



MEMOTEXT® Corporation

## **Type II Diabetes SMS Engagement for Patient Adherence to Oral Medications, Lifestyle and Diet**

**Walgreens Boots UK Case Study: 2018**

**Just-In-Time-Adaptive Intervention Messaging**

**MEMOTEXT, Restricted Document**

The information presented in this document is highly sensitive and confidential and is for use only by those to whom it has been provided. The information presented herein shall be treated as confidential and no part of it shall be disclosed. This document may not be reproduced, duplicated, or revealed, in whole or in part, or used in any other manner without the prior written permission of MEMOTEXT Corporation/MEMOTEXT LLC.

## MEMOTEXT Type II Diabetes Adherence Intervention Overview

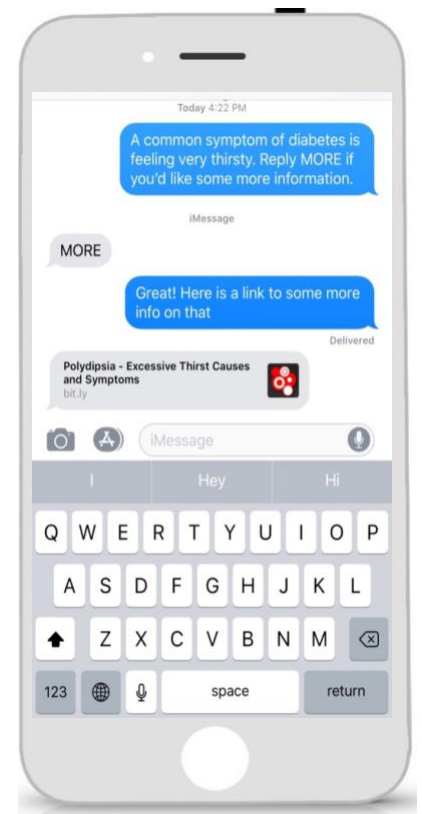
MEMOTEXT provides an affordable, scaled digital patient engagement service using adaptive telephone/voice/email/SMS based communications to individual customers subscribed to the service. Communications are short, personalized questionnaires, and are intended to identify customer attitudes towards health and potential barriers to following their medication/treatment regimen fully. Specific customer responses are used to adapt message flows to individuals.

**The objective is to maximize relevance, enhance beliefs and ultimately change medication adherence behavior.**

The Boots Diabetes Program took a proactive approach to recruit participants at pharmacy locations, targeting them based on their adherence behaviour. Patients who were identified as having low medication adherence for their diabetes treatment were approached at the point of sale by pharmacists. These pharmacists then provided information about the program, highlighting its benefits in supporting medication adherence through tailored messaging, reminders, and educational content.

The program aimed to engage participants with a tailored messaging system that included reminders, educational content, and motivational messaging. By addressing specific barriers to self-care and medication adherence, the program sought to empower individuals to manage their diabetes more effectively and reduce health disparities in this population. At program outset, patients are asked a series of questions based on the intervention rationale (see intervention rationale section).

Q1	Question 1, On a scale of 1-to-4, 1 being completely agree and 4 being completely disagree. <i>I understand what Diabetes is and how it is managed?</i>
Q2	Question 2, On a scale of 1-to-4, 1 being completely agree and 4 being completely disagree. <i>I understand what my Diabetes medicines do and how to take them?</i>
Q3	Question 3, On a scale of 1-to-4, 1 being completely agree and 4 being completely disagree. <i>I understand my diet recommendations, which foods to eat or avoid, and terms like glyceamic index?</i>
Q4	Next Question, On a scale of 1-to-4, 1 being completely agree and 4 being completely disagree. <i>I am confident that I can manage my diabetes so that it doesn't interfere with my everyday life.</i>
Q5	You're doing great! Question5, We know it's hard to always take your medication when you're supposed to, eat well and exercise – We're all human! On average, how often would you say you forget to take your medication or miss a dose for another reason? Press 1 for I never miss a dose, Press 2 for maybe once or twice a month I forget, Press 3 if you forget maybe once a week or Press 4 if you forget a few times a week.
Q6	Question 6, If you miss a does, what is the most common reason. Press 1 if you simply forget. Press 2 if you don't like the side effects of your medicines, Press 3 if you are simply too busy and it's a hassle or Press 4 if you don't understand what it's for or why you need it.
Q7	Last one, Now Press 1 for true or press 2 for false. <i>In the past 2 weeks I have had less interest or pleasure in doing things I usually like to do.</i>



## Sample Messaging

### Medication/Condition

D34	Diabetes is not caused by the body making too much sugar. Diabetes is caused by the body not making enough insulin or being unable to react to insulin. REPLY OK if you would like an Email with more information.	Email Avail.
D35	Being over-weight does strongly affects diabetes management.	
D36	Always talk to your doctor or pharmacist if you have a problem or question about your medication.	
D37	Even if you forget to take your diabetes medicines, it is important not to double dose.	
D38	Remember, your diabetes medications work even if you don't immediately or directly feel any changes.	
D39	Your diabetes medications work properly when taken consistently so you need to make medication-taking a habit & stick with it.	
D40	A common symptom of diabetes is feeling very thirsty. Reply OK if you'd like more info.	Email Avail.

### Inspirational - Motivational

I31	There are patterns of thought called 'self-talk'. Is your self-talk positive or negative? Recognize negative thought patterns and self-talk, and replace them with positive ones.	Email Avail.
I33	An important step in taking control of your feelings is considering what kinds of thoughts you are having. Are they positive or negative? And why?	Email Avail.
I34	You are not alone in trying to manage your health. Talk to friends and family, they may provide tips or advice you hadn't thought of.	
I35	When someone asks: "How are you feeling?" don't be afraid to tell them what you really feel.	
I37	What habits are you most interested in changing? Diet, stress, drinking, smoking? Let me know. Response is re-iterated back to patient.	

### Diet

D33	Drink plenty of water every day. This means aim to drink 8 glasses per day of water.	
D34	Trying to eat more healthily can seem daunting. In fact, by changing just a few eating habits you make a big difference to your diet. Remember, small changes add up.	Email Avail.
D35	Swapping whole milk for skimmed milk in your latte cuts the calories to almost half.	Email Avail.
D36	Swap a bag of crisps for home-made low-fat popcorn, it's easier to make than you might guess.	
D37	Once you find (low-fat) healthy foods you enjoy eating, stock up on them and take them with you when you leave the house.	

### Lifestyle/Physical Activity

L32	Exercise is a great stress buster. Unwind with some physical activity today. Press 5 for an easy stretch routine to be sent to you. Always ask your doctor before starting a new physical activity.	Email Avail.
L33	Exercise can help you lose weight and improve your mood.	Email Avail.
L34	Even a little bit of activity can lower the risk of developing major chronic diseases, such as coronary heart disease, stroke and others.	Email Avail.
L35	Walking and swimming are great ways of getting exercise, especially for those just beginning to exercise. Talk to your doctor before beginning an exercise program.	Email Avail.
L36	Even though exercising uses up energy, it can make you have more energy in the long-run.	Email Avail.
L37	Regular physical activity helps keep your bones strong.	Email Avail.

## Type II Diabetes MEMOTEXT Intervention Rationale

The MEMOTEXT Intervention Model is based on two well-known theories that attempt to explain why individuals do or do not engage in health behaviours: The Health Belief Model (Becker, 1974) and Social Cognitive (Learning) Theory (Bandura, 1986). The Health Belief Model emphasises that health behaviours are influenced by i) perception of the individual’s susceptibility to a health problem, ii) perception of the severity or seriousness of the health problem, iii) perception of the effectiveness and tolerability of the treatment (including benefits of treatment and barriers to adherence), and iv) cues to take action. Social Cognitive Theory stresses the importance of the individual’s thoughts and perceptions related to the behaviour such outcome expectancies and self-efficacy.

### Overview of inputs into Intervention model:

Variable Factors	Fixed Measure
a) Literacy	1. Demographics
b) Perceptual Barriers	2. History
c) Self Efficacy & Locus of Control	3. Baseline Self Reported Adherence
d) Depression	4. Practical Barriers (complexity of treatment regimen)
	5. Intent

Figure 1: Factors that Influence Medication Adherence

Based on the theoretical models of health behaviours outlined in the previous section, MEMOTEXT has identified fixed and variable factors that influence medication adherence (see Figure 1 above). The goal of the MEMOTEXT intervention is to assess an individual’s variable factors (i.e., the ones we can influence) and then tailor messages based on each individual’s unique combination of these factors. The rationale for assessing each variable factor is presented below, followed by the specific questions that will be used to tailor the intervention/messages (or message content).

### **Healthy-Literacy**

Literacy, especially diabetes-specific functional health literacy, is a major issue in diabetes treatment adherence. Several studies have found associations between low literacy, poor functional health literacy and diabetes (Adams et al., 2009; Jeppesen et al., 2009). Misinformation about diabetes and diabetes treatment (including medications) can form perceptual barriers, outlined in the next section, which in turn decrease treatment adherence. However, in order to effectively inform individuals and break down perceptual barriers an educational intervention must be tailored to the individual’s level of understanding.

Examples of Health Literacy Questions: Using questions to determine level of understanding about diabetes and how it is treated:

1. Do you know what all these terms mean: blood glucose, carbohydrates, glycemic index?
2. Do you ever have trouble understanding how to take your medication?
3. Do you ever have a hard time understanding how to manage your diet or what foods to eat?

#### 4. Myth Debunking -True or False? You only have diabetes when you don't feel well.

Individuals will be classified as either having high or low health literacy and messages containing information about diabetes and medication will match literacy levels.

## **2. Barriers to Adherence**

A number of barriers to medication adherence have been identified in the literature and these can be broadly characterised as 'practical' or 'perceptual' barriers. Practical barriers include memory difficulties and treatment regimen complexity while perceptual barriers relate to the individual's perceptions about their disease and its treatment.

The most common barriers to diabetes medication adherence include: forgetting pills or prescription refills, medication side-effects (including tolerability, worry about long-term effects), non-confidence that the medicine will help/lack of appreciation of the benefits, lack of appreciation/misinformation of the consequences of non-adherence (including that diabetes is not a serious problem), lack of social support (including someone to ask questions about medications and support from family/friends), not understanding medication-taking instructions/inability to read & understand pill bottle labels, not feeling part of the decision-making/goal-making process, medications costs, and complex medication regimens (Pollack et al., 2010; Daly et al., 2009; Walker et al., 2006; Nagelkerk et al., 2006).

Practical barriers endorsed will signal messages focused on memory-related tactics/suggestions and/or simplification of medication regimen (if possible). Perceptual barriers endorsed will signal messages providing easy-to-understand information about diabetes and the medications and strategies to help the individual incorporate better health behaviours into their lifestyle.

### **Examples of Questions Related to Adherence Rates & Barriers to Adherence:**

1. Do you ever forget to take your medications?
2. When you feel better do you sometimes stop taking your medicines?
3. Sometimes, if you feel worse when you take the medicine, do you stop taking it?
4. What are the most common reason(s) you don't take your medication? (with pre-selected options & a frequency scale)

Low adherence rate (high risk) - will receive messages focused on educational content & encouragement of positive behaviours. High adherence rate - will receive messages focused on habits/maintenance of positive behaviours.

## **3. Self Efficacy & Locus of Control**

Self efficacy is the belief that one is capable of performing/acting in a certain manner to attain certain goals (and/or the belief that one's actions have an effect on the environment – or the outcome). In patients with diabetes, self efficacy is consistently associated with diabetes-related self-care behaviours including, but not limited to, medication adherence (Sarkar et al., 2006; Aljaseem et al., 2001; Kavanagh et al., 1993). Furthermore, diabetes-specific interventions can improve self efficacy levels, and these in turn have been associated with increases in (positive) diabetes-related health behaviours (Trief et al., 2009; Anderson et al., 1995).

## Examples of Self-Efficacy Questions:

1. How often do you have difficulty following your diet recommendations?
2. How confident are you that you can choose appropriate foods to eat when you are hungry (or snacking)?
3. How confident do you feel that you can control your diabetes so that it does not interfere with the things you want to do?

Low self-efficacy – messages will focus on education, encouragement and self-empowerment. High self-efficacy – messages will focus on the importance of continued efforts and actions.

## **4. Depressive Symptoms**

In a large cohort that followed poorly-controlled diabetics over a 5-year period, depression was associated with increased rates of non-adherence to diabetes control medications, antihypertensives, and LDL control medications (Katon et al., 2009). Likewise, Moreau et al. (2009) found self-reported treatment non-adherence (in diabetics attending general practitioners' offices) was associated with depression, poor diabetes control (greater HbA1c levels, increased BMI), young age, single life, and perception of medication as a constraint. Another large study in an out-patient setting found that while rates of probable depression were high (19%) and were significantly associated with a 2.3-fold increased odds of missing medication doses in the previous week, levels of depressive symptoms were an even better predictor of medication non-adherence (Gonzalez et al., 2007). Thus even a small amount of depressive symptoms can have a significant negative impact on rates of medication adherence.

## Examples of Depression Screening Questions:

1. In the past two weeks, I have felt sad, down, blue, or helpless...
2. In the past two weeks, I have had less interest or pleasure in doing things I usually like to do... **OR**
3. In the past two weeks, I have looked forward to and been enjoying things less than usual...

Individuals experiencing significant levels of current depressive symptoms will receive messages based on cognitive behavioural theory (CBT) for depression, motivational messages using positive reinforcement and active listening techniques when eliciting feedback. In addition, recommendations for speaking to a physician will be made about how an individual is feeling.

## Outcomes and Results

**Pre-post and inter-program surveys demonstrated that the program resulted in improved health-related knowledge, self-efficacy, quality of life AND medication adherence.**

Pairwise data analysis confirmed preliminary findings of increased knowledge of diabetes management, medications and dietary recommendations with use of the program. There was a trend for patients to feel even more confident in their diabetes management while on the program longer. There was a dramatic decrease in self-reported rates of missing a medication dose, especially in the least-adherent patients.

Intervention	Overview	Results/Publications
<b>Oral Diabetes Medication &amp; Testing Adherence</b>	<ul style="list-style-type: none"> <li>Real time adaptive mood, literacy, lifestyle, diet, med / testing adherence messaging</li> <li>Based on self-efficacy, literacy, depression intake assessments &amp; claims</li> <li>Bot based validated intake</li> <li>Prediabetes module for @risk population</li> </ul>	<ul style="list-style-type: none"> <li>80% improvements in diabetes literacy, self efficacy pre/post</li> <li>75% felt better, healthier, happier</li> <li>↓ from 50% to 25% missed a dose 1x /week or more</li> <li>Refill avg 3.2 days earlier than control</li> </ul>

Findings of increased rates of medication-related side effects was verified suggesting that better medication adherence may be associated with more reported side effects. This represents an important area of potential intervention – future programs could adjust messaging to focus on explaining which side effects are common, how they can be avoided or mitigated.

It was also verified that the same individuals do change the focus of their diabetes management over time. This finding speaks to the importance of (or need for) **interactivity** in a successful intervention; patients need a dynamic program. This lends support to our use of a weighting system, in the current program, based on patients’ responses in real time.

Adherence related data was confirmed by analysis of refill data. Patients refilled their next prescription 2.6 days earlier when on the program. Patients picked up on average 56 more pills in the 6 months while on the program.

**Claims (Refill Based) Medication Possession Ratio (MPR) Analysis:**  
**Adherence improvements +55% improvements vs. historical**  
**Improved same store loyalty + patients filled on avg 3.2 days earlier**



UP TO 55% CHANGES IN MPR



RETENTION RATES

