MEMOTEXT
Literature Review

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MEMOTEXT

LITERATURE REVIEW

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Purpose:

The purpose of this document is to provide a review of projects and research that have utilized MEMOTEXT technologies and/or development methodology since 2011.

Introduction:

Founded in 2008 and commercialized in 2011, MEMOTEXT began as an SMS reminder service provider. Early on, from our users, we realized our technology was being used for medication adherence and wellness purposes. This was our opportunity; to leverage patient data and create a better behavior change methodology and technology platform, one that automatically created a mobile health intervention that was as unique as its user.

MEMOTEXT began by using subjective behavioral assessments (questionnaires) to build tailored and adaptive messaging and mobile health interventions. Over time we started to consume prescription claims data to understand patient medication history and refill patterns to provide an objective source for personalizing messaging content. We also began integrating external sources of health data, such as Apple Healthkit, Fitbit, Bitesnap, airnow.gov, and EMR data to both tailor interventions and provide decision support back to the healthcare practitioner.

MEMOTEXT's approach is that everyone is different, and people's needs change over time. Every population, every clinical workflow and every patient journey requires a nuanced set of content and intervention logic to effectively engage. MEMOTEXT's experience, and ability to design, consume and subsequently 'action' health-data has allowed us to create validated, efficacious digital health interventions.

Today we are a data-driven, evidence-based, personalized digital patient engagement technology provider. The MEMOTEXT platform enables a multitude of digital health products to be developed. We work with stakeholders to allow them to create their own engagement tools by leveraging core MEMOTEXT capabilities in analytics, recruitment, tailored communications (across multiple modalities such as SMS, IVR, mobile and web apps, voice assistants, e-mail), and validation.

MEMOTEXT enables user-centered design, development, validation, and commercialization of clinical patient communication applications. We do this both in collaboration with partners and directly for our clientele. We then make those interventions available on our platform for further scaled co-commercialization.

Our vision is to find value within the increasing availability and connectedness of health data (from multiple sources) to predict risk and personalize ubiquitous digital communications. We do this to improve outcomes for populations and the bottom line for our healthcare stakeholder clients and partners.
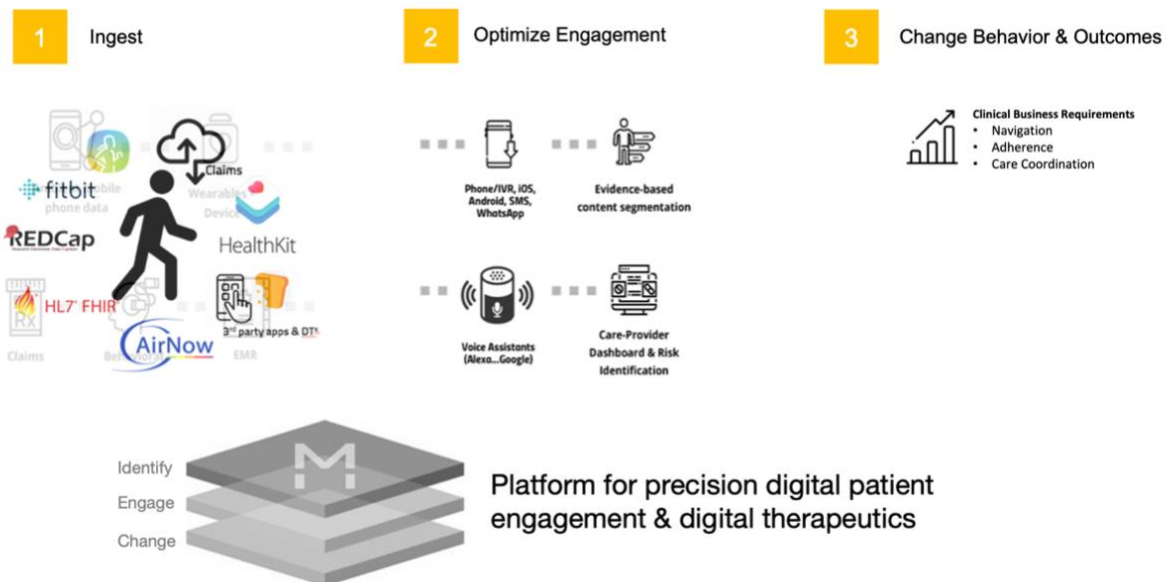

Figure 1: MEMOTEXT Patient Engagement System

Methodology of Review

The platforms chosen for this literature review focus on research and programs completed by or in collaboration with the MEMOTEXT team. For this literature review, posters, documents, presentations, and publications were reviewed both internally and externally by various commercial and academic groups.

Findings of the Review

1.0 Co-Commercialized Programs

MEMOTEXT works with select academic and provider institutions to co-create, validate and commercialize digital interventions and digital interventions with a regulatory pathway (digital therapeutics).

In-licensing, revenue-sharing models and even joint venture start-ups are some of the ways MEMOTEXT has collaborated with institutions to enable, co-develop and commercialize clinical engagement technologies.

University of British Columbia (UBC): SmartMom

In a 2017 collaboration with UBC, the effects of a program titled SmartMom https://www.smartmomcanada.ca/ were studied in pregnant women in the northern health authority in British Columbia. This program took a specific focus on aboriginal women living in rural residences who were at a socio-economic disadvantage. UBC led the recruitment process for this program and it was promoted through websites, posters, and takeaway marketing material such as magnets. Enrollment for this program was completed by the participant through a web portal or through TEXT2Enroll by texting a 5 digit short-code to sign up for the program. For this study, participants received three weekly messages scheduled based on their gestational week. Content included educational and supportive material with links to helpful website resources. In addition, there were six optional supplementary streams with additional educational content that a participant could choose to sign up for. Supplemental messages were delivered five minutes after their regular scheduled messages. The content for this project was created by the UBC and delivered by web portal or SMS. For participants who do not have access

to a phone, they could view the messages from any computer (Munro et. al,. 2017). SmartMom has now moved to co-commercialization.

Outcomes: Participants perceived SmartMom to be highly acceptable and relevant while text message modality reflected how participants currently sought pregnancy-related information specific to them. This is an ongoing study with discussions for expansion to different health authorities and provinces underway. (Munro et. al., 2017).

Currently (Nov. 2020) over 10,000 mothers in the Northern Health, Fraser Health, Interior Health, and Vancouver Coastal Health Authorities are using SmartMom. Located throughout the province of British Columbia, SmartMom is expanding across Canada.

Link: Prenatal education text messaging service launches throughout Northern B.C.

SmartMom Text Messaging for Prenatal Education: A Qualitative Focus Group Study to Explore Canadian Women's Perceptions

Saint Elizabeth Healthcare (SE Health): Ring of Support

Ring of Support (RoS) is a program which supports both caregivers/care providers and the seniors they are caring for. RoS is a personalized digital engagement system incorporating the use of Amazon Alexa/IVR technology to prolong independence for seniors at home and provide peace of mind while reducing the burden of stress for caregivers. A user experience evaluation was conducted with 50-60 SE health home care clients in the Central East LHIN in Ontario. The objective of this study was to get an understanding of the overall experience, preferences, and interests of seniors and their caregivers. We are currently working with the SE futures team on commercialization of Ring of Support and have conducted numerous market research surveys which have shown strong interest in the product.

Outcomes: 100% of the users communicated using IVR, Alexa, and SMS, with IVR being the most popular modality both for seniors and caregivers. 87% of users reported high satisfaction with the services and caregivers reacted extremely positively to being notified of updates about their loved ones. We were able to evaluate user preferences for modalities, interests, and abilities of older adults. We were also able to provide the

technical and operational feasibility of the solution after having done change management with the virtual nurse team and implement it within a clinical environment.

Link: [Ring of Support (RoS)- A Story of Industry-Clinical Partnership, Collaboration, and Revolutionizing Aging at Home](#)

Massachusetts General Hospital (MGH): Simple Online Family Intervention for ADHD (SOFIA)

In collaboration with MGH a medication adherence program was created in 2017 called SOFIA. SOFIA is a system designed for the parents of children ages 6-12 who are prescribed stimulant medications to treat ADHD. For a feasibility study, parents were recruited through a Partners Healthcare EMR to identify children 6-12 taking stimulant medication for ADHD. The healthcare providers were then contacted by MGH administrators inviting them to participate in the program. Participants received a set number of messages per week and educational content was segmented and delivered to participants based on their responses to trigger questions asked periodically. Reminders for prescription renewals were sent based on the 30-day medication cycle and were based on a refill validation process. Content included reminders, tips, facts, and 2-way (responsive) SMS messages in the form of myth debunking questions.

Outcomes: 85% of SMS intervention patients refilled their prescriptions in a timely manner compared with 62% of patients receiving treatment as usual.

Link: [An innovative SMS intervention to improve adherence to stimulants in children with ADHD: Preliminary findings](#)
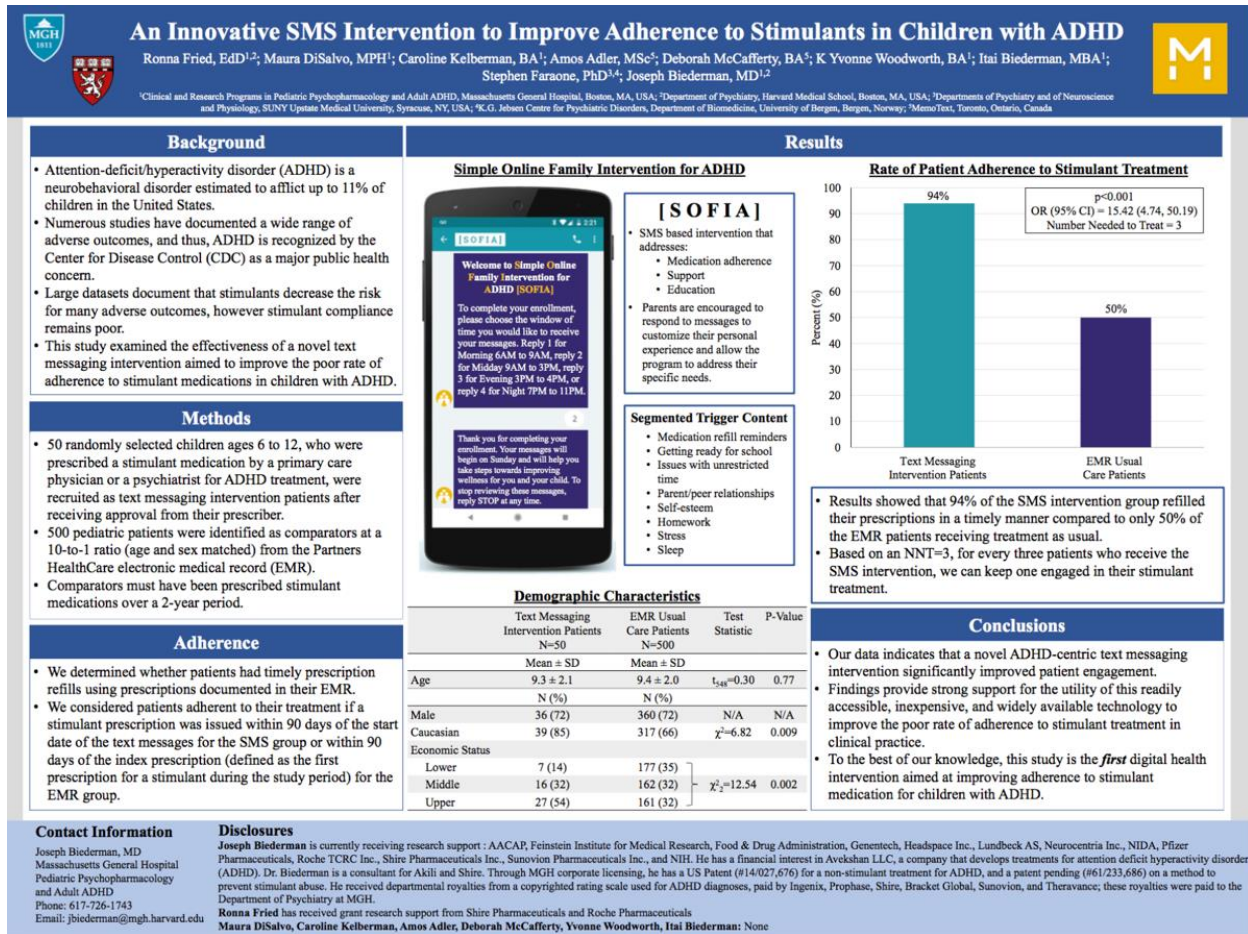
[ASCP Virtual Presentation](#)

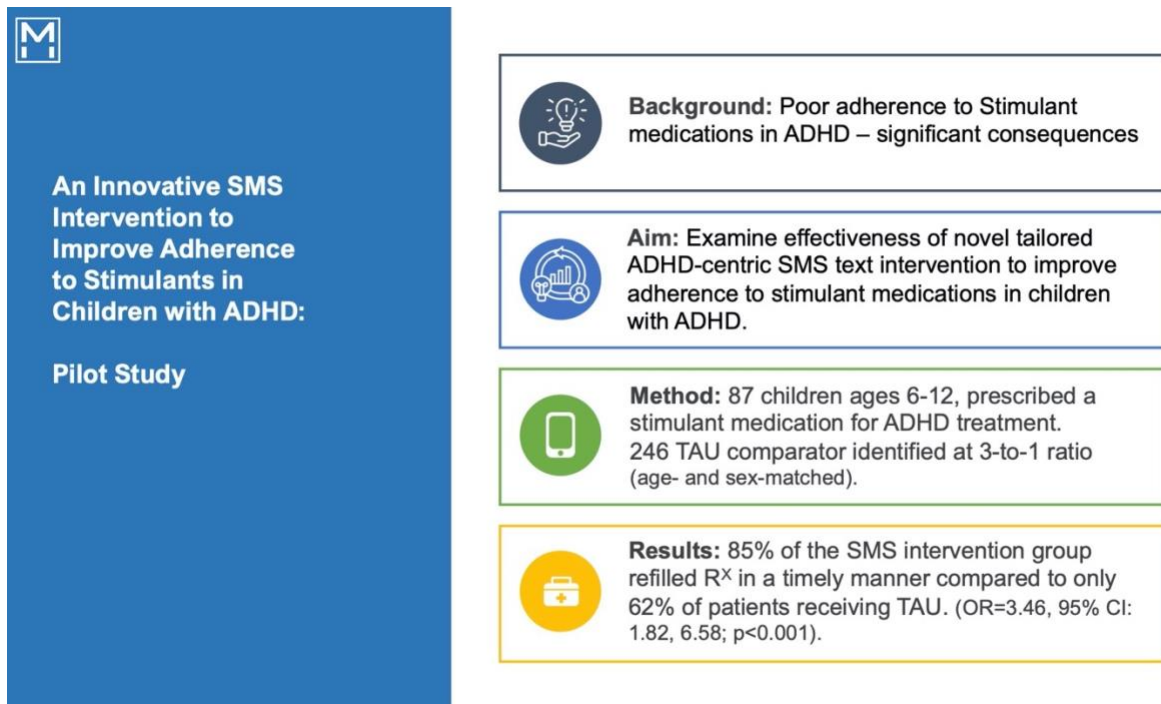Figure 2. SOFIA Poster Presentation presented at the APSARD annual meeting

An Innovative SMS Intervention to Improve Adherence to Stimulants in Children with ADHD:

Pilot Study

Background: Poor adherence to Stimulant medications in ADHD – significant consequences

Aim: Examine effectiveness of novel tailored ADHD-centric SMS text intervention to improve adherence to stimulant medications in children with ADHD.

Method: 87 children ages 6-12, prescribed a stimulant medication for ADHD treatment. 246 TAU comparator identified at 3-to-1 ratio (age- and sex-matched).

Results: 85% of the SMS intervention group refilled R^x in a timely manner compared to only 62% of patients receiving TAU. (OR=3.46, 95% CI: 1.82, 6.58; p<0.001).

Figure 3. SOFIA presentation at ASCP Virtual Conference

The Centre for Addiction and Mental Health (CAMH): A4i

The App4Independence (A4i) is a Joint Venture between the Centre for Addiction and Mental Health (CAMH) and MEMOTEXT. A4i is Canada's first digital therapeutic with a regulatory pathway for complex behavioural health. A4i's premier indication is to provide support, isolation-reduction and relapse-risk identification in schizophrenia and psychosis spectrum illnesses. We have brought together the expertise of Dr. Sean Kidd, Chief-Psychology Division and Senior Scientist at CAMH, Associate Professor of Psychiatry at the University of Toronto and Amos Adler M.Sc., the CEO of MEMOTEXT Corp. a leading innovator in personalization of validated digital therapeutics and strong advocate for evidence and empathy based digital patient engagement solutions.

A4i is a response to the gaps in the current system of care for individuals with schizophrenia-spectrum illnesses. Treatment and provider engagement are challenging areas in schizophrenia care. Challenges in schizophrenia-spectrum illness include poor community-based supports, care-transitioning, medication adherence and dissatisfaction with clinical care. These challenges contribute to frequent, lengthy, and costly hospital readmissions, low QOL, high levels of distress and difficulties engaging in community

roles. Digital engagement is a promising but largely unexplored and under-studied resource in schizophrenia care compared to advances in areas such as mood and anxiety disorders. They are particularly salient given their reach, low cost, and increasing relevance to younger schizophrenia populations most of whom use mobile technologies.

Our co-commercialized provider-innovator partnership has been iterating and testing the feasibility of a mobile intervention called App4Independence (A4i). A4i is an (iOS/Android) intervention to help reduce isolation, improve care coordination and support and validate models towards predictive insights into relapse risk. The patient co-designed app personalizes engagement using a data-driven (social) feed, notifications and messaging based on an evidence-informed intake portal, responses to notifications and ambient phone data (sleep/activity data and objective usage/digital phenotypes). Personalization manifests in peer-to-peer, evidence-based and ADL feed and notification content tailored to the individual. The app also provides symptom based 'toolkit' elements such as a patent pending ambient sound detector to help patients determine the difference between ambient noise and auditory hallucinations.

Over the course of 18 months the team iteratively developed the intervention with involvement of patients, families and clinicians, design team and an e-patient in residence. Feasibility testing involved 38 individuals with psychosis, primarily with schizophrenia and schizoaffective disorder diagnoses. Looking at three key areas: app usage, quantitative outcomes, and qualitative feedback, the results highlighted high user engagement and retention rates of: 100% at 7 days and 94% at 20 days (Kidd et al., 2019).
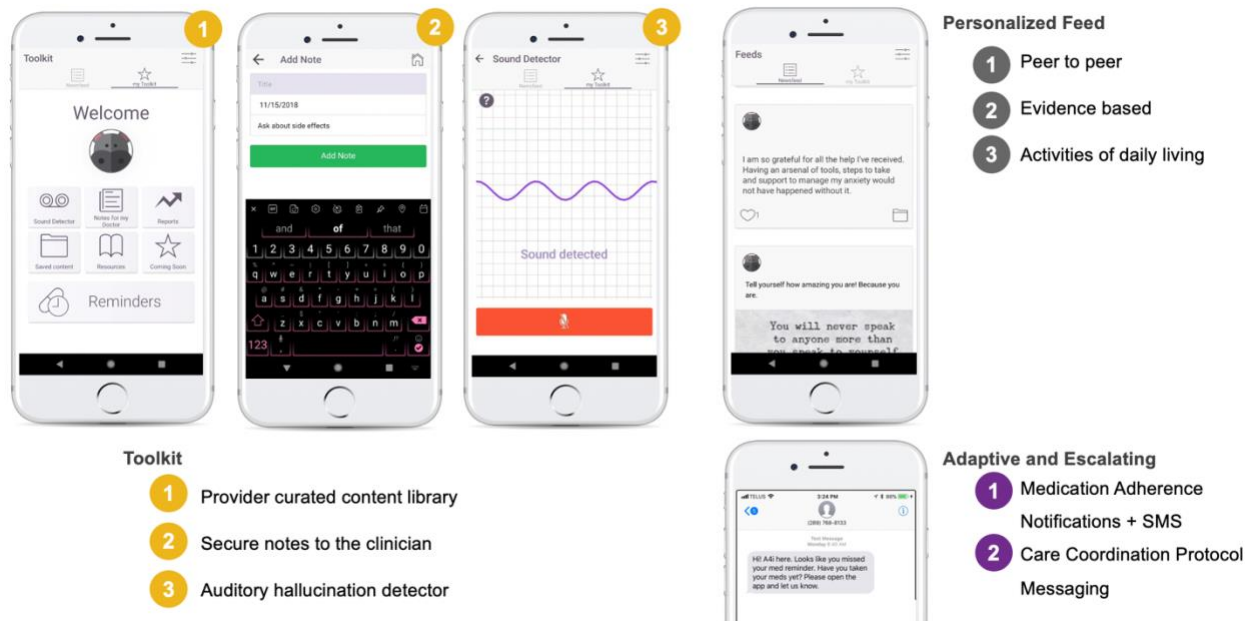
Figure 4. The A4i Application

While the period of testing was not sufficient to adequately assess potential impacts on adherence, a significant reduction in several symptom domains including psychoticism and depression were observed. We also observed a significant improvement in engagement with personal recovery in areas such as hope, knowledge about illness, and self- efficacy. **Interestingly, we observed that those with more significant mental health challenges at baseline tended to use the app the most frequently.** These findings amongst others have been captured in an academic publication PLOS ONE: Feasibility and outcomes of a multi-function mobile health approach for the schizophrenia spectrum: App4Independence (A4i)

MEMOTEXT and CAMH won a CIHR grant in 2020 and are now in the process of preparing for a formal randomized controlled trial of the A4i digital therapeutic.

ClinicalTrials.gov: Examining a Digital Health Approach for Advancing Schizophrenia Illness Self-management and Provider Engagement

Feasibility Outcomes:
Beta Testing Phase- Users from two testing cohorts were well retained throughout a three-week testing period. Cohort 1 and 2 had an average class retention rate of

44.3%(SD=18.8) and 46.0% (SD=20.1) respectively. 60% of users shared a post on the feed throughout the testing period and 71% of users liked a post at least once. At the conclusion of the testing period, 79.2% of participants said they would download the app if it was free in the App Store. The initiative is currently in the next phase of testing.

Feasibility Test- The A4i app was used for an average of 25.12 days for the purpose of this feasibility study. The average classic retention rate was 52.50% (SD = 22.13). The mean number of interactions with the app per day was 4.21 (SD = 5.19). In the first 7 days 37/38 users used the feed an average of 4.49 (SD = 12.25) times per day. Within the first 20 days, 36/38 used the feed an average of 2.66 (SD = 4.83,) times per day.

Links: Feasibility and outcomes of a multi-function mobile health approach for the schizophrenia spectrum: App4Independence (A4i)
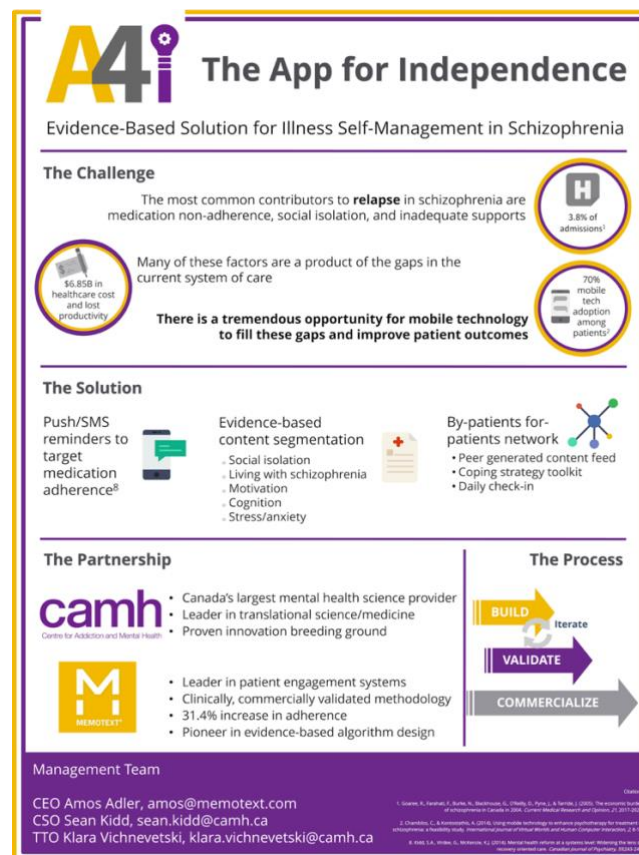

Figure 5. A4i Poster Presentation

2.0 Research

Six MEMOTEXT research projects were found in collaborations with the University of British Columbia (UBC), Vanderbilt University, NSU, FHI360, St. Michaels Hospital, and the University of Saskatchewan.

University of British Columbia (UBC): SmartParent

SmartParent was developed (Nov 2020) as a follow-up to the SmartMom program. SmartParent is Canada's first parent education program that provides trustworthy educational text messages to help guide parents through their baby's first year of life. The messaging content received is tailored to each baby's age and stage of development. Messaging includes evidence-based tips and links to support the transition to parenthood and the baby's growth and development. This study is being conducted by the University of British Columbia in collaboration with Optimal Birth BC.

Nova Southeastern University (NSU): Smoking Cessation Program

A research study was completed in 2017 with NSU involving adults wishing to receive support to help them quit smoking. Recruitment and enrollment were done onsite by clinicians through a web portal designed by MEMOTEXT. Throughout this program, participants received one SMS message in a predetermined sequence. Messages were focused on goals and motivation to assist with smoking cessation and the content and schedule were provided by NSU (Bronsburg, 2017).

Outcomes: Results of this study were published in the Online Journal of Applied Knowledge Management in 2016 and suggest that motivational intervening focused text messages may have had a positive impact on tobacco quit rates when coupled with evidence-based tobacco cessation programs (Bronsburg, 2017).

Link: [Text messaging's impact on an evidence based medicine tobacco cessation program](#)

St. Michael's Hospital: Flu Shot in Pregnancy

Alongside St. Michaels Hospital a randomized controlled trial was completed in 2017 to evaluate if text message reminders increase the likelihood of receiving the flu shot among pregnant women Eligible participants included pregnant women who saw their OBGyn for a prenatal visit during flu season with no restriction on age. Recruitment occurred onsite at the hospital by a clinician via a web portal created by MEMOTEXT. During this educational program, participants received one message in a predetermined sequence containing information about pregnancy and flu shot safety. The content and schedule were provided by the St. Michael's Hospital (Yudin et al., 2017).

Outcomes: Weekly text messages reinforcing the recommendation for and safety of the influenza vaccine in pregnancy did not increase the likelihood of receiving the vaccine among pregnant women (Yudin et al., 2017).

Vanderbilt University: REACH

A 2016 study titled REACH was created in partnership with Vanderbilt University. This study targeted individuals with Type II Diabetes on various therapies including oral medications, injectable medications, and insulin. Participants must have been adults who have demonstrated difficult maintaining adherence to prescribed treatments. Recruitment was driven by the REACH research team and the clinical trial leaders. Enrollment was completed by the clinician using their REDCap portal during face-to-face interviews with the participant. The REDCap Portal was integrated with MEMOTEXT for easy data exchange. For this study, participants received up to five SMS messages per day including educational material, self-reported adherence, self-reported healthy lifestyle, and feedback based on responses. Message content included reminders, education, support, behavioural skills, and goals. Messages contained both one-way and two-way communications and content was segmented based on questionnaire responses. An additional message was sent to notify participants when their A1c lab results were ready for them to view on a HIPAA-compliant hosted web page (Nelson et al., 2016).

Outcomes: Overall, participants were satisfied with REACH and provided favourable ratings for each of its elements and demonstrated a 96% response rate to assessment test messages (Nelson et al., 2016).

Link: [Development and Usability of REACH: A Tailored Theory-Based Text Messaging Intervention for Disadvantaged Adults With Type 2 Diabetes](#)

An additional research study was conducted with Vanderbilt University to examine user engagement in a 12-month text message intervention for diverse adult patients with diabetes. Eligible participants were over the age of 18, diagnosed with Type 2 Diabetes, and are both prescribed and responsible for their diabetes medications. Enrollment for this study was completed by RA's who conducted a preliminary baseline survey and an HbA1c test. Participants' relevant information was transferred from REDCap to the MEMOTEXT health platform. MEMOTEXT used this information to schedule and send text messages to the participants. For the first 6 months of the study, participants received daily text messages that included self-care and interactive content, a subset of participants also received monthly phone coaching. After 6 months, participants had the option of receiving fewer text messages (Nelson et al., 2020).

Outcomes: Patients were satisfied and there was a 91% response rate to interactive text messages over the 12-month period. Nearly half of the participants opted to continue receiving daily text messages after the first 6 months messages (Nelson et al., 2020).

Link: https://mhealth.jmir.org/2020/7/e17534/pdf

FHI360: HIV Strategy

FHI360 teamed up with MEMOTEXT in 2015 to develop and assess the efficacy of an integrated and scalable strategy to identify, recruit, link to care, retain in care, and maintain viral suppression among HIV-infected men who have sex with men (MSM). Eligible participants were adult patients on antiretroviral drugs or combination therapies. Recruitment was restricted to participants in the study and enrollment was completed by case managers through a MEMOTEXT-designed web portal. Participants in this study received up to three medication reminders, one motivational message, and an unlimited amount of refill or appointment reminders per day. These reminders were set by IVR, SMS or email based on participant preference. Participants had the functionality to reach out to the Case Manager directly from the message in any of the three communication methods offered.

Outcomes: Just over half of the study participants used the system for support. 20 participants were successful in using the communication platform to let their case managers know that they needed assistance.

Link: [Creating a Platform for Self-Directed Antiretroviral Medication and Appointment Adherence via Text, Phone and Email Messages for HPTN 078](#)
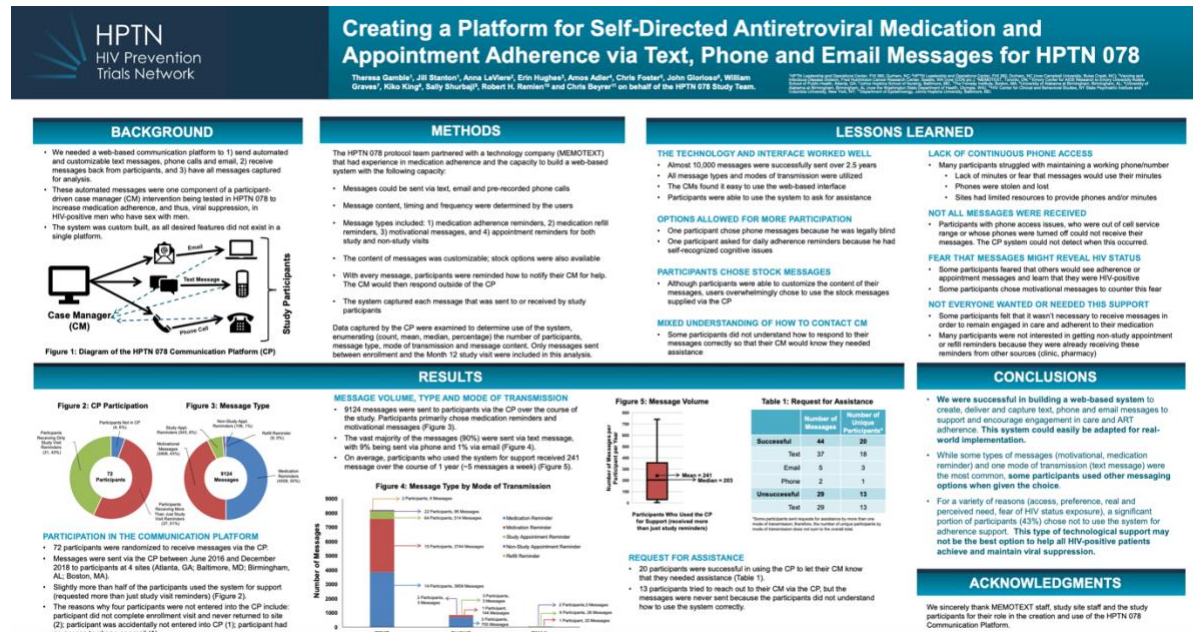

Figure 6. FHI 360 Poster Presentation

University of Saskatchewan

MEMOTEXT will be collaborating with the University of Saskatchewan for a research project addressing mental health during COVID-19. The proposed program's objective is to: combat misinformation, update communities with area specific information, provide mental health and wellness information, establish a conduit for citizen engagement in polling, clinical trial recruitment, and eventual treatment prompts. The MEMOTEXT platform will enable a personalized interactive two-way digital messaging intervention to allow individuals underserved by the health systems to get access to mental health support and resources.

Link: [Sask. researchers awarded $400K for mental health projects](#)

3.0 Education Programs

One program was identified as being solely an educational program. This program was in collaboration with the Canadian Pulmonary Fibrosis Foundation.

Canadian Pulmonary Fibrosis Foundation: Inspiration Patient Assistance Program

The educational program titled "Inspiration Patient Assistance Program" was a 2014 partnership with the Canadian Pulmonary Fibrosis Foundation. This initiative was an educational program for patients undergoing Esbriet (pirfenidone) treatment for idiopathic pulmonary fibrosis (IPF). Eligible participants were newly or previously diagnosed with IPF and prescribed Esbriet for treatment. Enrollment was open to anyone on the medication, however, the disease is typically found in males over the age of 50. In this program, participants were given the choice of receiving up to three messages per day. Message content varied from education, motivation, and healthy lifestyle and was offered via IVR, SMS and Email in both English and French.

Outcomes: The outcomes of this program are confidential.

Links: Inspiration™ Patient Assistance Program

4.0 Adherence Programs

Adherence programs involving education, support, and reminder components were divided into those that were adaptive and those that were static. Adaptive programs used segmentation based on survey responses to deliver customized and personalized content to users. Programs that were static delivered a pre-set array of content to all its users.

4.1 Adaptive and Data Driven Adherence Programs

Through literature review, eight adaptive adherence programs were identified leveraging partnerships with Johns Hopkins University, Boots UK, Allergan, Massachusetts General Hospital, Green Shield Canada, Genentech, Accountable Health Solutions, and PerformRX.

Johns Hopkins University (JHU): ADRS

In collaboration with Johns Hopkins University, a medication reminder program was created in 2014 for post-operative glaucoma patients in the JHU Hospital system. The program was titled "Impact of Automated Dosing Reminders on Medication Adherence Using Microsoft HealthVault" (ADRS). Recruitment and enrollment were led by the clinicians, and enrollment was completed online. For this intervention, participants received two segmented reminder messages per day via SMS or IVR (Boland et al., 2014).

Outcomes: From this intervention, a 31% increase was seen in adherence to post-op glaucoma therapy versus a match control group. Results are published in JAMA Ophthalmology (Boland et al., 2014).

Link: [Automated Telecommunication-Based Reminders and Adherence With Once-Daily Glaucoma Medication Dosing](#)

Boots UK: Type 2 Diabetes Medication Reminder Program

A medication reminder program with an education component was created in 2012 with Boots drugstores in the United Kingdom for patients with Diabetes. Recruitment was led by Boots UK pharmacists who would complete a paper form at the pharmacy. This form was sent to call centre (MessagePad) who then filled out an online application. Participants could choose their own frequency of messages to be either daily, weekly or bi-weekly. Messages included reminders, education, and motivational material related to medication, disease, lifestyle, or diet. This program was offered via SMS or IVR. The program segmented patients and content based on health attitudes, beliefs, and subsequent self-management and adherence behaviours. Re-segmentation occurred after six months to improve content targeting. Greatest improvements in medication adherence were seen in those with the lowest adherence at program start.

Outcomes: Results showed that 80-85% of patients demonstrated improved knowledge of diabetes management, 83% showed improved knowledge of diabetes medication, and a decrease from 50% to 25% of clients that missed a dose one or more times a week was seen. **Additionally, patients filled their prescriptions for METFORMIN an average of 2.3 days earlier than historical results.**

Allergan: Treatment Support Program

A Treatment Support Program with Allergan was created for Chronic Dry Eye Disease patients prescribed Restasis in 2016. Allergan led the recruitment process by administering brochures to doctors prescribing the target medication. Doctors then provided their patients with the brochure and a copay for enrollment card. Patients could enroll via text2enroll or through an external web portal created by MEMOTEXT. This medication reminder and education program recorded self-reported adherence in participants who received two messages per day either via IVR, SMS, or Email. The first message was education or refill focused while the second message was a medication reminder automatically scheduled 12 hours after the first message to accommodate medication requirements. Content delivered was segmented based on participant responses to survey questions. The pilot was initially limited to residents of Ontario but was later expanded to all of Canada.

Outcomes: Outcomes of this intervention include a significant reduction in the typical adherence drop off rate after the first 6 months. Specific KPIs are confidential.

Green Shield Canada (GSC): Stick2it

GSC partnered with MEMOTEXT in 2014 for the Stick2It intervention. This intervention was targeted at adult members who have new or 6-month historical claims for specific Cholesterol and Hypertension medications. Recruitment was led by GSC and involved two recruitment campaigns. First, members were mailed postcards and second, enrollment was completed via IVR and a web portal. This intervention was an adaptive education support program which involved self-reported adherence and participants receiving up to three messages per day based on personal preference. The message content included reminders, education, motivation and healthy lifestyle which includes heart-healthy recipes. Content delivered in both English and French was segmented at intake and subsequent weekly intervals based on participant survey responses through IVR, SMS and Email.

Outcomes: The Stick2It program had a retention rate of 91.1% (n=434) of participants and over a period of ten months. The program increased persistence by 37.3% based on claims data compared to a control group. A decreased medication dropout rate also proved significant.

Links: [The Importance Of Sticking To It: Non-Adherence To Prescription Medication](#)

Green Shield Canada: Dot the Bot: Using Private Insurance Claims to Predict the Onset of T2DM

A 2-year AI collaboration focusing on the Type 2 Diabetes (T2DM) population with one of Canada's leading health benefits providers led to the creation of multiple predictive models to address specific clinical business needs such as identifying: high cost plan members, drug switching in early stage treatment, and disease onset. By focusing on prevention and adherence to lower cost monotherapy medications as well as addressing the factors that increase the likelihood of cost escalations associated with T2DM, overall expenditures can be reduced. Using this knowledge and health behaviour change methodologies, a digital health intervention for plan members at risk of developing T2DM (assumed prediabetes population) and plan members with T2DM was developed to keep members at low-risk and low cost. Members who had certain prediabetes risk factors were screened using the CANRISK questionnaire, then onboarded to the prediabetes stream of the digital intervention. On the other hand, members who were already claiming T2DM medications were enrolled into the T2DM stream to assess, improve, and sustain adherence to their medications. In the end, a digital health navigator care bot engaged plan members for over 6 months, connecting to the health benefits provider's service offerings and sending them daily support, educational content, health trivia, and medication reminder messaging.
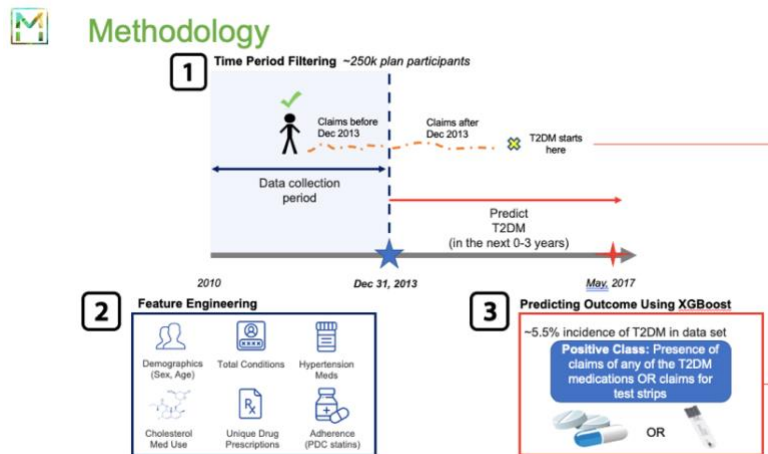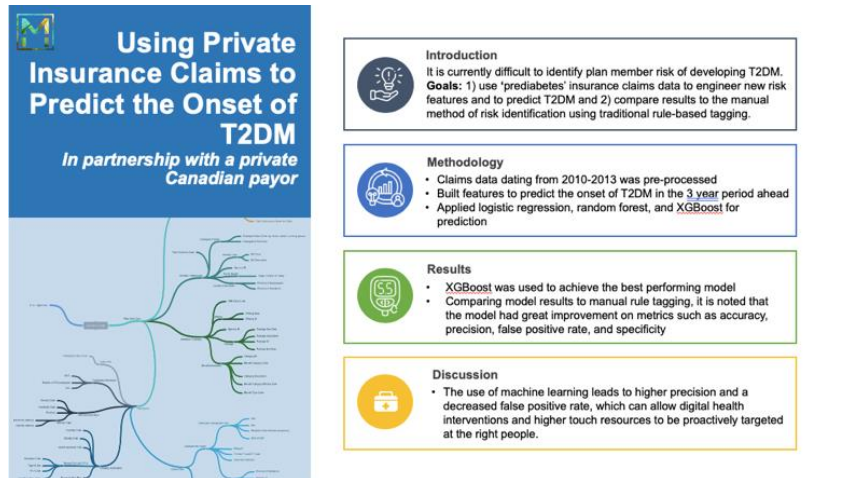
Outcomes: Findings revealed that staying adherent to high-cost T2DM medications, as calculated by the proportion of days covered (PDC) metric, leads to higher associated T2DM costs in the lens of the health benefits provider. In other words, it costs to stay healthy, proving that one of the most effective ways to avoid diabetic costs from the Canadian private insurer perspective is to prevent or delay members from developing diabetes in the first place.

Link: [Using Private Insurance Claims to Predict the Onset of T2DM](#)

[PQA Annual Meeting](#)

Figure 7. 2020 PQA Annual Poster Presentation

Genentech: MyCFCoach

Genentech partnered with MEMOTEXT to create MyCFCoach in 2015 for adults with Cystic Fibrosis and who were prescribed Pulmozyme as a supplement to their existing therapies. Genentech led the recruitment by providing clients with resources and advertising on social media. Enrollment for this reminder program was completed through a web portal. Participants self-reported adherence and received two messages per day. Messages included reminders, education, support, motivation and healthy lifestyle content which was segmented based on participant responses to survey questions. The content was delivered via SMS and email.

Outcomes: This intervention showed a high degree of patient satisfaction with the support program and above 90% retention rates.

Accountable Health Solutions (AHS): Blood Glucose Monitor (BGM) Adherence

In partnership with AHS, MEMOTEXT initiated a pilot program to in 2014 to assess and address patient adherence to prescribed BGM regimens in members with Type II Diabetes. Eligible participants were members who have claims for Diabetes testing supplies who are over the age of 18. AHS led recruitment by reaching out to eligible members via direct mail and enrollment was completed via a web portal. This reminder program included self-reported adherence and participants received up to 3 messages per day based on their own preferences. Message content included reminders, education, motivation, and healthy lifestyle. In addition, participants received a weekly mood meter. Content delivered via SMS and email was segmented based on participant responses to survey questions focused on diabetes health literacy, improving lifestyle, and increasing motivation.

PerformRX: HealthNHand

Developed by PerformRx, in conjunction with MEMOTEXT, a digital health intervention called HealthNHand launched in 2014 as an asthma medication adherence program (Figure 2). For this intervention, eligible participants were identified based on previous claims filled for a controller medication in the 6 months prior to the launch with no prior claims for medications used to treat COPD only. Recruiting was completed by direct outreach via phone or mail and participants self-enrolled through a web portal or by calling into the PerformRx call centre. The intervention itself was a tailored medication reminder, education, and support program where participants self-reported adherence.

Participants received up to four messages per day based on their controller medication requirements. Messages included reminders, education, live air quality index forecasts from airnow.gov, asthma triggers, motivation, and support for a healthy

lifestyle. Refill calls were determined based on the date their last claim was filled. The content was delivered via IVR, SMS, and email and segmented based on participant survey responses.

Outcomes: Results of this intervention showed a conversion of 40% of non-adherers (participants that take their medications less than half the time) into moderate or optimal adherers. Results were presented by poster at Stanford Medicine X Conference in Palo Alto California and by presentation at the 2015 Vendor Education Series for the Association for Community Affiliated Plans.
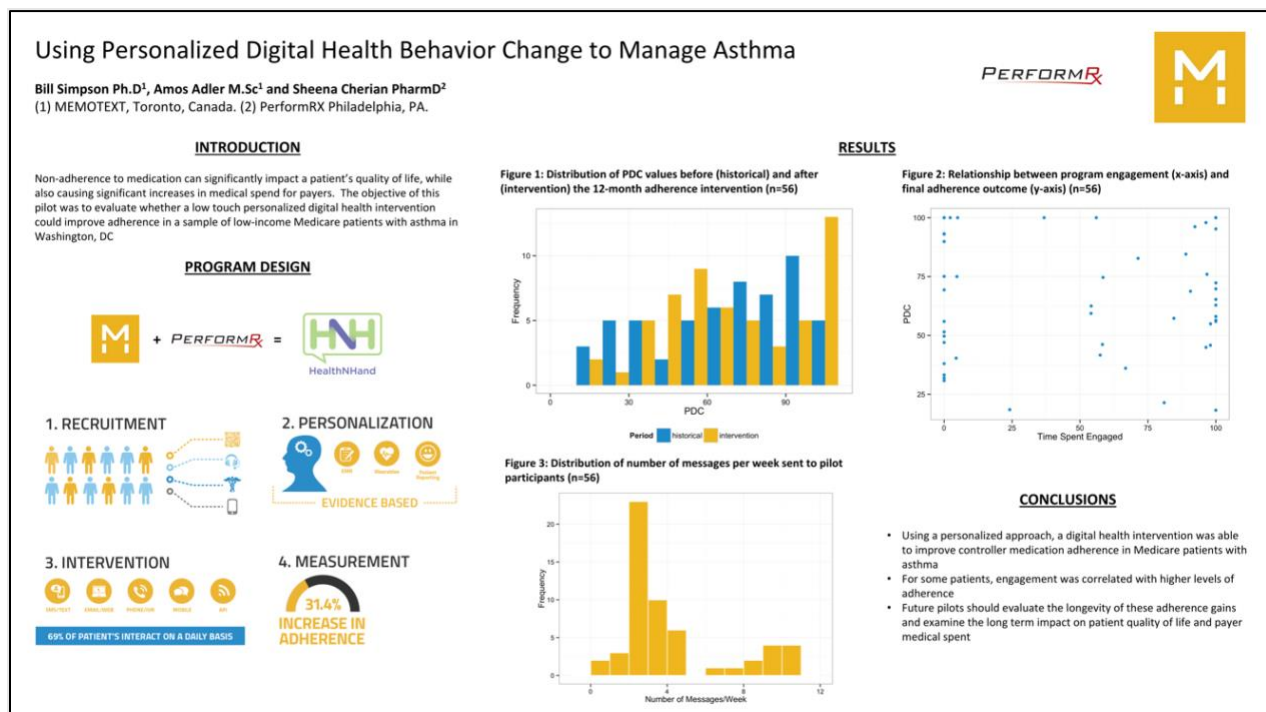

Figure 8. The PerformRX poster presented at the Stanford Medicine X Conference 2015.

Humana: Humana Health Connect

Humana Health Connect is a text-based messaging program designed to guide plan members with Diabetes towards the use of statins using digital solutions to promote patient engagement and drive behavior change. All members eligible were segmented into cohorts based on eligibility status for SUPD, and their Diabetes Complications Severity Index (DCSI) and Charleston Comorbidity Index (CCI) scores. A segmentation survey was deployed upon enrollment to personalize the type of educational and supportive content that would be delivered to the plan member based on their health literacy levels, beliefs about medication, and self-efficacy. Phase 1.0 was initiated May 2019 and consisted of recruitment of ~6000 members via email and IVR channels. Phase 1.5 in Nov 2019 followed up previous recruitment efforts with re-targeting text messages and email campaigns

Outcomes: Achieved program objectives by increasing statin users by 33% and showed significant improvements in knowledge and understanding of reasoning for statin adherence through educational messaging.

4.2 Static Adherence Programs

The literature review found six static adherence programs that are partnered with Nova Southeastern University, McKesson Canada, Sanofi Genzyme, Leo Pharmaceuticals, Arizona University, and Biogen.

Nova Southeastern University (NSU): ReMIND

In partnership with Dr. Kevin Clauson at NSU, a Diabetes Medication Reminder Program called ReMIND was established in 2012. ReMIND was a parallel group, open-label, randomized, controlled clinical trial study to use SMS messages to improve medication adherence in patients with Type II Diabetes. Recruitment was done by the clinical trial leader and enrollment was completed by the clinician through a web portal created by MEMOTEXT. Participants received one SMS message per day at 9:00 am.

Links: [What Happens When You Combine The Participatory Design Research Approach And A Patient Engagement Company For A Mhealth Study](#)?

McKesson Canada: INVIVA SMS & IVR Appointment Reminder Tool

MEMOTEXT partnered with McKesson Canada in 2017 for an INVIVA SMS Appointment Reminder Tool. This solution was designed to improve the appointment reminder process for patients at INVIVA infusion clinics. As there is a mandate for Patient Care Coordinator (PCCs) to provide appointment reminder phone calls within the 4-6 days prior to a scheduled appointment, the objective of this pilot project was to increase the ability of PCRs to send reminders while decreasing the daily call burden on PCCs through appointment reminders and care coordination. Patients of INVIVA were onboarded by PCRs and an e-consent was completed by SMS, IVR, or manually via nurses at the infusion clinics. A web portal was created to manage both users, patients, reminders, and to create reports. For this tool, patients were sent a reminder via their preferred primary communication method 5 days prior to their appointment. If no response was received, a second reminder was sent 3 days prior to their appointment. If there was still no response from the patient, a third reminder was sent via their preferred secondary communication method the day before the appointment. All message content, including emails, SMS messages, and IVR call scripts were created by McKesson.

As of March 2020, MEMOTEXT began performing COVID-19 screening for patients prior to their appointments to assess health risk. MEMOTEXT integrated a secure mobile-web based COVID-19 screening tool within the SMS care-coordination stream of messaging. We have also worked alongside McKesson to update the screening algorithm as COVID-19 circumstances evolve.

Outcomes: This project is currently active in 67 INVIVA Clinics.

Links: Case Study: Inviva Rises To The Pandemic Challenge

Sanofi Genzyme: Medication Reminder Program

In partnership with Sanofi Genzyme, a medication reminder and education program was developed in 2010 for adults with lower phosphorus levels as a result of Chronic Kidney Disease. Recruitment was done via online advertising and enrollment was completed by Sanofi Genzyme online or via a faxed form from the patient. In the program, participants received up to one message per day which included content such as recipes that focused on kidney health.

Outcomes: Outcomes of this intervention are confidential.

Leo Pharmaceuticals: Pharma Intervention

A Pharma-based intervention was completed alongside Leo Pharmaceuticals for participants that were newly diagnosed with Actinic Keratosis in 2013. The population was typically over 40 years of age and prescribed Picato as their primary treatment. Recruitment was led by participating HCPs and was integrated with the existing STI/Copay program. Physicians would provide patients with a non-activated card with their prescription to participate in the program each with their own unique identifier. Patients could then complete enrollment and activate their card by inbound IVR or a web portal. In this medication reminder program, messages were scheduled on a predetermined sequence based on rigid dosing and outcomes requirements. Messages included reminders, educational content, and surveys in both English and French via SMS or IVR.

Outcomes: Results of this project were high patient satisfaction with the intervention and a self-reported increase in ease of use of the product.

Arizona State University: TEXT2COPE

In a 2013 collaboration with Arizona University, a pilot study titled TEXT2COPE was developed to establish the feasibility, acceptability, and preliminary effects of a mobile technology cognitive behavioural intervention. A study of healthy lifestyle behaviours of parents of overweight and obese preschoolers was delivered in a primary care setting. Recruitment was done by the clinical trial leader and enrollment was completed by the clinician through a web portal designed by MEMOTEXT. This reminder program delivered up to one message a day to participants containing supportive messages. The content was curated by Arizona University and was offered via SMS (Militello, Melnyk, Hekler, Small & Jacobson, 2016).

Outcomes: Self-reported findings indicate that the program is feasible and acceptable in the population. The intervention also showed significant improvements in parental knowledge about nutrition (P=.001), physical activity (P=.012) and in their behaviours towards engaging in healthy lifestyle choices for their children (P=.040) (Militello, Melnyk, Hekler, Small & Jacobson, 2016).

Link: Automated Behavioral Text Messaging and Face-to-Face Intervention for Parents of Overweight or Obese Preschool Children: Results From a Pilot Study

Biogen Idec Canada: AVOTALK

In partnership with Biogen Idec Canada, a free telephone reminder and education services called AVOTALK was created in 2008 for patients with Multiple Sclerosis who take the once-a-week prescription AVONEX. Eligible participants were typically between 18 and 30 years old. Patient recruitment was done via case manager through their call centre and those who opted in received reminders and educational information about self-injections of Avonex. Additionally, support was offered via a live nurse should the patient have any questions or concerns. Each patient was able to personalize the timing of delivery of a medication reminder sent via IVR or SMS and all message content was created in English and French by Biogen.

Outcomes: Outcomes of the intervention show an adherence rate of 100% (n=40) and a retention rate of 96.5%.

Links: The Real Cost of Patient Non-Adherence

5.0 Support Programs

Broward Regional Health Planning Council (BRHPC): Wellness Support Program

A wellness support program was developed in collaboration with BRHPC. For this program, eligible participants were already enrolled in a wellness program with BRHPC and MEMOTEXT was provided with client contact information. Participants received one SMS message per week focused on living a healthy lifestyle. This program was carried out from April to July of 2017 and concluded successfully.

6.0 COVID-19 Response Programs

MEMOTEXT: RapidResponse

In response to the spread of COVID-19 across North America's health systems, MEMOTEXT has developed a clinical-grade COVID-19 digital engagement response tool for outreach, assessment and follow-up**.** RapidResponse is a rapidly customizable

SMS/IVR (interactive voice response) and web-based tool that can adapt to changing risk, volumes and specific protocol needs. The tool engages with employees, students, parents, or patients to assess health risk and needs and provide recommendations and supports for resources to support one's health based on risk and rapidly changing needs. The customizable dashboard and reporting surfaces insights for providers, clinicians, employers, and administration. In use with employers, home healthcare and large clinics across North America, MEMOTEXT Rapid Response has shown significant reductions in call center times and increased engagement with employees, patients and seniors.

Outcomes: More than 10,000 proactive SMS, IVR, or email messages are sent out each day to patients, students, parents, and employees.
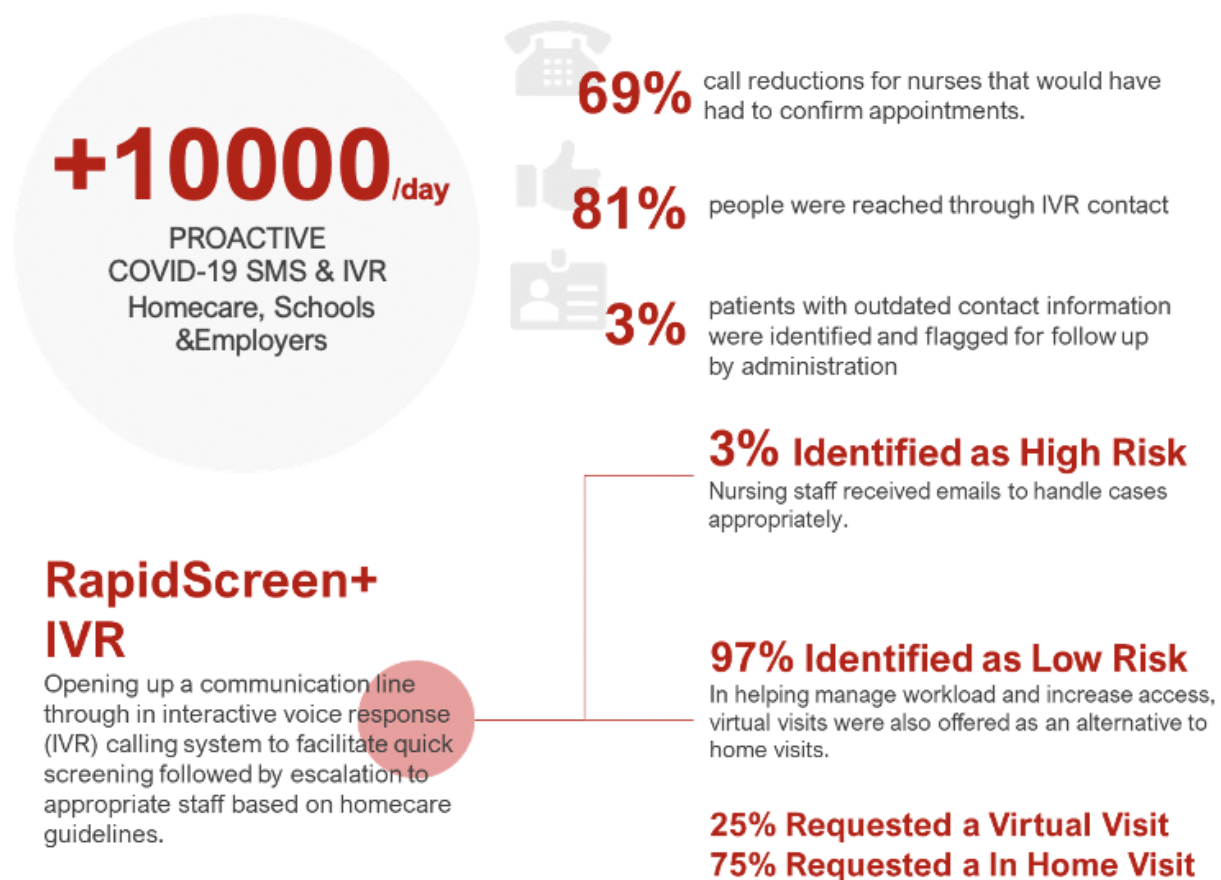
+10000/day
PROACTIVE
COVID-19 SMS & IVR
Homecare, Schools
&Employers

69% call reductions for nurses that would have had to confirm appointments.

81% people were reached through IVR contact

3% patients with outdated contact information were identified and flagged for follow up by administration

3% Identified as High Risk
Nursing staff received emails to handle cases appropriately.

97% Identified as Low Risk
In helping manage workload and increase access, virtual visits were also offered as an alternative to home visits.

25% Requested a Virtual Visit
75% Requested a In Home Visit

RapidScreen+ IVR
Opening up a communication line through in interactive voice response (IVR) calling system to facilitate quick screening followed by escalation to appropriate staff based on homecare guidelines.

Figure 9. RapidResponse Results

7.0 SMS Aggregation

Novartis: Gilenya Program

For Novartis, MEMOTEXT acts as an SMS aggregator for their Gilenya program targeting multiple sclerosis. For this program, Novartis created the message content and MEMOTEXT handled the SMS communication. Novartis led the recruitment process and completed the enrollment. This program is offered in English and French.

8.0 Quality Improvement Initiatives

MEMOTEXT: Balanced Adherence Metric

While the standard Proportion of Days Covered (PDC) metric quantifies adherence in patients with complex regimens, it may not accurately quantify other important dimensions of adherence. MEMOTEXT set out to combine PDC with Compliance Rate (CR), Delay to Refill, and Medication Persistence into a single, simple to interpret, metric which. The Balanced Adherence Metric (BAM) for claims data was created. This study showed that a mathematical combination of currently available adherence metrics may be more beneficial than either metric alone in objectively assessing adherence. Results were presented via poster (Figure 4) at the 2016 Pharmacy Quality Alliance (PQA) Annual Meeting & Innovation Forum in Arlington, Virginia.
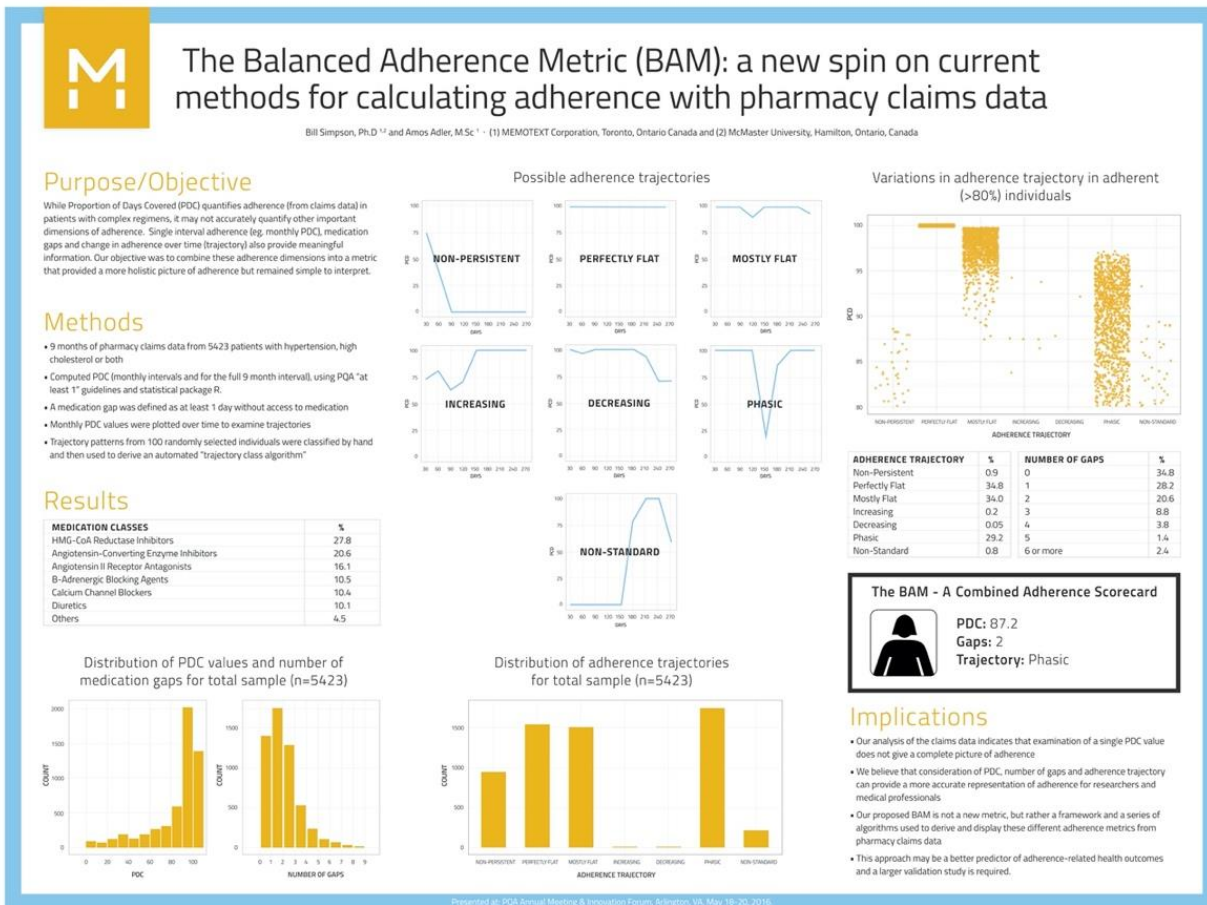
Figure 10. BAM 2016 poster presented at the Pharmacy Quality Alliance Annual Meeting & innovation Forum in Arlington, Virginia.

Conclusion

MEMOTEXT has been clinically and commercially validated since 2011 with solutions that are proven to improve adherence, provide efficiencies in care coordination, and empower provider decision support in commercial, clinical, and academic settings. Through the 30+ education, reminder, support, aggregation, application, and research interventions identified in this review, they have demonstrated expert abilities as a behaviour change engine that collects health data to personalize adherence solutions. Their highly customizable and evidence-based approach positions them to tackle the many challenges facing healthcare systems today.

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