

EXACTLY AS PRESCRIBED: Kaiser Permanente Researchers Shed Light on Poor Medication Adherence

KAISER PERMANENTE POLICY STORIES, VOL. 4, NO. 6



For people living with chronic diseases, prescription medications can increase longevity and improve quality of life. Yet, in the United States, more than half of adults 40 and older with chronic conditions report at least one episode of non-adherence to their prescriptions.¹ This is a particular problem for people living with multiple chronic conditions because they are often prescribed numerous medications. Like all prescription drugs, these medications must be taken exactly as prescribed to ensure both safety and effectiveness.

Poor medication adherence can cause needless suffering and result in the use of otherwise unnecessary health care services. So why do people stop (or never start) taking their medication, or take less than the full amount prescribed? There are a variety of common reasons, which include: forgetfulness, concerns about potential side effects; lack of understanding of the need for the medicine when they don't have symptoms; affordability of monthly out-of-pocket cost; and difficulty getting to the pharmacy. This brief explores Kaiser Permanente's cutting edge research on health-system-level interventions to lower barriers to medication adherence and empower patients to take their medications as prescribed.

WHAT YOU SHOULD KNOW

- A medication supply of 90-days or more can help increase adherence by minimizing out-of-pocket costs and the inconvenience of ordering refills and making multiple trips to the pharmacy.
- There is a well-documented inverse relationship between patient cost sharing and medication adherence: when cost sharing increases, adherence decreases, often resulting in poorer health outcomes.
- The online prescription refill function is an important feature of patient portals because of its association with improved medication adherence.
- Automated phone reminders can be a powerful and efficient tool to support medication adherence, reaching a large number of people quickly and inexpensively.
- Mail-order pharmacy services are not only convenient and time-saving, but they can also improve medication adherence.



A Leader in Medication Adherence Research

As the nation's largest, private-sector integrated delivery system, Kaiser Permanente is ideally positioned to study the factors that impact medication adherence. Most other health care delivery systems depend on third-party pharmacy benefit managers to administer their prescription drug programs, and

they do not own or operate their own pharmacies. In contrast, at Kaiser Permanente, the prescription drug program is fully integrated into the rest of the delivery system, giving the organization the ability to evaluate data about patients' use of both health care and pharmacy services. These data provide a unique lens for studying barriers to medication adherence. Julie Schmittiel, PhD, research scientist at Kaiser Permanente's Northern California Division of Research, has led multiple investigations on this topic. She notes, "Kaiser Permanente's integrated electronic health record and data systems, that include both pharmacy fill data and health care benefit information, allow researchers to conduct cutting-edge research on medication adherence, health care outcomes, and disparities."

Health System Levers of Influence

Years of research at Kaiser Permanente suggests that health care organizations have many "levers of influence" to promote medication adherence. According to Dr. Schmittiel, "Researchers across the organization have led the way in furthering our understanding of how health-system-level factors can play a positive role in improving adherence and health." The following are five health system levers of influence that Kaiser Permanente researchers have explored:

- Longer-Term Medication Supply
- Lower Copayments and Out-of-Pocket Maximums
- Online Refill
- Automated Phone Reminders
- Mail Order Pharmacy

1. Longer-Term Medication Supply

Refilling prescriptions every month can be a challenge for patients with chronic conditions. Once a prescribing physician determines that a long-term medication is well tolerated and at the proper dose for a patient, it may be appropriate to prescribe a longer-term supply. A quantity appropriate for 90-days or more can help increase adherence by minimizing out-of-pocket costs and the inconvenience of ordering refills and making multiple trips to the pharmacy.

In 2012, the Centers for Medicare and Medicaid Services introduced three measures of medication adherence for diabetes, hypertension and cholesterol as part of its Star rating system for Medicare Advantage plans. Kaiser Permanente researchers found that a longer-term medication supply is associated with better scores on Medicare Star measures. After controlling for patient-level factors such as age, income, and education, the strongest predictors of higher scores was a mean prescribed medication supply of greater than 90 days (compared with a one-month supply).²

2. Lower Copayments and Out-of-Pocket Maximums

While patient cost-sharing may curb overuse of nonessential services, it can be problematic to shift the financial burden of medications to chronically ill patients. There is a well-documented inverse relationship between patient cost sharing and medication adherence: when cost sharing increases, adherence decreases, often resulting in poorer health outcomes.³

In one Kaiser Permanente study, researchers examined the relationship between copayments and out-of-pocket maximums and medication adherence under the Medicare Star measures. They concluded that medication copayments less than or equal to \$10 for a 30-day supply and annual individual out-of-pocket maximums less than or equal to \$2,000 were significantly associated with higher adherence for three types of chronic disease medications: antihypertensives, oral antihyperglycemics, and statins.⁴

3. Online Prescription Refill

Online patient portals are becoming part of mainstream health care, empowering patients with access to test results, appointment scheduling, and prescription refills. The online prescription refill function is an important feature of patient portals because of its association with improved medication adherence.

Other researchers studied the experience of Kaiser Permanent patients before and after they began using the online refill function for statin medications. Over the

study period, those who switched to and exclusively used the online function for refills saw a six percent drop in medication non-adherence. (During the same period, a control group of patients who never switched to the online refill system saw no change in non-adherence rates.) Further, the switch to exclusive use of online refills also resulted in measurable clinical improvement; among switchers who were non-adherent to their statins prior to the switch, there was a six percent drop in poor blood pressure control after the switch.⁵



Another study examined whether there are disparities in the way patient portals influence health behavior or outcomes across patient racial/ethnic subgroups. The researchers found that racial/ethnic minorities who used the online refill function had improvements in medication adherence over time similar to whites.⁶

4. Automated Phone Reminders

Most households are all too familiar with the automated calls that are a staple of the telemarketing and polling industries. But when robocalls, technically known as interactive voice response (IVR), are coupled with an electronic medical record system, they can be a powerful and efficient tool to support medication adherence, reaching a large number of people quickly and inexpensively.

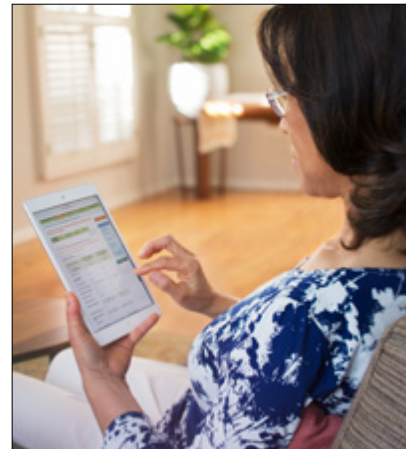
Researchers evaluated the impact of an IVR intervention on asthma medication adherence, compared to usual care. Kaiser Permanente made automated refill reminder calls when patients had less than a 30-day medication supply remaining or were more than 30 days late for a refill. The intervention resulted in a small but significant improvement in medication adherence.⁷ A separate Kaiser Permanente study found similar impacts of IVR on adherence to cardiovascular medication. Although the average improvement in medication adherence was relatively small (about two percentage points), this difference was statistically significant. In a large population, even these small percentage changes in adherence can impact hundreds or thousands of people.⁸

5. Mail-Order Pharmacy

Mail-order pharmacy services allow patients to order prescriptions online or by phone and have their medications mailed directly to their homes. Such systems are not only convenient and time-saving, but they can also improve medication adherence. According to research conducted in Kaiser Permanente's Northern California region, compared with patients who obtained diabetes-related medication refills

at brick and mortar pharmacies, patients who received them by mail were more likely to have good adherence. The researchers found a seven-to-eight-percentage point increase in adherence associated with mail-order use.⁹

In another study, black and Hispanic patients derived an even greater adherence benefit from mail-order pharmacy use than White patients, suggesting that mail-order pharmacy promotion may be an effective strategy to mitigate disparities in adherence.¹⁰



Putting Research into Action at Kaiser Permanente

Kaiser Permanente has translated many of its research findings on medication adherence into clinical practice – and its efforts are clearly paying off for patients. As noted, CMS’s Star quality-rating system for Medicare Advantage plans includes measures of medication adherence for diabetes, hypertension, and high cholesterol. Plans are rated on a one-to-five-star scale, with one star for poor performance, three for average, and five for excellent. Only a small number of health plans receive 5-star ratings on these measures,¹¹ yet Kaiser Permanente has consistently done so in nearly all of its regions, as highlighted in the chart below. This level of achievement reflects a comprehensive strategy that includes multiple interventions supported by research highlighted in this brief.

KAISER PERMANENTE’S 2016 MEDICARE STAR RATINGS FOR MEDICATION ADHERENCE			
Kaiser Permanente Region	Medication Adherence for Diabetes Medications	Medication Adherence for Hypertension (RAS Antagonists)	Medication Adherence for Cholesterol (Statins)
	CY 2014	CY 2014	CY 2014
California	★★★★★	★★★★★	★★★★★
Colorado	★★★★★	★★★★★	★★★★★
Georgia	★★★	★★★★	★★★★
Hawaii	★★★★★	★★★★★	★★★★★
Mid-Atlantic States	★★★★★	★★★★★	★★★★★
Northwest	★★★★★	★★★★★	★★★★★

Source: Centers for Medicare and Medicaid Services



A System-level Imperative for the Health Care Industry

As the population continues to age, and rates of chronic disease increase, the entire health care industry will be challenged to address medication adherence. This is a complex issue, and no single intervention can remove all of the barriers. Kaiser Permanente's

research about system-level factors that contribute to medication adherence provides guidance for delivery systems as they craft multi-faceted strategies to address this growing problem.

ENDNOTES

- 1 *Medication Adherence in America: A National Report Card – Langer Research Associates*, http://www.ncpa.co/adherence/AdherenceReportCard_Full.pdf
- 2 Julie A. Schmittiel, PhD, Gregory A. Nichols, PhD, Wendy Dyer, MS, John F. Steiner, MD, MPH, Andrew J. Karter, PhD, and Marsha A. Raebel, PharmD, “Health Care System-level Factors Associated With Performance on Medicare STAR Adherence Metrics in a Large, Integrated Delivery System,” *Med Care*. 2015 Apr; 53(4): 332–337.
- 3 Michael T. Eaddy, et al, “How Patient Cost-Sharing Trends Affect Adherence and Outcomes: A Literature Review,” *P T*. 2012 Jan; 37(1): 45–55., <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3278192/>
- 4 Julie A. Schmittiel, PhD, Gregory A. Nichols, PhD, Wendy Dyer, MS, John F. Steiner, MD, MPH, Andrew J. Karter, PhD, and Marsha A. Raebel, PharmD, “Health Care System-level Factors Associated With Performance on Medicare STAR Adherence Metrics in a Large, Integrated Delivery System,” *Med Care*. 2015 Apr; 53(4): 332–337.
- 5 Urmimala Sarkar, MD, MPH, Courtney R. Lyles, PhD, Melissa M. Parker, MPH, Jill Allen, PhD, Robert Nguyen, MA, Howard H. Moffet, MPH, Dean Schillinger, MD, and Andrew J. Karter, PhD, “Use of the Refill Function through an Online Patient Portal is Associated with Improved Adherence to Statins in an Integrated Health System,” *Med Care*. 2014 March ; 52(3): 194–201. doi:10.1097/MLR.0000000000000069.
- 6 Lyles CR, et al., “Refilling Medications Through an Online Patient Portal: Consistent Improvements in Adherence Across Racial/Ethnic Groups,” *J Am Med Inform Assoc* 2015;0:1–6. doi:10.1093/jamia/ocv126
- 7 Vollmer WM1, Feldstein A, Smith DH, Dubanoski JP, Waterbury A, Schneider JL, Clark SA, Rand C., “Use of Health Information Technology to Improve Medication Adherence,” *Am J Manag Care*. 2011 Dec;17(12 Spec No.):SP79-87.

- 8 William M. Vollmer, PhD; Ashli A. Owen-Smith, PhD; Jeffrey O. Tom, MD, MS; Reesa Laws, BS; Diane G. Ditmer, PharmD; David H. Smith, PhD; Amy C. Waterbury, MPH; Jennifer L. Schneider, MPH; Cyndee H. Yonehara, BS; Andrew Williams, PhD; Suma Vupputuri, PhD; and Cynthia S. Rand, PhD, “Improving Adherence to Cardiovascular Disease Medications With Information Technology,” *Am J Manag Care*. 2014;20(11 Spec No. 17):SP502-SP510
- 9 O. Kenrik Duru, MD, MSHS; Julie A. Schmittiel, PhD; Wendy T. Dyer, MSc; Melissa M. Parker, MS; Connie S. Uratsu, MS; James Chan, PharmD; and Andrew J. Karter, PhD, “Mail-Order Pharmacy Use and Adherence to Diabetes-Related Medications,” *Am J Manag Care*. 2010;16(1):33-40
- 10 Julie A. Schmittiel, PhD, Gregory A. Nichols, PhD, Wendy Dyer, MS, John F. Steiner, MD, MPH, Andrew J. Karter, PhD, and Marsha A. Raebel, PharmD, “Health Care System-level Factors Associated With Performance on Medicare STAR Adherence Metrics in a Large, Integrated Delivery System,” *Med Care*. 2015 Apr; 53(4): 332–337.
- 11 “Understanding the CMS Quality Evaluation System,” Pharmacy Quality Alliance, 2016, <http://pqaalliance.org/measures/cms.asp>