IMPROVING PRESCRIPTION MEDICINE ADHERENCE IS KEY TO BETTER HEALTH CARE

Taking Medicines as Prescribed Can Lower Costs and Improve Health Outcomes

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Successful treatment of disease with prescription medicines requires consistent use of the medicines as prescribed. Yet research shows that medicines commonly are not used as directed. Nonadherence to medicines is a major health care cost and quality problem, with numerous studies showing high rates of nonadherence directly related to poor clinical outcomes, high health care costs, and lost productivity. The cost of nonadherence has been estimated at $100 billion to $300 billion annually, including costs from avoidable hospitalizations, nursing home admissions, and premature deaths.[i]

Adherence to therapy is especially important for management of chronic diseases, such as diabetes, heart disease and cancer. Chronic disease affects nearly one in two Americans and treating chronically ill patients accounts for $3 out of every $4 spent on medical care.[ii] In a recent commentary, Harvard University researchers remarked that poor adherence among patients with chronic conditions persists "despite conclusive evidence that medication therapy can substantially improve life expectancy and quality of life."[iii] For the authors, the solution to this problem lies in "efforts to stimulate better prescribing of and adherence to essential medications [that] will increase value by improving population health, averting costly emergency department visits and hospitalizations, and improving quality of life and productivity."[iv]

Many of the human and economic costs associated with nonadherence can be avoided, making improving patient adherence one of the best opportunities to get better results and greater value from our health care system. Closing the adherence gap is important to the success of initiatives to improve the quality of health care, encourage better chronic care management, and promote better health outcomes. Forward-looking employers, health plans, and other stakeholders have begun implementing programs to encourage better adherence to medicines, but more remains to be done.

Medication Nonadherence Is A Common Problem

Nonadherence to needed medicines takes many forms. While the most common is simply forgetting to take a prescribed medicine, almost one-third of patients stop taking their medicine earlier than instructed.[v] Overall, nearly 75 percent of adults are nonadherent in one or more ways, such as not filling a new prescription or taking less than the dose recommended by the physician.[vi]

Primary Nonadherence

The rate at which patients refill prescriptions has been the focus of most prior research on adherence, with studies showing that many patients stop taking their medicines soon after having them filled. Now, the adoption of health information technology and electronic prescribing systems allows researchers to study how likely patients are to fill a new prescription in the first place, a measure referred to as "primary nonadherence."

- One new study of a commercially insured population indicates that nearly 30 percent of patients failed to fill a new prescription and that new prescriptions for chronic conditions such as high blood pressure, diabetes, and high cholesterol were not filled 20 to 22 percent of the time.[vii]
- A second study reports that new prescriptions for common maintenance medicines to control asthma and treat high cholesterol went unfilled 20 percent and 34 percent of the time, respectively.[viii]
- Other recent research shows that the share of patients that never become ongoing users (meaning they never fill the initial prescription or the first refill) of a newly prescribed diabetes, high blood pressure, or cholesterol medicine is eight times as great as the share who maintain ongoing use, but who do not routinely refill their prescriptions on time.[ix]

Secondary Nonadherence

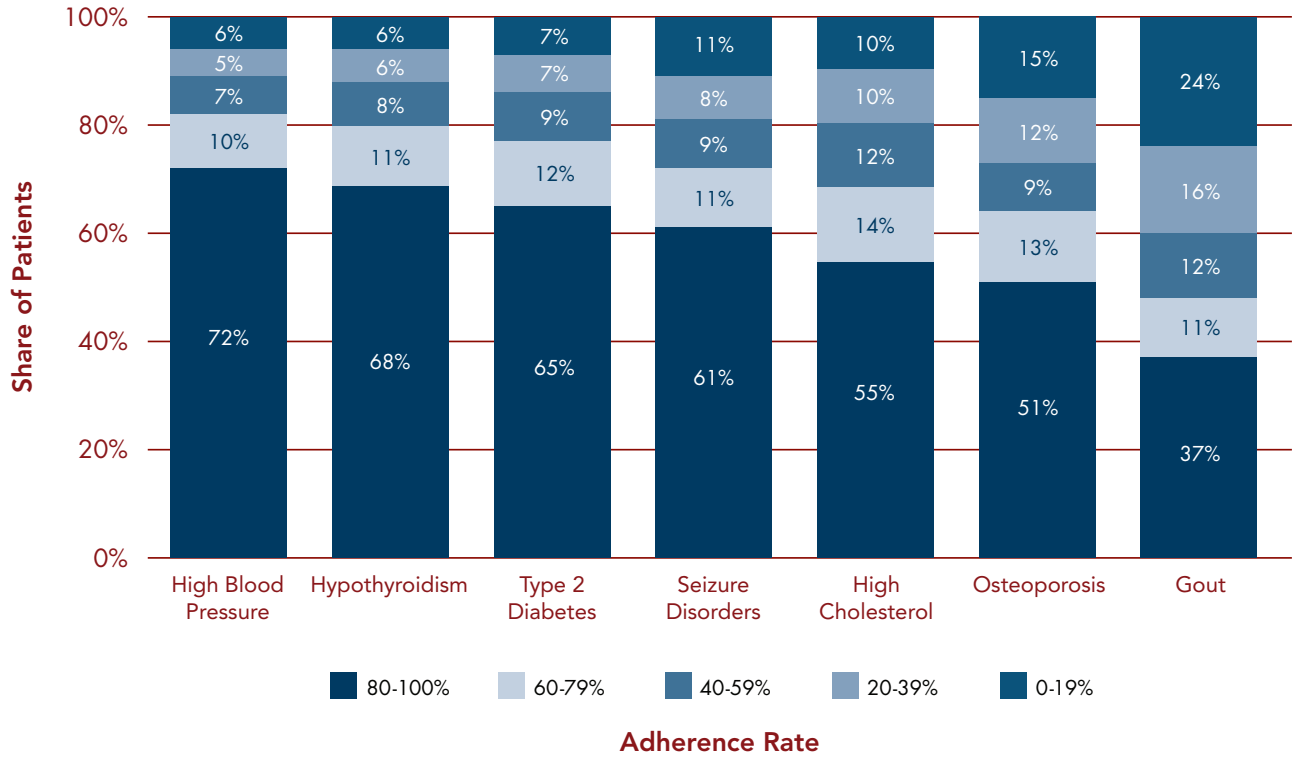
Most of the peer-reviewed literature on medication nonadherence is based on follow-up studies of patients who have filled at least one prescription. Because these studies do not include prescriptions that are written by a physician but never filled, they can be thought of as measuring the rate of "secondary nonadherence."

- Using a uniform method to compare adherence rates during the first year of therapy across a range of chronic medical conditions commonly treated with maintenance therapy, researchers found that the share of patients who regularly took their medicines as directed ranged from 72 percent for patients with high blood pressure to 37 percent for those with gout.[x] See Figure 1.
- Electronic monitoring studies indicate that even among chronically ill patients who regularly fill their prescriptions, only about half of the doses taken are taken correctly, as intended by a physician.[xi]
- Unfortunately, doctors are unable to predict which of their patients will likely be nonadherent to treatment. As former CBO Director Peter Orszag noted, "Doctors are no more accurate than relying on a coin flip in determining who will adhere to treatment and who won't (even among patients they know well)."[xii]

Reasons For Nonadherence Are Varied And Complex, Though Researchers Have Identified Some Common Predictors Of Poor Adherence.[xiii]

- Nonadherence is especially common when the patient is prescribed a medication to treat a disease for which the patient does not exhibit symptoms, such as high blood pressure or high cholesterol.

FIGURE 1: PATIENT ADHERENCE RATES BY CHRONIC CONDITIONS



Source: B.A. Briesacher et al. "Comparison of Drug Adherence Rates Among Patients with Seven Different Medical Conditions." *Pharmacotherapy*, June 2008

- Adherence is inversely proportional to the number of times a patient must take their medicine each day. The average adherence rate for treatments taken only once daily is nearly 80 percent, compared to about 50 percent for treatments that must be taken 4 times a day.[xiv]
- Patients commonly improve their medication-taking behavior in the days just before and after an appointment with a physician.[xv]

Not Taking Medicines As Prescribed Increases Health Care Costs And Exacts A Significant Human Toll. Controlling For Other Relevant Factors, Poor Adherence Is Associated With Increased Hospitalizations, Nursing Home Admissions, Physician Visits, And Avoidable Health Care Costs.

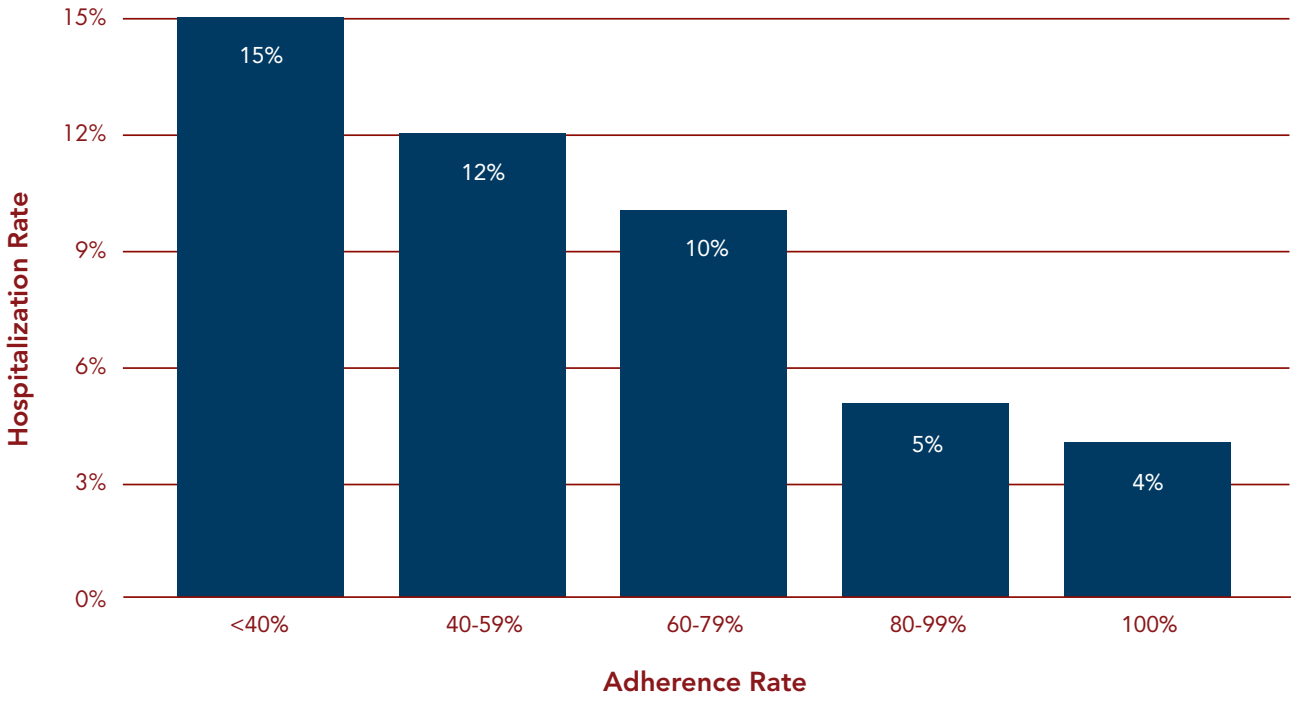
- A meta-analysis combining the results of numerous studies found that relative to patients with high levels of adherence, the risk of poor clinical outcomes—including hospitalization, rehospitalization, and premature death—among nonadherent patients is 5.4 times as high among those with hypertension, 2.8 times as high among those with dyslipidemia, and 1.5 times as high among those with heart disease.[xvi]
- Patients with diabetes who did not consistently take their diabetes medicines as prescribed were 2.5 times more likely to be hospitalized than those who followed their prescribed treatment regimens more than 80 percent of the time.[xvii] See Figure 2.
- Nonadherence has also been associated with as many as 40 percent of nursing home admissions and with an additional $2,000 a year per patient in medical costs for physician visits.[xviii]
- In one study of patients with high blood pressure, nonadherent patients were 7 percent, 13 percent, and 42 percent more likely to develop coronary disease, cerebrovascular disease, and chronic heart failure, respectively, over a 3-year period when compared to those who took their antihypertensive medicines as directed. Nonadherent patients were also 17 percent more likely to be hospitalized and had an average cost of hospitalization that exceeded that of an adherent patient by $3,575. Researchers estimated that total hospitalization costs could have been reduced by more than $25 million if nonadherent patients had been compliant with their treatment regimens.[xix]

TABLE 1: MAJOR PREDICTORS OF POOR ADHERENCE TO MEDICINES

Patient-Related Limitations	Barriers to Care or Medicine
Psychological problems, particularly depression	Poor relationship between patient and provider
Cognitive impairment	Missed appointments
Asymptomatic disease	Lack of health insurance
Inadequate follow-up or discharge planning	Cost of copayment or coinsurance
Side effects of medicine	Complexity of treatment
Patient lacks belief in benefit of treatment	Access restrictions (e.g., formularies, utilization management)
Patient lacks insight into the illness	

Source: Adapted from L. Osterberg and T. Blaschke. "Adherence to Medicine," *New England Journal of Medicine,* August 2005.

FIGURE 2: RELATIONSHIP BETWEEN ADHERENCE AND HOSPITALIZATION IN PATIENTS WITH DIABETES



Source: D.T. Lau and D. P. Nau, "Oral Antihyperglycemic Medication Nonadherence and Subsequent Hospitalization Among Individuals with Type 2 Diabetes." *Diabetes Care*, September 2004.

- In 1994, the economic impact of nonadherence was estimated at $100 billion annually, including costs from nursing home admissions and avoidable hospitalizations.[xx] A more recent estimate, based on a 2004 synthesis of the literature, puts the cost of nonadherence closer to $300 billion per year.[xxi] Other research indicates that 33 to 69 percent of medicine-related hospital admissions are caused by poor adherence, with a resulting estimated cost as high as $100 billion a year.[xxii]
- An examination of the relation between adherence to medicines and medical care utilization in a population with employer-sponsored insurance showed that hospitalization rates were significantly lower for patients with high adherence. Overall, improving adherence to prescribed medicines for diabetes, cholesterol, and blood pressure control resulted in $4 to $7 reductions in total health costs for every additional dollar spent on medicines.[xxiii]

Medicines That Lower The Number Of Pills Per Day Needed To Achieve The Desired Therapeutic Effect, Combine Individual Medicines Into A Single Pill, Or Reduce Side Effects Help To Eliminate Several Of The Known Barriers To Adherence.

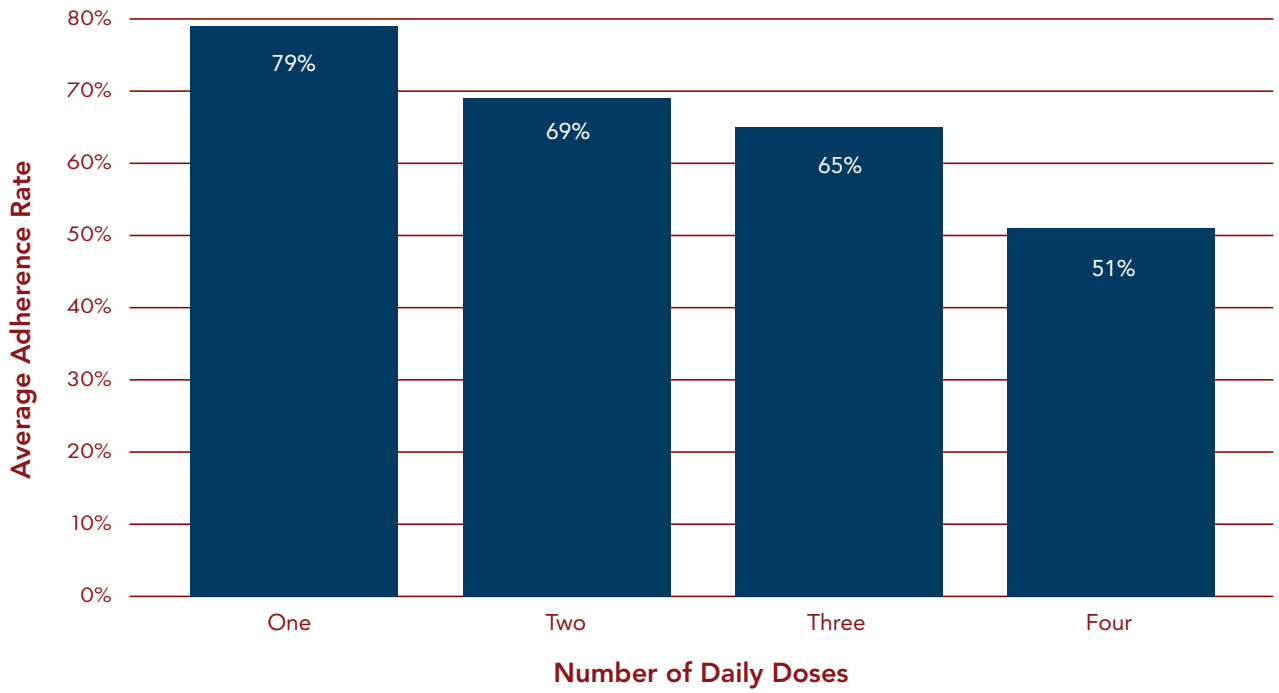
- Simple dosing (one pill, once daily) helps to maximize adherence, particularly when combined with provider reinforcement.[xxiv] The availability of extended-release versions of many medicines has made simplified dosage regimens possible, particularly for chronically ill patients who often take more than one medicine to manage their conditions.[xxv] For example, 32 million Americans use three or more medicines daily, while the average 75-year old has 3 chronic conditions and takes 5 medicines.[xxvi] See Figure 3.

- Compared to the use of 2 or more separate medications, fixed-dose combination therapies have been found to reduce patient nonadherence by 26 percent.[xxvii] Studies have also reported that a fixed-dose combination of two diabetes medicines increased adherence by almost 13 percent compared with taking two separate medicines and that almost 80 percent of hypertensive patients taking a fixed-dose combination adhered to therapy, compared with less than 70 percent of patients taking two separate medicines.[xxviii]
- Patients who report side effects from their medicines are 3.5 times more likely to not take their medicines as prescribed. In an analysis of patients' use of prescribed treatment for hypertension, patients taking medicines with fewer side effects had significantly better adherence over the four-year time period studied than patients on other medicines.[xxix]
- A study of a large group of commercially insured patients being treated for hypertension found significantly better adherence among patients taking angiotensin receptor blockers (ARBs) than among those taking several other types of antihypertensive medicines, despite a higher patient out-of-pocket payment for ARBs.[xxx] (As discussed subsequently, higher copays generally have been found to reduce adherence.)

Pharmacy Benefit Design Has A Direct Influence On Adherence To Medicines. Higher Copays And Restricted Benefits Lead To A Reduction In Use Of Medicines And Can Increase Total Medical Costs In The Long Run.

- A 2004 RAND study found that doubling copays for medicines reduced adherence by 25 percent to 45 percent. As patients' use of medicines declined due to increased copays, emergency room visits increased 17 percent and hospital stays rose 10 percent among patients with diabetes, asthma, or gastric acid disorder.[xxxi]

FIGURE 3: IMPACT OF DAILY DOSING SCHEDULE ON ADHERENCE



Source: A.J. Claxton et al. "A Systematic Review of the Associations Between Dose Regimens and Medication Compliance." *Clinical Therapeutics*, August 2001.

- A major synthesis of the literature reported a 2 percent to 6 percent decrease in prescription drug spending for every 10 percent increase in cost sharing (depending on therapeutic class and patient outcomes). Researchers also found an unambiguous association between higher medication copays or cost-sharing and increased use of hospitalizations and emergency medical services for patients with congestive heart failure, lipid disorders, diabetes, and schizophrenia.[xxxii]
- Researchers estimate that eliminating copayments for patients at medium to high risk of heart disease would improve adherence sufficiently to avoid 90,000 hospitalizations and generate savings exceeding $1 billion.[xxxiii]
- Compared to seniors with uncapped prescription coverage, seniors with a $1,000 annual benefit cap under a Medicare+Choice plan were less likely to use medicines appropriately and experienced unfavorable clinical outcomes. Use of medicines to treat hypertension, high cholesterol, and diabetes was 15 percent, 27 percent, and 21 percent lower, respectively, for patients subject to the cap relative to those with full coverage. The cap was also associated with poorer control of blood pressure, lipid levels, and glucose levels, and savings from reduced use of medicines were almost entirely offset by increases in the costs of hospitalizations and emergency care.[xxxiv]

Employers Working To Increase The Value Of Their Health Care Spending Are Investing In Incentives To Improve Adherence And Generating Positive Returns On Their Investments Through Productivity Gains And Lower Overall Health Care Spending.

- To provide an economic incentive for improved adherence by employees, in 2007 Pitney Bowes eliminated or reduced copays for statins and blood clot inhibitors. Adherence rates, which had been steadily declining, stabilized immediately after the program was implemented, resulting in a 3 percent to 4 percent increase in the average adherence rate relative to a control group whose copays did not change. Lower cost-sharing was also associated with an immediate 17 percent

to 19 percent increase in the odds that employees were "fully adherent," meaning that they took medicines as directed 80 percent or more of the time.[xxxv] Several years earlier, Pitney Bowes also reduced employee costs for all prescribed diabetes medicines and supplies, resulting in a 6 percent decrease in direct health care costs per participant with diabetes.[xxxvi]

- Three other employer groups who eliminated or reduced copayments for insulin and all oral diabetes medicines all saw significant increases in adherence for their employees with diabetes. Relative to employees whose copayments for diabetes medicines did not change, those whose copayments were waived or reduced were more likely to fill new prescriptions and more likely to continue their diabetes treatment over time.[xxxvii]
- According to research by Chernew and colleagues, an employer implementing a disease management program among 2 groups of employees found that when the disease management program was combined with economic incentives for 4 classes of chronic disease medications, it reduced nonadherence by 7 percent to 14 percent.[xxxviii] Additional research by these authors indicates that this increase in employee adherence led to reduced use of other medical care, thus offsetting the costs associated with the additional use of medicines encouraged by the program.[xxxix]
- Using claims data from 17 employers, researchers at the Integrated Benefit Institute found that high cost sharing for rheumatoid arthritis (RA) medications decreased adherence and led to increased incidence and longer duration of short-term disability leave. Researchers estimated that lowering patient copays would improve medication adherence, reducing lost productivity among workers with this disease by 26 percent.[xl]

Health Insurance Plans And Pharmacy Benefit Managers Also Recognize The Value Of Improving Patient Adherence And Are Experimenting With A Range Of Efforts To Encourage Patients To Use Their Medicines As Directed:

- In 2010, UnitedHealthcare announced that it would reduce copayments by $20 for patients who refilled their asthma and depression medicines on time. According to the CEO of UnitedHealth Pharmaceutical Solutions, "Patients with chronic diseases such as asthma and depression who take their medicines regularly and who comply with prescribed treatments are likely to stay healthier. They not only feel better, they can potentially avoid costly medical problems that could result from delaying appropriate therapy."[xli] UnitedHealthcare also offers employers a plan option to provide diabetes medicines at no charge to patients who take steps to manage their condition and participate in wellness coaching.[xlii]
- Working with researchers at the University of Pennsylvania, Aetna is studying whether giving patients a chance to win cash prizes will improve medication adherence. Each day a patient properly takes their medicine, as measured by a computerized pill box, they are eligible to win either $10 or $100. By paying patients a modest incentive to improve adherence upfront, the insurer hopes to save the much larger costs of hospitalization down the road.[xliii]
- Recognizing that "[i]mproved adherence is the hallmark of better quality care, healthier patients, and reduced overall medical costs," Express Scripts is testing a program to predict in advance which patients are likely to discontinue their medicines, allowing the pharmacy benefit manager to intervene before patients become nonadherent. Interventions will be tailored to the needs of the specific patient and may include reminders, pharmacist consultations, lower copays, and automatic home delivery of refilled prescriptions.[xliv]
- The Center for Connected Health, a division of Partners Healthcare, is experimenting with wireless electronic pill bottles to remind patients with high blood pressure to take their medication. Pill bottles are topped with special caps that signal patients with light and sound. An embedded wireless connection enables the cap to send automated calls to patients to inform them of missed doses and can also provide weekly progress reports and refill reminders. The caps also share adherence data with physicians and a social network if the patient chooses. The ongoing study measured a 27 percent higher rate of medication adherence compared to controls.[xlv]

Conclusion

Improving adherence holds great potential to contribute to better health outcomes and more effective chronic care management. In the private sector, forward-looking employers are taking steps to improve adherence, particularly among workers with chronic illnesses.[xlvi] In Medicare and Medicaid, improved adherence can be pursued through Medicare Part D medication therapy management programs, care transition medication reviews focused on high-risk beneficiaries, testing models "utilizing medication therapy management services" through the CMS Innovation Center, greater adoption of health information technology and more robust electronic exchange of information through the EHR Incentive Program, and a range of newly-established grant, demonstration, and pilot programs to encourage greater care coordination. Many of these initiatives include quality targets likely to require improved medication adherence.

Efforts to improve adherence represent win-win solutions in which patients, employers, insurers and the public all benefit.

ENDNOTES

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