality has also been reported. A cohort study evaluated the link between adherence and mortality in patients who had survived at least 15 months after an acute myocardial infarction. Low adherence with statins and beta-blockers was associated with higher mortality, and adherence correlated positively with survival. In the “Towards a Revolution in COPD Health” study, good adherence was associated with a 60 percent decreased risk of death and a 44 percent lower rate of severe exacerbations.

In addition to the impact of non-adherence on disease morbidity and mortality, the economic burden of non-adherence is also significant. In the observational study on hospitalization risk mentioned previously, high levels of adherence with diabetes and cholesterol medications were significantly associated with lower disease-related medical and total health care costs. It is unclear if adherence is associated with lower overall health care costs, but the burden of non-adherence on health care utilization has been reported. The estimated yearly cost is $396–$792 million, according to LaFleur and colleagues. According to the National Council on Patient Information and Education, non-adherence cost the United States $177 billion annually in total health care costs.

**REASONS FOR NON-ADHERENCE**

Reasons for medication non-adherence extend far beyond a patient simply forgetting to take his or her medications; in fact, some reasons for non-adherence may be beyond a patient’s immediate control. MTM provides an excellent opportunity for pharmacists dive in and assist patients who wish to identify, problem solve, and overcome their unique barriers to medication non-adherence.

Numerous potential barriers to medication adherence have been identified in the literature, and several different classification systems have been proposed. For example, barriers to adherence may be classified as being either intentional or unintentional. If a patient consciously decides not to adhere to his or her medication regimen, then the reason for non-adherence is considered intentional. On the other hand, if patients desire to be adherent but something beyond their decision making capabilities serves as a barrier, the reason for non-adherence is considered unintentional. A patient deciding not to take his atypical antipsychotic because he is worried about it causing weight gain and a patient deciding not to take her antidepressant because she does not see the need for it would both be classified as intentional reasons for non-adherence. In both cases, the patients actively chose not to take their medications as prescribed based upon their motivation and beliefs. Alternatively, a patient simply forgetting to take her bedtime statin dose or a patient unable to purchase his antiviral medication due to its high cost are both examples of unintentional non-adherence. In both situations, the patients intended to take their medications as prescribed but factors outside of their immediate control served as barriers.

Barriers to adherence may also be divided into five categories. These five categories include social and economic, health care system, condition related, therapy related, and patient related barriers to adherence. Social and economic barriers include those that are present because of a patient’s current social or economic situation. Examples include a patient not able to obtain transportation to the pharmacy to pick up medications in a timely manner and a patient unable to accurately follow a medication regimen due to low health literacy. Health care system barriers to adherence are those present because of deficiencies in the health care system. These barriers include the limited time many practitioners have to counsel patients on the best use of their medications and patients becoming lost to follow up due to a lack of continuity in care. A patient’s co-morbid health conditions may contribute toward condition related barriers to adherence. Examples in this category include a patient missing doses of his medications due to frequent psychotic episodes disrupting his daily routine, and a patient with depression that prevents her from taking an interest in actively treating her health conditions. Therapy-related barriers to adherence are those caused by unfavorable aspects of a patient’s medication regimen. For example, studies have demonstrated that as the daily dosing frequency of a medication increases, adherence to the regimen declines. Finally, patient related barriers...
to adherence may be unintentional or intentional, where the patient consciously decides not to adhere to his or her medication regimen. Patients may decide not to adhere due to negative beliefs about medications such as perceived inefficacy; one study showed that negative beliefs were significantly associated with low adherence. Examples of unintentional patient-related barriers include a patient with severe arthritis not capable of opening his prescription bottle to take his medication, and a patient with low vision unable to read the directions on a prescription bottle in order to follow the dosing regimen. Additional examples of barriers to adherence from each category are provided in Table 1.

It is important to note that multiple barriers may contribute toward non-adherence in the same patient at the same time. For example, a patient may be non-adherent to her diuretic regimen because it causes her to experience urinary frequency (therapy-related factor), while she is non-adherent to her antihypertensive regimen because she “feels fine” even if she does not take it (patient-related barrier). It is important for pharmacists to consider both intentional and unintentional barriers to adherence from each of these five categories while interacting with patients or during MTM sessions.

There is a common misconception that elderly patients are more likely to be non-adherent to medications than the general population. According to the literature, there is no consensus that age alone is a predictor of poor adherence. However, age-related changes in drug metabolism (pharmacokinetics) and action (pharmacodynamics) coupled with multiple health conditions and polypharmacy may make the elderly more susceptible to problems resulting from medication non-adherence than the general population.

**MEDICATION ADHERENCE ASSESSMENT**

It is appropriate to discuss adherence anytime patient behavior indicates; be it reinforcing or encouraging adherence. It is important for pharmacists to assess patients’ medication adherence during MTM sessions because patients generally will not disclose their medication-taking habits voluntarily. Although a consistently reliable, “gold standard” is not available, various direct and indirect methods are available to assess adherence. Direct measurements include monitoring serum drug levels or directly observing patients take their medications. Albeit objective and accurate, these methods may not be practical for community pharmacists.

There are various methods for indirectly assessing adherence. For example, adherence can be assessed by pharmacy refill record review and pill counts. Reviewing the pharmacy refill records may be useful to screen for non-adherence and helpful in identifying people who may benefit from adherence counseling or MTM services. However, this method is only useful if the patient fills all medications from a single pharmacy. Pill counts are also easy to perform, but this strategy is more intrusive and may not be practical or reliable for MTM services. Keep in mind that pill counts and pharmacy record review may overestimate adherence and provide no information about actual medication-taking behavior. If non-adherence is suspected through pharmacy record review or pill counts, the pharmacists must further evaluate and assess the patient.

Technological aids to assess adherence are available. Electronic monitors which record the date and time the vial is opened or record the time and date of each inhaler actuation exist. These devices have been used primarily for research purposes to assess adherence. The high costs limit widespread clinical applicability. Furthermore, screening tools to assess adherence are available. One screening tool is the Morisky scale, which is quick, simple, and validated. The original scale includes four “yes/no” questions about medication use patterns:

- Do you ever forget to take your medications?
- Are you careless at times about taking your medications?
- When you feel better, do you sometimes stop taking your medications?
- Sometimes if you feel worse when you take your medications, do you stop taking them?

Each “yes” response receives a score of 1 and high scores indicate poor adherence. Modified versions of this scale have been evaluated. Although studies have shown mixed results regarding the usefulness of this scale in screen-
Table 1. Selected Barriers to Adherence and Suggested Strategies to Improve Adherence

<table>
<thead>
<tr>
<th>Barrier To Adherence</th>
<th>Suggested Strategies to Improve Adherence</th>
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<tbody>
<tr>
<td><strong>Social and Economic</strong></td>
<td></td>
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<tr>
<td>• High medication cost</td>
<td>Promote cost-effective therapy, Use patient assistance programs, Suggest charitable pharmacies</td>
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<tr>
<td>• Cultural beliefs about treatment</td>
<td>Effective communication skills, Use interpreters, Choose appropriate patient education materials</td>
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<tr>
<td>• Language barriers</td>
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<tr>
<td>• Low health literacy</td>
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<tr>
<td><strong>Health Care System</strong></td>
<td></td>
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<tr>
<td>• Poor patient-provider relationship</td>
<td>Develop rapport with patients, Make patient counseling and education a priority, Effective communication skills, Routine follow-up, either in person or by telephone</td>
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<tr>
<td>• Limited time for consultation</td>
<td></td>
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<tr>
<td>• Instructions from clinician not clear</td>
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<tr>
<td><strong>Condition Related</strong></td>
<td></td>
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<tr>
<td>• Lack of symptoms</td>
<td>Patient counseling and education, Explore patient health beliefs, Self-monitoring (e.g. blood pressure)</td>
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<tr>
<td><strong>Therapy Related</strong></td>
<td></td>
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<tr>
<td>• Complexity of medication regimen</td>
<td>Simplify drug regimen, Minimize number of medications by using combination drug products, Use once daily or two times daily dosing, Special packing (e.g. blister-packs)</td>
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<tr>
<td>• Number of medications</td>
<td></td>
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<tr>
<td>• Frequency of dosing</td>
<td></td>
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<tr>
<td>• Adverse or side effects</td>
<td>Minimize adverse effects, Patient counseling and education, including how to manage adverse/side effects, Contact provider and suggest alternatives</td>
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<tr>
<td>• Poor administration technique (inhalers, injectables)</td>
<td>Patient counseling and education on proper administration, Support self-efficacy</td>
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<tr>
<td><strong>Patient Related</strong></td>
<td></td>
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<tr>
<td>• Worry of possible adverse effects</td>
<td>Patient counseling and education, Explore patient health beliefs, Empathy</td>
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<tr>
<td>• Inadequate knowledge regarding therapy</td>
<td>Effective communication skills, Routine follow-up, either in person or by telephone</td>
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<tr>
<td>• Perceived need for treatment</td>
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<tr>
<td>• Frustration</td>
<td></td>
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<tr>
<td>• Fear of dependence</td>
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<tr>
<td>• Previous treatment failure</td>
<td></td>
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<tr>
<td>• Perceived lack of effect</td>
<td></td>
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<tr>
<td>• Lack of motivation</td>
<td>Motivational interviewing, Effective communication skills, Routine follow-up, either in person or by telephone</td>
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<tr>
<td>• Forgetfulness</td>
<td>Simplify dosing regimen, Minimize number of medications, Pill boxes, Relate pill taking to daily activities like brushing teeth, Alarms, Dosing calendars, Family or caregiver assistance, Technological devices, SMS reminders, Special packing (e.g. blister-packs)</td>
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<tr>
<td>• Vision impairment</td>
<td>Family or other caregiver support, Assistive devices</td>
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<tr>
<td>• Hearing impairment</td>
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<tr>
<td>• Cognitive impairment</td>
<td></td>
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<tr>
<td>• Impaired dexterity</td>
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For non-adherence, it may still be used during MTM sessions to screen patients. Another self-reported tool for assessing adherence is the Medication Adherence Rating Scale. This scale includes 10 items and was developed using two other scales. It has been used to study adherence in patients with psychosis and is readily accessible online (http://www.virtualmedical-centre.com/calc.asp?calc=medication_adherence_rating_scale_mars).

The authors highly recommend use of the Medication Non-Adherence Risk Assessment Tool during MTM sessions. Also accessible online (http://adultmedication.com/AssessmentTools.html), it can be easily incorporated.
into the comprehensive medication review part of MTM. Instruct patients to bring all of their current medications including prescription, OTC, and herbal products. The first step is to determine what the patient knows about his/her medications. Patients who are unable to describe the indication or dosing may be at risk for non-adherence. If the patient is unable to identify the medication altogether, the second step is to give the patient the label and ask him/her to read the label. This step may provide an idea of the health literacy of the patient, which may also affect adherence. The third step is to assess the patient’s perceived efficacy and safety of the medication. Since patients’ beliefs about the efficacy of medications and the presence of side effects negatively affect adherence, this step provides some insights on these possible reasons for non-adherence. For medications that require more intensive administration techniques, for example inhalers or insulin, have the patient demonstrate how he/she administers the medication. This non-adherence assessment tool also includes other screening tools such as the mini-mental status exam (http://lifemanagement.com/nextsteps/Mini_Mental_Status_Exam.pdf) which identifies cognitive impairment, and the Rapid Estimate of Adult Literacy in Medicine—Revised (REALM-R) (www.ahrq.gov/pharmhealthlit/documents/REALM-R.pdf) which assesses patients’ health literacy. In summary, the medication non-adherence assessment tool explores possible reasons for poor adherence.

Finally, another practical approach that can be easily incorporated into conversation or during an MTM session, along with the medication non-adherence assessment tool, is to simply ask patients specifically about their adherence. Self-reporting of adherence has been shown to correlate well with pill counts and electronic monitoring. For instance, self-reporting of missed doses has been shown to correlate with a medication adherence rate of less than 60 percent. A limitation of self-reporting is that it may overestimate adherence because patients may give socially desirable answers or may have poor recall. Although some pharmacists may feel uncomfortable confronting this possibly sensitive issue, using effective communication skills will help to elicit a fairly reliable response. The use of leading or close-ended questions may not lead to truthful disclosures of non-adherence. For example, asking the patient in this fashion may be ineffective: “You don’t miss any doses, do you?” or “Do you take your medicines every day?” These questions lead patients to say what they think the pharmacist wants to hear. Instead, using open-ended (questions that cannot be answered with a simple yes or no), non-judgmental questioning is more effective. Table 2 lists suggestions for opening a dialogue regarding adherence. As economic factors (such as the ability to pay for medications) can affect adherence, direct inquiry regarding the patient’s ability to pay can be part of the assessment process. An open-ended question such as, “How do you pay for medicines?” may provide useful information.

If non-adherence is detected, it is important to determine the reason for non-adherence as this is critical to develop a strategy to overcome this barrier. Pharmacists should probe to find out the details on the reasons for non-adherence. Table 2 lists some suggestions. Again, using open ended questions is important.

**IMPROVING ADHERENCE**

**Evidence-Based Strategies**

Many studies have evaluated strategies to improve medication adherence. To provide clinicians with evidence-based interventions to help patients with long-term medication use, scientific reviews of adherence studies have been published. McDonald and colleagues evaluated randomized controlled trials of interventions to promote adherence. This scientific review only included studies that met specific criteria. Although a variety of interventions were evaluated, only 18 of 36 (50 percent) interventions were shown to improve adherence to chronic therapies. Interventions that helped improve adherence included patient instruction, communication and counseling, convenient care, self-monitoring, self-care, reminders, special packaging (such as blister packs), and family support therapy. Effective interventions were often complex and included combinations of strategies; the median number of interventions used was 3 (range 1–6). The only simple intervention that was shown to improve adherence was simplifying the dosing schedule. In other
words, changing a medication’s administration from four times daily to once daily. The authors concluded that “current methods for improving medication adherence for chronic health problems are mostly complex, labor-intensive, and not predictably effective.”

The Cochrane Reviews use rigorous methodology to summarize and interpret results of clinical studies. A Cochrane Review of interventions for enhancing medication adherence was published in 2008. Seventy randomized controlled trials were identified for this review; the studies varied in design, interventions and patients. Only 36 of 83 (43 percent) interventions were shown to improve adherence. These interventions, however, were often complex and included, for example, the following:

- Making care convenient
- Providing information and reminders
- Promoting self-monitoring
- Providing reinforcement and counseling
- Making routine telephone follow-up calls

Surprisingly, better adherence did not correlate to improvement in disease outcomes in most cases. Another systematic review evaluated interventions to improve adherence with chronic medical conditions. Similar to the studies described, the investigators used strict inclusion criteria and sought to identify methods that help improve medication use. Interventions were categorized as informational, behavioral, family, social, or combined. Informational strategies included educating and motivating through instruction such as patient education and counseling. These informational sessions varied in intensity and structure from a single one-hour session to multiple sessions of longer durations; these sessions were delivered one-on-one or to groups by all types of providers including pharmacists. Compared with usual care, six out of 12 studies showed a significant increase in at least one measure of adherence using informational strategies; clinical outcomes, however, did not improve. Behavioral interventions were those that influenced medication taking behavior and included using pill-boxes, reminders (cues) or calendars, rewarding desired behavior, and simplifying the regimen. Dose simplification improved adherence but resulted in mixed results in terms of clinical outcomes. Interventions that included assessment, feedback, reinforcement, and rewards resulted in significant improvements in adherence. Family and social interventions, including social support by family members or others were often combined with other interventions. Combined interventions that included informational and behavioral methods improved adherence in five of 12 studies. In aggregate, only 16 of 37 studies showed consistent improvements in adherence. The authors concluded that simplifying dose was most effective. Other interventions such as monitoring, feedback, and informational interventions delivered over multiple sessions are probably effective.

As summarized above, systematic reviews of the published literature have tried to identify interventions that enhance medication adherence. These studies, in general, have been weak and with mixed findings. Simplifying

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**Table 2: Suggested Dialogue Openers to Detect and Assess Non-Adherence**

**Detecting Non-Adherence**

- “I know many people have difficulty taking their medicines, so please tell me how you manage all these drugs.”
- “Many patients find it difficult to take each and every dose of their medications. What has been your experience?”
- “Many patients that are taking different medications over long periods of time will occasionally not take one or more of their medications. How often do you…?”
- “Do you ever take more or less of the prescribed amount for any reason?”
- “Most of my patients with this many medications have difficulty remembering what to take when. Has that been a problem for you too?”
- “How many doses do you typically miss during the course of the week?”
- “Are there any days over the previous two weeks that you have run out of any medicine or missed any doses?”

**Assessing Non-Adherence**

- “What concerns do you have about your medications?”
- “What do you think you could do to solve the problem of missed doses?”
- “What might prevent you from following the recommended treatment plan?”
- “How do you remember to take your medications?”
Evidence Supporting Interventions by Pharmacists

As pharmacists have become more involved in direct patient activities such as MTM, studies have evaluated interventions by pharmacists to enhance medication adherence. The Federal Study of Adherence to Medications in Elderly (FAME) was one of the first significant studies of pharmacists’ interventions and evaluated the efficacy of a comprehensive pharmacy program to enhance medication adherence. The FAME trial included patients from the Walter Reed Army Medical Center who were 65 years and older and taking at least four chronic medications. The comprehensive pharmacy program included individualized medication education usually lasting one hour, medications dispensed in blister-packs, and regular follow-up every two months with a pharmacist. This program improved adherence by 35.5 percent to a mean value of 96.9 percent. Moreover, systolic blood pressure and low-density lipoprotein cholesterol (LDL-C) improved. Continuation of the comprehensive pharmacy program led to persistence, although adherence declined when patients returned to normal care. This finding highlights the importance of continued interventions to sustain improvement in adherence.

Another randomized controlled trial assessed interventions by pharmacists to augment medication adherence in patients with heart failure. Patients were recruited from general and cardiology practices of Wishard Health Services, which serves medically vulnerable populations. Study pharmacists were specifically trained on heart failure; they performed a thorough medication history and provided patient-centered verbal instructions and written materials about patients’ medications. Medication vials were labeled with icons indicating what the medication was for (such as a heart icon for angiotensin converting enzyme inhibitors). Moreover, pharmacists monitored medication use, health care encounters, body weight, and other relevant data. When necessary, information was communicated to clinic nurses or physicians. The primary outcomes were medication adherence and clinical exacerbations. Adherence, tracked by using electronic monitors, improved in the intervention group by roughly 11 percent. However, this improvement in adherence did not persist during the three-month post-intervention follow-up period. The intervention group had fewer heart failure exacerbations and hospitalizations. Pharmacists’ intervention reduced both inpatient and outpatient health care costs.

A multi-center, randomized community-pharmacy based pharmaceutical care program evaluated methods to improve adherence to statin therapy. Each participant was assigned to either an intervention or control group. The control group received usual care and verbal as well as written drug information. The intervention group received patient education/counseling and feedback on cholesterol values. In the intervention group, patients were counseled at five different times for 10–15 minutes, and a lipid panel was obtained at three, six, and 12 months. Adherence was high in both groups (>90 percent) and did not differ between groups. Statin discontinuation rates were lower in the intervention group; 34 percent less at six months and 16 percent less at 12 months.

Recently, Morado and colleagues conducted a meta-analysis of studies evaluating pharmacists’ interventions to improve antihypertensive therapy adherence and blood pressure control. Fifteen studies met the inclusion criteria. These studies used a variety of interventions such as MTM, education of patients, education of health care providers, self-monitoring, more frequent follow-up, clinical visits with pharmacists, medication reminders, and administration systems (such as blister-packs). Most studies used two to five different interventions. Adherence was also measured using different methods such as self-reporting, pill counts, and refill data. The most commonly used interventions by pharmacists were MTM, patient education and more frequent follow-up. In general, 44 percent of interventions (7/16) showed improvement in adherence. Five studies showed negative, yet non-significant, effect on adherence.
Moreover, blood pressure control improved with 88 percent of pharmacist interventions.

**WHAT INTERVENTIONS CAN BE USED TO IMPROVE ADHERENCE?**
Although studies evaluating interventions for improving adherence have been weak and with mixed findings, there are some strategies that pharmacists can employ to help patients improve their adherence. If non-adherence has been identified as a problem during conversation, routine counseling or during an MTM session, it is important to identify the patient’s unique barriers to non-adherence. Based on these barriers, it is important to tailor interventions to the needs of the patient. Keep in mind that one intervention does not work for everyone, and most patients will benefit from a combination of strategies. Interventions for common barriers to adherence are described as follows and additional suggestions are provided in Table 1.

**Simplify the Regimen**
One of the simplest, evidence-based, solutions to improve adherence is to simplify the dosing schedule. If a complex regimen is a barrier to adherence, switching to a once or twice daily dosing regimen may enhance adherence. More “forgiving” drugs with long half-lives may also be preferred. Using combination products that will decrease the pill burden for the patient may be another alternative to consider. In hypertension, for example, numerous combination products are available to help simplify the dosing regimen for patients. Another evidence-based strategy is to use special packaging like blister-packs. Many patients with chronic diseases take multiple medications, and handling multiple bottles of medications may be complex and cumbersome. The use of blister packs, organized by the dosing schedule, has been shown to improve adherence. This special service from the pharmacy may help patients improve their adherence.

**Help Patients Remember**
One of the main reasons for medication non-adherence is failure to remember to take medications on time, whether due to cognitive impairment or just forgetfulness. A pillbox organizer or calendar may help patients in this situation. With many types of adherence aids now available with various capabilities like alarms, pharmacists can help the patient select the right one. A number of websites allow users to have recurring or one-time SMS (text) messages sent to their cell phones to remind them to take medications or perform self-monitoring. Additionally, a number of SMS messaging programs are available, or can interface with, pharmacy management systems. Patients with low health literacy or other limitations will benefit from the assistance of pharmacy personnel when scheduling reminders. Another strategy is cuing medications to daily events or relating pill taking to daily activities. For example, patients can keep morning medications on the breakfast table or by their toothbrush, and patients can set alarms on cell phones to remind them to take their medications. Blister-packs can also be helpful in improving adherence—either as a reminder that a dose has already been taken, or has yet to be taken. If cognitive decline has led to increased forgetfulness, involving family member or other support has been shown to be effective as well. Since one solution does not work for all, the goal is to work with the patient to find a solution that works for him/her.

**Educate the Patient**
Another common reason for non-adherence is the patient’s health beliefs. Patients who perceive that a medication is unnecessary or not working may not take their medicines as directed. A key strategy to address this barrier is to appropriately educate the patient. If the patient has any misconceptions about therapy, it would be prudent for the pharmacist to correct these misperceptions. Patient counseling for all patients is a preventive strategy to augment adherence. Inform patients of what the medicine is for, why the patient needs it, how to take it, how often to take it, and what to expect. Tips on educating or counseling patients are shown on Table 3. In educating patients, it is important to focus on what the patient needs to know and needs to do.
Minimize Adverse Effects
Another major reason for non-adherence may be side effects or adverse effects. It is important that pharmacists routinely assess for adverse effects and allocate adequate time during MTM sessions. If the pharmacist identifies this barrier, the patient should be appropriately counseled on how to manage this effect or the prescriber should be contacted to suggest other options. As a preventive measure, counseling about a potential side effect and its severity is important. For example, a patient decided to stop her diuretic regimen because it caused unexpected urinary frequency. Prior education and counseling could have alerted the patient to the side effect, provided a strategy for management and prevented this intentional non-adherence.

Promote Access to Medications
Access to medications can be an important cause of non-adherence. For example, if a patient is non-adherent to a medication because of its high cost, the pharmacist should work with the patient and prescriber to find appropriate alternatives to minimize the patient’s out-of-pocket costs, especially if he/she is in a coverage gap or “donut hole” of the insurance plan. Many pharmaceutical companies offer medication assistance programs for brand medications, and pharmacists can help patients navigate these programs. Along with the financial barriers, there may be logistical barriers such as not being able to drive to the pharmacy to obtain medicines. A delivery service can be used in this situation or family or other support may need to be recruited. If physical impairments hinder medication use, such as arthritis causing difficulty opening bottles, or swallowing difficulties, simple solutions to these problems are available, such as easy open caps, liquid formulations, or extemporaneously compounded products.

Encourage Self-Monitoring
Self-monitoring has been shown to effectively improve adherence. This strategy is especially important for conditions that are usually asymptomatic, such as high blood pressure, diabetes, and high cholesterol. As patients are able to “see” the effects their medications are having through monitoring, they may be more inclined to take them.

Optimize Pharmacist-Patient Relationship
It has been shown that patient satisfaction with health care providers can influence adherence. Patients who are satisfied with their health care provider are more adherent. Developing good relationships with all your patients may be a good strategy for promoting good medication adherence. During regular interaction and more intensive MTM sessions, the pharmacist has the ideal opportunity to develop rapport with patients and enhance the patient-pharmacist relationship.

Routinely Follow-Up
In studies that evaluated pharmacists’ interventions, medication adherence declined when the patient returned to “usual care.” Continued follow-up is critical to maintain medication persistence. Since patients have frequent contact with pharmacists and will generally return to the pharmacy regularly for refills, pharmacists are ideally positioned to follow-up with patients. Ensuring continued follow-up, especially for MTM patients with a new medication action plan, should be a priority because improving adherence should be a chronic intervention, not a one-time event. Telephone follow-up can be used and will also help to enhance pharmacist-patient relationship.

Other Interventions
Adherence requires significant behavior
Other strategies such as motivational interviewing have been shown to improve adherence. Motivational interviewing is defined as a directive, client-centered counseling style for eliciting behavior change by helping clients to explore and resolve ambivalence. Most patients are ambivalent to change, and this ambivalence affects patients’ motivation and readiness to change their behavior, such as adherence. A number of websites provide clinician education and tools on motivational interviewing; AdultMeducation.com provides more pharmacy-specific information regarding motivational interviewing.

CONCLUSION
Medication adherence refers to the extent to which a patient’s medication taking behavior corresponds with agreed upon recommendations from a health care provider. Numerous barriers to adherence have been identified in the literature, and multiple barriers may contribute towards non-adherence in the same patient. Regular patient interaction and one-on-one MTM provides pharmacists with the opportunity to help patients identify their unique barriers to adherence and to help them overcome these barriers. Several tools are available for pharmacists to use during MTM sessions to dig deeper and help identify barriers to adherence and multiple strategies for improving adherence have been described in the literature. It is important to remember that interventions need to be tailored to the specific needs of the patient. There is no “one size fits all” approach when it comes to improving medication adherence.

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CONTINUING EDUCATION QUIZ

1. “The extent to which the patient’s behavior coincides with medical or health advice” is called:
   a. Adherence
   b. Compliance
   c. Concordance
   d. Persistence

2. “The extent to which the patient’s behavior corresponds with agreed recommendations from a health care provider” is called:
   a. Adherence
   b. Compliance
   c. Concordance
   d. Persistence

3. Medication non-adherence includes:
   a. Failure to fill a new prescription
   b. Taking more medication than prescribed
   c. Taking someone else’s prescription medication
   d. All of the above

4. The World Health Organization estimates that only _______ of patients take their medications as prescribed.
   a. Ten percent
   b. Twenty-five percent
   c. Fifty percent
   d. Seventy-five percent

5. Non-adherence has been shown in studies to:
   a. Increase mortality
   b. Increase hospitalizations
   c. Increase quality of life
   d. A and B

6. According to the National Council on Patient Information and Education, the annual total health care cost of non-adherence in the United States is:
   a. $66 million
   b. $150 million
   c. $85 billion
   d. $177 billion

7. Which of the following is an example of an intentional non-adherence?
   a. Choosing not to take a medication because it is felt to be unnecessary
   b. Deciding not to take a medication due to its adverse effects
   c. Forgetting to take a dose of medication
   d. All of the above are unintentional non-adherence.

8. Indirect assessments of adherence include:
   a. Monitoring serum drug levels
   b. Reviewing the prescription refill record
   c. Counting the tablets remaining in a patient’s bottle
   d. Utilizing electronic adherence monitoring devices

9. Screening tools available to assess patient adherence include:
   a. Medication Adherence Rating Scale
   b. Medication Non-Adherence Risk Assessment Tool
   c. Morisky Scale
   d. All of the above

10. Which of the following statements is CORRECT?
    a. Self-reporting of adherence isn’t reliable.
    b. Self-reporting of adherence may overestimate adherence.
    c. Reviewing the pharmacy refill records may under-estimate adherence.
    d. Electronic monitors for pill bottles or MDIs are inexpensive.
12. What simple and easy intervention has been shown to consistently improve adherence?
   a. Counseling sessions  
   b. Reminders  
   c. Rewarding desired behavior  
   d. Simplifying the regimen (for example, from four times daily to once daily)

13. The Federal Study of Adherence to Medications in Elderly (FAME) found that:
   a. Medication adherence declined when pharmacist interventions were discontinued  
   b. Pharmacist intervention increased medication adherence rates  
   c. Pharmacist intervention improved systolic blood pressure readings  
   d. All of the above

14. Which statement is CORRECT?
   a. Pharmacists’ interventions have not improved patient outcomes.  
   b. Pharmacists’ interventions have been shown to reduce heart failure exacerbations and hospitalizations.  
   c. Pharmacists’ interventions to improve adherence have not shown positive results.  
   d. Pharmacists’ interventions have been shown to reduce mortality.

15. One of your patients does not take his medications as prescribed because he “feels the same whether he takes them or not.” Which of the following strategies may help improve his adherence?
   a. Recommending a pill box  
   b. Exploring the patient’s health beliefs  
   c. Using a medication calendar  
   d. Simplifying the regimen

16. What will you include in the comprehensive medication therapy review?
   a. Ask TT to describe what each medication is for.  
   b. Ask TT to show you how he takes his medications and how he uses his inhalers.  
   c. Conduct a mini-mental state exam to assess his memory.  
   d. All of the above

17. TT is unable to identify many of his medications, and he scores poorly on the mini-mental state exam. TT gets all of his medications from your pharmacy, and a pharmacy record review reveals gaps in refills. What may help to improve adherence?
   a. Make a medication calendar for TT.  
   b. Provide counseling and education.  
   c. Dispense his medications in “blister packs.”  
   d. All of the above

18. TT returns two months later for a follow-up appointment. You measure his blood pressure and cholesterol today. His blood pressure is 160/90, and his cholesterol is still high. When you ask TT about his adherence, he is not the best historian. What may help to improve adherence?
   a. Recruit a family member, possibly his wife, to provide additional support.  
   b. Recommend home blood pressure monitoring.  
   c. Call the doctor and suggest adding another antihypertensive medication.  
   d. A and B

TT is a 78-year-old man with a past medical history significant for COPD, hypertension, osteoarthritis, benign prostatic hyperplasia, dementia, and high cholesterol. He lives with his wife. He presents today for an MTM session.

Use the case above to answer questions 16-18.
LD, a 72-year-old woman, is referred by her physician to you for a comprehensive MTM session. Her physician is having difficulty managing her health conditions and is wondering if medication non-adherence may be contributing to LD’s sub-optimal response to therapy.

During your interview with LD you obtain the following information:

Current Disease states:
- diabetes mellitus (type 2)
- hypertension
- osteoporosis
- hyperlipidemia

Current Medications:
- metformin 1,000 mg po BID
- glipizide 10 mg po BID
- lisinopril 40 mg po daily
- hydrochlorothiazide 25 mg po daily
- alendronate 70 mg po weekly
- rosuvastatin 20 mg po daily
- acetaminophen 500 mg po q6h prn pain
- calcium carbonate 600 mg po BID

Use the patient case above to answer questions 19–20.

19. Which of the following would be the best dialogue opener for discussing non-adherence with LD?
   a. “Do you take your medications every day?”
   b. “Do you ever forget to take your medications?”
   c. “Many patients find it difficult to take each and every dose of their medications. What has been your experience?”
   d. “You don’t miss any doses, do you?”

20. You discover that LD only takes her rosuvastatin every other day to spread out its high cost. LD’s reason for non-adherence to rosuvastatin is best classified as:
   a. Condition related
   b. Health care system
   c. Social and economic
   d. Therapy related

Medication Adherence Assessment and Management
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Quiz: Shade in your choice

- 1. a b c d e
- 2. a b c d e
- 3. a b c d e
- 4. a b c d e
- 5. a b c d e
- 6. a b c d e
- 7. a b c d e
- 8. a b c d e
- 9. a b c d e
- 10. a b c d e

Quiz: Circle your choice

21. Is this program used to meet your mandatory C.E. requirements?
   a. yes b. no

22. Type of pharmacist:
   a. owner b. manager c. employee

23. Age group:
   a. 21–30 b. 31–40 c. 41–50 d. 51–60 e. Over 60

24. Did this article achieve its stated objectives?
   a. yes b. no

25. How much of this program can you apply in practice?
   a. all b. some c. very little d. none

How long did it take you to complete both the reading and the quiz? ______ minutes

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