Submitted by Lauren Rowley and Anthony Palmieri

CVS CAREMARK RESEARCH PARTNERSHIP

ADVANCING ADHERENCE & THE SCIENCE OF PHARMACY CARE

CVS CAREMARK

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Prescription medicine helps sick people get better.

Despite that, an alarming percentage of patients do not take their medications as directed by their doctors. Research shows that 25 percent of patients prescribed medications for a new illness fail to fill their initial prescription. Half of patients taking maintenance medications for a chronic disease stop taking their medications within a year of starting therapy.

This phenomenon is known as medication nonadherence and it is a major public health problem. Patients who stop taking their medicine face deteriorating health and potentially, unnecessary hospitalization. But this poor patient behavior doesn't just impact the individual patient's health; it impacts all of us as experts place the cost of unnecessary medical treatment resulting from non-adherence at $290 billion annually.

As a pharmacy innovation company that is reinventing pharmacy for better health, CVS Caremark is looking to learn why patients act the way they do when it comes to taking, or not taking, medicine. To do this we launched a research collaboration with Harvard University and Brigham and Women's Hospital in 2009. CVS Caremark, a retail pharmacy and pharmacy benefit manager, has the most comprehensive view of patients and their medication-taking behavior. Therefore it makes sense for us to take on this public health issue. If we find ways to improve patient adherence, we can improve health care quality and lower overall medical costs.

Through the collaboration with Harvard and Brigham and Women's, we have published 20 peer-reviewed studies in significant medical, pharmacy care and economic journals. This research is providing us with extensive insights into how to best apply pharmacy care and we are complementing this work with studies and real-time field testing on how to change patient behavior. That work is being conducted in collaboration with leading academics in the behavioral economic field participating in our Behavior Change Research Partnership.

Our research is advancing adherence and expanding the science of pharmacy care. Our investment of money and time is significant, and we have brought the nation's top research talent to the task. As a result, we are engaging patients by providing information to help them make appropriate decisions about their health. We are educating patients, physicians and the public about the importance of staying adherent. We are engaging policy leaders in discussions about the importance of pharmacy care as a strategic health care improvement tool and have launched an advertising campaign directed to policymakers on the issue. Along the way, we are conducting a public education campaign, an effort that began in earnest last May when we hosted a forum on the topic of adherence at the National Press Club and published a compendium of our research to share our findings with industry leaders and policymakers.

We are updating that work with this publication, Advancing Adherence and the Science of Pharmacy Care Volume 2, to add summaries of nine new studies. Following is a listing of the collaboration's 20 publications through March 2012.

Here are some of the areas our team has looked at:

Studies about the financial impact of adherence, and how the use of cost-effective medications can impact behavior:

- Medication Adherence Leads to Lower Health Care Use and Costs Despite Increased Drug Spending, *Health Affairs*, January 2011;
- The Use of Generic Drugs in Prevention of Chronic Disease is Far More Cost – Effective than Thought, and May Save Money, *Health Affairs*, July 2011

Studies about contributing factors to medication adherence:

- State Generic Substitution Laws Can Lower Drug Outlays Under Medicaid, *Health Affairs*, July, 2010;
- Changes in Drug Use and Out-of-Pocket Costs Associated with Medicare Part D Implementation: A Systematic Review, *Journal of the American Geriatrics Society*, September 2010;
- The Epidemiology of Prescriptions Abandoned at the Pharmacy, *Annals of Internal Medicine*, November 2010;
- The Implications of Therapeutic Complexity on Adherence to Cardiovascular Medications, *Archives of Internal Medicine*, January 2011;
- The Consequences of Requesting "Dispense as Written," *American Journal of Medicine*, March 2011;
- Adherence to Medication Under Mandatory and Voluntary Mail Benefit Designs, *American Journal of Managed Care*, July 2011;
- Are Caregivers Adherent to their Own Medications? *Journal of the American Pharmacists Association*, July/August 2011;
- Changes in Drug Utilization during a Gap in Insurance Coverage: An Examination of the Medicare Part D Coverage Gap, *PLoS Medicine*, August 2011;
- Enhanced Active Choice: A New Method to Motivate Behavior Change, *Journal of Consumer Psychology*, October 2011 (by the CVS Caremark Behavioral Change Research Partnership); .
- Trouble Getting Started: Predictors of Primary Medication Nonadherence, *American Journal of Medicine*, November 2011

Studies about the role and impact of health care professionals on adherence:

- Physician Effectiveness in Interventions to Improve Cardiovascular Medication Adherence: A Systematic Review, *Journal of General Internal Medicine*, May 2010;
- Modes of Delivery for Interventions to Improve Cardiovascular Medication Adherence, *American Journal of Managed Care*, December 2010;
- Physician Perceptions About Generic Drugs, *The Annals of Pharmacotherapy*, January 2011;
- An Integrated Pharmacy-Based Program Improved Medication Prescription and Adherence Rates in Diabetes Patients, *Health Affairs*, January 2012;
- Patterns of Medication Initiation in Newly Diagnosed Diabetes Mellitus: Quality and Cost Implications, *American Journal of Medicine*, March 2012

Studies about the role and impact of technology on adherence:

- Online Social Networking by Patients with Diabetes: A Qualitative Evaluation of Communication with Facebook, *Journal of General Internal Medicine*, October 2010;
- Healthcare Information Technology Interventions to Improve Cardiovascular and Diabetes Medication Adherence, *American Journal of Managed Care*, December 2010;
- Variations in Structure and Content of Online Social Networks for Patients with Diabetes, *Archives of Internal Medicine*, September 2011.

And we are far from done. Earlier this year we reconfirmed our collaboration with Brigham and Women's Hospital's Division of Pharmacoepidemiology and Pharmacoeconomics and will be continuing this research for another three years. We are in discussions with other health care companies to expand this work to include a review of medical claims data. We will continue to identify new ways to ensure our focused effort on this important topic continues.

As we move forward we will drive innovations that use the information we have assembled to inform the way we provide patient care. Look for us to develop new tools, such as ones that will allow pharmacists to predict and target patients at risk for poor medication behavior, so that those trusted professionals can counsel patients to improve their care. We will refine ways we communicate between pharmacists and physicians, so that together we can establish "pharmacy homes" to better manage and synchronize a patient's treatment. We are seeking to determine how comparative effectiveness and other clinical guidelines are being adhered to, in hopes of working with other providers to improve the quality of care. We are reviewing how to make social media a more effective tool for patients. In short, we are looking to use our research to develop programs and services that reinvent pharmacy and help people on their path to better health.

We hope this work sparks new conversations that will lead to a better, more cost effective health care system. Medication adherence is an important public health issue where CVS Caremark is taking a leadership role to make a difference so we can help provide more people with access to affordable quality care.

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Chief Medical Officer
CVS Caremark

OVERVIEW OF ADHERENCE RESEARCH

2011

FINANCIAL IMPACT OF MEDICATION ADHERENCE

Medication Adherence Leads to Lower Health Care Use and Costs Despite Increased Drug Spending

Published in *Health Affairs*, January 2011

It seems like an obvious conclusion – people who are adherent to medications for chronic diseases (meaning they take their prescription drugs as directed by their doctor) have lower overall health care usage and costs. However, previously published studies have not been able to provide compelling evidence of the direct connection between medication adherence and cost savings and many questions have remained:

> Are these patients' health care costs lower because they are adherent, or do they have lower costs and use fewer health care resources because they are simply healthier individuals who make good lifestyle choices (e.g., healthy diet, regular exercise)?

> How much lower are health care costs for adherent patients?

> Does the reduction in health care costs make up for the increase in pharmacy costs due to patients taking their medications regularly, and therefore taking more medication?

We know that almost half of all Americans, approximately 133 million people, have at least one chronic disease[1]. In addition, studies have found that one-third of patients do not take their medications as prescribed and an even higher percentage of people with chronic conditions stop taking their medications within a year of diagnosis[2]. Given these facts, CVS Caremark researchers evaluated integrated medical and pharmacy claims data and applied a disciplined methodology to better understand and analyze the impact of medication adherence for health plan sponsors. The research results were published in the January 2011 issue of *Health Affairs*[3] and definitively establish that adherent patients who take medications as directed do indeed cost the health care system less. The study quantified these savings for patients with congestive heart failure, high blood pressure, diabetes and high cholesterol, indicating that adherent patients may save the health care system as much as $7,800 per patient annually.

Patients who were adherent to their medications achieved savings as the result of fewer emergency department visits and fewer in-patient hospital days. In reviewing each of the four chronic conditions studied, the researchers found that adherent patients saved the following amounts compared to nonadherent patients:

Congestive heart failure patients saved $7,823 per year

High blood pressure patients saved $3,908 per year

High cholesterol patients saved $1,258 per year

Diabetes patients saved $3,756 per year

So what does this mean for the health care system in the coming years?

As health care reform is implemented and the Affordable Care Act expands access to medical care, players throughout the health care arena are all looking for ways to balance improved health outcomes with reduced spending. This research indicates that, even with increased pharmacy spending, medication adherence provides substantial medical savings due to reductions in hospitalizations and emergency department use. CVS Caremark believes that, moving forward, plan sponsors, government payers and patients should make programs that actively encourage medication adherence, such as value-based insurance design and pharmacist-led counseling, a top priority.

[1] Centers for Disease Control and Prevention. Chronic diseases and health promotion [Internet]. Atlanta (GA): CDC. 2010 Jul 7 [cited 2011 April 1]. Available from: http://www.cdc.gov/NCCdphp/overview.htm

[2] New England Healthcare Institute. Thinking Outside the Pillbox: A system-wide approach to improving patient medication adherence for chronic disease. August 2009

[3] Roebuck MC, Liberman, JN, Gemmill-Toyama M, Brennan TA. Medication Adherence Leads to Lower Health Care Use and Costs Despite Increased Drug Spending. *Health Affairs*. 2011; 30:191-99

The Use of Generic Drugs in Prevention of Chronic Disease is Far More Cost-Effective than Thought, and May Save Money

Published in
Health Affairs, July 2011

$475 billion annually to treat heart disease

Despite compelling evidence that medication adherence improves health outcomes, until recently there has not been an available body of published data to support the theory that improving adherence can also reduce overall health care costs. Furthermore, previously published studies in health care journals used the costs of branded medications in their calculations, and while they concluded that patients taking their medications as directed improved health outcomes, questions arose as to whether medical costs actually decreased.

This study, published in the July 2011 issue of *Health Affairs*[4] concludes that preventative care for chronic diseases in 2011 is significantly less costly than previous reports calculated, because generics are now more broadly available for most chronic diseases. This is in line with current research indicating that generic medications can help patients stay adherent because they are more affordable and cost has been identified as a barrier to adherence. Patients who are adherent to their medications save the system money because they face fewer emergency department visits and fewer inpatient hospital days.

The researchers reviewed a previous study published in 2008, which looked at prevention of cardiovascular disease using branded medications. This research estimated the cost of treatment to lower LDL cholesterol at more than $83,000 per quality adjusted life year (QALY), a financial measure to evaluate the impact of improving the quality of life for a patient with a chronic disease. Today, recalculating for the same treatment protocol using generics, the comparable cost for treatment would be just over $17,000 or 20 percent of the original estimate. There were even more dramatic cost savings identified in the research, including a comparison of glucose control for diabetes that was estimated to cost almost $49,000 per QALY using branded medications, compared to only $1,022 (just two percent of the originally calculated cost) per QALY, using readily available generics.

Given that more than 70 percent of all health care costs in the U.S. are spent treating patients who have one or more chronic diseases, this study shows that cost-effective generic medications are changing the economics for treating chronically ill patients. The researchers recommended that health care providers should focus on keeping patients adherent using available generic medications in order to help reduce medical costs while simultaneously improving care quality. Specific to the issue of cardiovascular disease, the researchers said cost implications for treatment need to be central to any policy discussions about reducing overall health care costs, because there are 80 million Americans spending approximately $475 billion annually to treat heart disease.

The researchers included recommendations for policy makers to consider, including:

> Promoting the use of generic medications in Accountable Care Organizations as part of health care reform.

> Limiting the use of prescription writing practices such as "dispense as written," where doctors and patients require the prescription be filled as a specific brand, and amending state Medicaid statutes that require patient consent before generics can be substituted, because those practices cost the system billions of dollars annually.

> Ensuring that e-prescribing practices encourage the use of more cost-effective medications.

> Developing education programs for patients and physicians around the effectiveness of generics to offset existing biases that result in generics not being prescribed.

> Promoting consumer incentive programs through pharmacy benefit management and health plan programs that promote the use of generics over brand medication.

No matter who holds the financial risk of paying for health care – the patient, employer or government health plans – using generic medications should be a key part of managing the treatment of chronically ill patients because the use of cost-effective medications is a practical solution that can be implemented quickly.

[4] Shrank WH, Choudhry NK, Liberman JN, Brennan TA. The Use of Generic Drugs in Prevention of Chronic Disease is Far More Cost-Effective than Thought, and May Save Money. *Health Affairs*. 2011; 30:7.

Given that more than 70 percent of all health care costs in the U.S. are spent treating patients who have one or more chronic diseases, this study shows that cost-effective generic medications are changing the economics for treating chronically ill patients.

CONTRIBUTING FACTORS TO MEDICATION ADHERENCE

The Implications of Therapeutic Complexity on Adherence to Cardiovascular Medications

Published in *Archives of Internal Medicine*, January 2011

Chronic diseases represent a major and growing health care issue. In fact, it is predicted that by the year 2030 more than 170 million people in the U.S. will be affected by one or more chronic diseases[6]. Further complicating this issue is the fact that most people living with a chronic disease take multiple medications to manage their condition and related co-morbidities, see more than one physician and may visit multiple pharmacies to fill their prescriptions – factors, which make it more difficult for these patients to be adherent to their medications.

CVS Caremark, Harvard University and Brigham and Women's Hospital researchers looked at the impact of complex drug therapy regimens on adherence for patients taking medications to manage chronic cardiovascular conditions and published their findings in the online issue of the *Archives of Internal Medicine* in January 2011[8]. While there is a body of research available that looks at the negative impact of drug regimen complexity – defined as the number of daily doses a patient must take – this study is the first to broaden the definition of therapeutic complexity to also include patterns of prescribing (numbers of different prescribers) and patterns of medication fills (using multiple pharmacies and not synchronizing refills to minimize visits to the pharmacy). As a result, the researchers found that during the 90-day study period, 10 percent of the patients in the study had 23 or more prescriptions from four different prescribers, used two different pharmacies and made 11 or more pharmacy visits.

Not surprisingly, this level of complexity had a real impact on medication adherence, with those patients who had a larger number of prescriptions, more visits to multiple pharmacies and lower refill consolidation demonstrating the worst medication adherence. As an example, those patients with multiple medications who did not consolidate their medication refills (patients who filled the fewest medications per pharmacy visit) had adherence rates that were 8.4 percentage points lower than patients with multiple medications who consolidated their refills (patients who filled multiple medications at a pharmacy at one time).

Because medication non-adherence is associated with negative health outcomes, the inherent complexity related to treating many chronic conditions may ultimately undermine chronic disease management. **As a result, the researchers suggest a variety of ways that health care providers and payors can begin to address this issue, including:**

[6] Wu, Shin – 11 et al. Projection of Chronic Illness Prevalence and Cost Inflation. RAND Corporation, 2000.

[8] Choudhry NK, Fischer MA, Avorn J, Liberman JN, Schneeweiss S, Pakes J, Brennan TA, Shrank WH. The implications of therapeutic complexity on adherence to cardiovascular medications. Archives Int Med. Published online Jan 10 2011. doi:10.1001/archinternmed.2010.495.

1 CREATION OF A CENTRALIZED "PHARMACY HOME" – similar to the concept of a medical home – where a patient's pharmacy care is evaluated and renewals and refills are better synchronized and managed. This could include providing patients with financial incentives for filling prescriptions at a single pharmacy, so that a single health care professional has a full view of the patient's needs and care.

2 DEVELOP PROGRAMS THAT REDUCE COMPLEXITY of both filling and taking medications by streamlining the number of trips it takes for patients to fill their prescriptions (e.g., encouraging programs such as 90-day versus 30-day prescriptions and coordination through mail order pharmacies).

3 EXPERIMENT WITH PROGRAMS AND TECHNOLOGIES that may make it easier for patients to better organize their medications.

The Consequences of Requesting "Dispense as Written"

Published in *American Journal of Medicine*, March 2011

States have adopted a variety of generic substitution laws as one way to help reduce medication costs. However, physicians and patients may override the generic substitution process by directing that a branded prescription be "dispensed as written" (DAW). Until recently, very little was known about how often and why these DAW requests occur and what impact they may have on medication adherence.

While advocates for DAW may argue that providing prescribers and patients with the opportunity to request that a medication be dispensed as written provides greater choice and the potential for improved adherence, research conducted by CVS Caremark, Harvard University and Brigham and Women's Hospital found that DAW requests are actually associated with excess costs and that patients are less likely to fill these medications. The research, published in the March 2011 issue of *The American Journal of Medicine*,[1] found that for patients with a chronic condition who were starting on a new therapy, those with a DAW prescription were 50 to 60 percent less likely to fill the more expensive brand medication than those who were able to fill the generic drug. Furthermore, the researchers calculated that eliminating DAW for appropriate generic substitutions could save patients as much as $1.2 billion annually and reduce health system costs by as much as $7.7 billion each year.

During the study period approximately five percent of all prescriptions had a DAW designation and that request was pretty equally split between the physician and the patient. In addition, specialists, older physicians and patients between 55 to 74 years of age were all more likely to request DAW.

> Eliminating DAW for appropriate generic substitutions could save patients as much as $1.2 billion annually and reduce health system costs by as much as $7.7 billion each year.

So, how can we address the unintended negative impact of DAW?

The first step is building awareness. Physicians and patients should be aware that dispense as written designations not only increase costs to the patient and the whole health care system, but often can discourage patients from taking their medications because of increased out-of-pocket costs. Among those populations identified in the study as being more likely to request DAW, targeted educational efforts about the safety and efficacy of generics can also help raise awareness that generic drugs are good alternatives to brand-name drugs. In addition, educational efforts should focus on patients who need to initiate medications for chronic conditions, because these patients are less likely to purchase their medications if they are dispensed as written and a less expensive option is not offered. ■

[1] Shrank WH, Uhlemann JN, Hacker MA, Avorn J, Kilabuk E, Chang A, Kesselheim AS, Brennan TA, Choudhry NK. The consequences of requesting "dispense as written." Am Jnl Med. 2011 (124). 309-317

Adherence to Medication Under Mandatory and Voluntary Mail Benefit Designs

Published in *American Journal of Managed Care*, July 2011

A critical challenge in designing pharmacy benefits for health plan sponsors is to find a balance between access to essential medications and the cost of those medications. Through the years pharmacy benefit managers have leveraged both voluntary and mandatory mail order plans in an attempt to provide more cost-effective coverage. In general, voluntary mail order plans provided access, but did not always deliver on cost savings if members did not move to mail order; while mandatory plans could deliver the cost savings, but initially caused member disruption and a perceived lack of access during implementation. As the cost of health care rises, plan sponsors have become even more attentive to how different plan designs impact medication adherence rates within their workforce.

The objective of this study was to compare patient medication adherence rates under voluntary and mandatory pharmacy mail order plans. The researchers reviewed pharmacy claims for more than 27,000 members in both mandatory and voluntary mail order pharmacy benefit plans. The results showed that when members are required to transition from filling prescriptions at a retail pharmacy location to a mail order pharmacy, some may prematurely discontinue their medications because of the steps involved in changing over to mail order. This unintended consequence results in a reduction in medication adherence and the potential for increased medical expenses.

The data indicates there is a need for pharmacy benefit managers to pay special attention to potential barriers to medication access during the time period when a prescription must be transferred from a retail pharmacy to a mail service pharmacy. Properly managing this transition can enable PBMs to find ways to improve medication adherence at this critical transition point and enable both members and health plan sponsors to reap the full benefits of mandatory mail order plan designs. In particular, one group of patients that should be closely monitored during this transition period are those who have no prior experience with mail pharmacies as they are most susceptible to stopping their medications. ■

Are Caregivers Adherent to Their Own Medications?

Published in *Journal of the American Pharmacists Association*
July/August 2010

More than 65 million Americans describe themselves as family caregivers, a self-identified group made up of people who provide some level of care to another family member. Given the physical and emotional demands experienced by family caregivers, there have been questions raised about the impact that caring for another may have on the caregiver's own level of medication adherence.

This study took a look at this issue by tabulating the results of an online survey of retail pharmacy customers, in which 38 percent of the people responding described themselves as family caregivers. The researchers found a compelling relationship between caregiving and the potential for a lack of medication adherence, primarily because caregivers are more focused on making sure their family members get proper care.

This research indicates that caregiving status is an important characteristic that can identify a potentially non-adherent patient. Health care providers and pharmacists can look for family caregiver status as an identifier among their patients in order to target those individuals and encourage them to stay on their own medicine. The study suggests that for pharmacists in particular, family caregivers represent an opportunity for proactive adherence counseling as pharmacists may frequently see caregivers in the store as they pick up medicine for others in the family.

Of the self-identified caregivers:

> 45% said they somewhat or strongly agree they are more likely to fail to take their own medicine, even though they provide medicine in a timely fashion to other family members.

> 46% of the caregivers said it is more important that they take care of their family members than themselves and 52% said they are willing to sacrifice their own health to make sure family members receive proper care.

> The study also found that if there is limited money for medications, caregivers will buy medicine for the people they are taking care of before purchasing it for themselves. ■

Changes in Drug Utilization During a Gap in Insurance Coverage: An Examination of the Medicare Part D Coverage Gap

Published in *PLoS Medicine*, August 2011

When Congress established the Medicare Part D program to extend government funded health care coverage for those 65 years and older to include pharmacy benefits, policymakers included a coverage gap or "donut hole" as an attempt to manage the cost of drugs used by beneficiaries under the new program. The "donut hole" works by requiring patients to pay 100 percent of their medication cost out-of-pocket after they reach a spending threshold of $2,830 (the 2010 program year guideline). Coverage subsidies begin for the beneficiary when they are charged for medications up to the threshold, and again after beneficiaries reach $4,550 in benefit expenditures. Because there are government subsidies for the pharmacy benefit before and after that threshold, the gap without available subsidies is called the "donut hole."

Supporters of the donut hole argue that the coverage gap benefits the health care system by making participants more sensitive to their medication costs. There was an expectation that people would seek out less expensive drug options when they entered the donut hole and that action would result in cost savings both for them and for their health plans. However, this study, which looked at prescription drug use among more than 660,000 Medicare beneficiaries enrolled in more than 200 Medicare Part D and retiree drug plans in 2006 and 2007 found quite the opposite. In fact, when beneficiaries had to bear the full financial burden of the cost of their medications, they were twice as likely to stop taking their medications altogether and become nonadherent than they were to switch to more affordable or generic drugs. The resulting decrease in medication adherence may save costs in the short run, but could ultimately result in higher medical costs as a result of adverse health events due to untreated chronic conditions.

While the Affordable Care Act incrementally eliminates the donut hole by 2020, until that time program beneficiaries remain at risk of decreased drug adherence because of high out-of-pocket drug costs. The researchers suggest that a strategy promoting the use of low cost medications that keeps people adherent would result in better health outcomes and overall reduced health care costs. ■

Enhanced Active Choice: A New Method to Motivate Behavior Change

Published in *The Journal of Consumer Psychology*, October 2011

Patient behaviors regarding how they make health care choices and decisions can ultimately impact medication adherence, health outcomes and even have implications on cost. Active choice communication represents a scenario where a patient is forced to make an explicit choice among several options in a health care setting. The alternative to "active" choice is a more passive "opt-in" or "opt-out" choice, where the most common choice made is usually a default position where the consumer does not have to take any action.

CVS Caremark created the Behavior Change Research Partnership in 2010 to help advise the company on how to develop practices to improve patient medication adherence through communications that encourage healthy behavior. The partnership is overseen by behavioral economists from the Tuck School of Business at Dartmouth College; the School of Medicine and the Wharton School of Business at the University of Pennsylvania; and Carnegie Mellon University. This study published in *The Journal of Consumer Psychology*[4] represents some of the outcomes of the partnership as it examines the effectiveness of an "active choice" communication alternative presented to consumers regarding their health care behavior.

The researchers looked at results from four different consumer tests involving three different decision tasks: intention to get a flu shot; requesting a reminder to get a flu shot, and enrollment in an automatic prescription refill program. The study compares the results of these tests, which presented innovative and personalized communications programs where patients needed to make a direct choice. The tests sought to determine if requiring consumers to make an active choice resulted in that person being more committed to continuing the behavior they selected; the results demonstrated that presenting an active choice increases compliance with the desired behavior indicating there are real advantages to forcing a decision. Ultimately, providing consumers with an active choice produced higher participation rates in the desired behavior in a health care setting. ■

[4] Keller PA, Harlam B, Loewenstein G, Volpp KG. Enhanced Active Choice: A New Method to Motivate Behavior Change. Journal of Consumer Psychology. 21:3 pp 376-383

Trouble Getting Started: Predictors of Primary Medication Nonadherence

Published in *American Journal of Medicine*, November 2011

Most studies on the topic of medication adherence evaluate behavior among patients who have filled their first prescription as researchers could not evaluate how many initial prescriptions were never actually delivered to the pharmacy. For the first time, electronic prescribing (e-prescribing) provides the opportunity to track primary nonadherence – initial prescriptions that are issued electronically and filled, but never picked up by the patient – an area of nonadherence that may have been previously undetected. This study evaluated more than 423,000 e-prescriptions written in 2008 by 3,634 doctors for more than 280,000 patients in all 50 states. The researchers either matched the e-prescriptions with resulting claims data or, in the case of those not picking up their prescription, used the lack of a claim within six months to identify primary nonadherence.

The results of the review show that nearly a quarter of patients given a new medication prescription by their doctor did not pick up their initial prescription, results that reflect slightly higher primary non-adherence figures than previous studies. The researchers note that this group of patients, who never start taking their medications, miss an opportunity to improve their health and are at risk of developing long-term complications.

Predictive factors for primary non-adherence identified by the researchers, include:

Out-of-pocket cost of medications. Patients who received prescriptions for medications that were not included on their formulary – and were therefore more expensive because co-pays would be higher – are more likely not to fill their first prescription.

Integration of the doctors' health information systems. Prescriptions sent directly to pharmacies or mail-order systems are more likely to be filled than e-prescriptions that doctors print out and give to patients.

Socio-economic factors. By reviewing zip codes and census data, the researchers determined that patients who live in higher income areas are more likely to fill prescriptions for new medications.

Type of medications. Prescriptions written for infants are almost always filled and antibiotics are filled at a rate of 90 percent. Medications for high blood pressure or diabetes saw primary non-adherence rates in excess of 25 percent.

CONTRIBUTING FACTORS TO MEDICATION ADHERENCE

State Generic Substitution Laws Can Lower Drug Outlays Under Medicaid

Published in *Health Affairs*, July 2010

As health care reform is implemented – with the goal of providing broader health care access and reducing the number of uninsured Americans – it is estimated that by 2019 more than 32 million Americans who currently do not have health coverage will gain coverage. More than half of these newly insured Americans are expected to be covered through Medicaid, with the Centers for Medicare and Medicaid Services (CMS) projecting a 34 percent enrollment increase in Medicaid and the Children's Health Insurance Program (CHIP) in 2014.

With this increase of Medicaid beneficiaries, it will become increasingly important to find ways to manage costs for the federally funded program while continuing to promote positive health outcomes. A study conducted by CVS Caremark, Harvard University and Brigham and Women's Hospital, published in the July 2010 issue of *Health Affairs*[9], found opportunities for state Medicaid programs to save more than $100 million simply by revising state laws to allow for easier and faster generic drug substitution (i.e., when a less expensive, but equally effective and chemically-identical generic medication is substituted for a more expensive branded drug).

Individual states are able to pass legislation regulating how they apply generic substitution laws for Medicaid beneficiaries and as a result the practice of generic substitution can vary widely. Some state boards of pharmacy have adopted mandatory generic substitution laws in which pharmacists are required to substitute a generic for a brand-name medication if the prescriber does not specify that the brand drug should be dispensed. Other states have enacted generic substitution laws that give pharmacists more discretion by allowing, but not requiring, pharmacists to substitute generics. In addition, some states require patient consent prior to generic drug substitution, while other states do not. The mandatory substitution and patient consent laws are separate statutes and states can adopt one, both or neither.

In this first-of-its-kind study, the researchers reviewed differences between existing generic substitution state policies and their impact on the uptake of generic simvastatin (brand-name Zocor®) for the treatment of high cholesterol, in the 18 months following Zocor's patent expiration in June 2006. They found that states requiring patient consent lagged by approximately 25 percent in the rates of generic substitution for Zocor. Based on this information the researchers estimated that nationwide, Medicaid programs could have saved approximately $19.8 million in the 15 months following the patent expiration of Zocor if all states had adopted policies that did not require patient consent for generic drug substitution. Furthermore, the researchers calculated that if the savings experienced by states that do not require patient consent were extended to states that currently require it, state Medicaid programs could see savings of up to $100 million for three widely used brand medications – Lipitor®, Zyprexa® and Plavix® – in the year after their respective patents expire.

This study illustrates that revising state regulations to allow pharmacists to make a generic drug substitution without direct patient approval following patent expiration, was the most impactful on the rate of generic uptake. Given the large number of widely used brand-name medications that are expected to go generic in the next few years, one way states can manage Medicaid drug costs without compromising quality is to explore opportunities to modify current generic substitution policies. ■

9 Shrank WH, Choudhry NK, Agnew-Blais J, Federman AD, Liberman JN, Liu J, et al. State generic substitution laws can lower drug outlays under Medicaid. *Health Affairs*. 2010; 29:1383-1390.

Changes in Drug Use and Out-of-Pocket Costs Associated with Medicare Part D Implementation: A Systematic Review

Published in the *Journal of the American Geriatrics Society*, September 2010

Medicare Part D, the government-backed pharmacy benefit program for elderly Medicare beneficiaries, was implemented January 1, 2006 to improve access to prescription medications for older adults. To better understand the impact of the implementation of Medicare Part D on changes in drug use and out-of-pocket costs, the researchers at CVS Caremark, Harvard University and Brigham and Women's Hospital conducted a review to evaluate all medical journal literature from January 2006 to October 2009 focused on the effect of the Part D program. The resulting study, published in the September 2010 issue of the *Journal of the American Geriatrics Society*[10], is a systematic review of 552 articles published in the nearly three-year study period. While 42 articles met criteria for full evaluation, ultimately 26 peer-reviewed articles were included for discussion in the study. Of these studies, 13 described drug use and out-of-pocket costs after the Part D program was implemented, seven discussed use and cost by beneficiaries in transition into the new program and six discussed the impact of the coverage gap (or donut hole).

The studies showed, as expected, that the inception of Part D was associated with a consistent overall increase in drug use and a decrease in out-of-pocket costs for enrollees. The research also showed that the transition to Part D went smoothly for many dual-eligible patients, but there were some vulnerable populations that experienced difficulties with the advent of the new coverage. For example, the studies reviewed around the Part D coverage gap showed that when

10 Pulinski JM, Kutabuk E, Schneeweiss S, Brenner TA, Shrank WH. Changes in drug use and out-of-pocket costs associated with Medicare Part D implementation: A systematic review. JAGS. September 2010; 58(9): 1764-1779.

beneficiaries reached the uninsured portion of the Medicare Part D program their experiences were associated with less drug use and higher out-of-pocket costs.

This analysis is a first step at better understanding the impact of the Part D program on Medicare beneficiaries and the authors of the study will continue further analysis on this topic. The researchers note that the conclusions from this systematic review must be interpreted with caution. For instance, although the research found that elderly patients fill 97 percent of their prescriptions within a single pharmacy chain, studies that rely on retail prescription claims may miss prescriptions of patients who use more than one chain. The researchers added that while discussions continue around Part D among policymakers and as changes to the coverage gap are considered, there is also a need to review data about the effects the program is having on health outcomes. ■

The Epidemiology of Prescriptions Abandoned at the Pharmacy

Published in *Annals of Internal Medicine*, November 2010

Much of the research on medication adherence has been based on the assumption that patients fill their initial prescriptions. Researchers have traditionally relied on prescription refill rates, patient self-reporting about how they take their medication and data from high-tech tools such as electronic pill bottles that track how often and when the bottle is opened. However, important gaps remain in our understanding of the causes of medication nonadherence and the best ways to intervene. One such gap is an understanding of why prescriptions are abandoned at the pharmacy—those prescriptions which are submitted by the prescriber and filled by the pharmacist, but are never picked up by the patient—a segment of medication nonadherence that represents an actionable opportunity for intervention.

To gain insight into this issue, researchers at CVS Caremark, Harvard University and Brigham and Women's Hospital reviewed de-identified data (data from which an individual's personally identifiable information, such as name, age, address, etc. is removed) from CVS Caremark's pharmacy benefit management business and the national CVS/pharmacy retail chain over a three-month period between July 1 and September 30, 2008. The results were published in the November 2010 issue of the *Annals of Internal Medicine*[1] and provide key insights into why and how often people do not pick up their initial prescriptions. Based on their findings regarding the percentage of prescriptions abandoned during the study period (3.27 percent over three months) and the fact that more than 3.6 billion prescriptions were filled in the U.S. in 2008[2], the researchers extrapolated that more than 110 million prescriptions are abandoned at U.S. pharmacies each year, costing pharmacies approximately half a billion dollars annually.

The researchers found a direct correlation between the amount of a patient's out-of-pocket copay and the likelihood of abandonment. Patients with a copay of $50 were nearly four times more likely to abandon a prescription at the pharmacy than patients paying $10. This result reinforces the widely studied correlation between out-of-pocket patient costs and medication adherence, while quantifying for the first time how often this factor results in an abandoned prescription. **The research also found correlations between:**

> TYPE OF PRESCRIPTION
New prescriptions were almost three times more likely to be abandoned than previously filled prescriptions.

> PATIENT AGE
Seniors were 45 percent less likely to abandon prescriptions than young adults (18-34 years).

>CO-MORBID CONDITIONS
Patients with multiple conditions abandon prescriptions at higher rates than those with fewer conditions.

This study evaluated a discrete event in the full continuum of the prescription drug delivery process – prescription abandonment at a retail pharmacy – which could represent an opportunity for health care providers to intervene and better support medication adherence. The researchers recommend that one way to help improve medication adherence is for prescribers and pharmacists to become familiar with the characteristics associated with higher rates of abandonment and suggested a simple prediction rule with four elements that can help rapidly assess risk and identify who could benefit from additional counseling or the selection of a less expensive medication option. **These elements include:**

1 REVIEW
the individual's benefit plan and tiered copays to help identify the most affordable option, as cost can be a factor in prescription abandonment.

2 UNDERSTAND
past pharmacy behavior. Is this prescription a new one or a refill?

3 IDENTIFY
the patient's age, as younger patients are more likely than older patients to abandon their medications.

4 DETERMINE
if it is an electronic vs. a hand-written prescription, as electronic prescriptions are more likely to be abandoned.

ROLE/IMPACT OF HEALTH CARE PROFESSIONALS

An Integrated Pharmacy-Based Program Improved Medication Prescription and Adherence Rates in Diabetes Patients

Published in *Health Affairs*, January 2012

In 2007 an estimated $174 billion was spent treating the diagnosed diabetes population. Because of the growing prevalence of diabetes, patients who are nonadherent to their medications, and physicians who fail to initiate use of appropriate medications to treat diabetes, represent a substantial cost to the US health care system. In response to increasing costs, CVS Caremark initiated Pharmacy Advisor™, an integrated pharmacy-based program to improve patients' adherence rates as well as doctors' initiation rates for concomitant medications used to treat people with diabetes. The intervention consisted of phone or face-to-face counseling from both mail-order and retail pharmacists who had specific information about the patient's treatment and had been trained to counsel patients about managing their diabetes.

This study found that the company's Pharmacy Advisor program increased both patient medication adherence rates and physician initiation of prescriptions, thereby improving care for diabetes patients and resulting in savings for health plans. The study provided further illustration of the central role pharmacists can play in improving the health of their patients. While ensuring adherence and appropriate treatment has long been the domain of primary care providers, as time demands on these health care providers increase, interventions carried out by pharmacists can complement their efforts. Pharmacists are also in a unique position to be able to monitor patient adherence and effectively intervene when needed. The study also provided insights into the problem of time-limited health care interventions because the data showed that patients stayed on their medications while they were being actively counseled, but once those pharmacist-patient conversations ended, adherence rates quickly fell.

To conduct the study, researchers analyzed the pharmacy claims data of benefit members at a large Midwest manufacturing company and focused on interventions with diabetic patients between October 2009 and April 2010. The study included an intervention group of 5,123 people who were proactively counseled by retail and call center pharmacists and a control group of 24,124 patients with diabetes who did not receive specialized counseling. The researchers measured gains in patient adherence and medication initiation rates of concomitant therapies for diabetes, such as statins, angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs).

The contacts by pharmacists with the patients and their doctors increased therapy initiation rates by as much as 39 percent for the full sample with an even higher increase of 68 percent for the group counseled at retail stores. Overall medication adherence rates increased by 2.1 percent, with face-to-face interventions by retail store pharmacists resulting in adherence rate increases of 3.9 percent. While expenditures for the counseling in the study totaled $200,000, the employer saved more than $600,000 through health care cost avoidance with the intervention group, a return on investment of $3 for every $1 spent on additional counseling.

In a health care system eagerly seeking programs that can reduce costs and improve care, this type of straight-forward, pharmacist-based counseling program that can improve adherence to existing medication regimens, encourage initiation of missing therapies and save money should be of great value. ■

Patterns of Medication Initiation in Newly Diagnosed Diabetes Mellitus: Quality and Cost Implications

Published in American Journal of Medicine, March 2012

Type-2 diabetes has emerged as one of the most significant health issues worldwide. In the U.S. alone, more than 20 million people have diabetes and the number of Americans with the disease is expected to increase by 165 percent by 2050. Treatment of the disease in the U.S. is estimated to cost $200 billion annually.

Six classes of oral medications have been approved by the U.S. Food and Drug Administration for the treatment of Type-2 diabetes. Although all the medications are effective at lowering blood glucose, the evidence supporting their impact on other clinical events varies. In 2006 the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD), issued evidence-based consensus guidelines recommending metformin, a generic drug, as the agent to be used as first-line therapy for patients newly diagnosed with Type-2 diabetes. This study, evaluated the pharmacy claims for more than 250,000 newly diagnosed diabetes patients who initiated oral medications between January 1, 2006 and December 31, 2008 to determine how doctors are adhering to the recommended guidelines. The study highlighted gaps between treatment recommendations and actual prescription protocols for Type-2 diabetes. In fact, while 65 percent of the patients studied received care consistent with the consensus guidelines, physicians in 35 percent of cases did not follow these guidelines for recommended first-line treatment.

This study is also among the first to define the fiscal implications of therapeutic choices in a large population of patients with diabetes, with the researchers noting that in addition to potential quality of care implications, patients, payors and the health care system could be paying an additional $420 million annually. This is due to physicians prescribing more expensive branded medications although the guidelines recommend use of generic medications. With the prevalence of diabetes increasing quite dramatically, the potential savings from improved adherence to these treatment guidelines could even exceed these estimates. ■

ROLE/IMPACT OF HEALTH CARE PROFESSIONALS

Physician Perceptions About Generic Drugs

Published in *The Annals of Pharmacotherapy*, January 2011

When evaluating the factors that contribute to medication nonadherence, one that frequently comes up is the cost of drugs. It appears that the more expensive a drug is, the more likely it will be that the patient will be nonadherent. As a result, generic medications seem to offer one solution to managing rising drug costs and could help encourage people to stay on their medications. Yet, despite a large body of research that points to the safety and effectiveness of generic medications, they remain underused by some doctors.

The researchers at CVS Caremark, Harvard University and Brigham and Women's Hospital believe that understanding how physicians perceive generics could help identify potential barriers to increasing generic medication use. In order to better understand physician perceptions related to generic drugs and identify characteristics associated with those physicians who have negative perceptions about generics, the researchers surveyed more than 2,700 physicians and analyzed the responses received as reported in the January 2011 issue of *The Annals of Pharmacotherapy*[14].

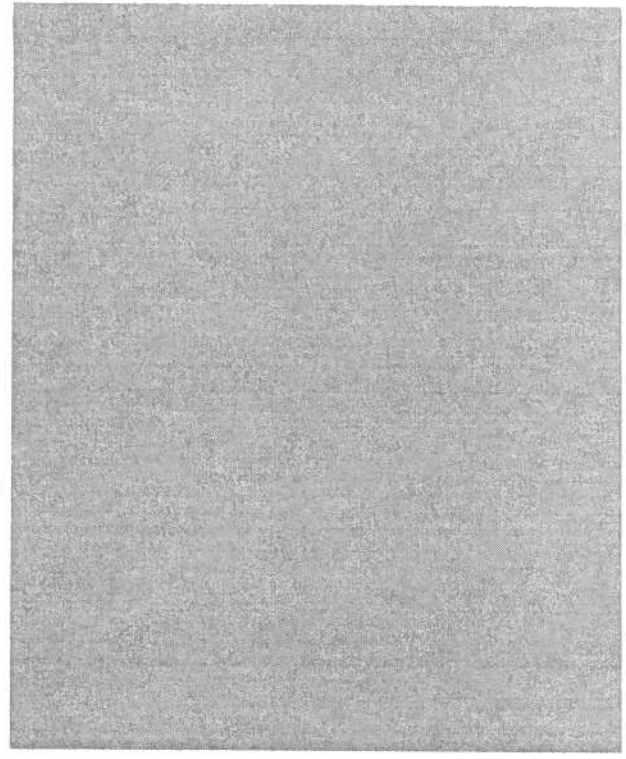
[14] Shane AM, Liberman JN, Fischer MA, Girotto C, Brennan TA, Choudhry NK. Physician perceptions about generic drugs. Ann Pharmacother. 2011;45:91-98.

While the majority of physicians surveyed were comfortable with the efficacy of generic mediations and were comfortable using generics themselves, almost one-quarter of those surveyed have negative perceptions about the effectiveness and quality of generic drugs, which may lead to physicians prescribing unnecessarily expensive medications.

The researchers found that age was a factor in a physician's perception of generics with physicians who were 55 years of age or older being 3.3 times more likely to have negative perceptions about generic drugs. In addition, the doctors surveyed said they were aware that some of their patients struggle with prescription drug costs and that many of their patients do not fill prescriptions due to cost. Surprisingly, despite this insight, the researchers did not find a relationship between the doctors' perceptions of cost burden and their perceptions of generics.

Given the significant cost savings that can be achieved by increasing the use of appropriate generic drugs, and the large number of widely-used brand drugs that are expected to "go generic" over the next few years, negative physician perceptions about generic drugs can be a barrier to increasing generic use and could contribute to elevated prescription drug costs for patients and payors.

As a result, there is a real need for finding effective ways to educate physicians to make them more comfortable with the safety, quality and efficacy profile of generic drugs. ■



Despite a large body of research that points to the safety and effectiveness of generic medications, they remain underused by some doctors.

ROLE/IMPACT OF HEALTH CARE PROFESSIONALS

Physician Effectiveness in Interventions to Improve Cardiovascular Medication Adherence: A Systematic Review

Published in *Journal of General Internal Medicine*, May 2010

There is a great deal of existing research that points to the fact that nonadherence to drugs used to treat chronic conditions is a common and often perplexing issue. While medication nonadherence has been shown to increase overall health care costs and worsen health outcomes, there are still no definitive answers about why patients don't take their prescribed medications and what interventions can help address the issue. Furthermore, little is known about which health care professionals are best able to deliver adherence interventions and what role the patient's physician should play in encouraging patient behavior to improve medication adherence.

In an attempt to better understand and quantify the physician's role in directing medication adherence, the researchers at CVS Caremark, Harvard University and Brigham and Women's Hospital conducted a systematic review of interventions to improve adherence to medications for heart disease and diabetes. The research, published in the May 2010 issue of the *Journal of General Internal Medicine*[1] reviewed and compared the effectiveness of interventions that relied on physician involvement, those interventions that relied on other health care professionals (e.g., nurses or pharmacists) and those that did not involve any health care professionals. Overall, the researchers found that existing physician-based adherence interventions have been less effective than strategies which rely on other health care professionals with specialized skills in pharmaceutical counseling or expertise in behavioral interventions.

The data indicated that, although small, physician-involved interventions did produce a positive effect on adherence, which may be attributed to the patient's perception of the physician's expertise or in the trust built through long-term doctor-patient relationships. The researchers suggest that referral networks linking physicians to other adherence experts could leverage the strengths of the physician's relationship with the patient, while limiting the demands placed on the physician's time and the related costs. While more research is needed to better understand the role of the physician in improving patient adherence in a cost-effective manner and how physicians can best collaborate with other health care professionals, the analysis suggests that non-physician health care professionals, such as pharmacists and nurses, can play an important role in improving adherence. ■

[1] Gutrona SL, Choudhry NK, Stedman M, Servi A, Liberman JN, Brennan TA, Fischer MA, Shrank WH. Physician effectiveness in interventions to improve cardiovascular medication adherence: A systematic review. JGIM May 2010;25:1093-1099.

Modes of Delivery for Interventions to Improve Cardiovascular Medication Adherence

Published in the *American Journal of Managed Care*, December 2010

We have become accustomed to seeing certain health care professionals ranked high on Gallup's annual Honesty and Ethics survey. The results announced in December 2010 were no exception with nurses at the top of the list and pharmacists ranked at number three. In the study of medication adherence, however, there has been very little research that compares the effectiveness of the "modes of delivery" for adherence interventions. So, while we know who Americans trust, thanks to Gallup, we don't know the best format to deliver information about adherence, who would be the most effective messenger or where patients are most open to hearing and acting on this information.

To help broaden the body of knowledge available about medication adherence, the researchers at CVS Caremark, Harvard University and Brigham and Women's Hospital conducted a systematic review of adherence interventions for patients with heart disease and diabetes, focused on how (in person, on the phone, written or electronically), by whom (physician, nurse, pharmacist) and where (hospital, pharmacy, clinic or home) the information was transferred to patients. The results, which were published in the December 2010 issue of the *American Journal of Managed Care*[1], found there is no substitute for a face-to-face session with a trusted health care provider. Pharmacists at a retail drug store were found to be the most influential voice in encouraging patients to take their medication as prescribed, followed by nurses at hospitals as patients are released.

[1] Gutrona SL, Choudhry NK, Fischer MA, Servi A, Liberman JN, Brennan TA, Shrank WH. Modes of delivery for interventions to improve cardiovascular medication adherence. Am J Manag Care. 2010; 16(12):929-942.

The researchers found that interventions using mail, fax or brochure-type communications that were not personalized had a relatively low impact on promoting patient adherence. Those programs that use electronic communications, such as videos and interactive technology, showed promise, but were determined to only have medium impact on increasing adherence among patients. The highest impact programs featured those which included pharmacists counseling patients in a retail drug store, followed by nurses talking face-to-face with patients who were leaving a hospital. In addition, face-to-face discussions between pharmacists and patients in a store were twice as effective at boosting adherence rates as programs where pharmacists talk with patients on the telephone.

This analysis is just a first step at better understanding the impact and influence that different communication vehicles and different messengers can have on delivering adherence information. **The researchers recommend areas of focus for future research on adherence, including:**

1 Reviewing the impact of life events **on increased patient receptiveness to the adherence message (i.e., hospital stays, particularly after a serious cardiac event).**

2 Evaluating psychological factors **during an acute illness and hospital stay and how they may impact a patient's willingness to modify adherence behavior.**

> The highest impact programs featured those which included pharmacists counseling patients in a retail drug store

3 **Delivery of in-person pharmacist counsel when a patient comes to pick up their medication.**

4 **New and innovative ways to take advantage of electronic technologies and tap into emerging social networks run by patients rather than health care professionals.**

ROLE/IMPACT OF TECHNOLOGY

Variations in Structure and Content of Online Social Networks for Patients with Diabetes

Published in *Archives of Internal Medicine*, September 2011

As patients increasingly use social media as a health care tool and resource, a survey by Harvard University, Brigham and Women's Hospital and CVS Caremark researchers demonstrated that there is great variability in the standards used to ensure sites effectively provide information and answers to health-related questions. The researchers examined diabetes-related social media sites and found they all use different communication and financing structures, vary in how they facilitate participation by experts and have little in common when it comes to oversight of content and membership criteria.

Study authors said it is clear that online social networks are playing an increasing role in health education. Factors causing patients to look for support online include the fact that primary care physicians have less time to spend with individual patients as they see increasing numbers of patients and have limited time for telephone consultations to answer questions related to chronic disease management. In addition, as the population that is familiar with using the web ages and begins to develop chronic diseases, they are looking to familiar on-line channels to help them cope with their disease.

The researchers focused on web sites that primarily provide information about diabetes.

They began their review by identifying 300 online diabetes-related sites through a Google search. They narrowed that number to 23 web sites that were not attached to any news organizations or academic institutions. The final study reviewed 15 web sites in depth, ranging in size from 3,074 members to more than 300,000, with the majority having more than 10,000 members. Eighty percent of the sites linked to Facebook, while two-thirds networked through Twitter.

The researchers said that information required for site membership was minimal and only one site required an extensive profile be sent to the site administrator for approval.

Physicians were available to answer questions on only 33% of the sites, while 67% of the sites called for site administrators to review content.

On 13% of the sites there was no apparent policing of information posted.

Industry advertising is allowed on all but three of the sites. Half of the sites that featured advertising had information from pharmaceutical manufacturers, 67% had ads from diabetes device manufacturers, and 13% published ads purchased by insurance companies.

Two-thirds of the sites allowed advertisements related to diet and exercise for diabetics.

Social media represents an important health care tool of the future so it is important to determine best practices for development as well as how these vehicles can be used to disseminate the right information to help patients treat their chronic disease. While social media is attractive to people looking to share information and find support and strategies for living with chronic disease, the authors said there is a long way to go before we can be confident patients are receiving high quality, accurate information about their conditions through this medium.

ROLE/IMPACT OF TECHNOLOGY

Online Social Networking by Patients with Diabetes: A Qualitative Evaluation of Communication with Facebook

Published in *Journal of General Internal Medicine*, October 2010

The Internet changed the way people search for health care information and new social media networking sites like Facebook have changed the way many people connect and interact. These new technologies also impact how individuals learn about health or build a community of patients who share clinical information and provide support. With more than 500 million registered users worldwide, Facebook is a destination and meeting place for social networking and disease-specific sites have appeared on Facebook as sources of information, support and engagement for patients with chronic diseases. However, very little research has been done to understand the content and sources of health-seeking behavior and information-sharing on popular social networking sites such as Facebook.

Researchers at CVS Caremark, Harvard University and Brigham and Women's Hospital examined the 15 largest Facebook communities dedicated to diabetes and published their findings in the November 2010 issue of the *Journal of General Internal Medicine*[16]. The researchers found what they classified as "tentative support" for the proposed health benefits of social media in the management of chronic disease. On the other hand, they also found that because of the inability to verify the identity of the individual or group posting information, when someone posts about a positive experience with a product or service it is difficult to know whether it is an authentic and unbiased claim or a marketing pitch.

On the positive side, members of online diabetes communities gain positive benefits from their participation in these forums. These patients receive interpersonal and community support from wall posts and discussion threads, can access specialized knowledge on disease management from their peers and have the opportunity to participate in a positive way with a community of their peers. Despite these positives, the researchers recommend that members of these communities use caution as they identified numerous incidences of surveys, marketing pitches and efforts to recruit patients for clinical trials where the true identity of the poster could not be confirmed.

The dynamics of the social networking environment hold promise for patients, providing a place where they can find a community of peers offering support and education, but also carrying the perils of an unregulated environment, which allows for substantial and non-transparent promotional and data-gathering activities. Clinicians should be aware of these strengths and limitations to help them better counsel their patients about sources of information and support about chronic disease. In addition, policymakers could begin to consider how to assure transparency in promotional activities in these online social networks. Finally, patients may consider seeking out social networking sites developed and patrolled by health professionals to promote an accurate and unbiased exchange of information. ■

[16] Greene JA, Choudhry NK, Kilabuk E and Shrank WH. Online social networking by patients with diabetes: A qualitative evaluation of communication with Facebook. JGIM. 2010;25:287-292.

Healthcare Information Technology Interventions to Improve Cardiovascular and Diabetes Medication Adherence

Published in the *American Journal of Managed Care*, December 2010

The application of Healthcare Information Technology (HIT) has been linked to a variety of benefits for health care cost and quality. Electronic Medical Records (EMRs) hold the promise of portability, ensuring that all of a person's relevant health care information is available no matter where, or by whom, they are treated. E-prescribing can make it faster and more convenient to get and track prescriptions. With all this promise, researchers and clinicians are beginning to look at the role HIT could play in facilitating medication adherence interventions, but to date, there has been little rigorous evaluation of the effectiveness of HIT-driven adherence interventions.

As part of their focus on adherence, researchers at CVS Caremark, Harvard University and Brigham and Women's Hospital conducted a systematic review of the existing literature on HIT interventions designed to improve medication adherence in cardiovascular disease and diabetes. In looking for published studies that address how electronic communications can improve adherence in these two disease areas, the researchers combed through more than 7,000 articles published since 1966, but only found 13 articles that met their criteria. Their analysis, published in the December 2010 issue of the *American Journal of Managed Care*[17], highlights the current scarcity of prospective data on the effectiveness of HIT interventions to improve adherence and a lack of compelling evidence which is needed to guide the development and implementation of future interventions. **The researchers identified some key points for consideration in future research and investigation into this area, including:**

[17] Mabono AS, Cicutone SL, Choudhry NK, Fischer MA, Stedman MR, Liberman JN, Brennan TA, Jain SH, Shrank WH. Healthcare Information Technology Interventions to improve cardiovascular and diabetes medication adherence. Am J Manag Care. 2010; 16(12 Spec No.) SP82-SP92.

Studies indicated that simple reminder systems were consistently successful. These reminder systems are unique compared to other HIT interventions in that they can be seamlessly integrated into the patient's daily routines without requiring additional effort on the part of the patient.

Studies examining the use of interactive HIT for education and counseling were less successful, indicating that the electronic delivery of education does not necessarily make it more effective.

While the researchers expected to find that HIT enhanced the effectiveness of adherence interventions by generating real-time adherence feedback to the health care providers, the results did not find a substantial improvement compared to reminder interventions alone.

Previous literature has indicated that patient engagement in care is associated with improved adherence to treatment. Although several of the studies reviewed aimed to create an interactive system for patients, they generally did so by gathering data from patients through relatively basic mechanisms (e.g., touch-tone keypad) and sending back automated, albeit customized, feedback designed to educate and counsel. Furthermore, these studies required a substantial degree of patient motivation, which may be unrealistic or pose a barrier.

While HIT interventions look like promising tools in the effort to improve medication adherence, more research is needed to fully understand and identify best practices. In reviewing the analysis, simple HIT interventions, such as reminder systems, appear effective, and efforts to implement them broadly would seem to be an efficient and relatively low-cost approach to improve adherence. However, reminders alone will not solve the problem. The researchers call for innovative systems to further engage and motivate patients to adhere to their medications. Few published studies describe sophisticated, interactive interventions that expand the functionality and capabilities of electronic health systems to provide patients and providers with more valuable and timely information, leaving us with limited evidence to guide the development and implementation of HIT adherence interventions. ■

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