Assessing the Impact of a
Community Pharmacy-Based Medication Synchronization Program
On Adherence Rates

Study Results prepared by Ateb, Inc.
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I. General Description

The National Community Pharmacists Association (NCPA®) collaborated with technology partner Ateb Inc. on a six-month study to examine the impact of a personalized, high-touch, community pharmacy-based medication synchronization program on medication adherence rates.

II. Background

Research confirms the critical role that pharmacists play in providing patients with the assistance necessary to maintain high levels of medication adherence. In particular, refill coordination at a single pharmacy is recognized as an effective tactic to improve adherence.[1] NCPA developed a program called Simplify My Meds™, which is based on the concept of refill synchronization and coordinates all of a patient's prescriptions to be filled on the same day each month. In parallel, Ateb developed an automated medication synchronization program (Time My Meds®) that uses similar Appointment-Based Model techniques. The Appointment-Based Model was pioneered in the 1990s by John Sykora, an independent pharmacist-owner in Long Beach, California. The model helps patients manage their prescriptions through scheduled visits and discussions with their pharmacist. Unlike automatic refill programs, the Appointment-Based Model builds upon established pharmacist-patient relationships to provide high-touch interactions. The Appointment-Based Model is described in detail at www.naspa.us/grants/abm.html.

Medication synchronization programs coordinate refills, decrease regimen complexity, boost adherence, and provide an opportunity for continual interaction between pharmacists and patients to review all of these patients' medications on a monthly basis to ensure safe and appropriate use. Both Time My Meds and Simplify My Meds promote the establishment of a community pharmacy as a patient's "pharmacy home." The pharmacy home model ensures coordination of the patient's medications, which has been demonstrated by research to improve persistence.[2]

III. Research Objectives

In order to determine if the practice-based impact of medication synchronization programs would correlate with research findings, NCPA engaged the services of Ateb to help conduct a study to assess the impact of a patient-centric medication synchronization program on patients' adherence to their medications. The study used Ateb's Time My Meds tool to automate, track, and measure the medication synchronization program in a selected group of independent pharmacies that were successful early

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[1] Choudhry NK, Fischer MA, Avorn J, Liberman, LN, Schneeweiss S, Pakes, J, Brennan TA, Shrank WH. "The Implications of Therapeutic Complexity on Adherence to Cardiovascular Medications." *Archives of Internal Medicine*2011; 171: 814-822.
[2] Ibid.

adopters of Appointment-Based Model medication synchronization programs. All pharmacies that participated in the study were familiar with and running a medication synchronization program prior to this study.

IV. Brief Study Description

A prospective, randomized, controlled study design was used to comprehensively assess the impact of a high-touch medication synchronization program on patients' medication adherence rates.

As a first step, a group of community pharmacies was identified that met criteria of having initiated and sustained a medication synchronization program for at least six months *AND* had a minimum of 50 patients enrolled in the program. From this group, a subset of ten pharmacies was selected based on the ability of the study team to quickly and easily integrate Time My Meds technology to automate and measure the impact of the medication synchronization program.

V. Methodology

Participating pharmacies' data were analyzed to evaluate the impact of the medication synchronization program using industry-accepted adherence measures and methodologies.

Patients at each of the ten pharmacies were divided into two categories: eligible and non-eligible. Patients were considered non-eligible for many reasons, including age (less than 18 years old) and medication profile (patient's medications were excluded from study). Factors contributing to patient eligibility included high medication burden and multiple chronic medications. Patients that were enrolled into the medication synchronization program became the study group. A subset of the patients from those eligible patients that were not enrolled in the synchronization program were then randomly selected to create a control group that was then matched to the study group patients on key characteristics (e.g. age, medications, demographics, comorbidity, and time on medications).

Pharmacy dispensing data for study and control patients were tracked for the six months prior to the study period as well as during the six-month study period to compare adherence rates for medications. To ensure that similar groups were compared in terms of adherence across the same disease areas, patients in both the study and control groups were receiving a medication from at least one of four therapeutic areas: cardiovascular, diabetes, hypertension and/or respiratory disease. For purposes of this study, cardiovascular medications include heart failure medications, antianginal agents, antiarrhythmic agents, antiplatelet agents.

VI. Timeline

The six-month study period commenced on April 1, 2013, and ended September 30, 2013.

VII. Pharmacy Profile

Participating pharmacies were selected based on the following criteria:
- Operating a medication synchronization program for at least six months prior to the study start
- Adequate patient base to enroll new patients into the medication synchronization program
- Use of specific pharmacy management systems to facilitate data capture
- Agreement to participate in the study

VIII. Patient Profile

The study included all patients who enrolled into the pharmacy's medication synchronization program during the study period, including a subset of patients who were receiving a medication in at least one of of the following: Angiotensin Converting Enzyme Inhibitors, Angiotension Receptor Blocking Agents, glucose-lowering agents, and/or HMG-CoA Reductase Inhibitors (statins).

IX.   Measurement Objectives

The primary objectives of the study were to:
1. Measure the overall impact of the medication synchronization on patient adherence and pharmacy business within the community setting.
2. Determine the impact of automation on established community pharmacy-based medication synchronization programs.

The specific study measurements included:

1. Active Patients	The number of patients who filled at least one prescription at the pharmacy within the previous 12 months (measured from September 30, 2013).
2. Eligible Patients	The number of eligible patients. Time My Meds uses proprietary predictive analytics to identify and rank patients who are likely to benefit from participation in a medication synchronization program. Data including the number and type of maintenance medications, the patients' demographics, and the patients' established medication history is used to create an eligibility score for each patient. Those patients with an eligibility score above a predetermined threshold were considered eligible patients.
3. Enrolled Patients	The number of patients enrolled by the pharmacy into the medication synchronization program through Time My Meds. **Note:** Patient enrollment was not limited to the eligible patient list.
4. Enrolled Patients vs. Eligible Patients	The ratio of Enrolled Patients (3) to Eligible Patients (2) expressed as a percentage.
5. Enrolled Patients vs. Active Patients	The ratio of Enrolled Patients (3) to Active Patients (1) expressed as a percentage.
6. Patients who Opted Out	The number of Enrolled Patients (3) who chose to opt out of the program post-enrollment.
7. Automated Prescription-Ready Calls	The number of automated calls placed to patients to notify them that their synchronized prescriptions were ready for pickup.
8. Automated Pick-Up Reminder Calls	The number of automated calls placed to patients to notify them that they were late in picking up their synchronized medications.
9. Synchronized Medications	The number of medications that were synchronized across all Enrolled Patients (3). **Note:** These patients may have had additional prescriptions for medications that were not synchronized as part of the program.
10. Synchronized Medications per Enrolled Patient	The average number of medications synchronized for each enrolled patient. Calculated by dividing the Synchronized Medications (9) by Enrolled Patients (3).

In addition to the ten study measurements, the study addressed the following analytics:

1. Impact on Adherence in Terms of Proportion of Days Covered	Using the Pharmacy Quality Alliance (PQA)-defined methodology known as PDC (Proportion of Days Covered)[3], the distribution of PDC scores for select groups of medications for the study group were calculated and compared to the PDC scores of medications for those patients in the control group.	
2. Calculated Lift in Terms of Additional Days on Therapy	Projected additional days on therapy for patients enrolled into the medication synchronization program.	
3. Impact of Program	Based on the calculated lift, create an estimate of the economic impact of the program.	

X. Study Measurement Results

The tables below provide each of the study's defined measurements (measurement number is in parenthesis at the top of each column).

Measurement Results Table 1: **Eligible and Enrolled Patient Metrics for Study Pharmacies**

	(1) Active Patients	(2) Eligible Patients	(3) Enrolled Patients	(4) Enrolled Patients vs. Eligible Patients	(5) Enrolled Patients vs. Active Patients
Mean	4,784	835	137	16.4%	2.9%
Median	4,459	751	125	16.1%	2.3%
Range (Min-Max)	(1,817-8,374)	(358-1,650)	(50-278)	(4.1-74.3%)	(<1-14.8%)
Totals	47,843	8,348	1,372	16.4%	2.9%

Pharmacy	(6) Patients who Opted Out	(7) Automated Prescription-Ready Calls*	(8) Automated Pick-up Reminder Calls*	(9) Synchronized Medications	(10) Synchronized Medications per Enrolled Patient
Mean	12	N/A	N/A	812	5.9
Median	10	N/A	N/A	731	5.8
Range (Min-Max)	(0-35)	N/A	N/A	(202-1591)	(4-9.2)
Totals	117	3,719	2,481	8,120	5.9

*Due to integration issues that did not allow Time My Meds to track prescriptions being released to the pharmacy in a timely manner, Automated Calls were not consistently run during the study period.

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[3] http://www.pqaalliance.org/images/uploads/files/PQA%20PDC%20vs%20%20MPR.pdf and
http://www2.sas.com/proceedings/forum2007/043-2007.pdf

Participating pharmacies completed the first month of the study with 1,007 patients; by the end of the six-month study, participating pharmacies had increased the total number of enrolled patients by over 35% (Measurement Results Table 2).

Measurement Results Table 2: **Impact of Automation on Medication Synchronization Enrollment**

|	Apr Enrolled Patients	May Enrolled Patients	Jun Enrolled Patients	Jul Enrolled Patients	Aug Enrolled Patients	Sept Enrolled Patients
Totals	1,007	1,262	1,304	1,334	1,350	1,372

XI. Study Analytics

The Proportion of Days Covered (PDC) impact for medications of patients enrolled in the medication synchronization program and those medications of patients not enrolled in the program were analyzed. Adherence as measured as PDC is 32.5% higher for synchronized medications compared to non-synchronized medications during the study period (Figure 1). Broken down by therapy type, the greatest difference in PDC scores between synchronized and non-synchronized medications was seen in respiratory drugs (Figure 2).

Figure 1: **Overall Impact of Medication Synchronization on Adherence (Measured as PDC)**
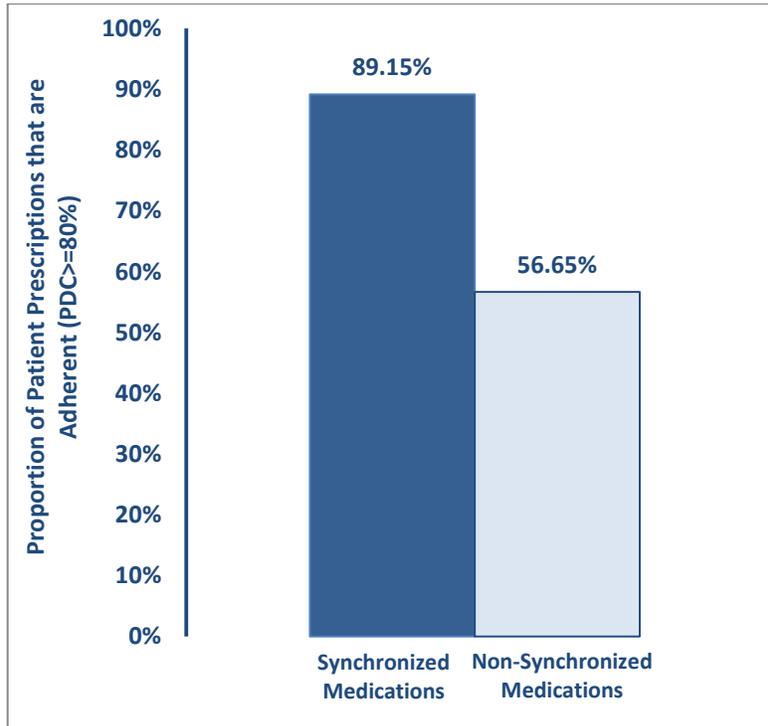
Figure 2: **Impact of Medication Synchronization on Adherence (Measured as PDC) by Therapy**
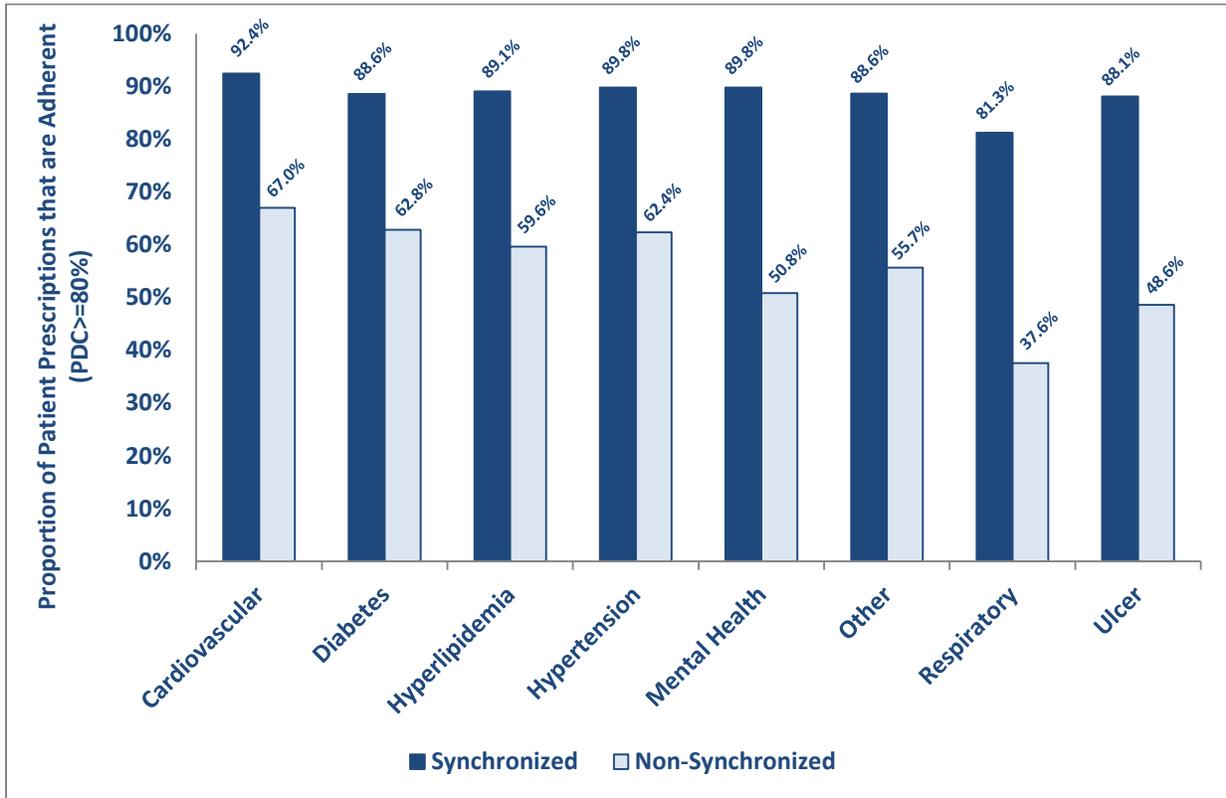
Medications that were only filled once or had greater than 45-day lapse between fills were not included in the PDC calculations. First-fill abandonment—the act of only filling a prescription for a new chronic medication one time—was reduced 90% with synchronized medications as compared to non-synchronized medications (Figure 3).

Figure 3: **Impact on First-Fill Abandonment**

Non-Synchronized Medications

Synchronized Medications

One Fill
More than One Fill
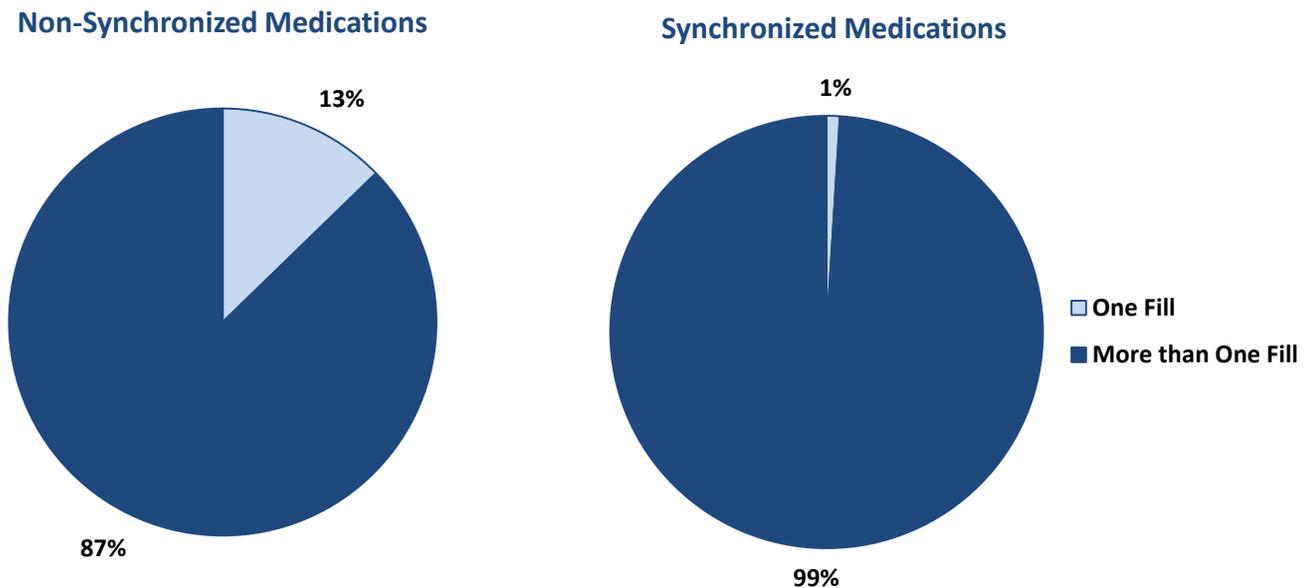
Average Days on Therapy Lift from Automation

The pre-period was measured from 10/18/2012 through 3/17/2013 (150 days) prior to the start of the Time My Meds program and the post-period measured from 5/1/2013 through 9/30/2013. Due to overlap during the transition period (3/18/2013 to 4/30/2013), fills that occurred before the start of the measurement period or continued after the measurement period were eliminated, creating an effective measurement period of 120 days. Extrapolating the 8.6 additional days on therapy in 120 days, automation yields an additional 26.2 days on therapy per medication over the course of a year, thus automation attributes to nearly one additional 30-day fill per prescription per year over a manual medication synchronization program. (Analytics Table 1).

Analytics Table 1: **Average Days on Therapy Lift of Automated vs. non-Automated Sync Process**

	Effective Measurement Period	**Average Days on Therapy in Measurements Period**
Pre-Period	120 days	105.9 days
Post-Period	120 days	114.5 days

Average Days on Therapy Lift from Medication Synchronization

As part of the integration process, historical data was collected from the pharmacies participating in the study. This data was used to track enrolled medication synchronization patients for a full year in the synchronization program. The table below shows the impact of medication synchronization for the 12 months ending September 30, 2013.

Looking over a trailing one-year period at the average days on therapy between synchronized and non-synchronized medications, the average days on therapy across synchronized medications was over 100 days greater than for those same medications for patients not enrolled into the medication synchronization program (Analytics Table 2). This represents over 3.4 additional 30-day fills per medication per patient. Using the average of 5.9 fills per patient, this yields 20 additional fills per patient, per year.

Analytics Table 2: **Annual Average Days on Therapy Lift of Medication Synchronization**

Synchronized Medications of Enrolled Patients		**Medications for Non-Enrolled Patients**	
Average Days on Therapy	Number of Medications Measured	Average Days on Therapy	Number of Medications Measured
337	4,158	234	35,020

Economic Impact of Automated Medication Synchronization

Using $56 per script revenue and $12.50 per script gross margin from the *2013 NCPA Digest sponsored by Cardinal Health*,[4] the additional 20 fills equates to $1,120 of additional revenue and $250 of additional gross margin per enrolled patient. Based on 100 enrolled patients per pharmacy this equates to $112,000 of additional revenue per pharmacy per year and an additional $25,000 per year of gross margin. The higher volume pharmacies in this study generated significantly higher returns based on patient counts—well in excess of 100 patients—and lifts above these averages.

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[4] http://www.ncpanet.org/index.php/digest

XII. Conclusions

This study demonstrates that community pharmacies adopting medication synchronization programs can make a substantial improvement to patient adherence. Further, this improved adherence contributes significantly to both the pharmacy's revenue and gross margin.

Other key findings:
1. As implemented using the Simplify My Meds program (powered by Time My Meds), medication synchronization drives patient adherence.
2. Overall lift due to medication synchronization was 3.4 additional 30-day fills per prescription per enrolled patient. The average enrolled patient received 5.9 synchronized medications. The overall lift projected from this study is 20 additional fills per year.
3. A greater than 50% improvement in adherence based on the number of medications achieving an 80% PDC measurement for prescriptions enrolled in the medication synchronization program.
4. First-fill abandonment was reduced over 90% for patients in the medication synchronization program who received a prescription for a new medication that was also managed in the medication synchronization program as compared to the control group.
5. As measured by the study, using automation allowed the pharmacies to increase the number of enrolled medication synchronization patients by over 35%.
6. Automation yielded between .75 and 1 additional fills per medication per year for medications managed through the automated program vs. the manual program.
7. Early community pharmacy adopters of medication synchronization programs have been very successful at tailoring the core components of the Appointment-Based Model into many different operational models. Each model works and produces consistently positive results.

Further, this study provided valuable learning regarding the impact of an Appointment-Based Model medication synchronization program, as well as the different deployment models being run by community pharmacies.