Medication Adherence Tools

The rise of chronic disease is one of the nation’s most pressing and expensive health care concerns. Tens of millions of Americans suffer from chronic conditions, resulting in billions of dollars in health care spending and significant morbidity and mortality. Despite the financial and human toll, many of these diseases can be effectively managed with the use of prescription medications. Unfortunately, many patients do not take their chronic disease medications as prescribed – up to half all patients in the U.S. do not take their medications as prescribed by their doctors.¹

Medication adherence tools represent an opportunity to save hundreds of billions of dollars. Technologies leveraging existing cell phones to remind patients and caregivers to take their medications continue to grow. In addition, an emerging technology space is the use of mobile applications for patients’ medication adherence, known as mHealth technology, which seamlessly integrates into daily routines and provides alerts when medications should be taken. Furthermore, pill bottle caps provide effective medication management quickly and easily for patients.

A representative sample of these tools includes Pleio BuddyTips, MemoText and Vitality GlowCaps.

Use Case

- As many as 2 billion cases of poor medication adherence each year are avoidable, and one-third to two-thirds of medication-related hospital admissions are linked to poor adherence.²,³,⁴
- 133 million Americans are affected by at least one chronic condition, and 75 percent of health care spending goes toward the care of those with chronic conditions.⁵
- Poor adherence disproportionately affects the elderly, those with chronic conditions and low-income individuals; for diabetes and hypertension, which disproportionately affect minorities, proper adherence averages only 50-65 percent.⁶,⁷

There are a number of medication adherence tools currently represented in the marketplace, all of which have similar but ultimately different foci:

- Smartphone Apps: Smartphone applications list patients’ medications, schedule pill reminders and help patients to order refills.
- Internet-connected Pill Caps: Internet-connected pill caps light up, play music and ring phones so patients do not forget to take their medication. The pill caps also send emails to remote caregivers, create adherence reports and refill prescriptions.
- Blister Packaging: Pharmaceutical packages designed to enhance patient adherence to medications have calendars printed on medication cards, or “blisters,” which are designed to help patients follow their drug regimen.

² Osterberg and Blaschke. 2005.
⁴ Osterberg and Blaschke. 2005.
⁷ Osterberg and Blaschke. 2005.
Other Tools: Medication reminders also come in the form of automatic pill dispensers, pill boxes, watches and alarm clocks, among others, which assist with medication management.

Clinical Benefit

It has been well-established in the literature that a variety of medication adherence tools have improved adherence for several chronic diseases, including asthma, glaucoma and hypertension.

- In 2011, early results were released from a Randomized Control Trial (RCT) that showed a 16 percent increase in adherence via SMS-texts and voice calls to ensure adherence to glaucoma treatment regimens (n=428).
- A seven-month research study in 2011 looked at the efficacy of the Pill Phone application to improve medication adherence among hypertensive patients and found that it had positive results (n=50).
  - Patients had a high level of acceptance and sustained use of the Pill Phone application, and refill rates increased with the use of the application and decreased after the application was discontinued.
- In 2010, Partners Healthcare’s Center for Connected Health announced results from a six-month clinical study measuring a 27 percent increase in adherence for users of an internet-connected pill cap (n=139).
- In February 2009, a three-month study looked at the adherence rates of an internet-connected pill cap and found that the average adherence rate was 86 percent, significantly higher than the World Health Organizations’ often-cited average adherence rate for the developed world of 50 percent.
- Universities and pharmaceutical companies are administering their own RCTs to quantify the impact and value of internet-connected pill caps to specific populations, conditions and therapies.
- In 2009, an analysis of the Pleio GoodStart program, in which BuddyTips e-mails, texts or phone messages are a component, found that it had been very well-received (n=2,628):
  - 70 percent of participants say it helped them with their medication regimen, and prescription refills increased by 29 percent over patients’ first 9 months of therapy.
- According to many experts, medication reminders in the form of automatic pill dispensers, pill boxes and alarm clocks provide the most accurate and valuable data on adherence, especially in difficult clinical situations.
- Studies have shown the adherence benefits of calendar-based blister packaging:

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14 Vitality. 2009. GlowCaps achieved an 86% rate of adherence.
16 Osterberg and Blaschke. 2005.
18 Center for Health Transformation. 2010.

Getting to Value: Eleven Chronic Disease Technologies to Watch
A 2008 study demonstrated that the percentage of on-time refills and the medication possession ratio were 13.7 and 6.2 percent higher, respectively, for the study group as compared to the control group.19

A 2006 RCT showed that blister packaging of blood pressure medication combined with pharmacist counseling improved adherence by nearly 40 percent compared with regular vials and no counseling; these elderly patients also experienced significant reductions in their systolic blood pressure.20

Financial Analysis

- Medication adherence represents a $290 billion opportunity to reduce costs.21
- Not taking medications as specifically prescribed costs over $100 billion a year in excess hospitalizations.22
- There has been minimal research done on return-on-investment (ROI) and cost-effectiveness of these tools.
- Smartphones can be expensive for safety net populations, but for the most part the technologies themselves are free applications to use, which means little up-front costs for the phones and no recurring costs after that.
- Third-party insurers typically do not cover the cost of these tools, although in some states, such as New York, certain medication adherence tools are covered by Medicaid.23
- Internet-connected pill caps have low up-front costs, as they usually only require a one-time fee of about $10.

Barriers to Adoption

- **Ease of Use Issues:** Many of these technologies use smartphone applications, which could be confusing for the elderly or those not technologically savvy.
- **Limited Data:** More rigorous controlled studies are needed to study ROI and cost savings.
- **Privacy Concerns:** In the absence of clear guidelines, the transfer of medical information over the internet is likely to raise privacy concerns with patients.
- **Cost of Supporting Devices:** Smartphones could be cost-prohibitive to elderly, minority and low-income populations.
- **Reimbursement Issues:** Widespread adoption is dependent on the reimbursement model, and most third-party insurers do not cover the cost of these tools.

Next Steps to Implementation

1. Advocate for Reimbursement: Data suggests that these technologies are effective in improving medication adherence, which leads to reduced costs and improved quality. A fundamental question, however, is who pays for adherence? In turn, a next step is to address payment challenges by advocating for reimbursement under current fee-for-service models and future bundled payment models where providers will be rewarded for cost effective care. This could be aided through the development of cross-cutting adherence strategies that emphasize the importance of these technologies. In addition, the

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23 In New York, Section 3621 of the Public Health Law authorizes a telemedicine demonstration program in Medicaid.
case for reimbursement could be made through the creation of adherence partnerships and coalitions, such as the Partnership to Fight Chronic Disease and Script Your Future.

2. Encourage Research on Specific Adherence Tools: It is clear that, overall, medication adherence tools work. However, what is less clear is which specific adherence tools are the best or most effective? As a result, more research should be undertaken to assess which technologies have the best financial and clinical outcomes.

3. Opportunity for the Safety-Net: A critical question surrounding the topic of medication adherence is who pays for it, but perhaps equally important is the question of who pays for adherence when there is a lack of money available? Advocating for reimbursement, therefore, should not just be focused on current fee-for-service models and future bundled payment models. Rather, strategies should be developed around how to incentivize reimbursement for adherence specifically within the Medicaid population.