Pharmacologic therapy can only be effective if the patient takes the medication and takes it as prescribed. This is important for all medications, but especially medications that are used in the treatment of chronic illnesses. Many healthcare providers assume that patients will follow their recommendations and adhere to prescribed drug therapy. However, studies have shown this to be an incorrect assumption. It is hard to determine the true incidence, but it is estimated that 50% of patients with chronic illnesses do not take medications as prescribed. Not only can this increase patient morbidity and mortality, but medication nonadherence is estimated to increase health-related costs by $100 billion per year.

Nonadherence
Adherence, previously referred to as compliance, is defined as the degree or extent to which patients follow agreed upon recommendations from healthcare providers. A closely related term is persistence which can be defined as either the length of time a recommendation is continued, or as the act of continuing the regimen for a specified period of time. Adherence can be intentional (e.g., patient decides to skip a dose) or unintentional (e.g., patient forgets to take a dose) and can vary over time. Adherence rates are generally reported as the percentage of time the prescribed medication doses are actually taken by the patient over a specified period of time. Currently there is no standard as to what constitutes adequate adherence, but many clinical trials use rates of greater than 80% to be acceptable. Because of its significant clinical and economic impact, it is important for healthcare providers to identify patients who are nonadherent with medications so that steps can be taken to intervene.

Measuring Medication Nonadherence
Determining medication nonadherence can be challenging since taking a medication is an individual patient behavior and no one assessment tool has been identified as superior. There are many different measures; however, each has its own inherent limitations. Subjective measurements by asking the patient or their family/caregiver is the most common and simplest way to identify medication nonadherence; however, this often leads to an underestimation of nonadherence rates. This is especially true when the patient being interviewed is asked closed-ended questions (e.g., “Do you take your medications as directed on the bottle?”) as opposed to open-ended questions (e.g., “Tell me how you take this medication.”). Open-ended questions tend to open up the conversation for discussion (Figure 1). Objective measures such as counting the patient’s pills or reviewing pharmacy refill histories can be used, but they also may not give an accurate assessment since you can’t guarantee that the medication was taken correctly or even taken at all by the patient. The presence and quantity of some medications or their response can be monitored through blood levels (e.g., phenytoin, warfarin) or measurement of their physiologic responses (e.g., heart rate, blood pressure). These tests are useful but they can be expensive, may require a doctor’s visit and are subject to other influences such as drug and/or disease state interactions. In an attempt to capture more information accurately, new technology, such as medication event monitoring systems (MEMS), are being developed to electronically capture when and how frequent a medication bottle is opened. They currently provide the most accurate inform-
ation on medication taking behavior, but their use has been primarily in clinical trials, and are expensive. Using a combination of these measurements can give healthcare providers a more accurate picture of how their patients are actually taking their medication.

**Identifying Medication Nonadherence**

There has not been any one single reason identified as to why patients don’t take their medications, but research has determined that that medication-taking behavior is individualized, complex, and there are many factors that influence a patient’s decision. In general, they can be grouped into patient, provider, and healthcare system-related factors. These factors often include barriers which can negatively influence a patient’s adherence to their medications (Figure 1). It is important to note that patients can have more than one barrier to adherence and their presence can change over time.

Studies have also identified strong predictors of medication nonadherence in patients. These include: the presence of psychiatric disease (especially depression), presence of cognitive impairment, treatment of an asymptomatic disease (e.g., hypertension), inadequate discharge/follow-up planning, patient’s lack of belief in the benefit of treatment, patient’s lack of insight into disease, poor provider-patient relationship, the presence of side effects from medication, complexity of treatment, missed appointments, cost of medication and copayment, and presence of barriers to care or medications. Therefore, it is important for healthcare providers to identify patients with these barriers to medication adherence, as well as those patients that possess any of the risk factors for nonadherence. This can be accomplished by conducting a medication adherence assessment on a routine basis (e.g., every patient visit or every time a prescription is written) which will help to identify patients who are in need of additional interventions for improvement.

**Strategies to improve medication adherence**

Because each patient has differing reasons for nonadherence, and no one approach works for everyone, strategies must be individualized. Additionally, the approach may need to change over time for the same patient. Recently, a comprehensive review was published which looked at the results of randomized controlled trials of interventions for improving medication nonadherence in patients. It concluded that…

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**Figure 1. Barriers to Medication Adherence** (adapted from references 1,3,5)

<table>
<thead>
<tr>
<th>Patient interaction with Provider</th>
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</thead>
<tbody>
<tr>
<td>Poor understanding of disease</td>
</tr>
<tr>
<td>Poor understanding of benefits/risks of treatment</td>
</tr>
<tr>
<td>Poor understanding of prescribed medication</td>
</tr>
<tr>
<td>Complex medication regimens</td>
</tr>
<tr>
<td>Poor communication</td>
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<tr>
<td>Low functional health literacy</td>
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<tr>
<td>Inadequate follow-up planning</td>
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<table>
<thead>
<tr>
<th>Patient interaction with Healthcare System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor access to medical care</td>
</tr>
<tr>
<td>Missed clinic appointments</td>
</tr>
<tr>
<td>Poor access to pharmacy</td>
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<tr>
<td>Restrictive medication formularies</td>
</tr>
<tr>
<td>High medication and copayment costs</td>
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<tr>
<td>Fragmented healthcare system</td>
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<table>
<thead>
<tr>
<th>Provider interaction with Healthcare System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor knowledge of drug costs/formulary coverage</td>
</tr>
<tr>
<td>Limited appointment times</td>
</tr>
<tr>
<td>Inadequate access to health information</td>
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<tr>
<td>Fragmented healthcare system</td>
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many of the adherence interventions for long-term medications were complex, and too labor-intensive to be implemented in non-research settings. It was also noted that even the interventions that were shown to be effective didn’t result in large improvements in adherence or treatment outcomes. Despite these conclusions, there are strategies healthcare providers can utilize either individually or collaboratively with other healthcare providers to improve medication adherence in their patients (Table 1).

Focusing on the patient-related factors, enhancing patient education is a key component. Not only can it result in a more open dialogue between the patient and provider, which can enhance the provider-patient relationship, it can create an opportunity for providers to openly discuss issues related to patient beliefs and adherence barriers. Patients may also feel more at ease to discuss medication-related issues (e.g., adherence, adverse effects). When asking patients about their medications, open-ended questions should be used to allow for a more accurate assessment (Table 2). Educating patients also allows the patient to take on a more active role in their treatment which can result in greater motivation and empowerment.

Addressing many of the patient-related adherence factors can also lead to improvements with the physician-related factors. However, there are other opportunities for prescribers to improve medication adherence when prescribing medications. Research has shown that in patients with chronic diseases, medication adherence improves with less frequent dosing. In studies that compared once-daily to twice-daily dosing, the patients with medication dosed once-daily had 13% to 26% more adherent days compared to twice-daily dosing. Other studies have shown similar findings with medication regimens, with a mean (SD) dose-taking adherence of 79% (14%) with once-daily dosing, 69% (15%) with twice-daily dosing, 65% (16%) with thrice-daily dosing, and 51% (20%) with four-times daily dosing. One way this can also be accomplished is by using extended-release, transdermal, or depot formulations of a drug, if available. Adherence rates have also been shown to decrease when the number of pills taken per day increase. Taking advantage of medications that are available in fixed-dose combination pills may help with this adherence-related issue, and allows for a reduction in the number of drug copayments for the patient. Prescribing generic versus brand name medications can also be useful not only for patients who have economic barriers, but for patients taking multiple medications, which is common in patients with chronic conditions. If no generic formulations are available, there are several prescription assistance programs in which patients, if they qualify, can enroll in to receive medications for free or at a reduced cost.

If medication nonadherence has been identified or suspected, patients should be scheduled back for a follow-up visit to monitor adherence. This not only allows the patient to see the emphasis being placed on adherence, but also allows for a focused visit to discuss medication and adherence-related issues. Partnering with the patient’s pharmacist is another way that patient education and the importance of adherence can be reinforced and monitored.

Conclusion
Medication nonadherence is a common problem with significant consequences for patients, their healthcare providers, and the healthcare system in general. Not only does it predispose patients to increased morbidity and mortality, but it increases health-related costs. There are however, simple strategies that healthcare providers can take to help patients improve their medication adherence once it is identified.

For more information on adherence and related resources, please visit the following websites:

- Medication list for patients: www.safemedicationlist.com
- Medication adherence in older adults: www.adultmeducation.com
- Health literacy measurement tools: www.ahrq.gov/populations/sahlsatool.htm
- Prescription assistance programs: www.needymeds.org
  www.togetherrxaccess.com
Table 1. Strategies for physicians to improve medication adherence in their patients1-3

- Review the medication list at every visit with patient
- Use open-ended questions when asking patients about their medications
- Involve patients in the decision making process when it comes to prescriptions
- Take into account the financial situation of the patient when prescribing medications
- Look for generic alternatives if cost is a concern
- Prescribe medications that don’t require frequent administration
- Prescribe combination pills if available
- Avoid complex regimens if possible
- Prescribe medicines that can be taken at the same time of the day
- Provide clear simple instructions
- Talk to patient about medication side effects and how they can deal with them
- Assess functional health literacy
- Increase patient education, providing clear simple instructions
- Utilize multiple methods of patient education (e.g., verbal, print, web-based, formal education programs)
- Encourage patient to get all of their medications filled at the same pharmacy
- Ask for assistance from other healthcare providers (e.g., pharmacists, nurses) to monitor adherence and reinforce patient education

Table 2. Questions that can be used to assess a patient’s medication adherence2

- I know it must be difficult to take all of your medications regularly. How often do you miss taking them?
- Of the medications prescribed to you/listed, which ones are you taking?
- Have you had to stop any of your medications for any reason?
- How often do you not take medication X?
- When was the last time you took medication X?

References

To report medical fraud, contact the Medicaid Quality Assurance Bureau. NMMedicaidFraud@state.nm.us or (505) 827-3100 or Fax (505) 827-3185. We appreciate your continued support of our efforts to encourage quality care for our Medicaid clients.
Questions and/or comments about this newsletter may be directed to Diana Moya, R.Ph. at (505) 827-3174 or DianaJ.Moya@state.nm.us. DUR newsletters are posted on the New Mexico Human Services Department website: http://www.hsd.state.nm.us/providers/utilization-review.aspx.