The Unhidden Cost of Noncompliance

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The Unhidden Cost of Noncompliance

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Statement of Need
Health care costs continue to hit all-time highs, with patient noncompliance as a significant contributing factor. This complex issue is a burden on the health care system and, although well documented, efforts to correct noncompliance remain marginal. Studies in the United States have shown that poor adherence to medications causes an estimated 125,000 deaths annually and also accounts for 10%-25% of hospital and nursing home admissions. More than 70% of all prescriptions go unconsumed, leading to an estimated $77 billion in excess health care costs annually. Yet noncompliance to therapy is not limited to medications. It also includes failure to keep appointments, following recommended dietary and lifestyle changes, and abiding by other recommended preventive health practices. Consequently, noncompliance is one of the greatest concerns facing the health care system and managed care.

The challenge of convincing patients to follow a mutually accepted change in health-related behavior is daunting but is recognized by a growing number of stakeholders as a focus area for quality improvement. The costly and preventable effects of chronic disease in areas such as cardiovascular disease, respiratory disorders, and diabetes are forging new alliances to combat this public health issue. The unhidden cost of care due to poor compliance has brought new players to the table, thereby prompting employers, policy benefits managers, manufacturers, government, and various quality-related organizations to join forces with health plans and their providers to address the strain on productivity and the health care system. The convergence of new strategies, technology, and stakeholders has initiated opportunities to address this national health care problem.

This activity addresses the cost issues associated with noncompliance and focuses on emerging strategies designed to improve compliance outcomes. Thought leaders from various stakeholders will evaluate and recommend innovative methods and programs to improve treatment compliance outcomes.

Physician Continuing Medical Education
Accreditation Statement
This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of Postgraduate Institute for Medicine (PIM) and Impact Education, LLC. PIM is accredited by the ACCME to provide continuing medical education for physicians.

Credit Designation
Postgraduate Institute for Medicine designates this educational activity for a maximum of 1.5 AMA PRA Category 1 Credits. Physicians should only claim credit commensurate with the extent of their participation in the activity. The estimated time to complete the activity is 1.5 hours.

Pharmacist Continuing Education
Accreditation Statement
Pharmacists are accredited by the Accreditation Council for Pharmacy Education (ACPE) as a provider of continuing pharmacy education.

Credit Designation
Postgraduate Institute for Medicine designates this continuing education activity for 1.7 contact hour(s) (0.17 CEUs) of the Accreditation Council for Pharmacy Education. (Universal Program Number – 809-999-08-073-H01-P). If you have received credit for UPN 809-999-07-099-L04 or UPN 809-999-08-116-L04-P, you are not eligible for this activity.

Fee Information
There is no fee for this educational activity. The release date is August 1, 2008, and the expiration date is September 1, 2009.

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Product Disclosure
The authors report that there is no mention in this learning activity of prescription drugs for off-label use that is unapproved by the Food and Drug Administration.
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Learning Objectives

After completing this activity, the participant should be better able to
1. Describe the clinical and economic impact related to noncompliance within the managed health care setting.
2. Explain methods, such as motivational interviewing techniques, for improving overall compliance to therapies.
3. Specify current strategies to optimize the use of medication therapy management programs.
4. Identify collaborative approaches that maximize available resources to improve treatment compliance outcomes.

Source of Funding

This activity is supported by an educational grant from MERCK/Schering-Plough Pharmaceuticals.

Presentation Forum

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Synopsis

Medication noncompliance often results in worsening outcomes and increased overall medical expenditures in managed care. The problem of noncompliance is particularly significant in the management of chronic conditions, such as cardiovascular disease, diabetes, and asthma, because drug therapy may be discontinued or interrupted for various reasons (the high cost of some medications, patients forgetting to fill or take prescriptions, or the belief that regular use of prescribed medications is unnecessary).

Exploring reasons for medication noncompliance can assist managed care stakeholders in the development of successful interventions to improve patient compliance. Value-based benefit design can serve to address some of the economic concerns voiced by patients regarding noncompliance. Other interventions should be multifaceted and based not only on patient education efforts that demonstrate the value of drug therapy, but also on successful behavioral strategies that target both patients and providers. Behavioral interventions, such as motivational interviewing, offer more than well-intentioned advice or scare tactics. Instead, motivational interviewing is a client-centered, directive (goal-oriented) method for enhancing intrinsic motivation to change by exploring and resolving ambivalence. Collaborative networks, such as the Pharmacy Quality Alliance, and medication therapy management programs are 2 pharmacy management initiatives that are useful in reducing medication noncompliance among plan members.

Managed care stakeholders should strive toward a value-based health care system by investing more on appropriate medication use, including initiatives to reduce nonadherence, to avoid the high costs of treating severe disease in the future. Initiatives for improving compliance should be multidimensional to address the economic, educational, and behavioral components of noncompliance for both the provider and the patient. When carefully designed and applied appropriately, these interventions for improving medication compliance provide a significant opportunity to potentially decrease morbidity, mortality, and total (direct and indirect) costs.

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*This program is approved for 1.7 contact hour(s) (0.17 CEUs) of the Accreditation Council for Pharmacy Education. (Universal Program Number 809-999-09-073-HO1-P). Pharmacists will be required to complete a posttest and program evaluation. For accreditation information, please see page S26.

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Value-Based Benefit Design: Using a Predictive Modeling Approach to Improve Compliance

John J. Mahoney, MD, MPH

ABSTRACT

BACKGROUND: Increased medication compliance rates have been demonstrated to result in improved clinical outcomes and reduced overall medical expenditures. As such, managed care stakeholders should take the total value approach to benefit design and consider total medical costs beyond the cost of pharmacotherapy alone.

OBJECTIVES: To describe the value-based benefit design employed by Pitney Bowes (specifically, the predictive modeling approach), to improve medication compliance, and to report the results of this intervention.

SUMMARY: Despite significant skepticism surrounding value-based benefit design, there is growing evidence that these plans can be used in conjunction with careful pharmacy management. In fact, value-based design provides a different lever on pharmacy management and allows for the appropriate drug to be channeled to the appropriate person. Studies demonstrating the adverse impact of high coinsurance levels further augment the argument for value-based benefit design. Value-based benefit design was employed at Pitney Bowes, a $6.1-billion global provider of integrated mailstream solutions, with noticeable success. Patients were either placed in a disease management program or in a secondary program promoting preventive care. The company selectively cut copays to achieve that end, and this total value approach translated into significant savings.

CONCLUSION: To develop a successful value-based benefit design, stakeholders cannot simply cut costs or cut copays. Action must be taken as part of a concerted program, coupled with disease management or similar interventions. “Value based” means that positive outcomes are the ultimate goal, and barriers to those positive outcomes must be addressed.

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Chronic disease places a significant financial burden on managed care and the economy in general. The annual costs of chronic conditions, such as diabetes and cardiovascular disease, are estimated to be $174 billion and $403 billion, respectively, in the United States alone.1,2 As these chronic disease costs continue to rise, managed care stakeholders are continually looking for areas in which the quality of care can be improved and expenditures controlled.3 One such area is medication compliance, where increased compliance rates have demonstrated improved clinical outcomes and reduced overall medical expenditures.3

Considering the already high cost of pharmacotherapy, it may seem counterintuitive that increased regular medication use would ultimately result in reduced medical costs. To reconcile this seeming contradiction, stakeholders must consider total medical costs beyond the cost of pharmacotherapy alone—the total value approach. While drug costs inevitably rise with increased medication compliance, the improved clinical outcomes that result from appropriate and adequate use of prescribed pharmacotherapy create cost savings that more than compensate.3 These savings may be potentially realized in any number of ways including fewer clinically significant events, fewer emergency department visits, fewer hospitalizations, fewer physician’s office visits, and generally reduced morbidity and mortality. As such, payers, providers, and even employers are regularly seeking ways in which to increase rates of medication compliance. One employer who is taking a proactive approach to improving medication compliance is Pitney Bowes.

Founded in 1920, Pitney Bowes is a $6.1-billion global provider of integrated mailstream solutions. The company comprises a global team of 35,000 employees, with 24,000 employees in the United States and > 2 million customers worldwide. Pitney Bowes is known for solid, predictable earnings and growth that is driven through innovation and dependable service delivery. As a result, company costs, including health care costs, must be predictable at all times.

To monitor health care expenditures, Pitney Bowes measures not only the employer contribution but the annual total cost of care for company employees on a “per employee” basis. By comparing their company-specific data for this measure with a benchmark of 18 similar companies via the Hewitt Health Value Index, Pitney Bowes stakeholders are able to establish where the company stands in terms of health care spending and review these results in terms of predictability. From 1994 to 2000, Pitney Bowes’ health care costs were comparable with the benchmarks but experienced questionable yield in managing total cost, with high overhead, despite introducing a managed care/
Value-Based Benefit Design: Using a Predictive Modeling Approach to Improve Compliance

A New Approach Using Predictive Modeling

To better understand the employee population and make meaningful changes in benefit design, it helps to first look at the segmentation of users of services based on the enrollee annual cost distribution. In doing so, Pitney Bowes stakeholders were able to break down the population into 4 distinct segments: non-users, those using <$1,000/year, those using $1,000-$10,000/year, and those using >$10,000/year (Figure 2). The following data from the Pitney Bowes employee population are fairly representative of most large organizations that have a self-funded plan; however, the data may not generalize to other organizations.

- Nonusers—those who never use the health plan at all (i.e., never get screened, never visit a primary care physician)—constitute 10% of the total population and obviously account for none of the total annual spending.
- Those using <$1,000/year constitute approximately 50% of the total population and account for 10% of total annual expenditures. This largest segment of the enrollee population is most likely taking advantage of preventive services, using primary care, and filling the occasional prescription.
- Users at $1,000-$10,000/year make up 35% of the total population and account for 15% of total annual spending. It can be assumed that these enrollees may have experienced an accident or a condition that required extensive outpatient care or hospitalization; however, when coupled with the largest segment using <$1,000/year, these enrollees still only account for 25% of total health care spending.
- Adding in the nonusers accounts for 95% of the population and 25% of the total annual expenditures. The smallest segment (5%) of the employee population—those using >$10,000/year—accounts for 75% of total health care spending.

Unfortunately, most health care approaches are built around chasing this latter group of enrollees: the high-cost patient. While targeting a small number of enrollees and leveraging efforts to control large expenditures may be a reasonable concept yielding solid short-term savings, the remaining largest segment of the group tends to be ignored in the process. To truly provide quality, cost-effective health care, stakeholders must find a way to manage the entire enrollee population. Classic plan design dictates attempting to minimize the utilization of services by implementing copays, deductibles, and changing copay and coinsurance levels. While these actions may serve to control costs, they are short-term solutions that fail to address the root of the problem. An alternate approach suggests that stakeholders must determine the factors that cause enrollees to jump from the largest segment of the population with moderate costs (the 50% using <$1,000/year) to the smallest segment of the population constituting the largest percentage of total health care spending (the 5% using >$10,000/year). At Pitney Bowes, predictive modeling was employed to make this determination by using the claims data warehouse.
Analysis of claims data at Pitney Bowes determined that enrollees do not simply move randomly from segment to segment. Instead, predictive modeling demonstrated that there were several factors in particular that served as indicators that an enrollee would move from a relatively low-cost segment to a relatively high-cost segment in the space of 1 year: chronic disease—specifically, asthma, diabetes, and hypertension—coupled with poor medication compliance. In the model, the predictive value for this set of factors was relatively high, indicating a strong correlation between poor medication compliance in chronic disease patients and migration to a high-cost tier of health care services use. Key predictors for migration to a high-cost tier included >1 fill of albuterol in a 30-day period in patients with asthma, <9 thirty-day fills in a 12-month period in patients with diabetes, and <9 thirty-day fills in a 12-month period in patients with hypertension.

Using this information, stakeholders at Pitney Bowes came to the logical conclusion that chronic disease is a cost driver, but that costs can be managed by increasing enrollees’ compliance with recommended treatments for their chronic conditions. However, the harsh reality is that this push for medication compliance does not happen often. Doctors may not actively encourage patients to take their medications, and there is often little follow-up on poor prescription refill rates. To overcome this lack of an unsolicited push for medication compliance, Pitney Bowes put a disease management program in place. This program was initially carved out, but as time went on, the company began to carve it into the health plans as the plans became more sophisticated in operating the programs.

While the design and implementation of a disease management program to improve medication compliance represented a step in the right direction for Pitney Bowes in managing their enrollee population, a simple matter of economics still remained: the elasticity of demand. Basically, this concept states that as the price of a product or service increases, people tend to purchase it less frequently; unfortunately, this holds true for medication as well as any other purchasable item. To overcome this obstacle, the stakeholders at Pitney Bowes turned to benefit design. This was accomplished by moving the price of medication so that enrollees had an easier, more affordable opportunity—or at least fewer financial barriers—to manage their condition. This standpoint is essentially the crux of value-based benefit design.

### Value-Based Benefit Design

Although evidence in favor of value-based benefit design was scarce to virtually nonexistent around the year 2000, some interesting survey material was published by 2001 demonstrating the implications of medication cost to the patient in affecting compliance. For example, a Harris survey from 2001 demonstrated that medication compliance was very income dependent. In this survey, as people made less money, there was a higher probability that they would not take their medication or would try to stretch it by either taking a smaller dose or taking it less frequently (Figure 3). In another Harris survey from 2005, 35% of respondents cited “saving money” as a reason for not taking prescribed medication, making it the third most popular response.

A 2007 meta-analysis of 132 peer-reviewed publications by Goldman et al. further bolsters the argument for value-based benefit design. In this analysis of the impact of financial burden on medication compliance, researchers reported that increased cost-sharing was associated with lower rates of drug treatment, worse adherence among existing users, and more frequent discontinuation of therapy. Ultimately, Goldman et al. found that a 10% increase in cost-sharing was associated with a 2%-6% decrease in prescription drug spending. This outcome was most likely to occur in patients with chronic conditions.

From the patient perspective, the advantages of value-based benefit design and improved compliance can be seen in a study by Sokol et al. from 2005. Researchers looked at a population of patients with diabetes and their corresponding drug costs and total costs in 1 year by compliance rates. Patients demonstrating 1%-19% medication compliance experienced low drug costs ($55 annually) but a higher total cost (approximately $8,700 annually) than any other compliance group. Conversely, while drug costs were highest in patients with 80%-100% compliance ($763 annually), total costs were lowest (approximately $4,500 annually). This study demonstrates that improved compliance results in higher drug costs but ultimately lower overall costs to the individual.
Pharmacy Plan Design Implementation

Because the evidence supporting value-based benefit design has been apparent in “real-world” settings, such as the Pitney Bowes population, the primary question that remains concerns the implementation of such a plan. Initially, a list of conditions to target should be formulated based on the prevalence of targeted conditions in the enrolled population. For Pitney Bowes, approximately 25% of the employee population lives in the Northeast—namely, in the New York tri-state region, where one of the highest rates of asthma in the country exists. This elevated prevalence of asthma in the Pitney Bowes population creates an opportunity for improvement. This holds true in the Pitney Bowes population even when there is high turnover, and positive return on investment in an expensive disease management program would be more likely for employers with high retention rates. For conditions such as asthma, returns in terms of increased quality of care for the individual may be evident within 1 year. While the prevalence of other conditions, such as diabetes, in the Pitney Bowes population remains on par with national averages, opportunities for improvement in medication compliance still exist.

After establishing the worth of a value-based pharmacy plan in terms of disease prevalence, stakeholders must establish a baseline for adherence rates to track improvement among enrollees. At Pitney Bowes, the pharmacy benefits manager Caremark tracks adherence rates and reports them back to the company. In reviewing baseline medication adherence for some prevalent chronic conditions among the Pitney Bowes enrollee population, asthma demonstrated the lowest adherence score with 33 compared with 75, 76, and 76 for diabetes, hypertension, and hyperlipidemia, respectively. The rates quoted are indicative of the experience in the more stable population component. Reliable adherence rates were not able to be generated in work groups with high turnover. A common target adherence score for disease management programs is 80. As such, the focus of Pitney Bowes value-based benefit design interventions fell primarily in the realm of asthma and diabetes with only marginal involvement in hypertension and hyperlipidemia, where compliance rates have been traditionally higher.

Once baseline adherence rates have been established, a value-based pharmacy design can be set into motion, preferably without upsetting an organization’s underlying pharmacy design. At Pitney Bowes, the original pharmacy plan design consisted of the 3-tier coinsurance. In addition, the original plan was a more consumer-based design, with coinsurance levels at 10%, 30%, and 50% (Figure 4) and no minimum or maximum coinsurance levels at any tier. Furthermore, there was an out-of-pocket maximum for pharmacy. Enrollees could actually pay an extra premium to “purchase” a lower coinsurance rate. At the inception of the value-based pharmacy plan design, the company removed all of the standard pharmacy management tools including generic substitution, therapeutic substitution, step therapy, mandatory mail order, and most prior authorizations with the exception of a few related to safety issues. Company stakeholders chose to continue charging for all medications as opposed to offering free prescription drugs and to maintain a degree of price separation between brand and generic. The coinsurance feature facilitates beneficiary awareness of the price difference between brand and generic drugs because the underlying acquisition cost for the pharmacy determines the allowed cost on which the coinsurance is based.

In implementing the value-based pharmacy plan at Pitney Bowes, one key concept that was relayed from the researchers to plan stakeholders was that $20 appears to be the threshold for people acquiring or not acquiring a prescription. Specifically, if the cost is > $20, they’ll think twice and maybe even 3 times about buying the medication. As such, one of the goals of the new plan design, even after reducing all prices, was to keep prices at < $20 for a 30-day supply of medication.

In the new design, all medications for the target conditions (i.e., asthma, diabetes, hypertension) were moved down to tier 1 instead of favoring one medication over another (Figure 5). Stakeholders at Pitney Bowes felt that the discussion of which medication is right for a particular patient should be reserved for the patient, doctor, and pharmacist and not the employer.

Another key element was that individuals did not need to “qualify” for the discount by participating in a disease management
program or through achieving biometric “targets,” such as glycated hemoglobin (A1c) levels <7%. Thus, medication was continuously available to the individual at the lower price, not only at the first fill.

**Results**

Immediate results were experienced by consumers as a result of the new value-based pharmacy plan design at Pitney Bowes. For enrollees who were on any branded medication for a targeted condition, the cost of a 30-day fill decreased by 30%-80%, and the company was able to keep copays below the $20 level. As a result of this reduced financial burden for prescription medications, changes in behavior soon followed. Medication compliance improved, and there was a marked migration to combination therapy as a result of the movement of combination drugs from tier 3 to tier 1, thereby improving their affordability. This migration was particularly noticeable with parents who had a child with asthma and were now able to afford long-acting controller medications as opposed to multiple medications or albuterol alone. In fact, the use of albuterol monotherapy among enrollees with asthma declined from 51% to 33% between 2001 and 2006, and the use of long-acting controllers increased from 49% to 66%. This was coupled with an observed 22% decline in emergency room use and a 62% decline in avoidable hospital admissions over the same time periods.

Looking at enrollees’ annual cost of care over a 3-year period, those with asthma experienced a 15% decline in total costs and a 19% decline in pharmacy costs from baseline levels. Likewise, enrollees with diabetes experienced a 6% decline in total costs and a 7% decline in pharmacy costs. While these decreases in cost to the patient were coupled with increases in pharmacy costs for Pitney Bowes, the company was now paying far less for medications to treat the complications of noncompliance. Ultimately, the costs offset each other and actually produced some savings for Pitney Bowes. In terms of indirect costs, the active number of short-term disability cases and associated costs among diabetes patients declined between 2002 and 2004, despite a slight increase in the prevalence of diabetes in Pitney Bowes employees.

During the 5 years between 2001 and 2006, the asthma compliance score in the study population rose from 33 to 62, the diabetes compliance score rose from 75 to 81, the hypertension compliance score rose from 76 to 82, and the hyperlipidemia score rose from 76 to 83. The greatest improvement observed in the fledgling stages of the compliance-improving interventions was an ability to move enrollees out of suboptimal adherence and into adherence that approximated a reasonable rate.

The disease management program at Pitney Bowes is still credited with contributing most significantly to these improvements by utilizing an incredibly active communications campaign around compliance. Obviously, the pricing changes also contributed to these improvements, particularly for asthma, diabetes, and hypertension. Statins and statin fixed-dose combinations were moved from tier 3 to tier 1 in the early stages of the pharmacy plan redesign; this may have likewise had an effect on improvements in compliance for hyperlipidemia, although not as profound an effect as for the other 3 conditions. Similar interventions by other employers have demonstrated the advantage of adding a value-based benefit design to disease management interventions. In a recently published study, Chernew et al. reported the effects of Marriott International’s value-based benefit design initiative for improving compliance to recommended treatment regimens. The value-based benefit design initiative reduced copayments for 5 chronic medication classes in conjunction with a disease management program. Compared with a control employer that used the same disease management program, medication compliance increased among enrollees in Marriott’s value-based initiative for 4 of 5 medication classes as noncompliance was reduced by 7%-14%.

While these improvements in medication compliance represent a positive trend, the matter of enrollees taking the right medications still remained. Evidence dictates that patients with diabetes who are postcardiac event should be maintained on statin...
therapy; however, in the Pitney Bowes population, approximately only 60% of postcardiac event diabetes patients were receiving statin therapy. Furthermore, approximately only 50% of enrollees who had experienced a heart attack, bypass surgery, or stenting were on a statin. As a result, beginning in 2007, Pitney Bowes made statins and statin fixed-dose combinations available free of charge to enrollees with the 2 aforementioned conditions. At year’s end, the percentage of diabetics on a statin rose 10% with increases in adherence scores. Results for the high-risk cardiac group were not available at the time this paper was written.

Contrary to the supposition that a value-based design will cause a shift from generic to branded products, this has not been the case in Pitney Bowes enrollee population. For example, in the case of diabetes medications, there was not a rush to buy branded products after implementation of the value-based design, even with prices dropping by 30%-80%. Even as late as 2006 at 5 years after the implementation of the value-based design, there was still a reasonable distribution between generic and branded products among Pitney Bowes enrollees.

In terms of key pharmacy metrics, generic utilization improved from 38.3% to 54% between 2001 and 2006 for the Pitney Bowes active population. Prescriptions per member per year (PMPY) likewise rose during the same time period from 8.1 to 10.6, and net PMPY cost rose from $320 to $632. The compound annual growth rate for generic utilization increased by 7%, prescriptions per member increased by 5.3%, and PMPY increased by 14.6% between 2001 and 2006. Furthermore, compliance interventions at Pitney Bowes have contributed to the company being able to consistently track below benchmark in terms of total employee health care cost since 2001 at the inception of the value-based pharmacy plan design (Figure 6). The rate is currently 15%-20% below benchmark levels. The annual growth rate of this figure remains at approximately 6%. Putting these results in perspective, for 2007, the gap between Pitney Bowes per-employee cost and the benchmark, if extrapolated out over the corporation, is worth about $40 million in avoided costs. Of that, approximately one third is due to the company’s purchasing and plan design, and two thirds are due to the company’s preventive measures and chronic disease management program.

**Conclusions**

Despite significant skepticism surrounding value-based benefit design, there is growing evidence that these plans can be used in conjunction with careful pharmacy management. In fact, value-based design provides a different lever on pharmacy management and allows for the appropriate drug to be channeled to the appropriate person. Data demonstrating the adverse impact of high coinsurance levels further augment the argument for value-based benefit design.

To develop a successful value-based benefit design, stakeholders cannot simply cut costs or cut copayments. Action must be taken as part of a concerted program, coupled with disease management or similar interventions. “Value based” means that positive outcomes are the ultimate goal, and barriers to those positive outcomes must be addressed. At Pitney Bowes, the ultimate endpoint was either placing the patient into the disease management program or, in a secondary program, promoting preventive care. The company selectively cut copays to achieve that end, and this total value approach translated into significant savings.

**DISCLOSURE**

Author John J. Mahoney discloses that there was no financial relationship or financial interest relating to the topic of this activity. Mahoney was responsible for the entire study concept and design of this article. He performed all of the data collection, data interpretation, writing, and revision of this article.

**REFERENCES**

Not Getting to Goal: The Clinical Costs of Noncompliance

Benjamin J. Ansell, MD, FACP/FACC

ABSTRACT

BACKGROUND: Cardiovascular disease is characterized by significant prevalence and cost in the managed care setting. Despite overwhelming evidence in favor of statin use for lowering low-density lipoprotein cholesterol (LDL-C), medication compliance to these agents remains suboptimal, as it does in other disease states.

OBJECTIVE: To establish the benefits of statin therapy in cardiovascular disease, demonstrate the current lack of compliance to lipid-lowering agents, and present potential interventions to improve medication compliance.

SUMMARY: As evidenced by a consistent body of clinical trial data, intensive LDL-C reduction plays a critical role in the mitigation of cardiovascular risk. Yet, the effectiveness of lipid-lowering strategies is offset to a significant degree by both physician and patient factors that limit goal attainment. Despite extensive evidence demonstrating the benefits of lipid-lowering therapy, many patients are still not getting to goal because the transition from physician awareness to clinical practice is lagging. Patient noncompliance to therapy also limits goal attainment, thus resulting in poor health outcomes and increasing managed care costs.

CONCLUSION: To overcome the issues surrounding LDL-C goal attainment, interventions designed to increase goal attainment should be based not only on the conclusions of clinical trials but also on successful patient- and provider-focused behavioral strategies. Interventions for improving adherence to lipid-lowering medication will provide an opportunity to decrease morbidity, mortality, and hospitalization associated with cardiovascular disease.

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As a result of its prevalence and cost, cardiovascular disease demands significant attention by managed care stakeholders. Collectively, heart disease and stroke are the leading cause of death among American men and women, resulting in approximately $400 billion in direct medical expenditures and lost productivity.\textsuperscript{1} In managed care, plans are graded on their performance in the treatment of cardiovascular disease in terms of Healthcare Effectiveness Data and Information Set (HEDIS) attainment. Despite a collective awareness of the impact of cardiovascular disease, as well as effective therapies for treating these conditions, a disparity exists between the health care community’s knowledge of how to prevent and manage cardiovascular disease and the implementation of practice and management strategies to bridge the gap. Specifically, there is a wealth of knowledge regarding risk factors that contribute to cardiovascular disease, such as dyslipidemia and hypertension, yet there is relatively poor adherence to proper therapy for these chronic conditions.

In particular, the benefits of lowering low-density lipoprotein cholesterol (LDL-C) have been well established.\textsuperscript{2,3} Since the advent of modern pharmacotherapy, statin use has been proven to lower LDL-C. A meta-analysis of >90,000 patients demonstrated a 17%-26% reduction in risk of coronary events with statin use versus placebo.\textsuperscript{3} Despite the overwhelming evidence in favor of statin use, medication compliance to these agents remains suboptimal, as it does in other disease states. Data have demonstrated that medication compliance rates for various chronic disease states drop to <50% 12 months after the initial prescription; statin compliance may be even less in some demographic groups (i.e., the elderly, those with low income, those prescribed a statin for preventive purposes).\textsuperscript{4,5}

Beyond the obvious clinical implications of noncompliance to pharmacotherapy, such as higher LDL-C levels and an increased rate of coronary events in patients who are noncompliant to statin therapy, noncompliance can result in a poor quality of life and increased medical expenditures in managed care. In cardiovascular disease as well as in other conditions, noncompliance has been linked to increased morbidity in the form of drug resistance, disease-related complications, hospitalizations, and disability, as well as increased mortality.\textsuperscript{6} The economic ramifications of these adverse health outcomes are significant, with analyses demonstrating a distinct correlation between medication compliance and medical costs. For example, in one analysis, Sokol et al. reported that, as compliance to therapy decreases, overall cost of care increases.\textsuperscript{6} The result is that hundreds of billions of dollars are being attributed to medication noncompliance annually.\textsuperscript{7}

Several measures may be used by managed care stakeholders to overcome patient noncompliance to medication therapy. Specifically, educational and behavioral interventions have demonstrated promise in improving compliance, thereby positively
effecting treatment outcomes and reducing overall health care costs. These interventions may be applied to a myriad of disease states, including cardiovascular disease.

### Current State of Care for Cardiovascular Disease

Despite clinical evidence demonstrating the benefits of lipid lowering in averting coronary events and improving health outcomes, many patients fail to achieve LDL-C goals. In addition, there appears to be a gender disparity in cardiovascular care in that women are less likely to achieve LDL-C goals. The National Evaluation Project Utilizing Novel E-Technology (NEPTUNE II) Survey, for example, demonstrated a lack of patients who attained their LDL-C goal even in a best-case scenario for compliance to therapy. NEPTUNE II researchers surveyed a sample of the top decile of statin prescribers across the United States and assessed the equivalent of a “day in the life” of their practice by observing 20 consecutive patients. By reviewing the LDL-C goals of these patients according to National Cholesterol Education Program Adult Treatment Panel (NCEP ATP) III guidelines and then evaluating patient status in relation to their goals, the researchers assessed guideline attainment.

In NEPTUNE II patients who were at relatively low coronary heart disease (CHD) risk and, therefore, had a relatively high LDL-C level target, 89% were at LDL-C goals (Figure 1). In moderate-risk patients with ≥2 risk factors, 76% were at goal. Finally, in patients with the most significant disease and arguably the most at stake, only 57% actually attained their LDL-C treatment goal. NEPTUNE II researchers also reported that the more severe a patient’s disease state, the more likely they were to be at their LDL-C goal (Figure 1). For example, patients with established CHD are more likely to get to goal compared with diabetic patients or patients with other coronary risk equivalents.

A separate study of NEPTUNE II patients according to gender revealed poorer LDL-C goal attainment among females than males. Although goal attainment was not exceptional among high-risk male patients, attainment was significantly worse among high-risk female patients (60% vs. 50%, respectively; P < 0.001). Interestingly, the providers’ gender did not have an effect on outcomes; results were similar for both male and female providers.

Women at high risk for CHD have also demonstrated slow attainment of treatment goals for LDL-C and other cardiovascular clinical markers, such as high-density lipoprotein cholesterol (HDL-C) and triglycerides (TGs). Patients with CHD or risk equivalent should arguably be started on lipid-lowering therapy at the first visit following detection or diagnosis; however, there is often a lag in the initiation of therapy in clinical practice as well as an extended delay in actually getting patients treated to goal (Figure 2). One study demonstrated this lag in attaining goals over a 3-year period for LDL-C, HDL-C, TGs, and non-HDL-C. Furthermore, by the end of the study, only 29% of high-risk female patients attained the LDL-C goal of <100 mg per dL, and
only 32% attained the non-HDL-C secondary target of <130 mg per dL for CHD prevention. As a result, the percentage of high-risk female patients attaining combined goals for LDL-C/HDL-C/TGs after 3 years was even lower at 12% (Figure 2).

This study also demonstrated that gender-based disparity in LDL-C goal attainment may be the result of suboptimal pharmacotherapeutic treatment. Study researchers reviewed the attainment of Class I pharmacotherapy recommendations among high-risk women in a managed care setting and reported that only 32% of high-risk women with LDL-C levels ≥100 mg per dL were receiving statin therapy. Similarly, only 10% of high-risk women with LDL-C levels <100 mg per dL were receiving a statin. These results are startling considering that all high-risk women beyond childbearing age should arguably be receiving statin therapy.

Data from the European Action on Secondary and Primary Intervention to Prevent Events (EUROASPIRE) II Survey demonstrate that the problem of patient failure to achieve lipid goals is not confined to the United States and may be the result of inadequate titration of statin therapy to LDL-C goals. In EUROASPIRE II, Kotseva et al. reviewed the medical records of 8,181 patients with CHD in 15 European countries. Researchers reported that 58.3% of patients did not reach the European Society of Cardiology total cholesterol goal of <5.0 mmol per L despite the fact that 60.6% of patients were being treated with statin therapy. Similar to gender-based disparities in the United States, a higher percentage of female patients failed to achieve goal than did male patients (63.6% vs. 57.3%; \( P = 0.007 \)) in this European study. While these percentages are of interest to clinicians in the United States and Europe alike, perhaps the most compelling data extracted from EUROASPIRE II are the distribution of doses of the various statins used with respect to achieving cholesterol goals. It becomes apparent from the data that a vast number of patients included in the survey were on low-dose statin therapy, were not at goal, and were seemingly maintained on that same low dose. A failure to titrate the statins to effective doses was ultimately the common denominator; this was not simply an issue of the statins not working adequately. The underlying message is that, with rare exceptions, clinicians have the ability to bring nearly every patient toward their NCEP goals by using conventional pharmacotherapy, which is also demonstrated in U.S. clinical trials.

One such trial by Catapano et al. illustrates the success that clinicians can achieve in treating patients to NCEP goals by using ATP III LDL-C goals and, specifically, the goal of <70 mg per dL as the endpoint, researchers in this study established robust rates of goal attainment among patients via appropriate titration of rosuvastatin and ezetimibe/simvastatin. Escalating doses of rosuvastatin (i.e., 10 mg, 20 mg, 40 mg) resulted in ATP III LDL-C goal achievement in 90.1%, 93.3%, and 95.6% of patients, respectively, with 93.0% of patients achieving goal on all doses of rosuvastatin (Figure 3). Similarly, escalating doses of combination ezetimibe/simvastatin (i.e., 10/20 mg, 10/40 mg, 10/80 mg) resulted in ATP III LDL-C goal achievement in 94.7%, 95.8%, and 97.5% of patients, respectively, with 95.9% of

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**FIGURE 3 Patients Reaching LDL-C Goals on Rosuvastatin (R) and Ezetimibe/Simvastatin (E/S)**

| Percent Patients Attaining ATP III LDL-C Goals | R                  | E/S
<table>
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<tr>
<td>R 10 and E/S 20</td>
<td>90.1%</td>
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<tr>
<td>R 20 and E/S 40</td>
<td>93.3%</td>
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<tr>
<td>R 40 and E/S 80</td>
<td>95.6%</td>
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<tr>
<td>All R and All E/S</td>
<td>93.0%</td>
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| Percent Patients Attaining LDL-C <70 mg/dL     | R                  | E/S
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<tr>
<td>R 10 (n=123) and E/S 20 (n=121)</td>
<td>28.9%</td>
</tr>
<tr>
<td>R 20 (n=119) and E/S 40 (n=117)</td>
<td>35.3%</td>
</tr>
<tr>
<td>R 40 (n=106) and E/S 80 (n=127)</td>
<td>50.0%</td>
</tr>
<tr>
<td>All R (n=350) and All E/S (n=365)</td>
<td>29.4%</td>
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Proportion of patients attaining NCEP ATP III LDL-C goals for low (<160 mg/dL), moderate (<130 mg/dL) and high (<100 mg/dL) risk patients.
\( P = 0.009 \).
\( P \leq 0.001 \) for treatment comparison between rosuvastatin and ezetimibe/simvastatin at specified doses and across doses.
\( P = 0.005 \).

LDL-C = low-density lipoprotein cholesterol; NCEP ATP III = National Cholesterol Education Program Adult Treatment Panel III.
patients achieving goal on all doses of ezetimibe/simvastatin. Similar but more modest improvement was reported with dose escalation of both rosuvastatin and ezetimibe/simvastatin in the rates of patients achieving the more aggressive LDL-C goal of <70 mg per dL (Figure 3). Appropriate utilization of pharmacotherapy puts LDL-C goal attainment within the reach of both the clinician and patient. Taking these data into consideration, the strategy of using more aggressive statin therapy at initial dosing and introducing combination therapy earlier to get patients to goal may indeed be the optimum treatment decision.

Given the wealth of data supporting the appropriate use of lipid-lowering pharmacotherapy in the treatment and prevention of cardiovascular disease, it is tragic that managed care fails to treat more patients to goal. Unfortunately, when dealing with chronic asymptomatic diseases, patient and, to some extent, provider behaviors must be altered to actually transition the information from clinical trials into clinical practice. In addition, clinical trials represent the very best-case scenarios in terms of compliance because patient care is followed up, drugs are provided at no cost, and some level of patient education is often associated with the trials. Therefore, the problem of poor goal attainment is likely even more significant than it appears in much of the literature.

Providers may contribute to noncompliance by not sharing decision-making with patients and failing to assess the individual patient’s goals for treatment. However, regardless of the mechanisms by which poor compliance and goal attainment occur, the costs cannot be ignored, especially for patients at highest risk. While clinical goals are a component of the solution that managed care can grasp fairly easily, attainment of those goals requires a more complex understanding of people and their behaviors. All of these factors must be discussed to effectively address noncompliance.

Noncompliance to Therapy

The World Health Organization defines adherence (i.e., compliance) as “the extent to which a person’s behavior—taking medication, following a diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a health care provider.” In terms of compliance to pharmacotherapy, the patient must complete a certain process before any particular treatment can actually be used, let alone used effectively. The patient must fill the prescription, take the medication as recommended, renew the prescription, potentially adjust the dosage, and potentially discontinue the medication. As medications are added or changed over time, the patient must recycle this process. If a patient decides not to fill a prescription, not to take it as recommended, or not to refill the prescription, these decisions will obviously impact compliance.

While some small degree of noncompliant behavior is likely expected by managed care stakeholders, many do not realize that noncompliance is more often the rule than the exception. In fact, two thirds of all Americans on prescription medication fail to take either any or all of the prescription. Breaking down this noncompliant behavior even further, 29% stop taking their medication before the prescription runs out, 22% take less than the prescribed amount on the label, and 12% never even fill the prescription. Polypharmacy further compounds the problem, with 59% of people with ≥ 5 medications taking them improperly, irrespective of age.

As previously mentioned, statin therapy appears to consistently have the poorest compliance among the cardiovascular therapies, which is likely due to the demographics of the statin-treated population. Income may be lower in these often elderly patients, thereby making the therapies less affordable. In a study of a Medicaid population of enrollees in a pharmaceutical assistance program aged ≥ 65 years, compliance at baseline was only 60% because 40% did not initially fill their prescriptions. After 5 years, compliance dropped to 30% as the remaining compliant population stopped taking their prescription medication over the long term.

When considering the diseases confronting Americans as they age, a preventive model presents even greater challenges in overcoming the underlying reasons for noncompliant behavior. Basically, the more asymptomatic the patient or the more
improvement a patient begins to feel, the less likely the patient is to take a medication.\textsuperscript{5} For example, a cohort study using linked population-based administration data from Ontario, Canada (N = 143,505), revealed that patients taking a statin post-event were likely to remain compliant longer than patients taking a statin who demonstrated evidence of disease progression and were even more likely to remain compliant than patients taking a statin for preventive reasons who were likely asymptomatic (Figure 4).\textsuperscript{5} Post-event patients and patients with evidence of disease progression do relatively well in the short term, with compliance declining over time, but patients who are only taking a statin for preventive ideological reasons without necessarily feeling better as a result are the least likely to maintain adherence in the long run.\textsuperscript{5} This decline in compliance over time is not confined to therapy for cardiovascular disease.\textsuperscript{6} Specific compliance rates vary by therapeutic class but demonstrate similar discontinuation patterns, with the most dramatic decline occurring between months 1 and 4 of therapy.\textsuperscript{5}

Sokol et al. demonstrated the impact of medication noncompliance on total diabetes medical cost in a study of 3,260 patients.\textsuperscript{8} For patients at 80%-100% adherence, total medical costs were approximately $4,000 compared with approximately $9,000 for patients at 1%-19% adherence (Figure 5).\textsuperscript{8} Although drug costs escalated, as expected, in the increasingly compliant groups, medical costs decreased, thus reducing the total cost of care in more compliant groups.\textsuperscript{8}

Noncompliance involves a myriad of economic and provider/health care-related factors beyond the patient-related factors discussed previously. Patient out-of-pocket cost is certainly one of these factors, which is impacted most significantly by copayments. One study demonstrated that compliance was greatest and declined less rapidly among patients with copays from $0 to < $10 compared with patients with copays from $10 to < $20.\textsuperscript{18} In this analysis, researchers reported that compliance was lowest and declined most rapidly among patients with copays ≥ $20.

Using cardiovascular disease as a model, one study demonstrated the impact of provider-related factors on patient compliance.\textsuperscript{19} In this study, surveyed providers cited the time constraints of a “typical” office visit as well as the use of multiple guidelines with different recommendations (e.g., different recommendations for female patients) as barriers to providing patient education and obtaining improved compliance to therapies.\textsuperscript{19} Regarding health care-related factors, another study reported that fragmented care negatively impacts compliance.\textsuperscript{20} In this study (N = 21,011), patients who patronized ≥ 2 pharmacies or who had ≥ 3 prescribing physicians had approximately twice the rate of nonadherence over a 1-year period.\textsuperscript{20}

\section*{Interventions for Improving Compliance}
A multidimensional approach is necessary to effectively address the diverse and varying factors contributing to noncompliance in managed care. The literature supports this approach, with some studies citing the integration of multiple components as the key toward a successful approach to improving adherence.\textsuperscript{16,21} Furthermore, follow-up visits or multiple interventions should improve attempts to enhance compliance.

Due to the various contributors to the problem of noncompliance, a need arises to focus on educational, behavioral, and combination strategies to implement evidence-based treatment plans.\textsuperscript{10} Clearly, education is critical. Education starts with the provider, who is typically the physician supplemented by the support of nurses and pharmacists.\textsuperscript{10} In addition, written materials and Web sites can be helpful in bolstering educational interventions. Behavioral efforts center on follow-up with high-risk patients via telephone or mail to ensure that they come in for scheduled visits and/or take their medications.\textsuperscript{10} Behavioral interventions may also entail including the patient as a partner in treatment decision making and enlisting the social support of family members and significant others.\textsuperscript{21,22} Additional behavioral factors shown to positively impact compliance include an insight into the disease state, a belief that the medication will cure or control the disease, a feeling of being threatened by the disease, and a good relationship with the health care provider.\textsuperscript{23} The positive effect of this latter factor was demonstrated in a study by Piette et al. in which patients with “high trust” in their physician demonstrated reduced cost-related underuse of medication compared with patients with “low trust,” despite increasing out-of-pocket costs.\textsuperscript{24} Obviously, combining behavioral and educational efforts can be quite effective in preventing nonadherence.\textsuperscript{10}

Providers play an integral role in ensuring the success of compliance interventions, beginning with a strategy of improved
communication with patients. To improve compliance, providers should discuss compliance with their patients at every visit in a nonjudgmental manner and should also communicate their respect for the patient’s perspective on his/her condition. Furthermore, providers must divulge a rationale for any recommended treatment and negotiate a plan that anticipates and addresses any problems that may arise. Ultimately, a collaborative process for problem solving should be established with patients to ensure that they take an active role in their treatment, thereby increasing the likelihood that compliance-improving interventions will be successful.

The aforementioned noncompliance-targeted activities have been applied in some form to clinical practice with noticeable success. For example, the University of California Los Angeles Comprehensive Hospital-Based Atherosclerosis Management Program (CHAMP) instituted a discharge protocol 15 years ago for patients hospitalized for myocardial infarction (MI) to improve utilization of and adherence to evidence-based therapies. Prior to implementation of the CHAMP protocol, persistence rates for aspirin, beta-blocker, and statin therapy in patients 1 year postdischarge for MI were modest at 68%, 18%, and 10%, respectively. Post-CHAMP persistence rates at 1 year after discharge for these therapies improved to 94%, 57%, and 91%, respectively. These improved persistence rates resulted in significantly reduced rates of coronary events such as recurrent MI, hospitalization, and cardiac mortality (P<0.05).

Similar results have been demonstrated in outpatients with cardiovascular disease. At Walter Reed Army Medical Center, a study of 200 ambulatory patients aged >65 years with coronary risk factors introduced 3 phases to examine an intervention for medication noncompliance. The first phase constituted a 2-month observational period to determine patient compliance with blood pressure- and lipid-lowering treatments. The second phase involved a 6-month intervention in which all patients received aggressive disease management in the form of medications dispensed in a time-specific blister pack. The final phase consisted of a follow-up period in which half of the patients were maintained on blister pack medication dispensing for 6 months while the other half resumed medication dispensed in conventional bottles. Patients selected for the trial were deemed at risk for noncompliance due to their age and to the prescription of ≥4 chronic medications. Relative to baseline compliance (approximately 60%), most patients improved to nearly 100% compliance. Following Phase 2 of the study, patients who resumed their usual care also returned to their baseline levels of compliance compared with those who were maintained on intensive pharmacy oversight with time-specific blister pack dispensing. While this intervention had relatively little impact on LDL-C lowering in terms of outcomes, blood pressure was significantly reduced in patients receiving more careful administration of the time-specific blister pack (P=0.04).

### Conclusions

Intensive LDL-C reduction plays a critical role in the mitigation of cardiovascular risk. Still, the effectiveness of lipid-lowering strategies is offset to a significant degree by both physician and patient factors that limit goal attainment. Despite extensive evidence demonstrating the benefits of lipid-lowering therapy, many patients are still not getting to goal because the transition from physician awareness to clinical practice is lagging. Additionally, patient noncompliance to therapy also contributes to poor health outcomes and increasing costs in managed care.

To overcome the issues surrounding LDL-C goal attainment, interventions used to attain these goals should be based not only on the conclusions of clinical trials but also on successful behavioral strategies from both the patient and provider perspective. Interventions for improving adherence to lipid-lowering medication will provide an opportunity to decrease cardiovascular disease morbidity, mortality, and hospitalization, as well as improve the quality of life for patients and reduce costs for managed care.

### DISCLOSURE

Author Benjamin J. Ansell has received honoraria as a speaker and consultant for AstraZeneca, Pfizer, and Merck. Ansell was responsible for the entire study concept and design of this article. He performed all of the data collection, data interpretation, writing, and revision of this article.

### REFERENCES


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While there have been improvements in health care since the inception of managed care, significant gaps in quality pervade the current U.S. health care system. According to Healthcare Effectiveness Data and Information Set measures, an average gap of 12.1% exists between top-performing plans and the system in its entirety. These gaps in quality result in an estimated 16,800-39,900 avoidable deaths, 45 million sick days, and $7.4 billion in lost productivity every year. At the same time, health care costs continue to hit all-time highs, with total spending topping $2 trillion in 2006.

One key factor driving the apparent quality gaps and rising costs in the current health care system is nonadherence to prescription medications. Adherence to long-term therapy for chronic diseases in developed countries averages 50%, and the consequences of nonadherence include poor health outcomes and increased health care costs. U.S. studies have shown that poor adherence to medication causes an estimated 125,000 deaths annually and also accounts for 10% of hospital and 25% of nursing home admissions. These statistics result in an estimated $100 billion in additional health care costs each year in the United States.

Nonadherence occurs for many different reasons. Patients often fail to either fill or take their prescriptions for chronic conditions, but they may also discontinue their medication early or take their medication less often than indicated. This latter form of nonadherent behavior is perhaps the most common phenomenon, with nearly 1 in 3 people reporting that they take a prescription medication less often than prescribed (Figure 1). The implications of these various forms of nonadherent behavior are significant. Even small gaps in therapy, such as those created by a missed prescription fill or a skipped week of taking prescribed medications, may negate the benefits of regular therapy. Although less apparent than direct patient nonadherence, suboptimal treatment regimens or higher-than-recommended doses can also contribute to adherence issues and gaps in quality.

In response to these significant issues surrounding nonadherence, key policy and quality organizations have called for action to address improvements in the management of medications. These management strategies, such as collaborative networks and medication therapy management (MTM) programs, may lead to a reduction in overall health care expenditures by optimizing therapeutic outcomes, especially in elderly patients. These improved health outcomes should in turn elicit a reduction in adverse medication events along with their attendant emergency room visits and hospital stays, thereby ultimately resulting in reduced expenditures for managed care organizations.

Collaborative networks in managed care pharmacy are designed to measure pharmacy quality with the goal of reporting meaningful
information to the public, pharmacies, and pharmacists. The end goal of these initiatives is to improve outcomes in the way in which pharmaceutical care is delivered. Founded in 2006, the Pharmacy Quality Alliance (PQA) was the first such organization to attempt this undertaking in the United States, driven largely by the implementation of Medicare Part D. For a nationwide government initiative such as Part D, some measure of pharmacy quality is imperative, primarily in determining whether the billions of dollars spent on prescription drugs resulted in an improvement in quality of care and/or reduced costs elsewhere in the health care system. The PQA strives to be the consistent, standard-setting body so that the value of the investment in prescription drugs (both commercial and Part D), as well as other significant investments, can be determined.

The PQA features a steering committee of 15 stakeholders representing assorted organizations, corporations, and employers. In addition, the PQA has more than 100 volunteer members who offer a broad representation of the different facets of pharmacy practice including health plans, pharmacy benefits managers, drug manufacturers, biotechnology companies, health care standard-setting groups, and pharmacy-related associations, with the following mission:

“To improve health care quality and patient safety through a collaborative process in which key stakeholders agree on a strategy for measuring performance at the pharmacy and pharmacist-levels; collecting data in the least burdensome way; and reporting meaningful information to consumers, pharmacists, employers, health insurance plans, and other health care decision makers to help make informed choices, improve outcomes and stimulate the development of new payment models.”

Essentially, the PQA is seeking to establish the type of robust measures for pharmacy that have already been established in the general health care community by such organizations as the American Quality Alliance, National Committee for Quality Assurance (NCQA), National Quality Forum, Hospital Quality Alliance, and so forth. Although separate from these entities, the PQA was founded on the principle that health care stakeholders must find a way to harmonize measures across disciplines and arrive at a point of shared responsibility for improving patient outcomes.

The bulk of the PQA’s mission is accomplished through working groups. Initially, there were 2 groups: the Quality Metrics work group determined what markers would be measured, while the Data Aggregation Reporting work group determined how these markers would be measured and to whom it was reported. More recently, the PQA has developed 2 other work groups: the Research Coordinating Council who focuses on research and demonstration projects for future PQA measures and the Education and Communications work group who focuses on education and outreach efforts for disseminating the information collected by the PQA.

At the outset, the Quality Metrics group developed the initial set of 37 starter metrics to outline/identify what should be monitored to measure pharmacy quality. These measures span several disease states and areas of drug administration including cardiovascular disease, diabetes, hyperlipidemia, and patient safety. While not all of these initial measures passed field testing, nonadherence was nevertheless an underlying theme, with 12 of the 37 metrics addressing medication adherence (Table).

In developing these measures, the Quality Metrics group commissioned several groups in specific areas (e.g., cardiovascular disease, diabetes) to devise the actual metrics, develop the numerators and denominators, and formulate how these measures would be reported. An example of the considerations necessary for this process that are specific to nonadherence can be found in the gap in therapy metric, which measures the percentage

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<td>• 14 cardiovascular disease measures</td>
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<td>• 4 measures in respiratory disorders</td>
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<td>• 3 measures in the generic efficiency area</td>
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<td>• 12 of 37 measures address adherence/compliance</td>
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PQA = Pharmacy Quality Alliance.
of prevalent users who experienced a significant gap in medication therapy, defined as 30 days in a 6-month measurement period. This metric was developed on the premise that there are certain patients who experience a gap in therapy that may lead to an adverse event. Whether dealing with cardiovascular disease, diabetes, or any number of other diseases, measuring gaps in therapy is an important piece in the measurement of overall pharmacy quality. In promoting efforts to address nonadherence, the PQA developed a metric for proportion of days covered (PDC), defined as the median proportion of days covered by therapy, with the goal of further assessing the proportion of patients meeting the PDC threshold. Here again, medication adherence was given significant consideration by the group as being a measure of pharmacy quality, particularly because the interaction between pharmacist and patient in the pharmacy has the potential to positively impact the patient’s medication adherence.

The application of these 2 metrics to diabetes therapy provides a good example of their utility. As mentioned previously, the gap in therapy metric looks at a 30-day period of nonadherence constituting significant lapse. In this example, the group came back with a list of several diabetes agents to be evaluated for gaps in therapy including sulfonylureas, meglitinides, biguanides, thiazolidinediones, alpha-glucosidase inhibitors, all insulins, dipeptidyl-peptidase 4 inhibitors, and incretin mimetic/amylinomimetic agents. Pharmacy claims data were used as the primary source of data for this metric on a go-forward basis.

The PDC metric for diabetes measures the proportion of days in the follow-up period “covered” by prescription claims for the medication(s) used to treat diabetes. Here, the follow-up period includes the days between the initial claim and the end of the measurement period, and each day in the follow-up period is determined to be “covered” (or not) based on the Quantity Dispensed and Days’ Supply fields for prescription claims for medications used to treat diabetes. The PDC threshold is defined as the level of PDC above which the treatment regimen has a reasonable likelihood of achieving most of the potential benefit. The group recommended a preliminary threshold of 60% in light of the potential uncertainty in data collection and quality. For this metric, similar to the gap in therapy metric, a number of diabetes therapies are included, and pharmacy claims data are the primary data source.

The suboptimal treatment regimen metric for diabetes looks at patients receiving less-than-ideal therapy from a different perspective. This metric measures the percentage of patients who have been dispensed medications for diabetes and hypertension who are not receiving an angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker. This oversight can be regarded as an omission of therapy, and it can also apply to an asthmatic who is not receiving a steroid or any number of other scenarios.

Conversely, the PQA also looks at medication overuse as a measure of quality because dosing at higher-than-recommended levels can lead to hospitalizations and other adverse events. For diabetes, the medication overuse dosing metric is defined as the percentage of patients receiving an oral hypoglycemic agent at doses exceeding Food and Drug Administration-approved labeling. This measure is calculated at monthly intervals during the measurement period within a population known to be taking oral hypoglycemics. The denominator for this measure is the number of adults with ≥2 claims for an oral hypoglycemic agent who were continuously enrolled in a drug plan during the 6-month observation period.

In terms of reporting, the PQA has accomplished a number of objectives in 2006 and 2007, including the development of principles of reporting to pharmacists and pharmacies as well as to the public. Upon performing an environmental scan, the alliance found that few reports identifying the attributes of good pharmacy quality were available in the United States for pharmacies, pharmacists, and consumers. While other examples in health care do exist, including a compendium of report cards by the Agency for Healthcare Research and Quality, report cards in pharmacy are lacking aside from 1 example in Australia.9 In response to the lack of pharmacy reports, the PQA’s Reporting work group was organized into 2 teams: one to work on the public reporting template and one to work on the pharmacy and pharmacist reporting template. The resulting model reporting template was put into field testing at the end of 2007.

Also in 2007, the PQA’s Reporting work group was expanded to include data aggregation because a significant amount of groundwork had to be established for the alliance to understand the sources of data and devise ways to pull the sources together so that the data could be reported more broadly. As such, the Data Aggregation and Reporting work group was charged with creating strategies for obtaining data, formulating the architecture for how data would be reported, detailing the nomenclature that would be used, and developing reporting tools.

Two different sets of data are important when reporting to consumers and pharmacies/pharmacists, and the PQA is reviewing how this desire for information is changing to include more crossover between the groups. Typically, consumers want information regarding the location of pharmacies, pharmacy hours (i.e., whether a pharmacy is open 24 hours), whether a pharmacy offers compounded prescriptions, whether a bilingual staff is available, and whether there are drive-through or home delivery options available from the pharmacies. The PQA took this one step further from the traditional consumer-driven reporting scheme and is investigating offering information to consumers about drug adherence rates, hemoglobin Alc measures, and hyperlipidemia measures for various pharmacies. Whereas pharmacies are traditionally involved with measures, such as generic dispensing rates and their generic index, the PQA is looking at offering pharmacies some of the same information they are testing on consumers. This information, such as data regarding adherence rates, hemoglobin Alc measures, and beta-blocker
use measures, will allow pharmacies to determine how they are performing in relation to the average in each of these categories.

In bringing about this more comprehensive approach to traditional pharmacy and consumer reporting, the PQA is striving to provide the level of information that people really want. Consumers will be able to review the data and then take action because the information is unbiased. This more informed generation of consumers will inevitably push pharmacy practice to a higher level than has yet been conceived.

All of the aforementioned starter metrics and demonstration projects have yielded little data to date, but more robust data are expected later in 2008 and into 2009. Only then will stakeholders be able to assess where the PQA has been and what the alliance has been able to accomplish in pushing the practice of pharmacy forward.

Medication Therapy Management

MTM represents another pharmacy management strategy for improving medication nonadherence. MTM is based on the premise that taking steps to improve medication management can strengthen the pharmacy care model by increasing the targeting of drug therapy problems, establishing focused medication management interventions, and developing a framework that is patient centered. The desired result of such programs is the integration of pharmacy services into the mainstream of U.S. health care. By facilitating these services, managed care organizations can reduce drug therapy problems and improve health and economic outcomes.

While many plans have been implementing MTM-like programs over the years, there has been industry pressure, in part due to the implementation of Medicare Part D, to measure pharmacy quality and make it more broadly available across the industry, not only for Medicare plans but also for commercial plans. This increased pressure has lead the NCQA to develop new MTM measures for 2007 including annual monitoring for patients on persistent medications, potentially harmful drug-disease interactions in the elderly, and use of high-risk medications in the elderly.

In conjunction with these new MTM measures, the NCQA has introduced relative resource use measures to assess value of care.1 When using these measures, plans report total resource use across various service categories, including medical and pharmacy utilization within select disease categories. In 2007, these categories were diabetes, asthma, and low back pain; in 2008, plans will report on chronic obstructive pulmonary disease and cardiovascular disease. After reporting is complete for the calendar year, costs are standardized and data are risk adjusted so that plans can be compared with one another on relative resource use. In concert with quality measures, these relative resource use measures can be employed to assess relative health plan value.

Using a scatter plot of relative quality graphed against relative resource use, the distribution of commercial plans according to

![Figure 2](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAAIQAAABACAYAAAC1cXuEAAAgAElEQVR42uOwz8w...)

DIabetes Relative Resource Use in Terms of Medical Costs* for Commercial HMO/POS, 2006

*Diabetes, medical costs; includes inpatient facility costs, evaluation and management costs, and surgery costs; excludes pharmacy costs.

HMO=health maintenance organization; POS=point of service; Rx=prescription.

![Figure 3](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAAIQAAABACAYAAAC1cXuEAAAgAElEQVR42uOwz8w...)

DIabetes Relative Resource Use in Terms of Outpatient Pharmacy Costs for Commercial HMO/POS, 2006

HMO=health maintenance organization; POS=point of service.
the relative resource use measures can be observed. For example, in diabetes management, relative resource use for commercial plans is viewed in terms of both medical costs (excluding pharmacy costs) and outpatient pharmacy costs (Figures 2 and 3, respectively). In these scatter plots, each dot denotes a commercial plan's position on the continuum of relative resource use versus relative quality. Plans falling in the upper left shaded portion of the plot have theoretically ideal relative resource use because their resource use is low with respect to high relative quality. Plans falling in the lower right-hand corner of the plot have theoretically suboptimal relative resource use because their resource use is high with respect to low relative quality.

■ Conclusions

Managed care stakeholders should strive toward a value-based health care system by investing more on appropriate medication use, including initiatives to reduce nonadherence to avoid the high costs of treating severe disease in the future. Collaborative networks and MTM are 2 such initiatives that are useful in reducing medication nonadherence among plan members. The PQA has laid the foundation for developing useful pharmacy quality metrics, aggregating data, and reporting to both consumers and pharmacies in spearheading this effort. At the same time, the NCQA has developed MTM measures to monitor pharmacy quality. Both organizations have used Medicare Part D as an impetus for these initiatives in an effort to assess the value of the high-cost investment in prescription medications that accompanies the government mandate.

Data reported from these initiatives will become available to a wide array of stakeholders, including consumers who are becoming more informed and are thus driving improvements in pharmacy quality by making educated choices in health care. Likewise, a wide array of stakeholders will need to be involved in the development and implementation of pharmacy management efforts to represent the interests and points of view of all areas of pharmacy in design and decision making. Thus, a well-rounded and organized approach involving the collaboration of pharmacies, pharmacists, payers, employers, and quality-assurance organizations is critical to improving quality in treatment adherence and ultimately in lowering costs. The resulting system of measurement and reporting will provide evidence of improvements in pharmacy quality many years after the advent of Medicare Part D, thereby demonstrating the value of large-scale investments in managed care pharmacy.

DISCLOSURE

Author William K. Fleming discloses that there was no financial relationship or financial interest relating to the topic of this activity. Fleming was responsible for the entire study concept and design of this article. He performed all of the data collection, data interpretation, writing, and revision of this article.

REFERENCES

ABSTRACT

BACKGROUND: As chronic disease continues to weigh more heavily on health care resources, lifestyle management and compliance to treatment become paramount to patient care and care coordination. Although a wealth of information is available to the public regarding the basic tenets on exercise, nutrition, weight management, power of medications, and so forth, patients do not always modify their behavior accordingly to improve their overall health. Motivation seems to be both the key element as well as the central puzzle in efforts to change behavior.

OBJECTIVE: To identify several strategies, including motivational interviewing, that can be used to reduce resistance and improve the odds of achieving positive clinical outcomes among noncompliant/resistant patients.

SUMMARY: Providers once thought the following about nonadherent patients: They don’t see (are in denial or lack insight), they don’t know, they don’t know how, and/or they don’t care. However, instead of focusing on the reasons why people do not change, researchers in behavior change science recognize that the best questions to ask are: “Why do people change?” and “What can we do to help?”

A worst-case scenario undermining positive clinical outcomes is one in which the provider is arguing for change while the patient argues against it. It is, therefore, more effective to enlist strategies that address the complex interaction of motivations, cues to action, perception of benefits and consequences, expectancies, environmental and cultural influences, self-efficacy, state of readiness to change, ambivalence, and implementation intentions. Motivational interviewing is one such approach that is evidence-based and increasingly well proven. Motivational interviewing is a client-centered, goal-oriented method for enhancing intrinsic motivation to change by exploring and resolving ambivalence, and it offers more than simply well-intentioned advice or scare tactics.

CONCLUSION: A client-centered approach is the most important component of a health coaching skill set. Patients can ascertain whether you are truly intentioned advice or scare tactics.

Why Don’t People Change?

Historically, providers believed in 4 popular notions concerning their patients’ struggles to adhere to their treatment plans. Providers thought the following about their nonadherent patients: They don’t see (are in denial or lack insight), they don’t know, they don’t know how, and/or they don’t care. Also, we know that this, too, is not enough. Researchers in behavior change science recognize that the best questions to ask are: “Why do people change?” and “What can we do to help?”

Why People Change

Over the last 2 decades, researchers have explained behavior change by exploring the following theories: priorities and values (Values Theory), perceived benefits and consequences (Health Belief Model), self-efficacy (Social Cognitive Theory), and a plethora of other theories...
Influencing Patient Adherence to Treatment Guidelines

### Motivational Interviewing

Motivational interviewing is “...a client-centered, directive [goal-oriented] method for enhancing intrinsic motivation to change by exploring and resolving ambivalence.”5 The motivational interviewing approach has been incorporated across diverse populations, settings, and health topics. Its efficacy was first demonstrated in the treatment of addictions, such as illegal drugs and alcoholism. Continued research and 2 recent meta-analyses that include rigorous methodology have reinforced the evidence for the effectiveness of this client-centered approach.9,10

Motivational interviewing has since been shown to be effective in improving general health status or well-being, promoting physical activity, improving nutritional habits, encouraging medication adherence, and managing chronic conditions, such as mental illness, hypertension, hypercholesterolemia, obesity, and diabetes.11-31 In summary, motivational interviewing has been shown to be equivalent to more intensive treatment, efficacious at low doses (2-3 sessions), effective as a pretreatment adjunct, effective as an approach for less-motivated or prepared people, and applicable in a wide range of situations for diverse populations.32

(See the Bibliography section at www.motivationalinterview.org for a complete listing of all published literature using the motivational interviewing approach, as well as Rollnick et al., for information on how motivational interviewing has been adapted to the health care setting.33)

Motivational interviewing is not based on the information model; does not rely on information sharing, advice giving, or scare tactics; and is not confrontational, forceful, guilt ridden, or authoritarian. Rather, it is shaped by an understanding of what triggers change. An interaction that is consistent with motivational interviewing principles consistently outperforms traditional advice giving in the treatment of a broad range of behavioral problems and diseases.10

### Why the Traditional Health Education Approach Engenders Resistance

There is a subset of patients who do embrace the lifestyle changes and treatment plan that are necessary to manage their conditions. In these cases, education and follow-up are adequate. However, many more patients are resistant to treatment regimens. The reasons given for this resistance vary: they don’t like taking medication, they don’t think that their condition is severe enough to warrant behavior modification, they are too busy or stressed, they don’t want to make the recommended lifestyle changes, or they don’t think they can.

It becomes quite apparent that knowing what to do and putting this knowledge into action are very different issues. When a provider encounters resistance, it seems natural to provide good arguments in support of the recommendations for the specified treatment or behavior. Therefore, the provider repeats the advice and appropriate information or instructions. This evokes a natural response in the patient to present reasons why they can’t, won’t, aren’t able to, or can’t see why they should follow the advice. This effect can be seen in what’s been called the “Yeah-But Dance” between the provider and the resistant patient (Table 1).

| Pharmacist: “I see that you haven’t filled this prescription in quite a while.” | Patient: “Yeah, I’ve just been really busy.” |
| Pharmacist: “It’s really important to take this medication on a regular basis. Did you take it as prescribed?” | Patient: “I know. Sometimes I forget. I don’t like the side-effects.” |
| Pharmacist: “People tolerate this medication very well if they take it as directed.” | Pharmacist takes a few minutes to cover the proper way to take the medication. |
| Pharmacist: “If you keep having problems, I would advise you to talk to your provider about it. Perhaps he will adjust the dose or even put you on another type of medication.” | Patient: “Okay then. Your prescription should be ready in a few minutes. Any more questions?” Brief pause. “I hope you take this as directed. It’s really important for your health.” |

The most current behavior change research indicates that not only is this type of exchange ineffective in evoking change, but studies have shown that it predicts negative clinical outcomes.9,10 Therefore, it is likely that the worst-case scenario undermining a good clinical outcome is one in which the provider is arguing for change while the patient argues against it. Rather, a more recent perspective is that most people need more than well-intentioned advice or scare tactics to prompt them to adhere to treatment guidelines. They need an evidence-based approach that is congruent with the theories presented earlier.

It is more effective to enlist strategies that address the complex interaction of motivations, cues to action, perception of benefits and consequences, expectancies, environmental and cultural influences, self efficacy, state of readiness to change, ambivalence, and implementation intentions. Motivational interviewing is one such approach.

### Typical “Yeah-But Dance”

| Pharmacist: “I see that you haven’t filled this prescription in quite a while.” | Patient: “Yeah, I’ve just been really busy.” |
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It becomes quite apparent that knowing what to do and putting this knowledge into action are very different issues. When a provider encounters resistance, it seems natural to provide good arguments in support of the recommendations for the specified treatment or behavior. Therefore, the provider repeats the advice and appropriate information or instructions. This evokes a natural response in the patient to present reasons why they can’t, won’t, aren’t able to, or can’t see why they should follow the
Motivational interviewing has been adapted for brief interventions and has been successfully used in the primary care setting. During a typical interaction, the proficient practitioner emphasizes the 3 underlying assumptions of motivational interviewing—collaboration, evocation, and autonomy—to establish rapport, reduce resistance, support autonomy, and elicit “change talk” (i.e., one’s own reasons and arguments for change). The intended outcome of these motivational interviewing sessions is for clients to resolve ambivalence, move through the stages of change, and follow through on treatment guidelines, which would ostensibly result in improved clinical outcomes (Table 2).

### Application of Motivational Interviewing in the Primary Care or Pharmacy Setting

The following scenarios present specific motivational interviewing techniques that the provider can use in a brief interaction in a clinic or pharmacy setting to encourage treatment adherence.

#### Expressing Empathy

**Objective:** To establish rapport and avoid resistance by demonstrating your understanding of the patient’s situation.

**Example:** “It’s not easy making all of these changes.”

**Follow-up:** “On the other hand, you did say that you know these numbers put you at risk.”

#### Rolling with Resistance

**Objective:** To avoid pushing against and magnifying resistance and to allow the patient to simply explore their barriers in a non-judgmental, supportive environment.

**Example:** “You really don’t want to take the medication anymore. It is hard to remember to take it, and you are feeling good.”

**Follow-up:** “I’m wondering where you see yourself in 6 months after going off the medication.”

#### Elicit-Provide-Elicit (E-P-E)

**Objective:** To find out what the patient already knows, fill in the gaps or correct misconceptions, and explore how this will fit into the patient’s lifestyle. This is a time-saving strategy that both validates patient knowledge and allows time to address barriers.

**Example:** Elicit: “Mrs. Roberts, can you tell me what you know about how this medication works and how you’re supposed to take it?” Provide (after patient answers): “That’s great. You’ve pretty much got it nailed. I’d just like to remind you about avoiding certain foods when you take it.” Elicit: “What do you think is the biggest barrier for you to take this regularly?”

#### Supporting Autonomy

**Objective:** To reduce resistance by assuring the patient that you know you cannot make them do anything—it is their choice.

**Example:** “Of course, it’s your choice, but as a pharmacist, I’d be concerned if you elected not to try this medication.”

### Table 2: Motivational Interviewing Approach

<table>
<thead>
<tr>
<th>Pharmacist</th>
<th>Patient</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I see that you haven’t filled this prescription in quite a while. I’m wondering how it’s been going for you.”</td>
<td>“Well, I know I’m supposed to take it every day, but I don’t like the side-effects.”</td>
<td>“Tell me more about that.”</td>
</tr>
<tr>
<td>“Tell me more about that.”</td>
<td>“Well, I’ve been getting nauseous sometimes and even light-headed.”</td>
<td>“That’s a good question.” Pause. “It may be when I skip breakfast. I guess I’m supposed to eat something with it. But sometimes I’m in too much of a hurry.”</td>
</tr>
<tr>
<td>“That’s a good question.” Pause. “It may be when I skip breakfast. I guess I’m supposed to eat something with it. But sometimes I’m in too much of a hurry.”</td>
<td>“Yeah … exactly! But I know I should be taking it more regularly.”</td>
<td>“So, when you get really busy, you take it on an empty stomach and then you feel lousy.”</td>
</tr>
<tr>
<td>“I’m wondering if you have any ideas about how you could do this even when you are really busy.”</td>
<td>“Hmmm … I guess I could just grab something easy to eat in the car, like a banana or protein bar. Would that help?”</td>
<td>“I think it could. But I would encourage you to experiment with different ways of taking the medication until you figure out what works for you. And if your side-effects persist, please do talk to your provider. So, what do you think?”</td>
</tr>
<tr>
<td>“I think it could. But I would encourage you to experiment with different ways of taking the medication until you figure out what works for you. And if your side-effects persist, please do talk to your provider. So, what do you think?”</td>
<td>“I’m going to give it a try. I guess there’s no reason why I can’t figure this out. I know I need to take these. Thanks for helping me figure it out.”</td>
<td>“I’m happy to brainstorm with you anytime. I really do think you will be able to figure something out. This will be ready in just a few minutes.”</td>
</tr>
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</table>

In this scenario, do you think the patient will take the medication as prescribed? If so, what will the patient do if there are continued side effects?

**Follow-up:** “Again, your doctor or I cannot make you do anything. I do think it’s important that you consider all of your options and make the right choice for you at this time. If you do elect to try this medication, I can assure you that your doctor can monitor any side effects and tweak the dosage.”

### Exploring Ambivalence

**Objective:** To help the patient consider the pros and cons of change in a relaxed yet systematic manner.

**Example:** “So, let’s talk about the pros and cons of taking this medication for your lipids.”

**Follow-up:** “Let me see if I can summarize where you are. On the one hand, you hate the thought of going on any drug. You also don’t like the copays and the hassle of filling the prescription. On the other hand, you haven’t been able to do much with your diet, and work is so busy that you haven’t been exercising either. You do see the importance of getting your numbers in line. Did I get it all? What do you think is the best option for you?”

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Eliciting Change Talk

**Objective:** To evoke from the patient his/her personal reasons, desire, ability, and need for change. This “change talk” predicts increased commitment to the lifestyle change, which in turn is correlated to good clinical outcome.

**Example:** “What makes it important to you to start an exercise program?” “What benefits would come from losing weight?” “Why do you want to quit smoking?”

**Follow-up:** “You know that exercise will help you manage your stress, lose some weight, and lower your cholesterol levels. Plus, when you did it before, you had more energy and slept better. You also want to be a good role model for the kids and be able to play sports with them.”

Developing a Plan of Action

**Objective:** To evoke from the patient a plan that they feel is realistic and fits into their lifestyle. By having patients “own” the plan, they are more likely to follow through.

**Example:** “So, what’s the next step for you?” “What do you think you could do (and would be willing to do) for your health right now that would make the most difference?” “What do you think is your best option?”

**Follow-up:** “You’ve outlined a great plan. You’re going to try to increase the fiber in your diet and cut back on portion sizes. You’re also going to try and walk more often. Lastly, you’re willing to try the medication to see how that works for you. So, you’re going to do this?”

These specific motivational interviewing techniques offer providers a way to encourage treatment adherence during a brief interaction with a patient in the clinic or pharmacy setting. Obviously, these various techniques should be applied in different scenarios as part of a tailored approach to increase medication adherence based on the prevailing patient and situational characteristics.

**Conclusions**

The most important first step toward improving your health coaching skill set is to embrace a client-centered approach. Patients can ascertain whether you are truly attempting to understand their situation and help them explore their ambivalence compared with merely trying to manipulate them into change. By respecting each patient’s autonomy and resisting the urge to push against patient resistance, you have a better chance to achieve treatment compliance. Ideally, by evoking reasons, desire, ability, and need for change, you strengthen the patient’s motivation to make the lifestyle change. Lastly, by allowing the patient to develop and/or own the treatment plan, the odds of reaching positive clinical outcomes are greatly improved.

**DISCLOSURE**

Author Susan Butterworth discloses that there was no financial relationship or financial interest relating to the topic of this activity. Butterworth was responsible for the entire study concept and design of this article. She performed all of the data collection, data interpretation, writing, and revision of this article.

**REFERENCES**

Influencing Patient Adherence to Treatment Guidelines


The Unhidden Cost of Noncompliance

Method of Participation
There are no fees for participating in and receiving credit for this activity. During the period from August 1, 2008, through September 1, 2009, participants must (1) read the entire supplement; (2) complete the posttest, credit application, and evaluation form; and (3) either send the completed forms to Postgraduate Institute for Medicine by mail or FAX at 303.790.4876 or complete the activity online at www.amcp.org (CE/CME Center) where you will access the posttest, credit application, and evaluation form.

These materials and all other materials provided in conjunction with continuing medical education activities are intended solely for purposes of supplementing continuing medical education programs for qualified health care professionals. Anyone using the materials assumes full responsibility and all risk for their appropriate use.

Continuing Education for this activity is processed through the AMCP.org Online Learning Center site at www.amcp.org (CE/CME Center).

The posttest worksheet on page S27 is provided to assist you in marking your answers prior to entering the online CE center for submission.

In order to receive CE credit for this program, you must complete the following forms online:

1. Posttest form for this program, “The Unhidden Cost of Noncompliance,” on the AMCP.org Online Learning Center site. To receive CE credit, you must receive a score of at least 70%. You will have 2 opportunities to pass the posttest.
2. Program evaluation form.

A statement of credit will be issued only upon receipt of a completed activity evaluation form and a completed posttest with a score of 70% or better. Your statement of credit will be mailed to you within three weeks.

To complete the activity online, go to www.amcp.org (CE/CME Center), where you will access the posttest and evaluation form.

The Posttest Answers and Evaluation Form may be mailed or faxed to:
Postgraduate Institute for Medicine, 367 Inverness Pkwy., Suite 215, Englewood, CO 80112; FAX: 303.790.4876
The Unhidden Cost of Noncompliance

1. What is the average adherence rate with long-term therapy for chronic disease in developed countries?
   a. 90%
   b. 70%
   c. 50%
   d. 30%

2. The most common type of nonadherent behavior is estimated to be:
   a. Taking medication less often than indicated
   b. Discontinuing medication early
   c. Failing to fill prescriptions
   d. Failing to take filled prescriptions

3. The Pharmacy Quality Alliance’s (PQA) gap in therapy metric defines a gap in therapy as:
   a. 30 days in a 12-month measurement period
   b. 60 days in a 12-month measurement period
   c. 15 days in a 6-month measurement period
   d. 30 days in a 6-month measurement period

4. It is likely that the worst-case scenario for a good clinical outcome is one in which the:
   a. Patient is empowered to take charge of his or her own health
   b. Provider demonstrates the benefit of a change in the patient’s behavior
   c. Patient has a good plan for change with adequate social support
   d. Provider is arguing for change while the patient argues against it

5. Which of the following is true of motivational interviewing?
   a. It is a client-centered, directive method for enhancing intrinsic motivation.
   b. It is based on the information model and relies on information sharing.
   c. An interaction that is consistent with motivational interviewing principles performs similarly to traditional advice-giving in the treatment of a broad range of diseases.
   d. It is a confrontational approach that uses guilt-ridden techniques and an authoritarian point of view.

6. The following are all examples of the application of motivational interviewing in the primary care or pharmacy setting except:
   a. Expressing empathy
   b. Maintaining resistance
   c. Rolling with resistance
   d. Supporting autonomy

7. A total value approach for determining the cost-benefit of a managed care intervention is characterized by considering:
   a. The cost of pharmacotherapy
   b. The cost of hospitalizations
   c. Overall medical costs
   d. The cost of office visits

8. The smallest segment of the Pitney Bowes employee population constituting the 5% using > $10,000/year in services account for what percentage of total health care spending?
   a. 75%
   b. 65%
   c. 55%
   d. 45%

9. Which set of factors was determined by predictive modeling to serve as an indicator that an enrollee would move from a relatively low-cost segment to a relatively high-cost segment in the space of 1 year?
   a. Low income coupled with limited education
   b. Chronic disease coupled with poor medication compliance
   c. Severe trauma coupled with poor medication compliance
   d. Depression and/or anxiety coupled with chronic disease

10. According to an observational Canadian study, the shortest duration of statin compliance has been observed among patients who are prescribed a statin:
    a. After a cardiac event
    b. Due to LDL-C levels that severely exceed recommended goals
    c. While demonstrating evidence of disease progression
    d. As preventative therapy

11. Compliance with statin therapy at baseline and at year 5 in an elderly Medicaid population was estimated to be:
    a. 90% and 60%, respectively
    b. 80% and 50%, respectively
    c. 60% and 30%, respectively
    d. 50% and 20%, respectively

12. Which of the following is not a key component of an intervention to improve medication compliance?
    a. Patient education
    b. Behavioral considerations
    c. Follow-up visits/calls
    d. Passive-aggressive interviewing
The Unhidden Cost of Noncompliance

To assist us in evaluating the effectiveness of this activity and to make recommendations for future educational offerings, please take a few minutes to complete this evaluation form. You must complete this evaluation form to receive acknowledgment for completing this activity.

Please answer the following questions by circling the appropriate rating:

1=Strongly Disagree  2=Disagree  3=Neutral  4=Agree  5=Strongly Agree

EXTENT TO WHICH PROGRAM ACTIVITIES MET THE IDENTIFIED OBJECTIVES

Upon completion of this activity, participants should be better able to:

1. Describe the clinical and economic impact related to noncompliance within the managed health care setting
2. Explain methods, such as motivational interviewing techniques, for improving overall compliance to therapies
3. Specify current strategies to optimize the use of medication therapy management programs
4. Identify collaborative approaches that maximize available resources to improve treatment compliance outcomes

OVERALL EFFECTIVENESS OF THE ACTIVITY

5. Was timely and will influence how I practice
6. Enhanced my current knowledge base
7. Addressed my most pressing questions
8. Provided new ideas or information I expect to use
9. Addressed competencies identified by my specialty
10. Avoided commercial bias or influence

IMPACT OF THE ACTIVITY

Name one thing you intend to change in your practice as a result of completing this activity:

Please list any topics you would like to see addressed in future educational activities:

Additional comments about this activity:
**POSTTEST ANSWERS, CREDIT APPLICATION, AND EVALUATION FORM**

**The Unhidden Cost of Noncompliance**

**FOLLOW-UP**

As part of our ongoing continuous quality-improvement effort, we conduct post-activity follow-up surveys to assess the impact of our educational interventions on professional practice. Please indicate your willingness to participate in such a survey:

- Yes. I would be interested in participating in a follow-up survey
- No. I’m not interested in participating in a follow-up survey

**POSTTEST ANSWERS**

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**REQUEST FOR CREDIT**

Name (please print)  
Degree

Organization  
Specialty

Address

City, State, Zip

Telephone  
Fax  
E-Mail

Signature  
Date Completed

**FOR PHYSICIANS ONLY**

I certify my actual time spent to complete this educational activity to be: ________________

- I participated in the entire activity and claim 1.5 credits.
- I participated in only part of the activity and claim ______ credits.