Communication-Focused Technologies:

Health Messages for HIV-Positive Men Who Have Sex With Men

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Final Report

Communication-Focused Technologies: Health Messages for HIV-Positive Men Who Have Sex With Men

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None of the investigators has any affiliations or financial involvement that conflicts with the material presented in this report.

Preface

This project was funded as an Accelerating Change and Transformation in Organizations and Networks (ACTION) task order contract. ACTION is a 5-year implementation model of field-based research that fosters public–private collaboration in rapid-cycle, applied studies. ACTION promotes innovation in health care delivery by accelerating the development, implementation, diffusion, and uptake of demand-driven and evidence-based products, tools, strategies, and findings. ACTION also develops and diffuses scientific evidence about what does and does not work to improve health care delivery systems. It provides an impressive cadre of delivery-affiliated researchers and sites with a means of testing the application and uptake of research knowledge. With a goal of turning research into practice, ACTION links many of the Nation's largest health care systems with its top health services researchers. For more information about this initiative, go to http://www.ahrq.gov/research/action.htm.

This project was one of three task order contracts awarded under the *Communication-Focused Technologies* request for task order (RFTO). The goal of this RFTO was to develop and test proof-of-concept projects that leverage innovative communication-focused technologies to improve access to care, service quality, or patient safety in ambulatory settings. Of particular interest were projects that made innovative use of communication-based technologies, were person-centered, focused on hard-to-reach populations, and addressed ambulatory care issues.

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Chapter 1. Introduction

This study aimed to develop, implement, and test a short message service (SMS)-based intervention to improve health care quality and outcomes among patients treated in an ambulatory care setting. The intervention provided tailored health-communication messages for HIV-positive men who have sex with men (MSM) aged 25 and older. The messages focused on improving medication adherence and appointment attendance, reducing risk-taking behaviors, and enhancing social support, general health and well-being, and patient involvement.

This chapter describes the proliferation of cell phone use in the United States and the potential suitability of SMS to enhance self-management of long-term conditions resulting in better quality care, improved patient outcomes, and lower costs. It also introduces the concept of tailored health-communication messages as the focus of an intervention delivered via SMS. The rationale for this approach is that tailored health-communication messages are consistent with patient-centered care because both are responsive to the needs and preferences of individuals and consequently may enhance the ability of patients to self-manage their conditions, leading to increased functionality and a higher quality of life. Additionally, this chapter provides background on the current scope of the HIV/AIDS epidemic in the United States.

Cell Phones and Text Messaging

Among the general U.S. population, 83 percent of adults own a mobile phone.[1] Mobile phone ownership is higher among younger adults than older adults, higher among men than among women, and increases with higher levels of education and income.[2] However, there are no significant differences in mobile phone ownership by race or ethnicity. Regardless of these overall differences, socioeconomically disadvantaged populations, less educated young adults, and people who rent or frequently change addresses have been identified as having high rates of cell phone use.[3] Furthermore, higher levels of cell phone use have been associated with lower levels of self-reported health status and participation in health-compromising behaviors.[3] As the use of cell phones has increased, so has their functionality. SMS allows for instantaneous delivery of short messages (up to 160 characters) directly to individuals at any time, place, or setting via their cell phones, and it has rapidly become a common mode of communication.

Given the pervasiveness, low cost, and convenience of the technology, SMS messages may be particularly well-suited for supporting the treatment of diseases or conditions that must be managed over an extended period.[4] For example, SMS technology may enable providers to monitor patients' health and track and guide their self-care beyond the clinical setting via timely, personalized feedback and support for self-care. SMS messaging not only facilitates more frequent communication with patients, but also offers the opportunity to deliver health-related messages at precisely the times and places where these messages can have the greatest impact, such as medication reminders consistent with an individual's dosing schedule.

Over the past few years, many health-related applications for mobile phones have been developed; however, many were developed and implemented outside of the United States where mobile phone use is more common and, in general, mobile phone networks are more pervasive and advanced than they are in the United States. Most of these applications are new, and few have been rigorously evaluated in large, controlled trials; consequently, evidence regarding their effectiveness is limited.[3,5] Additionally, it is important to recognize that applications developed

and implemented in other countries may not translate well in the United States because of differences in health care and technological infrastructures.

Tailored Health-Communication Messages

SMS messages can be customized and tailored to fit the needs of specific individuals. Tailored health-communication messages refer to "any combination of information and behavior change strategies intended to reach one specific person, based on characteristics that are unique to that person, related to the outcome of interest, and derived from an individual assessment."[6] A growing body of evidence shows that tailored messages are more effective than nontailored messages because tailored messages appear to be more likely to catch the individual's attention, be read and remembered, saved, discussed with others, perceived as interesting, be personally relevant, and have been written especially for them.[6] Tailored health communication is consistent with patient-centered care, which is responsive to the needs and preferences of individuals. It facilitates communication between patients and providers and helps patients to empower themselves to be active participants in decisions about their care and daily management of their health. Meeting patients' individual needs for information about their health may improve communication with their providers and enhance their ability to self-manage long-term conditions by increasing their ability to follow medication, monitoring, and other regimens for healthy living.

The HIV/AIDS Epidemic in the United States

After more than a quarter century into the HIV/AIDS epidemic, HIV prevalence in the United States is higher than it has ever been. The CDC estimates that more than one million adults and adolescents are currently living with HIV in the United States.[7] Furthermore, HIV incidence has remained relatively stable since the late 1990s, with approximately 56,000 people becoming infected annually.[8]

MSM continue to be severely and disproportionately affected by the HIV/AIDS epidemic. Although MSM represent approximately 2 percent of the U.S. population, they accounted for 53 percent of all new infections in 2006.[8] Furthermore, there has been a reversal in the downward trend of HIV diagnoses among MSM.[9] Estimated diagnoses of HIV infection increased approximately 17 percent among MSM from 2005 to 2008, after a period of decline from the 1980s to 1990s.[7]

The availability of effective antiretroviral therapy (ART) has altered the HIV epidemic from being an acute disease to a chronic, manageable condition for many people living with HIV (PLWH).[10] A number of factors contribute to an individual's ability to effectively manage his or her condition, including medication adherence, access to and active involvement in one's medical care, reducing or eliminating risk behaviors, having adequate social support, and general health and well-being, such as eating a nutritious diet, getting daily exercise, and adequate rest.

Adopting and maintaining healthy behaviors and a medication regimen over a lifetime can be challenging for anyone and may require ongoing behavioral reinforcement to prevent relapse. A tailored health-communication intervention delivered via SMS messaging may be one avenue by which to provide the ongoing reinforcement that will result in higher health care quality, better outcomes, and lower long-term costs.

Overview of This Report

This document describes the development of the SMS intervention and the methods used to implement and evaluate the intervention with a sample of HIV-positive MSM patients from the Howard Brown Health Center (HBHC) in Chicago, IL. It also presents the evaluation results, discusses the key findings and lessons learned, and suggests areas for future research.

Chapter 2. Intervention

Drawing on the ubiquity and flexibility of SMS, we developed, implemented, and tested an SMS-based intervention that aimed to improve health care quality and outcomes among HIV-positive MSM treated in an ambulatory care setting. The intervention provided messages focused on improving medication adherence and appointment attendance, reducing risk-taking behaviors, and enhancing social support, general health and well-being, and patient involvement (Figure 1). This proof-of-concept study focused on MSM because of the disproportionate burden of HIV/AIDS among this population.

Figure 1. Conceptual model illustrating domains of SMS intervention and link to health care quality and outcomes
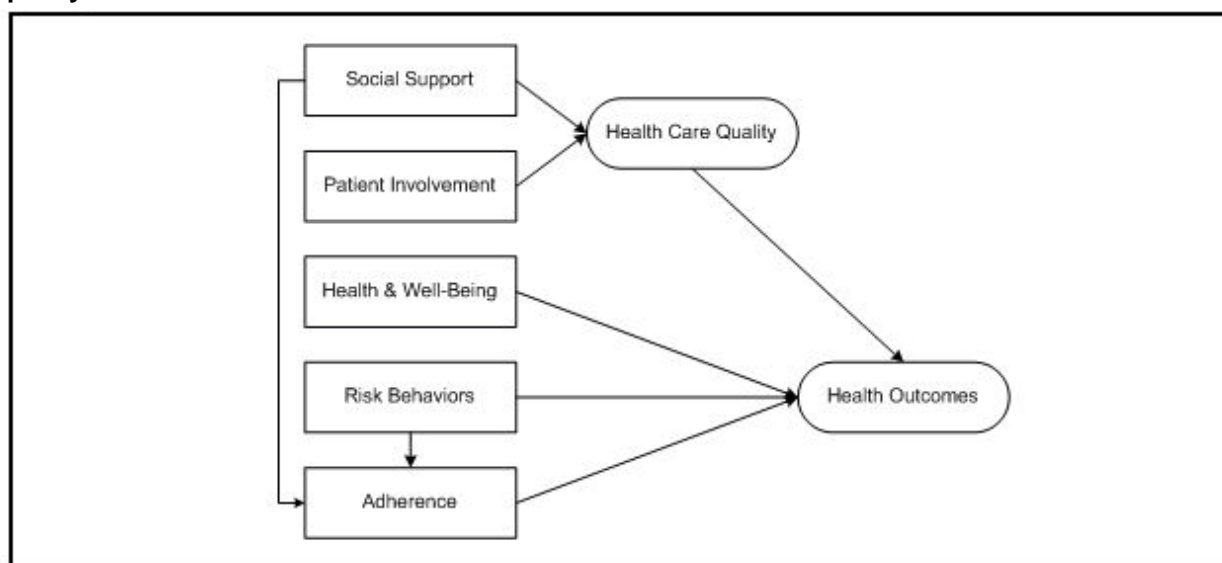
Our target clinical and systemic goals were to develop an intervention that—

- Is straightforward, relatively inexpensive, and easily transferable for implementation in any ambulatory care setting treating HIV-positive MSM.
- Once developed, requires minimal staff time to implement in an ambulatory care setting.
- Is viewed as acceptable and useful by MSM living with HIV.
- Changes targeted knowledge, attitudes, beliefs, intentions, and behaviors in the desired direction.
- Increases medication adherence and appointment attendance.
- Positively influences health care quality and outcomes for MSM living with HIV.

Message Content

We developed the message content for the intervention by beginning with a set of draft HIV prevention messages developed previously using a systematic formative research process for

HIV-positive individuals. First, we mapped each of the existing messages to the nine topic areas included in the current intervention. This process enabled us to identify gaps and to develop additional messages to fill those gaps. The draft messages were reviewed by three experts with extensive experience developing, implementing, and evaluating HIV prevention interventions for gay men and providers at HBHC. The messages were revised based on the experts' and providers' feedback. Finally, we qualitatively pretested the messages using in-depth, one-on-one interviews with eight HIV-positive MSM aged 25 or older in the Raleigh-Durham, NC, area; incorporated the participants' feedback; and finalized the messages. Each topic area and the message delivery schedule by topic is described below.

Medication adherence. Participants who reported a history of medication nonadherence in the week prior to the baseline assessment or who began ART within the past 6 months received messages designed to complement their prescribed regimen. For example, patient-customized notifications were used to remind participants daily to take their medications, consistent with their clinical dosing schedule, which is generally 1–3 times per day. For those participants who are nonadherent or are just beginning ART, the medication reminder messages were the most frequent type of message they received. Participants who were therapeutically adherent also received adherence messages on a weekly basis that encouraged them to continue taking their medications as prescribed.

Appointment reminders. All participants received clinical and behavioral health appointment reminders as part of the intervention. Appointment reminders were sent as SMS messages 1–3 days prior to the participant's scheduled appointment.

Sexual risk reduction. Participants who reported at least one sex partner in the past 3 months received messages designed to reinforce condom use and communication with sex partners about HIV and other sexually transmitted infections (STIs). Messages regarding sexual risk reduction were sent on Saturday evenings, when participants might be likely to engage in sexual activity.

Substance use risk reduction. Considering substance use behaviors within the past 3 months, participants who reported drinking an alcoholic beverage 2 or more times per month, binge alcohol use at least once a month, or any illicit drug use received messages to reduce use or harm. Messages regarding substance use risk reduction were sent on Friday evenings, when participants might be likely to engage in alcohol or drug use.

Sexual and substance use risk reduction. Because risky sex and substance use often co-occur, we developed a separate set of messages for Saturday evening delivery. Participants who reported any co-occurrence of substance use and sexual activity within the past 3 months received messages designed to reduce harm.

Cigarette smoking. Because smoking cigarettes weakens the immune system in persons with HIV/AIDS, we included smoking cessation messages in our menu of messages. Participants who reported current cigarette smoking received cessation messages every Thursday.

General health and well-being. We anticipated that all study participants would benefit from periodic messages designed to promote healthy living by stressing the value of a lifestyle in which, for example, reduction of stress, improved nutrition, and moderate physical activity are associated with an enhanced quality of life. These messages were delivered to all participants every Wednesday to complement the other messages participants received.

Social support. In addition to general social support messages delivered every Sunday, we cataloged available social support resources sponsored by HBHC, including HIV support groups, substance abuse groups, health and well-being forums, and other meetings/events of interest.

Based on their demographic and preintervention assessment survey responses, participants were notified of support groups, including meeting schedules and contact information for joining.

Patient involvement. All participants received messages aimed at helping them to empower themselves to be active health care consumers. These messages were delivered to all participants on Thursdays.

Dynamic Tailoring Via Two-Way Text Messaging

A unique feature of our design was the use of bidirectional messaging to support interactions with study participants and dynamic tailoring of content throughout the intervention. We asked questions of all participants throughout their exposure to the intervention, and their responses were used to update the content they received, when appropriate. Three types of questions were administered via two-way SMS: weekly medication adherence assessment, process questions, and sexual and substance use risk-reduction reassessment.

Weekly medication adherence assessment. Every Sunday evening, participants were asked if they missed any ART doses in the preceding week. Participants were asked, "Over the past 7 days, on how many days did you miss a dose of medication? Please text us back the number of days you missed a dose (0–7)." Responses were processed to determine whether individuals had been adherent to their regimen. Every Monday, participants were sent appropriate responses. Adherent participants received a supportive response to continue, and nonadherent individuals received encouragement to comply with their regimen in the week ahead. If at any time during the program an adherent participant reported a missed dose, we began sending medication reminders to them for the duration of the intervention.

Process questions. Nine questions specific to intervention satisfaction, including feedback on the frequency of messaging and the relevance of content, were asked of all participants. In an effort to distribute the response burden, these messages were delivered twice weekly throughout weeks 6 through 9. Participants were asked the following questions to assess process:

- How often do you read the text messages you get from HB?
  Text 1A = always, 2A = usually, 3A = sometimes, 4A = never
- Do you like the messages you are receiving from HB?
  Text 1B = yes, 2B = no
- How often are the HB messages sent at the right times?
  Text 1C = always, 2C = usually, 3C = sometimes, 4C = never
- How do you feel about the number of text messages you get from HB?
  Text 1D = too many, 2D = about right, 3D = not enough
- Are the message topics you get from HB interesting to you?
  Text 1E = very, 2E = somewhat, 3E = a little, 4E = not at all
- How often do you use the info in the text messages from HB?
  Text 1F = always, 2F = usually, 3F = sometimes, 4F = never
- How helpful are the text messages you get from HB?
  Text 1G = very, 2G = somewhat, 3G = a little, 4G = not at all
- Do you feel like the HB messages were written for you?
  Text 1H = yes, 2H = no

Sexual and substance use risk-reduction reassessment. A reassessment of risk-taking behaviors related to sexual activity and substance use (as described above) was asked of all participants on days 36 and 64 of the intervention. Participants were asked the following questions to reassess risk:

- In the past 4 weeks, have you had 5 or more drinks of alcohol within a couple of hours (e.g., 2–4 hours)?
  Text 1 = yes, 2 = no, 3 = don't remember
- In the past 4 weeks, have you used recreational drugs (e.g., pot, meth, cocaine, or heroin)?
  Text 1 = yes, 2 = no, 3 = don't remember
- In the past 4 weeks, have you had sex *without a condom* with any of your sex partner(s)?
  Text 1 = yes, 2 = no, 3 = don't remember
- In the past 4 weeks, have you used alcohol or drugs before or during sex? Text 1 = yes, 2 = no, 3 = don't remember

"Yes" and "don't remember" responses were analyzed and used to initiate sending risk-reduction messages to those individuals who did not initially qualify for receiving messages in these categories.

The message delivery schedule in Table 1 illustrates the distribution of messages by topic and by day for the 13-week SMS intervention.

Table 1. Message delivery schedule by topic

Topic	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Medication Reminder	X	X	X	X	X	X	X
Appointment Reminders	ad hoc	ad hoc	ad hoc	ad hoc	ad hoc	ad hoc	ad hoc
Rx Adherence Assessment	X						
Rx Adherence Response		X					
Patient Involvement		X					
Health and Wellness				X			
Smoking Cessation					X		
Substance Risk						X	
Sexual Risk							X
Sex & Substance Risk							X
Risk Questions	X Days 36 & 64						
Process Questions			X Weeks 6–9		X Weeks 6–9		
Tailored Social Support		X Days 9–19	X Days 9–19	X Days 9–19	X Days 9–19	X Days 9–19	

Message Classes

The complexity of our intervention required us to design a flexible approach to tailoring the messages received by each participant. As described in the previous section, the core content includes medication adherence, appointment reminders, sexual risk reduction, substance use risk reduction, smoking cessation, general health and well-being, social support, and patient involvement. To be responsive to the RTI Institutional Review Board (IRB) conditions permitting subjects to opt out of any category of message and to manage each subject's personal preferences for customizing medication adherence messages, the core content was parsed into 24 message classes for processing and programming purposes (Table 2).

Table 2. Message class architecture

Class Number	Text Name	Notes	Time to Send
1	Weekly Adherence Question	Weekly on Sunday. All participants will be set up to receive this when their account is created.	17:00
2	Took All Response to #1	Will come in with Monday data. 1 message for following Tuesday. Message depends on place in cycle.	16:00
3	Missed Response to #1	Will come in Monday data. 1 message for following Tuesday. Message depends on place in cycle.	16:00
4	Rx Daily Adherence	Different message each day for 7 days. Repeats weekly throughout program. A single custom message is optional. A custom time can also be defined by the participant.	15:00
5	Rx A.M. Adherence	Different message each day for 7 days. Repeats weekly throughout program. A single custom message is optional. A custom time can also be defined.	08:00
6	Rx P.M. Adherence	Different message each day for 7 days. Repeats weekly throughout program. A single custom message is optional. A custom time can also be defined.	21:00
7	Sex Risk	Different message every Saturday.	22:00
8	Substance Risk	Different message every Friday.	22:00
9	Sex & Substance Risk	Different message every Saturday.	22:00
10	Smoking	Different message every other Thursday, starting second Thursday.	10:30
11	General Health & Wellness	Different message every Wednesday. All participants will be set up to receive this when their account is created.	10:00
12	General Social Support	Different message every Sunday. All participants will be set up to receive this when their account is created.	14:00
13	Patient Involvement	Different message every Monday. All participants will be set up to receive this when their account is created.	09:30
14	Process Question	Different questions days 38, 40, 45, 47, 52, 54, 59, & 61. All participants will be set up to receive this when their account is created.	12:30
15	Substance Question	Question at days 36 & 64.	10:30
16	Sex Question	Question at days 36 & 64.	11:30
17	Substance & Sex Question	Question at days 36 & 64.	12:30
18	General Social Support	Different messages days 9, 10, 11, & 12.	12:30
19	Tailored Social Support 1	Message delivered day 13.	12:30
20	Tailored Social Support 2	Different messages days 14 & 15.	12:30
21	Tailored Social Support 3	Message delivered day 16.	12:30
22	Tailored Social Support 4	Message delivered day 17.	12:30
23	Tailored Social Support 5	Message delivered day 18.	12:30
24	Tailored Social Support 6	Message delivered day 19.	12:30

Rapid Tailoring Process

New participants were enrolled in the study every Friday throughout the 4-month recruitment phase. The tailoring algorithm is shown in Appendix A. This Rapid Tailoring Process used data from the HBHC-administered screener, the Message Tailoring Form, and the preintervention survey to create a unique text message profile for each subject. A Rapid Tailoring Form (Table 3) was used to code the critical values from these three data sources into an electronic tailoring worksheet and to manually create each participant profile. This process is referred to as "rapid" tailoring because of the time constraints on our research staff to carry out the post-processing of the data collected through the screening and enrollment visits in order to begin sending messages to participants every Saturday.

Table 3. Rapid tailoring form

Message class	Topic	Source
2	Response: Adherent	Q24 = 1
3	Response: Nonadherent	Q22 = 1 and (Q23 = 1 or Q24 ≠ 1)
4	Rx Adherence Daily	Q22 = 1 and (Q23=1 or Q24 ≠ 1) and Q26 = 2, 3, 5, 6
5	Rx Adherence A.M.	Q22 = 1 and (Q23 = 1 or Q24 ≠ 1) and Q26 = 1
6	Rx Adherence P.M.	Q22 = 1 and (Q23=1 or Q24 ≠ 1) and Q26 = 4
7	Sex Risk	Q44 ≥ 2
8	Substance Risk	Q58 ≥ 3 or Q59 ≥ 2 or Q61a-g ≠ 2
9	Sex & Substance	Q45 ≠ 1
10	Smoking	Q56 ≠ 2
15	Substance Question	All receive
16	Sex Question	All receive
17	Sub/Sex Question	All receive
4	Custom Time (Daily)	Q26a, worksheet
5	Custom Time (A.M.)	Q26a, worksheet
6	Custom Time (P.M.)	Q26a, worksheet
18	General Social Support	All should receive these messages
19	Older Adults, 50+	Screener, Q1 ≥ 50
20	Newly Diagnosed	Q19a1, Q19a2 ≤ 6 months of survey date
21	Long-time Positives	Q19a1, Q19a2 > 6 months of survey date
22	African-American MSM	Screener, Q2 = Black or African American
23	Latino MSM	Screener, Q3 = Hispanic
24	Young Adults	Screener, Q1 = 25–29 years old

Chapter 3. Methods for Implementation and Evaluation

This section describes the methods used to implement and evaluate the intervention.

Implementation Methods

The SMS communication protocol is most commonly used for person-to-person messaging; however, messages also can be sent using Web-based SMS gateway providers. Gateways facilitate the traffic between the message originator and mobile subscribers and are mainly responsible for passing-through messages that are disseminated from the Web. We are working with an SMS gateway service provider, Intelecare Corporation, to modify the software components required to administer and transmit SMS messages among multiple users.

Whenever possible, design and development activities were informed by the standards and recommended practices for software engineering, as issued by the Institute of Electrical and Electronics Engineers. Specific guidance regarding preliminary technical design descriptions, requirements documentation, verification and validation methods, and project quality assurance planning were applied. To best protect participants, RTI and Intelecare complied with the standards described in the U.S. Consumer Best Practice Guidelines for Cross-Carrier Mobile Content Programs developed by the Mobile Marketing Association. Applying such standards reflects an appreciation for state-of-practice recommendations in developing and maintaining the software required for this project.

Our design and development approach comprised a three-phase process: concept development and requirements capture, design and implementation, and system testing.

Concept Development and Requirements Capture

In the concept phase, the project team finalized the vision for the technical aspects of the project and developed a set of general requirements. The following characteristics were captured during the concept development phase and have been applied.

- **General requirements**
  – The intervention will reach a minimum of 50 study subjects over a 6-month period from the start date and support two-way messaging for all subjects enrolled.
  – A method for tailoring unidirectional and bidirectional content will be established.
  – All data collected throughout the intervention will be stored and transferred in a secure manner.
  – Web access to the gateway manager shall be limited, password controlled, and encrypted.

- **Research staff system interactions shall be supported in the following means:**
  – A Web-based portal will provide access to all subjects enrolled and permit real-time updates to the message content sent to all subjects.

- A method for uploading tailored participant profiles will be established to auto-enroll new study subjects weekly, including—
  1. Subject PIN
  2. Mobile phone number
  3. Message class assignments
  4. Start date
  5. End date
- A method will be established for downloading participant responses to questions transmitted to study subjects for processing.
- A method will be established for uploading data based on participant responses to two-way interactions.

- **Message management/transmission**
  - Multiple groups of messages will be sorted by message class, and tailored class assignments will be attributed to each participant.
  - Distribution will be automated, and customizable delivery options can be modified to alter message transmission intervals or frequencies.
  - A messaging script will be developed for 90-days exposure for each message class.
  - Modification of messaging script will be conducted on days 35 and 64, based on participants' responses to risk reassessment questions.
  - Activation of medication adherence reminders for any participant will be supported at any time throughout the implementation phase.

- **Reporting**
  - The project team will receive access to individual confirmation records or reports of messages sent.
  - Reports of total system activity for the intervention period will be provided, to include total messages sent, confirmations, and messages received.

- **Study subjects**
  - Participants have the ability to opt out of the study at any time through the on-site Study Coordinator.
  - Participants have the ability to opt out of any particular message class at any time through the on-site Study Coordinator.
  - Participants can specify a "do not text" timeframe (e.g., 00:00–08:00hr).

Design and Implementation

As described in Chapter 2, message classes were developed to support tailoring content for participants. Message content, tagged by class and day of intervention, comprised the technical script for this 90-day, automated intervention. The most significant effort in preparing for the implementation was establishing a common vocabulary and series of processes and documentation to support data exchange between RTI and Intelecare.

Both incoming and outgoing data from RTI were formatted based on the output of the Rapid Tailoring Process described in Chapter 2 and converted to an XML "UserList" that includes the

items listed in Table 4. The UserList was posted by 10 p.m. every Saturday throughout the implementation phase. To facilitate the transfer of the UserList, a File Transfer Protocol (FTP) site that used a 256-bit Advanced Encryption Standard (AES) connection was used to post the data directly to the SMS gateway.

Table 4. UserList XML file format for enrollment data

Position	Example	Name
0	1234	User ID
1	307-690-5477	Cell Number
2	1/0	Inclusion Class #2
3	1/0	Inclusion Class #3
4	1/0/Custom Msg	Inclusion Class #4
5	1/0/Custom Msg	Inclusion Class #5
6	1/0/Custom Msg	Inclusion Class #6
7	1/0	Inclusion Class #7
8	1/0	Inclusion Class #8
9	1/0	Inclusion Class #9
10	1/0	Inclusion Class #10
11	1/0	Inclusion Class #15
12	1/0	Inclusion Class #16
13	1/0	Inclusion Class #17
14	15:00	Custom Time for #4
15	08:00	Custom Time for #5
16	21:00	Custom Time for #6
17	*	Inclusion Class #18
18	1/0	Inclusion Class #19
19	1/0	Inclusion Class #20
20	1/0	Inclusion Class #21
21	1/0	Inclusion Class #22
22	1/0	Inclusion Class #23
23	1/0	Inclusion Class #24

System Testing

Prior to initiating system testing, testing of the code base and individual components of the system was handled by Intelecare, as a term of their contract. After completion of their internal verification and validation process, system testing began in July 2010 with a validation of each functional unit. First, test UserLists were created and transferred from RTI to Intelecare via FTP. Once the process was deemed acceptable, Intelecare and RTI developers began testing the transmission and receipt of messages on a test schedule. Six members of our project staff agreed to receive test messages based on a full implementation of the UserList, file transfer, and activation of new users in the SMS gateway. Messages were transmitted to these users on a compressed schedule over the course of 2 days, as shown in Figure 2. Based on responses to a series of two-way SMS messages, a dynamic tailoring process was tested. The final step in the system process was a detailed review of the message content to be delivered by class and by day.

Figure 2. System testing screen capture
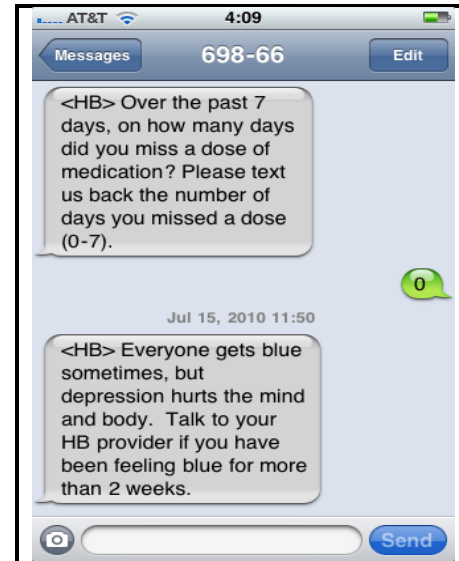
Intervention Monitoring

Regular status calls were held every Friday with RTI and the HBHC Study Coordinator to review the week's recruitment strategies and progress, screening data, enrollment data, and any other relevant topics related to implementation and evaluation. In addition, RTI held weekly status calls with the lead developer from Intelecare to discuss topics related to system performance.

Between calls, RTI staff had access to the Intelecare Reminder Manager, as shown in Figure 3. This password-protected and encrypted Web site permitted monitoring the intervention in real time. Full access was limited to the Implementation Task Lead and enabled him to edit participant phone numbers, disable message classes at the participant's request, and send ad hoc appointment reminders (although the Study Coordinator was able to program appointment reminders into the system).

Figure 3. Intelecare reminder manager

Summary minutes from the weekly calls, the incoming data from the Study Coordinator, and any issues noted in the Reminder Manager were distributed to the project team and the project director for review.

Automated Rapid Tailoring Process

An automated process for the initial tailoring of new enrollees was implemented in September 2010. Prior to the transition to an automated process, multiple data inputs were evaluated for each participant, and their message class assignments were determined manually, as shown in Table 3. Our Implementation and Evaluation Task Leads worked collaboratively to develop a process by which data from the HBHC-administered screener and the preintervention survey are imported and processed in SAS, then exported into a spreadsheet that emulates the data structure of the UserList XML file shown in Table 4. Despite this improvement, some of the nonstandardized data elements captured by the HBHC Study Coordinator in the Message Tailoring Form, including the customization of medication adherence reminder preferences, still required manual data entry.

The data output from the automated process was tested against known tailoring outcomes from previous participants and validated before fully implementing this process enhancement during the intervention. To date, the Automated Rapid Tailoring Process has significantly improved the accuracy and ease of assigning each new participant to receive the proper messages.

Individual Appointment Reminders
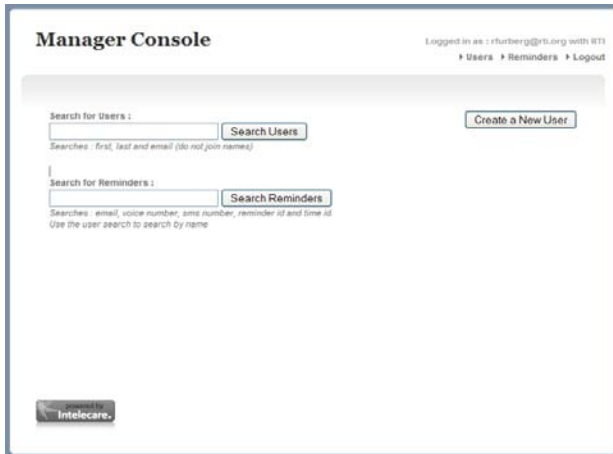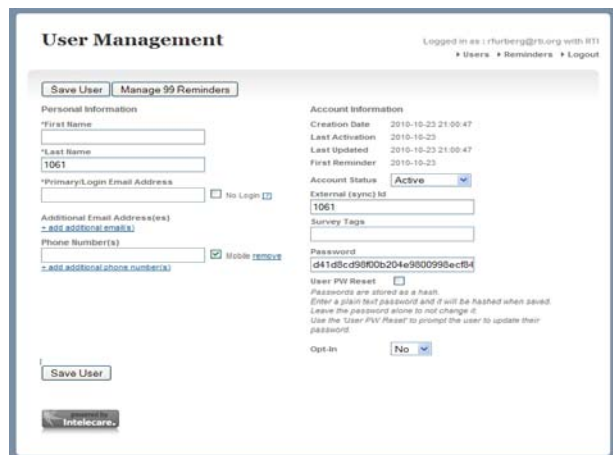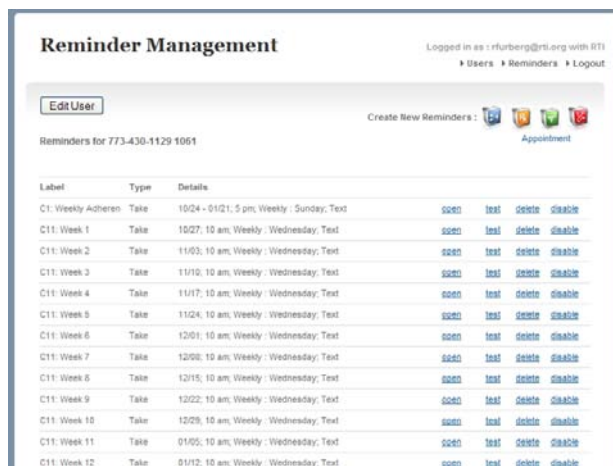
In an effort to simplify the method for entering individual appointment reminders for participants, our project staff developed a process for the HBHC Study Coordinator to do so. For each participant, 3-month followup visits are scheduled during their enrollment visit, at which point the reminders were programmed. Figure 4 shows the process for programming appointment reminders. Throughout the intervention, the Study Coordinator monitored the reminder schedule on a weekly basis and made updates as necessary.

Figure 4. AHRQ communication-focused technology (HIV-SMS) appointment reminder process
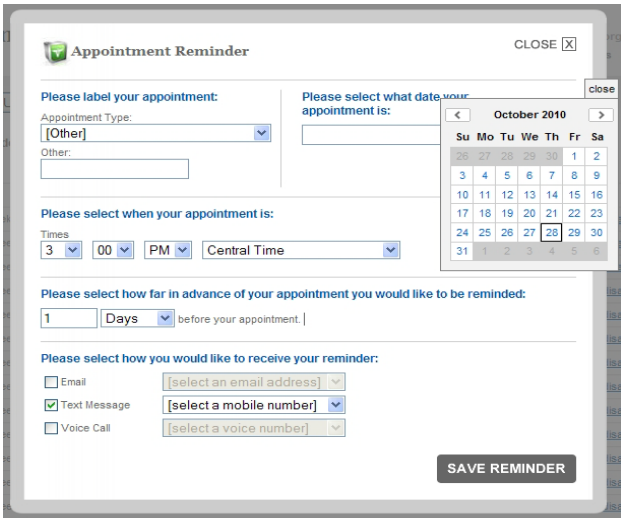
Step	Screen Shot
1. To access the InteleComm program console, navigate to the following URL: 2. https://www.intelecare.com/rti/manager 3. Login using your e-mail address and assigned password.	

Figure 4. AHRQ communication-focused technology (HIV-SMS) appointment reminder process (continued)

Step	Screen Shot
4. After logging in successfully, you will see the Manager Console page. 5. To access the full list of participants, click on the "Search for Users" button.	
6. Successfully opening the participant's account reveals additional details of their enrollment, including their mobile phone number and number of remaining/pending reminders for the intervention. 7. Select "Manage *n* Reminders."	
8. From step 8, you will see the Reminder Management page, which lists all of the messages a participant is scheduled to receive. 9. There are four colored icons below the page header. Click on the green icon with the caduceus on it. When the cursor is paused over the green icon, the text "Appointment" will appear below.	

3-7

Figure 4. AHRQ communication-focused technology (HIV-SMS) appointment reminder process (continued)

Step	Screen Shot
10. From step 10, the Appointment Reminder popup will launch, as shown to the right. 11. First, label the appointment using the appointment type drop-down menu as "other." 12. Select the date of the appointment using the calendar feature by selecting the calendar icon. 13. Using a 12-hour A.M./P.M. convention, select the appointment time and time zone [Central Time]. 14. To set reminder timing, enter "1 Days before your appointment." 15. For method of reminder, select "Text Message" and select the participant's mobile number from the drop-down menu. 16. Select "Save Reminder" to complete the process.	

Quality Assurance

Four key quality assurance steps were taken to ensure that the highest quality standards were maintained throughout the implementation phase.

1. **System verification.** System verification was completed before initiating data collection. Following the configuration of the system for use on this project, a robust dynamic testing plan was developed and executed. Working in concert with Intelecare technical staff, our project team ensured that the system was fully implemented as described in the requirements specifications and documented the results of stability and reliability exercises, peak performance checks, and the continuity of two-way data exchange.
2. **Test devise.** A test device was maintained to monitor the health and status of the SMS gateway in real time. During the data collection phase, the technical development task leader monitored the status of the gateway by activating a mobile device to receive a sample of outgoing messages.
3. **Systematic and serial review.** Performance of a systematic and serial review of gateway components was completed. Project team members with access to the gateway personally checked and documented the functionality of the gateway Web portal and system status indicators. A communications protocol was developed to ensure timely reporting of any issues observed by the project team's SMS monitors.
4. **Contingency and continuity plans.** The SMS gateway service provider's contingency plans were closely monitored to ensure continued coverage. The Implementation Lead reviewed Intelecare's business continuity and disaster recovery plans and found them both to be acceptable in support this effort. In addition, our project team had personal access to Intelecare's Systems Architect and Client Services Manager assigned to our contract.

Privacy and Security

Privacy and security measures are of paramount concern to both RTI and Intelecare. Both organizations consider privacy and security to cover three critical areas: physical security, operational security, and system security.

Physical security. Physical security includes locking down and logging all physical access to servers at the vendor's data center, including the following:

- Limiting data center access to data center technicians.
- Biometric scanning for controlled data center access.
- Security camera monitoring at all data center locations,
- 24/7 on-site staff providing additional protection against unauthorized entry.
- Using unmarked facilities to help maintain a low profile.
- Having physical security audited by an independent firm.

Operational security. Operational security involves creating business processes that follow security best practices to limit access to confidential information and maintain tight security over time, including the following:

- Using ISO17799-based policies and procedures, which are regularly reviewed as part of the SAS70 Type II audit process.
- Training all employees on documented information security and privacy procedures.
- Restricting access to confidential information to authorized personnel only.
- Logging and tracking systems access for auditing purposes.
- Using secure document-destruction policies for all sensitive information.
- Having disaster recovery and business continuity plans independently audited.

System security. System security involves locking down systems, starting with hardened operating systems and up-to-date patching, including the following:

- Installing the system using hardened, patched operating system.
- System patching configured to provide ongoing protection from exploits.
- Using dedicated firewall and virtual private network (vpn) services to help block unauthorized system access.
- Applying data protection with managed backups.
- Using optional, dedicated intrusion detection devices to provide an additional layer of protection against unauthorized system access.
- Using Distributed Denial of Service (DDoS) mitigation services.

Enrollment

RTI partnered with HBHC to implement and evaluate the intervention. During fiscal year 2008, HBHC provided medical care services to 1,670 HIV-positive patients comprising approximately 30 percent of the total clinic population. Most HIV-positive patients are male (89 percent) and a minority are female (8 percent) or male-to-female transgender individuals (3

percent). Approximately one-half of HBHC's HIV-positive patients are Caucasian, one quarter are African American, 12 percent are Latino, and 12 percent are other races/ethnicities. HIV-positive patients at HBHC range in age from 16 to 79, with most (93 percent) being aged 25 or older.

We obtained IRB approval at both RTI and HBHC for the study, and this approval covered both implementation and evaluation. We submitted an amendment request to RTI's IRB in October 2010 to enroll more than 50 participants (i.e., up to 60) to offset possible attrition and received approval on the amendment. We also submitted an amendment to HBHC's IRB and enrolled two additional participants after obtaining approval in November 2010.

We worked with AHRQ to obtain a clinical exemption from the Office of Management and Budget (OMB) to conduct the pre- and postintervention assessment surveys for the evaluation. The enrollment process into the intervention and evaluation were the same and occurred simultaneously. Therefore, we describe the enrollment process here.

Eligible participants were identified primarily in two ways: (1) HBHC providers identified eligible participants during routine visits for primary care, and (2) participants self-referred to the study after seeing posters/flyers in the clinic's waiting or exam rooms. An on-site Study Coordinator at HBHC managed recruitment and initial screening. English-speaking, HIV-positive participants aged 25 or older[*] who agreed to allow us to access their medical records, have cell phones, and were amenable to receiving SMS messages during the 3-month intervention, were eligible to participate. We further limited the study participants to MSM. Because HBHC's mission is to promote the well-being of gay, lesbian, bisexual, and transgender people, most of HBHC's male patients are MSM. We recruited 52 participants over a 4-month period (July–October 2010). Among the participants, 46 completed the intervention, which was implemented for a 3-months period with each individual participant. To minimize potential attrition from loss of cell phone service, we provided incentives to offset the costs associated with monthly SMS plans. Each participant received an incentive of $25 upon enrollment and $10 per month for the 3-month study period.

The on-site Study Coordinator at HBHC approached all individuals within the clinic setting who were identified by the care team as eligible to participate based on the inclusion criteria. After prescreening to confirm eligibility, the Study Coordinator informed participants of the nature and demands of the study. To protect patient confidentiality, the Study Coordinator consented and enrolled interested participants in a private office at HBHC. During informed consent, a message tailoring form (see Appendix B) was used to document a participant's preferences for receiving certain types of messages during the study and decline receipt of certain categories of messages as required by RTI's IRB. After obtaining informed consent, the Study Coordinator assigned each voluntary participant a personal identification number (PIN). This unique identifier served to anonymize the information required to carry out the intervention as well as each participant's evaluation data. The initial screening was limited to capturing demographics, including age and race/ethnicity. The participant's cell phone number and his or her ability to receive text messages were documented. The Study Coordinator noted the reason for exclusion of any patient who was unable or unwilling to participate. Upon enrolling a study participant, the Study Coordinator entered the participant's PIN, cell phone number, and Message Class assignment in the Gateway Manager. Dissemination of many messages was fully automated and did not require further intervention by staff. However, the gateway provider

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[*] Restricting enrollment to patients aged 25 or older was required to avoid overlap with an SMS-based adherence study for youth under age 25.

allowed the on-site Study Coordinator to program medical and behavioral health appointment reminders for individual participants. Participants were provided with automated opt-out instructions upon request, if they decided to withdraw from the study.

Once enrolled, initial clinical values (i.e., results of routine viral load testing and CD4 count) were captured, and participants completed a comprehensive preintervention assessment survey. These data were used to profile each study participant and tailor specific message content for the 3-month intervention, as described in Chapter 2.

Evaluation Methods

Because the effectiveness of the proof-of-concept rested on both successful implementation and at least preliminary evidence that it had the intended effects on targeted outcomes, our evaluation sought to answer questions in two broad domains: implementation process evaluation and outcome evaluation (see Table 5 for evaluation questions and data sources). The implementation process evaluation measured the extent to which the intervention was implemented as planned. We also sought to accurately describe the activities conducted in support of the implementation objectives and provide data on the time and cost involved in carrying out the intervention activities. The outcome evaluation entailed the more direct assessment of whether the intervention had an impact on the outcomes it aimed to influence and gauged the extent to which the intervention was effective in changing targeted knowledge, attitudes, beliefs, intentions, and behaviors in the desired direction as well as having the potential to positively affect health care quality and health outcomes.

To capture the breadth of the intervention's impact on a multitude of outcomes, we used a mixed-method approach that incorporated both quantitative and qualitative data, allowing us to capitalize on the benefits of both approaches[11]. Quantitative approaches are useful for estimating the impact of programs on patient outcomes, whereas qualitative approaches can provide important insight into the process by which these impacts were achieved. Through the use of free-response open-ended questions, qualitative data also allow for greater understanding of patients' perceptions of the program that may not be captured by the close-ended questions used to gather quantitative data. As a part of this mixed-method approach, we used data from the following sources:

- Study implementation team
- Sms system
- On-site study coordinator
- Patient surveys (pre- and postintervention)
- Participant medical records
- Qualitative interviews with patients
- Qualitative interviews with clinic staff

As a result, our evaluation design used multiple measures that provide for a "triangulation" of methods to ensure that the conclusions drawn from our primary analyses are reliable[12] Our evaluation design is illustrated in Figure 3.

Figure 5. Evaluation design
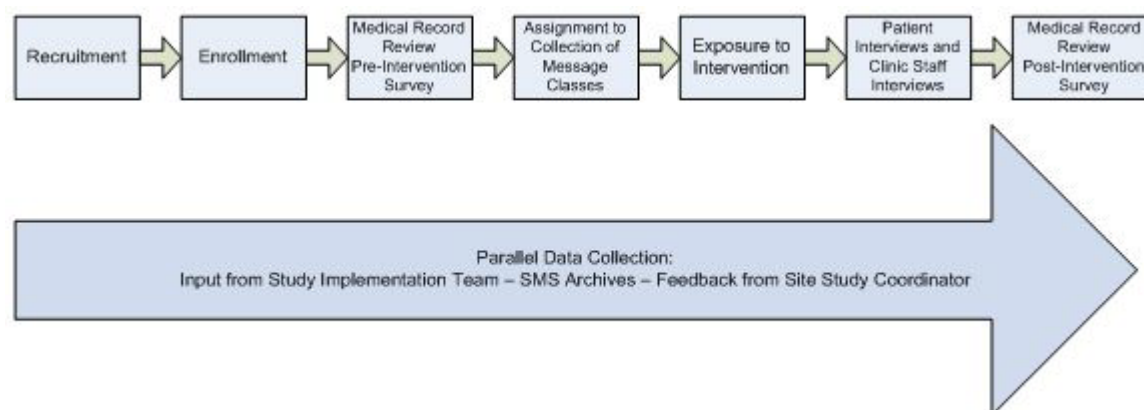
Table 5. Evaluation questions and data sources

		SMS system	Study implem. team	Onsite study coord.	Patient surveys	Medical record	Qual-itative patient inter-views	Qual-itative clinic staff inter-views
Organizational Context	Is staffing adequate to implement the program? To sustain it?	—	*	*	—	—	—	—
Organizational Context	Is the IT infrastructure adequate to support the program?	—	*	*	—	—	—	—
Organizational Readiness for Change	Does the program have a champion or champions? Who are they? What do they do to support the program?	—	—	*	—	—	—	*
Implementation Policies and Practices	What was the time involved in setting up the system and sending out the text messages?	—	*	*	—	—	—	—
Implementation Policies and Practices	Who is responsible for maintaining program momentum?	—	—	*	—	—	—	*
Implementation Policies and Practices	How was the program rolled out or disseminated within the clinic? Among patients?	—	*	*	—	—	*	*
Implementation Policies and Practices	How are patients selected?	—	—	*	—	—	—	—
Implementation Policies and Practices	What training is available? What does it consist of? Who offers the training to staff? To patients?	—	*	*	—	—	—	*
Implementation Climate	Do staff feel the program is supported by leadership? Why/why not?	—	—	*	—	—	—	*
Implementation Climate	Do staff want to participate in the program? Why/why not?	—	—	*	—	—	—	*
Implementation Climate	Under what context and environmental factors was the intervention implemented?	—	*	*	—	—	—	*

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Table 5. Evaluation questions and data sources (continued)

		SMS system	Study implem. team	Onsite study coord.	Patient surveys	Medical record	Qual-itative patient inter-views	Qual-itative clinic staff inter-views
Implementation Effectiveness	How many text messages were developed and distributed?	*	*	—	—	—	—	—
Implementation Effectiveness	How many messages were received?	*	—	—	—	—	—	—
Implementation Effectiveness	How many messages did recipients reply to?	*	—	—	—	—	—	—
Implementation Effectiveness	Did the target audience react favorably to the messages?	—	—	*	*	—	*	*
Implementation Effectiveness	How did the intensity of the messaging vary across individuals and over time?	*	*	—	—	—	—	—
Implementation Effectiveness	What was the rate of attrition? Why was there attrition?	*	*	*	*	—	—	—
Implementation Effectiveness	Did participants read the text messages?	*	—	—	*	—	*	—
Implementation Effectiveness	Did participants use the information in the text messages? Why/why not? How?	—	—	—	*	—	*	—
Implementation Effectiveness	Did participants have any concerns about receiving this information via text messages (e.g., privacy or disclosure concerns)?	—	—	—	*	—	*	—
Innovations Value-Fit	How important is this program to staff? To patients? Why?	—	—	*	*	—	—	*
Barriers to Program Implementation, Maintenance and Sustainability	What were the obstacles, if any, encountered in tailoring the messages?	—	*	—	—	—	—	—
Barriers to Program Implementation, Maintenance and Sustainability	What were the obstacles, if any, in implementing the intervention?	—	*	∗	—	—	—	—
Barriers to Program Implementation, Maintenance and Sustainability	What obstacles did participants encounter?	—	*	∗	*	—	∗	∗
Barriers to Program Implementation, Maintenance and Sustainability	What challenges lie ahead?	—	*	∗	—	—	∗	∗
Facilitators to Program Implementation, Maintenance and Sustainability	What factors facilitated and supported the implementation?	—	*	∗	—	—	—	∗
Program Fidelity	Did the participants enact the program as planned? Why/why not?	—	*	∗	—	—	—	—

Table 5. Evaluation questions and data sources (continued)

		SMS system	Study implem. team	Onsite study coord.	Patient surveys	Medical record	Qualitative patient interviews	Qualitative clinic staff interviews
Program Fidelity	What were the deviations from the plan? What factors contributed to deviation from the plan?	—	*	*	—	—	—	—
Program Fidelity	What difference did the deviations from the plan make?	—	*	*	—	—	—	—
Patient Satisfaction	How satisfied were participants with the text messages?	—	—	*	*	—	*	*
Patient Satisfaction	What aspects of the text messages did the participants like/dislike?	—	—	*	*	—	*	*
Patient Satisfaction	Were participants more/less satisfied with certain topics?	—	—	*	*	—	*	*
Patient Satisfaction	What features of the program should be changed?	—	*	*	*	—	*	*
Patient Satisfaction	How did participants feel about the timing, number, and/or content of the text messages?	—	—	*	*	—	*	*
Recommendations for Improvement	What would we do differently if we were starting over?	—	*	*	—	—	*	*
Recommendations for Improvement	What would we recommend to a clinic interested in starting a program like this?	—	*	*	—	—	—	*
Recommendations for Improvement	Were there any unintended outcomes as a result of the intervention?	—	*	*	—	—	*	*
Recommendations for Improvement	What lessons were learned from the implementation?	—	*	*	—	—	*	*
Business Case	What are the resources necessary to implement a program like this? Why are they essential?	—	*	*	—	—	—	*
Business Case	What are the start-up costs?	—	*	*	—	—	—	
Business Case	What were the costs involved in implementing the intervention?	—	*	*	—	—	—	
Business Case	What are the gains to the organization?	—	—	*	—	—	—	*
Outcomes	Was the intervention effective in changing targeted knowledge, attitudes, beliefs, behavioral intentions, and/or behaviors in the desired direction?	—	—	—	*	—	*	—
Outcomes	Was the intervention effective at increasing medication and appointment adherence?	—	—	—	*	*	*	—
Outcomes	Was the intervention effective at increasing patient involvement in their care?	—	—	—	*	—	*	—
Outcomes	Was the intervention effective in increasing perceived social support?	—	—	—	*	—	*	—

Note: Em dash (—) represents an empty cell.

Data Sources

SMS system. We used data from the SMS system to assess implementation effectiveness. The SMS system was set up to collect data on a variety of measures that will inform the implementation process evaluation. Data tracking documentation was initiated by the on-site Study Coordinator and maintained by RTI analysts to monitor program enrollment, study participation, and the rate of attrition.

During the study period, monthly reports were provided by the SMS gateway service provider and used to compile a data exchange history for each participant. These monthly reports conveyed to the project team the number of registered users in the system, as well as the number and content of messages sent and received during the reporting period. These histories were compiled in a flat file to list all of the messages transmitted, time-stamped message receipts, and messaging confirmations, as well as the content of all two-way communications, including queries sent to participants and messages received into the system, from each study participant. Upon completion of the study, this data exchange history contained a full account of system interactions for every study participant.

In addition to the monthly reports, project staff accessed the gateway weekly through a secure data feed to gain access to raw data for conditional analysis. We intended to evaluate and quantify issues associated with suboptimal message delivery, including rates of SMS latency on GSM and CDMA networks.

Study implementation team. We analyzed data from the study implementation team to assess organizational context, implementation policies and practices, implementation climate, business case, barriers and facilitators to implementation and sustainability, implementation effectiveness, program fidelity, and recommendations for improvement. Weekly project team meetings were held during which the study implementation team followed a standard agenda to report on process, level of effort, and any obstacles or challenges encountered during the planning, development, or implementation process. These data were logged and analyzed as part of the evaluation.

In an effort to accurately document the cost of implementation, the study implementation team captured data on all of the expenses encountered. Analysts recorded operating expenses in a flat file to accommodate various methods of assessing total cost upon completion (e.g., analyses limited to preintervention costs, projections of per-participant expense). The operating expenses we anticipated encountering and documented include the burdens associated with Web survey development and maintenance, gateway front-end customization and monthly SMS service fees, and administrative study coordination and participation incentives.

On-site Study Coordinator. The on-site Study Coordinator provided a unique perspective for the evaluation, and these data contributed to the assessment of almost every content area included in Table 5. The Study Coordinator participated via telephone in the weekly project team meetings and reported on process; level of effort; any obstacles or challenges encountered during recruitment, enrollment, and implementation; and any informal feedback that she obtained from participants during the implementation period. The Study Coordinator also completed and submitted forms on a weekly basis to report on enrollment (e.g., how many potential participants were approached, screened, enrolled, declined), document her own perceptions regarding the intervention's ease of use and level of effort required to implement the intervention, as well as document any feedback on the intervention obtained from participants.

Patient surveys. After enrollment, participants were directed to complete a Web-based survey using a private computer terminal on site at HBHC. The intent of the preintervention survey (shown in Appendix C) was twofold. First, these data served to generate a user profile during the characterization phase. Second, the data were used to establish a baseline for evaluation after exposure to the SMS content. To ensure participant confidentiality, respondents were prompted to log in to the Web site using their assigned personal identification number (PIN).

Upon completion of the 3-month intervention, participants were scheduled to complete a second Web-based survey using the same methods used for the preintervention assessment. The data from the postintervention survey (shown in Appendix D) were used primarily to address questions related to implementation effectiveness, patient satisfaction, and outcomes. After the participant completed the postintervention survey, the Study Coordinator confirmed and recorded that the participant's PIN has been deactivated within the Gateway Manager. No personal identifiers were collected or stored as a part of the Web surveys. Survey data were temporarily housed on a password-protected, encrypted server and downloaded from the site nightly. Once downloaded, the pre- and postintervention assessment data were archived for statistical analysis and managed by project leadership in accordance with all of RTI's confidentiality procedures and Institutional Review Board (IRB) policies.

Qualitative patient interviews. We conducted nine in-depth interviews with study participants during the course of the implementation period. Given the sensitivity of the topics and for the convenience of the participants, these interviews were conducted via telephone, which also helped to maintain participant anonymity and confidentiality. We selected a purposeful sample of participants based on their sociodemographics (e.g., age, race/ethnicity) to ensure that we received feedback from a diverse subsample of participants. The Study Coordinator identified approximately 20 potential participants for the interviews and provided RTI with the first names and telephone numbers of these individuals. RTI staff called potential participants, informed them of the nature of the interview, and asked them if they would like to participate. If a potential participant passively or actively declined, we selected an age- and race/ethnicity-matched alternate from the list. No PINs for any of the participants in the sample were provided. After participants were screened and scheduled, RTI staff obtained verbal consent prior to each interview. During the interviews, we collected detailed, qualitative data on a variety of topics, including implementation effectiveness, patient satisfaction, barriers to implementation and sustainability, recommendations for improvement, and outcomes (see Appendix E for interview guide). An observer took notes during each interview, which did not contain any identifying information.

Qualitative clinic staff interviews. We conducted five qualitative interviews with clinic staff, including clinicians, case managers, and counselors, during the course of the implementation period. For the convenience of the participants and for cost efficiency, we conducted these interviews via telephone. RTI staff e-mailed potential participants, informed them of the nature of the interview, and asked them if they would like to participate. Interviews were scheduled via e-mail. Once interviews were scheduled, the Study Coordinator provided the staff with the consent form, and the staff returned the signed consent form to the Study Coordinator prior to the telephone interview being conducted. As this research was taking place at their worksite, HBHC required signed informed consent from their staff so they acknowledged understanding that their responses to the survey did not jeopardize their employment.

During the interviews, we gathered information on the content areas, including organizational context, organizational readiness for change, implementation policies and practices, facilitators and barriers to program implementation and sustainability, implementation climate, value fit, and recommendations for improvement (see Appendix F for the interview guide). An observer took notes during each interview, which did not contain any identifying information.

Medical record. Data from the participants' medical records (e.g., laboratory test results, appointments) were used to complement the primary data collected as part of the evaluation. These data were also used to facilitate sending appointment reminders. The medical record documentation form is shown in Appendix G.

Evaluating the Implementation

Our evaluation focused on conducting both a thorough implementation process evaluation and an outcome evaluation. The implementation process evaluation was conducted to document how the intervention was deployed and to determine the feasibility and potential for implementing the intervention in other ambulatory care settings. The outcome evaluation focused on patient satisfaction with the intervention and the impact of the intervention on targeted knowledge, attitudes, beliefs, intentions and behaviors, health care quality, and outcomes measures.

Qualitative analysis. The primary sources of qualitative data for our evaluation included input from the study implementation team, interviews with patients and clinic staff, and input from the on-site Study Coordinator. Our qualitative data analysis stemmed from reviewing the data, in which we considered the content in terms of themes, frequency and correlations, and types of causal and logical statements expressed by the participant(s), with the goal of noting regularities, patterns, explanations, possible configurations, causal flows, and propositions contained in the data.[13,14] We used a matrix approach to analyze data that allows for efficient organization and review of salient content in the data.

Quantitative analysis. Quantitative data for the evaluation came from the SMS system and the pre- and postintervention assessment surveys. We calculated primarily descriptive frequencies from the SMS system data. The primary source of quantitative data for the evaluation was from the pre- and postintervention patient surveys. Given the exploratory nature of the study and the corresponding sample size, we focused primarily on descriptive analyses. We computed frequencies and percentages for the categorical outcomes and means and standard deviations for the continuous outcomes at each of the time points. For example, we computed percentages of the items on message receptivity/use administered through the postintervention survey to address the following questions:

- What percentage of participants read the text messages?
- What percentage of participants used the information in the text messages?
- What percentage of participants had concerns about receiving the information via text messages?
- Which aspects of the text messages did participants like/dislike?

Next, we evaluated whether the program resulted in changes in the following key patient outcomes, based on data from the pre- and postintervention surveys, using paired t-tests for continuous variables and McNemar's tests for categorical variables:

- Medication adherence
- HIV knowledge
- Self-efficacy
- Social support
- Quality of life
- Attitudes and beliefs
- Risky behaviors
- Patient involvement

Where applicable, we examined changes in the outcomes among participants who received the specific message type. For example, we examined changes in medication adherence only among participants who received the medication messages. We hypothesized that patients would experience significant improvements in the outcomes following the intervention with the strongest effects for the factors specifically addressed in the text messages (e.g., medication adherence).

Triangulation. Evaluation research stresses the importance of developing measures that provide for a "triangulation" of methods (i.e., multiple data sources and collection strategies) to ensure that the conclusions drawn from primary analyses are reliable[12]. Consequently, we collected evaluation data from a variety of sources, including quantitative and qualitative sources.

In essence, it is desirable to show that evaluation findings from multiple data sources and measures are consistent with each other and generally point to the same overall conclusion about intervention effects. For example, if survey data results suggest that certain groups of participants were dissatisfied or did not use the information in the text messages, we will look to the qualitative interview data to obtain more detailed information about possible reasons as well as ways to address them for future implementations. Such triangulation of data adds validity to the primary evaluation conclusions about the effects of the intervention on its intended outcomes. Data triangulation was an underlying objective of the evaluation.

Chapter 4. Implementation Evaluation Results

Study enrollment began on July 18, 2010, and by the end of the enrollment period (October 22, 2010), a total of 52 participants were enrolled, 46 of whom completed the intervention and the postintervention assessment survey. We completed nine qualitative interviews with consumers and five qualitative interviews with providers. This chapter presents the results from the SMS system, the study implementation team, and the on-site Study Coordinator. In addition, the findings from the baseline and followup assessment surveys and medical record are presented. Finally, the key results from qualitative patient and provider interviews are presented.

SMS System

An analysis of the SMS system log files and participant replies served as a data source for descriptive statistics on the performance of the technical intervention, a measure of self-reported medication adherence, risk behavior assessment, and process evaluation.

We developed 151 text messages for this study. During the implementation period of July 18, 2010, to February 21, 2011, we sent a total of 7,208 messages to study participants (Table 6). Of these, 321 messages, or approximately 4 percent of messages, failed to reach the intended recipient for unknown reasons. All participants received messages over the entire course of the 90-day intervention.

Table 6. Number of texts sent and received

		Number of texts
Texts Sent by RTI	Successfully sent	6,887
Texts Sent by RTI	Failed	321
Texts Sent by RTI	Total sent	7,208
Texts Received by RTI	Process responses	214
Texts Received by RTI	Adherence responses	492
Texts Received by RTI	Acknowledgments	317
Texts Received by RTI	Other responses	68
Texts Received by RTI	Requests to stop receiving messages	4
Texts Received by RTI	Total	1,095

Because the message content was tailored on baseline survey results, the intensity of messages, such as the average number of messages received by participants each week, varied. The overall distribution of message intensity over the 13-week intervention is shown in Table 7. Because participants received tailored social support messages during the first few weeks of the intervention, the mean number of text messages sent to respondents peaked in the first three weeks and declined thereafter.

Table 7. Mean number of texts sent to respondents, by week of participation in the study

Week	Mean (SD)
1	10.88 (6.72)
2	12.76 (7.08)
3	8.96 (6.97)
4	7.45 (6.82)
5	7.71 (6.72)
6	7.08 (7.88)
7	6.12 (6.70)
8	5.78 (7.15)
9	5.98 (7.29)
10	4.35 (7.01)
11	3.25 (5.82)
12	2.59 (5.63)
13	1.35 (3.49)

As described in Chapter 2, the high degree of tailoring for this intervention was achieved by assigning participants to various classes of messages. The entire message class architecture is shown in Table 2 and the distribution of participants to each class is shown in Table 8.

Because the intervention was tailored to each subject, not all participants qualified to receive each class of message.

Table 8. Number of participants assigned to receive each message

ClassID	Message type	Number of participants
class_4	Rx Daily Adherence	1
class_5	Rx A.M. Adherence	14
class_6	Rx P.M. Adherence	20
class_7	Sex Risk	22
class_8	Substance Risk	24
class_9	Sex & Substance Risk	17
class_10	Smoking	20
class_12	General Social Support	40
class_13	Patient Involvement	34
class_15	Substance Question	51
class_16	Sex Question	50
class_17	Substance & Sex Question	47
class_18	General Social Support	41
class_19	Tailored Social Support: Older adults, 50+	12
class_20	Tailored Social Support: Newly Diagnosed	12
class_21	Tailored Social Support: Long-time Poz	41
class_22	Tailored Social Support: AfAm MSM	16
class_23	Tailored Social Support: Latino MSM	13
class_24	Tailored Social Support: Young Adults	13

The majority of messages for the intervention were developed to be unidirectional and noninteractive. These were messages sent from the SMS system to participants and did not prompt recipients to post a reply or interact with the texts in anyway However, subsets of the messages sent were bidirectional texts, developed to prompt responses from participants to facilitate real-time dynamic tailoring or for data collection across a variety of topic areas. Two-way texting content included a weekly medication adherence check and process questions plus risk assessment questions asked sporadically throughout the intervention. Table 9 lists all of the two-way SMS messages used during the intervention and the timing and frequency of when these messages were sent.

Table 9. Two-way SMS messages sent, timing, and frequency

Message content	Frequency/schedule
In the past 4 weeks have you had 5 or more drinks of alcohol within a couple of hours (e.g., 2–4 hours)? Text 1i = yes, 2i = no, 3i = don't remember	Asked in baseline survey. If participants qualified to receive risk-reduction messages, these texts were sent on intervention days 36 and 64.
In the past 4 weeks have you had sex without a condom with any of your sex partner(s)? Text 1K = yes, 2K = no, 3K = don't remember	Asked in baseline survey. If participants qualified to receive risk reduction messages, these texts were sent on intervention days 36 and 64.
In the past 4 weeks have you used alcohol or drugs before or during sex? Text 1L = yes, 2L = no, 3L = don't remember	Asked in baseline survey. If participants qualified to receive risk reduction messages, these texts were sent on intervention days 36 and 64.
How often do you read the text messages you get from HB? Text 1A = always, 2A = usually, 3A = sometimes, 4A = never	Asked of all participants on intervention day 38.
Do you like the messages you are receiving from HB? Text 1B = yes, 2B = no	Asked of all participants on intervention day 40.
How often are the HB messages sent at the right times? Text 1C = always, 2C = usually, 3C = sometimes, 4C = never	Asked of all participants on intervention day 45.
How do you feel about the number of text messages you get from HB? Text 1D = too many, 2D = about right, 3D = not enough	Asked of all participants on intervention day 47.
Are the message topics you get from HB interesting to you? Text 1E = very, 2E = somewhat, 3E = a little, 4E = not at all	Asked of all participants on intervention day 52.
How often do you use the info in the text messages from HB? Text 1F = always, 2F = usually, 3F = sometimes, 4F = never	Asked of all participants on intervention day 54.
How helpful are the text messages you get from HB? Text 1G = very, 2G = somewhat, 3G = a little, 4G = not at all	Asked of all participants on intervention day 59.
Do you feel like the HB messages were written for you? Text 1H = yes, 2H = no	Asked of all participants on intervention day 61.

Study Implementation Team

Organizational context. Early on, staffing was insufficient to address all of the study's programming needs. Consequently, we made two major changes to address these shortcomings. First, responsibility for programming appointment reminders shifted from the RTI Implementation Lead to the HBHC Study Coordinator. After some initial training, this process worked much more efficiently and benefited patients because both medical and behavioral health appointment reminders could easily be programmed into the system. Second, we added another RTI staff person to the team to handle the two-way messaging component of the intervention. This staff person reviewed responses from the weekly adherence questions and maintained a database of responses that helped to determine the types of adherence messages people received

the following week. For example, people who reported perfect adherence received a message encouraging them to maintain their adherence, whereas people who were nonadherent received messages encouraging them to get back on track.

Implementation climate. HBHC is one of the nation's largest lesbian, gay, bisexual, and transgender (LGBT) health care organizations. The agency serves more than 36,000 adults and youths each year. Its diverse health and social service delivery system focuses on the following programmatic divisions: primary medical care, behavioral health, research, HIV/STI prevention, case management, social services, youth services, older adult services, and community initiatives. At any given time, several research studies are ongoing at HBHC, ranging from clinical studies to social/behavioral cohort and interventional studies.

Barriers to program implementation, maintenance, and sustainability. One of the unique yet challenging aspects of this study was that the tailoring was determined through a combination of information from three independent sources. This tailoring process was designed to ensure that participants received only those types of messages they qualified to receive, based on predefined thresholds (e.g., history of medication nonadherence, sexual, and alcohol and drug use behaviors). The primary data source for the tailoring process included the results from a 77-question, Web-deployed baseline survey that served to identify which categories of messages were appropriate for each participant. The secondary data source used was the Message Tailoring Form, completed by the Study Coordinator and participant, which captured an individual's preferences for receiving certain types of messaging content, including their preference to opt out of certain categories (e.g., sexual risk, drug- and alcohol abuse-reduction messages). The third data source used in tailoring the SMS content was the screener data, completed by the Study Coordinator. Variables of interest from the screener included demographic data that were used to provide tailored social support messages for groups and events of interest to MSM of various races and ethnicities. Initially, compiling a single, tailored profile for each participant using these three inputs was very time consuming because it was conducted by hand, however, once the system was automated in SAS, the tailoring algorithm was more easily generated.

Another challenge was the difficulty recruiting participants for the study. The study implementation team worked closely with the Study Coordinator to identify strategies to aid in recruitment, such as presenting at provider meetings, situating herself in the clinic on a regular basis, and posting flyers in the exam rooms. Working together, we were able to overcome recruitment barriers, although it was necessary to extend the enrollment period by 1 month to achieve our desired sample size.

Another potential issue affecting the program's sustainability is that over time participants might start to experience "message fatigue" and either stop reading the messages or opt out of the program altogether. This supposition is supported by qualitative findings. Some of the men reported that they received too many messages and that they wanted interim opportunities to opt out of certain message classes if they were not finding them useful.

Facilitators to program implementation, maintenance, and sustainability. Factors that promoted implementation included the Study Coordinator's degree of commitment to the study; for example, she worked tirelessly to help us achieve our desired sample size, using a variety of recruiting approaches among patients and providers at HBHC. Another factor was the strength and seamlessness of the messaging platform and the quality of work achieved by Intelecare, our IT vendor. The Intelecare messaging platform is a well- developed, highly reliable system that is currently in use to support multiple, simultaneous campaigns. Integration of the messaging content, development of the messaging intervals and frequency, testing the system, and

monitoring its status during the intervention phase benefitted from the maturity of the system and the expertise of the Intelecare programmers.

Business Case. The resources essential to implementing a program such as this one include a designated staff person to implement the program within the clinic, IT infrastructure to track recruitment and enrollment, a messaging platform that can support rapid tailoring and dynamic tailoring, and space in which to enroll and conduct the assessments. This section describes the levels of effort and expenses associated with conducting the intervention.

RTI. A total of 1,228 labor hours (0.59 FTE based on 2,080 labor hours available per year) were dedicated to the intervention. Labor hours were parsed by startup and maintenance activities. Start-up activities included developing the text messages, determining the delivery schedule, configuring the messaging platform, and developing the baseline and followup assessments. Labor hours for start-up amounted to 872 or 0.42 FTE. Maintaining the intervention encompassed managing ongoing enrollment and tailoring the intervention to each new participant; configuring the messaging platform for new participants as they were enrolled and coding individualized reminders, such as appointment dates; addressing issues with the messaging system voiced by participants and the on-site Study Coordinator; and accessing, coding, and responding to data from the two-way messaging component of the intervention. Labor hours for maintenance amounted to 356 or .17 FTE.

HBHC. A total of 520 labor hours (0.25 FTE based on 2,080 labor hours available in a year) were dedicated to the intervention. The total amount of the subcontract was $116,269. For start-up, which mainly included advertising activities, labor hours totaled 104 (0.05 FTE). In addition to labor, start-up costs included purchasing advertising materials (e.g., flyers, business cards). An estimated $23,254 was spent on start-up. Maintenance was more intensive, amounting to 416 labor hours (0.20 FTE). Maintenance activities included managing rolling enrollment, monitoring message receipt issues and troubleshooting, ongoing advertising, scheduling followup survey appointments and scheduling reminders, and abstracting laboratory data. The cost for these maintenance activities amounted to approximately $93,015.

Intelecare. A total of 114.5 labor hours (.055 FTE based on 2,080 labor hours available in a year) were dedicated to the intervention. Labor hours consist of 80 for programming (modification of the base system for specific study needs), 18.5 for project management (on-going coordination of the technical, operational and marketing needs required for launch), and 16 hours for client services (post-launch management, customer service issues, and data reporting).

Overall, time savings were realized as the intervention progressed. The most significant gains resulted from the study implementation team becoming more familiar with the intervention and more efficient with the manual processes. Some tailoring activities that were initially conducted by hand were automated, which not only reduced the burden associated with enrolling new participants, but increased coding accuracy.

On-site Study Coordinator

Organizational context. We asked the on-site Study Coordinator her opinions about the organizational context in which the study was implemented. From her perspective, the staffing is adequate to implement and sustain the program; however, the IT department is too "overloaded" to support a program like this. This was not an issue for the current study because the programming, messaging, and database management—all critical resources for a program such as this one—were carried out by Intelecare, an outside vendor. But outsourcing these

components may not be sustainable given available resources. The Study Coordinator worked with Intelecare directly to troubleshoot issues with message delivery (e.g., figuring out why participants were not getting certain messages). The Study Coordinator also received training from Intelecare so that she could program clinical and mental health appointment reminders directly, making this step more efficient.

The Study Coordinator and her supervisor were the main champions for the study, responsible for maintaining program momentum. Two clinical care providers and the Research Coordinator were also very supportive of the program and actively referred patients to the study. To roll out the study, the Study Coordinator made announcements about the study at research and provider meetings; posted study flyers in exam, waiting, and interview rooms; and e-mailed providers throughout the intervention period, including case managers, to remind them about the study and encourage them to refer eligible patients.

Implementation policies and practices. When asked about the implementation climate, the Study Coordinator was positive, saying that the clinic's leadership was very supportive of the study and understood its importance in that the study put them on the cutting edge of technology and health care. Most other staff were supportive of the study. However, lack of support by some staff was attributed to competing demands or limited interest as well as concerns about mission creep (i.e., HBHC's mission is to provide direct services, not to conduct research). Another factor that may have played into providers' interest level was that at the same time our study was taking place, HBHC was experiencing significant financial uncertainty. Overriding concerns about HBHC's future may have lessened the study's importance to some staff.

Implementation effectiveness. In the Study Coordinator's opinion, participants reacted very favorably to the messages and the program overall, and several said they were "sad" when the messages ceased. The Study Coordinator believed that participants were reading the messages they received because they called to ask her questions about the content. A few patients reported that they stopped reading their adherence messages because they knew what the messages were about, based on the delivery time. Thus, even though they were unread, message delivery reinforced adherence.

The most helpful messages, in the Study Coordinator's opinion, were the adherence messages, particularly for patients who were just starting a medication regimen or had recently made changes to their regimen. One patient suggested tailoring the substance abuse messages further, based on whether an individual used alcohol, other drugs, or both; commenting that he did not read these types of messages because he only drank alcohol and did not use other drugs.

Facilitators to program implementation, maintenance, and sustainability. The Study Coordinator offered several important insights regarding facilitators to program implementation, such as widespread support of the program by providers, the available of the Study Coordinator on-site to facilitate recruitment, designated staff to implement the study, and the appeal of the text messages themselves. Further, the Study Coordinator indicated that the program was easy to implement and was carried out according to plan. No barriers to implementation were reported.

Patient satisfaction. Patients were generally satisfied with the text messages. Only one participant requested that we stop sending him messages soon after he joined the study. A few participants felt the messages were "cheesy" and that there were too many adherence reminders, although these were timed based on participants' regimen and preferences. Participants particularly liked the humorous tone of the messages and that the messages were not only about adherence, but about "other things to keep them healthy." The biggest complaint from adherent participants was that they did not receive the daily adherence messages. This finding suggests

that assessing need by reported adherence is not sufficient to determine individual messaging preferences.

Some participants complained about the number of questions they received during the intervention period. Participants were asked to report weekly on their adherence in the past 7 days. During weeks 6 to 8, we sent two process questions to participants asking them to comment on the number, timing, and content of the messages. In weeks 5 and 9, participants received questions to assess recent sexual and substance use behaviors to determine whether these messages should be turned on for the remainder of the intervention period. The Study Coordinator suggested that spacing out the questions may have been more preferable to participants. Also, forewarning participants at enrollment that they were going to receive these types of questions during the specified weeks might be beneficial.

Some participants voiced concerns about confidentiality, expressing worry that people would see the messages and they would be "outed" as HIV positive by the content. Participants reported that they had to be very careful where they left their phones so others would not see the messages when they arrived, particularly those with iPhones because text messages are displayed on the screen in their entirety. Based on the survey data, however, concerns about confidentiality appeared to be minimal, with 68 percent of the sample reporting that they were not at all concerned about people seeing the text messages they got from the study.

Recommendations for improvement. Throughout the course of the study, several recommendations for improvements emerged, including the following:

- Lowering the age requirement would help to reach a group of patients who are technologically savvy and would benefit from the program. (However, it should be noted that the reason why the age limit for this study was set at age 25 or older was because at the time the study was implemented, another ongoing text-messaging study was being conducted with patients aged 24 or younger.)
- Making adherence messages available to adherent patients who wanted them is warranted given the finding that many patients who were adherent wondered why they were not receiving their adherence messages and were disappointed to find out why they were not receiving these messages.
- Spacing out the process questions is advisable given participants' complaints about the timing and number of questions received at once.
- Exploring strategies to mask the intent of some of the messages so as not to "out" participants' HIV status is critical for more widespread interest and retention in such a program.

Patient Surveys

Sociodemographic characteristics. Participants are diverse in terms of age and race/ethnicity, as shown in Table 10. Among participants, 27 percent are aged 25–29, 33 percent are aged 30–39, 25 percent are aged 40–49, and 16 percent are aged 50 or older. In regard to race/ethnicity, 44 percent of participants reported their race as White, 33 percent as Black, and 23 percent as other; 33 percent reported being Hispanic. Additionally, the sample is skewed toward higher educated individuals: 47 percent of participants have a Bachelor's degree or higher, 38 percent have some college education, and 16 percent have a high school diploma, GED, or less education.

Among participants, 87 percent self-identified as gay or homosexual, 10 percent as bisexual, and 4 percent as queer. In terms of relationship status, 67 percent are single, 29 percent are in a relationship with a man, and 4 percent are married to a man.

Almost all participants (92 percent) reported being in excellent, very good, or good health.

Table 10. Demographic characteristics and cell phone use (N=52)

Characteristic	N	Percent
Age: 25–29	14	27
Age: 30–39	17	33
Age: 40–49	13	25
Age: 50–59	6	12
Age: 60+	2	4
Race: Black	17	33
Race: White	23	44
Race: Other	12	23
Hispanic Origin: Yes	17	33
Hispanic Origin: No	35	67
Education: Did not complete high school	4	8
Education: High school diploma or GED	4	8
Education: Some college	20	38
Education: Bachelor's degree	19	37
Education: Master's/doctorate/professional degree	5	10
Sexual Identity: Bisexual	5	10
Sexual Identity: Gay/Homosexual	45	87
Sexual Identity: Queer	2	4
Relationship Status: Single	35	67
Relationship Status: Married to a man	2	4
Relationship Status: In relationship with a man	15	29
Health Status: Excellent	6	12
Health Status: Very good	22	42
Health Status: Good	20	38
Health Status: Fair	3	6
Health Status: Poor	1	2
Number of text messages send per day: < 1	3	6
Number of text messages send per day: 1–10	15	29
Number of text messages send per day: 11–20	11	21
Number of text messages send per day: 21–30	2	4
Number of text messages send per day: 31–40	7	13
Number of text messages send per day: 40+	13	25
Number of text messages send per day: Don't know	1	2
Number of text messages send per day: < 1	2	4
Number of text messages send per day: 1–10	16	31
Number of text messages send per day: 11–20	10	19
Number of text messages send per day: 21–30	2	4
Number of text messages send per day: 31–40	6	12
Number of text messages send per day: 40+	14	27
Number of text messages send per day: Don't know	2	4
Use cell phone for e-mails	25	48
Use cell phone for Internet	30	58

Cell phone use. At baseline, 6 percent of participants reported sending less than 1 text message per day, 29 percent reported sending 1–10 texts per day, 21 percent reported sending 11–20 per day, 17 percent reported sending 21–40 per day, 25 percent reported sending more than 40 per day, and 2 percent said they did not know how many texts they sent per day (Table 10). Among participants, 4 percent reported receiving less than 1 text message per day, 31 percent reported receiving 1–10 texts per day, 23 percent reported receiving 11–30 texts per day, 12 percent reported receiving 31–40 texts per day, 27 percent reported receiving 40 or more texts per day, and 4 percent reported that they did not know how many texts they received per day.

Almost half of participants (48 percent) said that they use their cell phones for e-mail, and the majority (58 percent) said that they use their cell phones to access the Internet.

Sexual behaviors. At baseline, 17 participants (33 percent) said that they had not been diagnosed with an STI other than HIV, 15 participants (29 percent) said that they had been diagnosed with a non-HIV STI within the past 12 months, and 20 participants (38 percent) said that they had been diagnosed with a non-HIV STI more than 12 months ago. At followup, 7 participants (15 percent) said they had been diagnosed with an STI other than HIV during the past 3 months (data not shown).

We assessed the number of sex partners in the past 3 months and detected a statistically significant change in the number of reported partners from baseline to followup among those participants who received sexual risk-reduction messages (Table 11). We also assessed the number of times participants had sex in the past 3 months, the number of times participants had sex without a condom in the past 3 months, and how often they used alcohol or other drugs before or during sex in the past 3 months, and did not detect any statistically significant changes from baseline to followup (Table 11).

Table 11. Sexual behaviors

Variable	All partic-ipants: Baseline (N=52) N (%)	All partic-ipants: Followup (N=46) N (%)	All partic-ipants: p-value	Participants receiving sexual behavior messages: Baseline (N=25) N (%)	Participants receiving sexual behavior messages: Followup (N=22) N (%)	Participants receiving sexual behavior messages: p-value
# people had sex with in past 3 months: 0	1 (2)	8 (15)	0.805	0 (0)	2 (9)	< 0.001
# people had sex with in past 3 months: 1	6 (12)	16 (31)		8 (32)	7 (32)	
# people had sex with in past 3 months: 2–5	17 (33)	11 (21)		9 (36)	7 (32)	
# people had sex with in past 3 months: 6+	15 (29)	11 (21)		8 (32)	6 (27)	
# times had sex in past 3 months: 1–5	13 (25)	15 (29)	0.675	11 (44)	9 (47)	0.848
# times had sex in past 3 months: 6–10	25 (48)	5 (10)		4 (16)	4 (21)	
# times had sex in past 3 months: 11+	7 (13)	14 (27)		10 (40)	6 (32)	

Table 11. Sexual behaviors (continued)

Variable	All partic-ipants: Baseline (N=52) N (%)	All partic-ipants: Followup (N=46) N (%)	All partic-ipants: p-value	Participants receiving sexual behavior messages: Baseline (N=25) N (%)	Participants receiving sexual behavior messages: Followup (N=22) N (%)	Participants receiving sexual behavior messages: p-value
# of times had sex without a condom in past 3 months: 0	14 (27)	14 (27)	0.392	7 (28)	9 (47)	0.605
# of times had sex without a condom in past 3 months: 1–5	12 (23)	12 (23)		10 (40)	6 (32)	
# of times had sex without a condom in past 3 months: 6+	19 (37)	10 (19)		8 (32)	4 (21)	
Used alcohol or drugs before or during sex in past 3 months: Never	15 (29)	12 (23)	0.834	5 (20)	5 (25)	0.656
Used alcohol or drugs before or during sex in past 3 months: Rarely	13 (25)	12 (23)		3 (12)	5 (25)	
Used alcohol or drugs before or during sex in past 3 months: Sometimes	11 (21)	6 (12)		9 (36)	4 (20)	
Used alcohol or drugs before or during sex in past 3 months: Most of the time/Every time	14 (27)	8 (15)		8 (32)	6 (30)	

Substance use. Among participants, 40 percent reported smoking cigarettes (Table 12). At baseline, 8 percent reported that they never had an alcoholic drink in the past 3 months, 19 percent reported that they did so once a month, 38 percent reported 2 to 3 times a month, and 35 percent reported once a week or more. When asked how often they had five or more alcoholic drinks within a couple hours over the past 3 months, 26 reported never, 30 percent reported once a month, 26 percent reported 2 to 3 times a month, and 17 reported once a week or more. At baseline, the majority of participants (61 percent) reported using marijuana in the past 3 months, 35 percent reported using cocaine, 44 percent reported using methamphetamine, 13 percent reported using MDMA, and 13 percent reported using GHB. Overall, we did not detect any statistically significant changes in smoking or substance use from baseline to followup among participants who received smoking or substance use messages (Table 12).

Table 12. Smoking and substance use

Variable: Smoking	All partic-ipants: Baseline (N=52) N (%)	All partic-ipants: Followup (N=46) N (%)	All partic-ipants: p-value	Participants receiving smoking/ substance abuse messages: Baseline (N=20) N (%)	Participants receiving smoking/ substance abuse messages: Followup (N=17) N (%)	Participants receiving smoking/ substance abuse messages: p-value
Smoke cigarettes	21 (40)	19 (41)	0.564	20 (100)	17 (100)	--
Seriously considering stopping smoking in next 3 months	12 (67)	13 (72)	--	12 (71)	11 (69)	--

Table 12. Smoking and substance use (continued)

Variable: Substance use	All partic-ipants: Baseline (N=52) N (%)	All partic-ipants: Followup (N=46) N (%)	All partic-ipants: p-value	Participants receiving smoking/ substance abuse messages: Baseline (N=24) N (%)	Participants receiving smoking/ substance abuse messages: Followup (N=20) N (%)	Participants receiving smoking/ substance abuse messages: p-value
Had an alcoholic drink in past 3 months: Never	4 (8)	6 (12)	0.855	1 (4)	2 (10)	0.932
Had an alcoholic drink in past 3 months: Once a month	10 (19)	9 (17)		2 (8)	2 (10)	
Had an alcoholic drink in past 3 months: 2–3 times a month	20 (38)	17 (33)		8 (33)	7 (35)	
Had an alcoholic drink in past 3 months: Once a week or more	18 (35)	14 (27)		13 (54)	9 (45)	
Had 5 or more alcoholic drinks within a couple of hours in past 3 months: Never	19 (37)	24 (46)	0.032	6 (26)	8 (40)	0.677
Had 5 or more alcoholic drinks within a couple of hours in past 3 months: Once a month	17 (33)	11 (21)		7 (30)	4 (20)	
Had 5 or more alcoholic drinks within a couple of hours in past 3 months: 2–3 times a month	11 (21)	3 (6)		6 (26)	3 (15)	
Had 5 or more alcoholic drinks within a couple of hours in past 3 months: Once a week or more	4 (8)	8 (15)		4 (17)	5 (25)	
Have used the following drugs in past 3 months: Marijuana	27 (59)	19 (42)	0.317	14 (61)	9 (45)	0.564
Have used the following drugs in past 3 months: Cocaine	8 (29)	6 (13)	1.000	6 (35)	4 (20)	1.000
Have used the following drugs in past 3 months: Heroin	0 (0)	1 (2)	--	0 (0)	1 (5)	--
Have used the following drugs in past 3 months: Methamphetamine	6 (46)	6 (13)	0.317	4 (44)	3 (15)	0.317
Have used the following drugs in past 3 months: MDMA	2 (17)	1 (2)	--	1 (13)	0 (0)	--
Have used the following drugs in past 3 months: GHB	3 (25)	4 (9)	0.157	1 (13)	2 (10)	0.157
Have used the following drugs in past 3 months: Ketamine	0 (0)	3 (7)	--	0 (0)	1 (5)	--

Medication adherence. Almost all participants (98 percent) reported currently taking medication to treat HIV: 37 (73 percent) reported taking medication for more than 12 months, whereas 12 (24 percent percent) reported that they started taking medication 1 to 3 months ago, and 2 (4 percent) reported that they started 4 to12 months ago. At baseline, more than half (n=27, 55 percent) reported not missing any doses in the past 7 days, whereas 10 (20 percent) reported missing one dose, 7 (14 percent) reported missing two doses, 4 (8 percent) reported missing three doses, and 1 (2 percent) reported missing six doses. Among participants who responded to the followup survey, 44 (96 percent) reported taking medications for HIV, with 29 (66 percent) not missing any doses, 8 (18 percent) missing one dose, 4 (9 percent) missing two doses, and 3 (7

percent) missing three doses. Among participants who received medication reminders, we detected a statistically significant decrease in number of missed medication days at followup as well as a significant decrease in the number of participants who cited "simply forgot" as a reason for missing their medication (Table 13).

Table 13. Medication adherence

Variable	All partic-ipants: Baseline (N=51) N (%)	All partic-ipants: Followup (N=44) N (%)	All partic-ipants: p-value	Participants receiving medication messages: Baseline (N=21) N (%)	Participants receiving medication messages: Followup (N=14) N (%)	Participants receiving medication messages: p-value
Number of days in past 7 days missed a dose of medication…mean (SD)	0.79 (1.25)	0.56 (0.93)	0.268	1.76 (1.44)	0.82 (1.07)	0.038
Reasons for missing medications: Away from home	20 (39)	9 (25)	0.180	9 (45)	5 (38)	0.317
Reasons for missing medications: Busy with other things	19 (37)	10 (28)	0.655	10 (50)	4 (31)	0.157
Reasons for missing medications: Simply forgot	28 (55)	11 (31)	0.096	14 (70)	4 (31)	0.046
Reasons for missing medications: Too many pills to take	2 (4)	2 (6)	0.317	1 (5)	1 (8)	--
Reasons for missing medications: Wanted to avoid side effects	4 (8)	1 (3)	--	2 (10)	1 (8)	--
Reasons for missing medications: Did not want others to notice you taking medication	7 (14)	3 (8)	0.564	2 (10)	1 (8)	0.317
Reasons for missing medications: Change in daily routine	15 (29)	6 (17)	0.257	9 (45)	4 (31)	1.000
Reasons for missing medications: Felt like drug was toxic/harmful	1 (2)	0 (0)	--	0 (0)	0 (0)	--
Reasons for missing medications: Fell asleep/slept through dose time	20 (39)	11 (31)	0.480	12 (60)	6 (46)	0.564
Reasons for missing medications: Felt sick or ill	4 (8)	2 (6)	--	2 (10)	2 (15)	--
Reasons for missing medications: Felt depressed/overwhelmed	9 (18)	3 (8)	0.564	6 (30)	1 (8)	0.157
Reasons for missing medications: Problem taking pills at specified times	6 (12)	5 (14)	0.655	6 (30)	2 (15)	0.157
Reasons for missing medications: Ran out of pills	4 (8)	2 (6)	0.564	2 (10)	2 (15)	1.000
Reasons for missing medications: Felt good	3 (6)	0 (0)	--	2 (10)	0 (0)	--
Reasons for missing medications: Drunk or high	7 (14)	5 (14)	0.180	3 (15)	1 (8)	0.317

* Includes only respondents who reported taking medications for HIV.

Social support. At baseline, at least half of participants reported having the following types of social support most or all of the time: someone to count on when they need to talk (71 percent), someone to give them information to help them understand a situation (71 percent), someone to give them good advice about a crisis or personal problem (58 percent), someone who

understands their problems (58 percent), someone to have a good time with (58 percent), and someone to provide tangible support (56 percent). Less than half of participants reported having the following types of social support most or all of the time: someone to get together with for relaxation (48 percent), someone to take care of them if they are sick (46 percent) and someone who shows them love and affection (46 percent). Overall, we detected a statistically significant increase in social support from baseline to followup among all participants and among those participants who received social support messages (Table 14).

Table 14. Social support

Variable	All partic-ipants: Baseline (N=52) Mean (SD)	All partic-ipants: Followup (N=46) Mean (SD)	All partic-ipants: p-value	Participants receiving social support messages: Baseline (N=51) Mean (SD)	Participants receiving social support messages: Followup (N=45) Mean (SD)	Participants receiving social support messages: p-value
Social support score	3.60 (1.05)	3.96 (0.87)	0.005	3.62 (1.06)	3.97 (0.87)	0.007
Someone you can count on to listen to you when you need to talk	3.96 (1.03)	4.26 (0.74)	0.025	3.98 (1.03)	4.27 (0.75)	0.036
Someone to give you information to help you understand a situation	3.76 (1.04)	4.13 (0.88)	0.028	3.76 (1.05)	4.13 (0.89)	0.028
Someone to give you good advice about a crisis or personal problem	3.72 (1.15)	4.17 (0.88)	0.004	3.73 (1.16)	4.20 (0.87)	0.004
Someone who understands your problems	3.52 (1.26)	4.02 (1.06)	0.011	3.53 (1.27)	4.04 (1.07)	0.011
Tangible support like money or food	3.41 (1.45)	3.54 (1.41)	0.497	3.44 (1.45)	3.56 (1.42)	0.570
Someone to take care of you if you were sick	3.28 (1.42)	3.41 (1.51)	0.473	3.31 (1.43)	3.42 (1.53)	0.547
Someone who shows you love and affection	3.46 (1.38)	4.04 (1.15)	0.005	3.47 (1.39)	4.04 (1.17)	0.007
Someone to have a good time with	3.74 (1.22)	4.09 (1.01)	0.022	3.76 (1.23)	4.09 (1.02)	0.030
Someone to get together with for relaxation	3.59 (1.26)	3.98 (1.20)	0.011	3.62 (1.25)	4.00 (1.21)	0.016

Patient involvement. At baseline, most participants (92–98 percent) agreed or strongly agreed with statements about patient involvement dealing with asking providers questions about their care, feeling comfortable talking with their providers, feeling involved in making decisions about their care, and understanding answers given by their providers. Overall, we did not detect as statistically significant change in patient involvement from baseline to followup (Table 15).

Table 15. Patient involvement and quality of care: All participants

Item/Scale	Baseline (N=52) Mean (SD)	Followup (N=Mean (SD)46)	p-value
My providers made sure I understood what my lab test results (such as CD4 and viral load) meant for my health.	4.64 (0.72)	4.59 (0.62)	0.728
My providers spent enough time with me.	4.47 (0.79)	4.42 (0.87)	0.719
I asked my providers all of the questions I had about my HIV care.	4.49 (0.76)	4.44 (0.76)	0.710
I felt comfortable talking about personal or intimate issues with my providers.	4.47 (0.84)	4.42 (0.75)	0.700
I was involved in making decisions about my health care with my providers.	4.49 (0.79)	4.53 (0.55)	0.710
When I asked my providers questions about my HIV care, I understood their answers.	4.55 (0.76)	4.55 (0.63)	1.000
I found my providers to be accepting and nonjudgmental of my life and health care choices.	4.76 (0.68)	4.71 (0.51)	0.599
I would rate my providers' knowledge of the newest developments in HIV medical standards as…	4.67 (0.56)	4.53 (0.63)	0.160
I would rate the quality of care at this clinic in comparison to other clinics I know about as…	4.38 (0.91)	4.55 (0.67)	0.227

Note: Rating scale ranges from 1 (strongly disagree) to 5 (strongly agree).

Message receptivity. Most participants (98 percent) indicated that the messages were easy to understand, that they trusted the information in the messages (89 percent), and that they felt the messages gave them good advice (82 percent) (Table 16). The majority said that they liked the messages (76 percent), they learned something new from the messages (61 percent), the messages helped them remember to take their HIV medication (62 percent), informed them of HBHC services/resources (76 percent), grabbed their attention (72percent), would motivate PLWH to act in ways that would prevent further transmission (70 percent), and to be involved in their health care (69 percent) (Table 16). The majority reported that the messages were interesting (65 percent), convincing (71 percent), and said something important to them (65 percent).

Table 16. Percentage of respondents indicating agree or strongly agree with statements regarding the text messages: Followup survey (N=46)

Item	Agree/Strongly agree: N	Agree/Strongly agree: Percent
Overall, I liked the text messages.	35	76
I learned something new from the text messages.	28	61
The text messages were easy to understand.	45	98
I was interested in the message topics	30	65
I trusted the information in the messages.	41	89
The text messages were convincing	32	71
The messages said something important to me.	30	65
The messages grabbed my attention.	33	72
The messages told me something I didn't already know.	20	43
The messages were confusing.	2	4
I did not like the messages.	9	20
The messages were persuasive.	20	43
The messages were very appealing to me.	20	43
I felt like the messages were designed for me	20	43
The messages promoted behaviors that are difficult for me to do.	10	22
The messages motivated me to change my behavior.	20	44
The messages would motivate people living with HIV to act in ways that would prevent giving HIV to others.	31	70
The messages contradicted what I know about HIV prevention.	6	13
The messages helped me to remember to take my HIV medication.	28	62
The messages motivated me to be involved in my health care.	31	69
I learned about services or resources available to me from the messages.	34	76
The messages gave me good advice.	37	82

The majority of participants used the following adjectives to describe the text messages: accurate, believable, effective, clear, informative, interesting, and realistic (Table 17). None of the participants said the messages were dishonest or offensive.

Table 17. Percentage of respondents reporting positive and negative adjectives about the text messages: Followup survey (N=46)

Adjective	Selecting the adjective: N	Selecting the adjective: Percent
Accurate	32	70
Annoying	14	30
Believable	29	63
Complex	3	7
Effective	32	70
Embarrassing	7	15
Clever	15	33
Clear	35	76
Condescending	2	4
Dishonest	0	0
Familiar	21	46
Far-fetched	1	2
Creative	18	39
Inappropriate	3	7
Informative	32	70
Interesting	24	52
Irritating	5	11
Offensive	0	0
Original	16	35
Pointless	4	9
Realistic	25	54
Silly	9	20
Stigmatizing	5	11
Worth Remembering	21	46

We asked participants to rate each message category on a scale from 1 to 10. Medication reminders and appointment reminders were the most highly rated messages (Table 18). Being actively involved in health care, general health and wellness, social support, and preventing risky sex behaviors were also highly rated. The lowest rated messages were preventing/reducing the risk of alcohol/drug use and smoking cessation.

Table 18. Mean ratings by type of message: Followup survey (N=46)

Type of message	Mean	SD
Appointment reminders	8.62	1.68
Medication reminders	8.63	2.35
General health and wellness	7.91	2.70
Preventing risky sex behaviors	7.51	2.75
Preventing or reducing alcohol/drug use	6.79	3.21
Social support	7.86	2.77
Smoking cessation	6.69	3.60
Being actively involved in my health care	8.19	2.75

Note: Rating scale ranges from 1 to 10.

Most participants (86 percent) reported always reading the messages they received from the study (Table 19). However, only 14 percent said that they always used the information in the messages.

Table 19. Percentage of respondents reporting reading and/or using information from the text messages: Followup survey (N=46)

Item	Always N (percent)	Usually N (percent)	Sometimes N (percent)	Never N (percent)
How often did you read the text messages you received from the study?	38 (83)	6 (13)	2 (4)	0 (0)
How often did you use the information that was in the messages?	6 (13)	12 (26)	19 (41)	9 (20)

The majority of participants (67 percent) said that they were not at all concerned that people could see the text messages they got from the study (Table 20). Almost three quarters (71 percent) said the text messages were somewhat or very helpful, and 78 percent said they were somewhat/very satisfied with the messages they received. Most participants (87 percent) said that it is very important to have programs like this one.

Table 20. Percentage of respondents by perceptions of the text messages: Followup survey (N=46)

Item	Very	Somewhat	A little	Not at all
How concerned were you that people could see the text messages you got from the study?	6 (13)	4 (9)	5 (11)	31 (67)
How helpful were the text messages that you received?	20 (43)	13 (28)	9 (20)	4 (9)
How satisfied were you with the messages you received?	25 (54)	11 (24)	5 (11)	5 (11)
How important is it to have programs like this one where people can receive information from their health care providers through text messages?	39 (87)	4 (9)	2 (4)	0 (0)

On a scale from 1 to 10, participants rated the frequency (7.38), timing (7.02), and content (7.44) of the messages highly (Table 21).

Table 21. Mean ratings of message frequency, timing, and content: Followup survey (N=46)

Type of message	Mean	SD
The number of messages you received	7.30	2.78
The timing of the messages you received	7.02	3.36
The content of the messages you received	7.44	2.81

Note: Rating scale ranges from 1 (worst) to 10 (best).

Overall, we detected a statistically significant increase in HIV knowledge from baseline to followup (Table 22).

Table 22. HIV knowledge: All participants

Variable	Baseline (N=52) N (percent) correct	Followup (N=46) N (percent) correct	p-value
Knowledge Score…mean (SD)	35.97 (11.17)	90.12 (13.11)	< 0.001
Certain oral health problems, such as oral candidiasis and herpes simplex, are common in people with HIV/AIDS.	5 (10)	30 (65)	<0.001
If a person does not take their HIV medications at the right time of the day, they can become resistant to their HIV medications.	33 (63)	30 (65)	0.593
HIV is cured when someone's HIV viral load is "undetectable."	1 (2)	45 (98)	<0.001

Table 22. HIV knowledge: All participants (continued)

Variable	Baseline (N=52) N (percent) correct	Followup (N=46) N (percent) correct	p-value
If someone's viral load is "undetectable," they don't need to use condoms during sex.	47 (92)	41 (95)	0.317
Eating a high-fat diet help people with HIV/AIDS digest their medications.	24 (46)	27 (59)	0.083
People who have HIV can get reinfected with a drug resistant type of HIV.	3 (6)	37 (82)	<0.001
Exercise is always unsafe for people with HIV/AIDS.	2 (4)	44 (96)	<0.001
Recreational drugs can make a person's HIV medications less effective.	0 (0)	35 (78)	--
It is best for a person to stop taking their HIV medications as soon as they feel better.	0 (0)	45 (98)	--
Taking HIV medications regularly protects people from getting common illness, such as food poisoning.	41 (79)	38 (83)	0.467
After a few months, it becomes less important for people to take their HIV medications at the right time of day.	44 (85)	39 (85)	1.000

We did not detect any significant change from baseline to followup in self-efficacy related to protecting oneself and one's partner from HIV (Table 23).

Table 23. Self-efficacy: All participants

Variable	Baseline (N=52) Mean (SD)	Followup (N=46) Mean (SD)	p-value
Self-efficacy score	3.94 (0.90)	3.87 (1.18)	0.540
I am confident that I can refuse to have sex if my partner doesn't want to use a condom.	3.89 (1.30)	3.69 (1.46)	0.237
I am confident that I can protect myself from STIs.	4.00 (1.15)	3.80 (1.34)	0.229
I am confident that I can protect myself from getting infected with another strain of HIV.	3.89 (1.17)	3.80 (1.32)	0.656
I am confident that I can protect my partners from getting HIV from me.	4.04 (1.13)	3.98 (1.22)	0.667
I am confident that I can use condoms consistently with my sex partners.	3.91 (1.16)	3.82 (1.37)	0.617

Note: Rating scale ranges from 1 (strongly disagree) to 5 (strongly agree).

We found a statistically significant improvement from baseline to followup in one measure of HIV stigma (i.e., In many areas of my life, no one knows that I have HIV), and a marginally

significant improvement in another (i.e., I never feel the need to hide the fact that I have HIV) (Table 24).

Table 24. HIV stigma: All participants

Variable	Baseline (N=52) Mean (SD)	Followup (N=46) Mean (SD)	p-value
In many areas of my life, no one knows that I have HIV.	3.65 (1.48)	3.09 (1.52)	0.007
Since learning I have HIV, I feel set apart and isolated from the rest of the world.	2.98 (1.45)	2.70 (1.38)	0.217
Most people with HIV are rejected when others find out.	3.22 (1.36)	3.13 (1.15)	0.656
Since learning I have HIV, I worry about people discriminating against me.	3.35 (1.42)	3.15 (1.49)	0.323
I never feel the need to hide the fact that I have HIV.	2.37 (1.40)	2.76 (1.51)	0.080
I have been hurt by how people reacted to learning I have HIV.	3.22 (1.32)	3.26 (1.29)	0.856
I regret having told some people that I have HIV.	3.02 (1.47)	2.91 (1.46)	0.574

Note: Rating scale ranges from 1 (strongly disagree) to 5 (strongly agree).

Overall, we did not detect a statistically significant change in HIV attitudes and beliefs from baseline to followup (Table 25). However, we did detect a significant decrease in the belief that if both sex partners are HIV positive, they do not need to use condoms during sex.

Table 25. HIV attitudes and beliefs: All participants

Item/Scale	Baseline (N=52) Mean (SD)	Followup (N=46) Mean (SD)	p-value
It is important to tell your sex partners that you have HIV.	4.49 (0.89)	4.58 (0.62)	0.456
It is important to keep learning about HIV, its treatment, and new developments in HIV research.	4.61 (0.83)	4.65 (0.57)	0.660
Drug or alcohol use can increase the risk for passing HIV to others because people are more likely to do risky behaviors when they are drunk or high.	4.46 (0.89)	4.46 (0.72)	1.000
Being in a relationship with another HIV-positive person can lead to a closer, more understanding relationship.	3.74 (1.16)	3.72 (1.11)	0.913
Monogamy is an effective prevention strategy.	3.76 (1.16)	3.78 (1.15)	0.890
It is important for my health to keep my doctor's appointments.	4.65 (0.87)	4.76 (0.52)	0.404
If both sex partners are HIV positive, they don't need to use condoms during sex.	3.69 (1.20)	2.56 (1.44)	0.001

Note: Rating scale ranges from 1 (strongly disagree) to 5 (strongly agree).

Overall, we did not detect any statistically significant change from baseline to followup in self-efficacy for following one's treatment plan (Table 26).

Table 26. Confidence in following treatment plan: All participants

Item/Scale	Baseline (N=52) Mean (SD)	Followup (N=46) Mean (SD)	p-value
Overall scale	8.96 (1.16)	8.89 (1.55)	0.769
Follow the instructions correctly for a large number and variety of prescription medications?	9.07 (1.58)	8.82 (2.27)	0.487
Take your medications as they are prescribed?	9.23 (1.31)	9.25 (1.43)	0.932
Work with your provider to reach agreement on the best medication for you overall?	9.30 (1.50)	9.41 (1.39)	0.685
Discuss openly with your provider any problems that may be related to your medications?	9.48 (1.17)	9.48 (1.39)	1.000
Stick to your treatment plan even when side effects begin to interfere with daily activities?	8.71 (1.50)	8.71 (1.83)	1.000
Integrate your treatment plan into your daily routine?	9.26 (1.12)	8.85 (1.71)	0.055
Stick to your treatment plan even when your daily routine is disrupted?	8.26 (2.04)	8.43 (2.16)	0.577
Stick to your treatment plan when you aren't feeling well?	8.80 (1.64)	8.70 (2.15)	0.748
Continue with your treatment plan even when you are feeling discouraged about your health?	8.80 (1.93)	8.91 (1.87)	0.610

Note: Rating scale ranges from 1 (not at all sure) to 10 (totally sure).

We did not detect any significant change from baseline to followup in the health care provider communication (Table 27 or quality of life indicators we measured (Table 28).

Table 27. Health care provider communication: All participants

Item/Scale	Baseline (N=52) N (percent)	Followup (N=46) N (percent)	p-value
My providers explained the side effects of HIV medications in a way I could understand.	48 (96)	42 (93)	0.083
My providers suggested ways to help me remember to take my HIV medications.	43 (86)	37 (82)	0.414
My providers explained to me what kinds of medical tests I should be getting and how often I should get them.	46 (90)	39 (85)	0.414
My providers talked to me about how to avoid passing HIV to other people and how to protect myself from getting infected again with HIV.	43 (84)	37 (82)	0.706
My providers talked to me about how to protect myself from getting STIs or how to avoid passing them on to others if I already had one.	45 (88)	38 (84)	0.414

Table 27. Health care provider communication: All participants (continued)

Item/Scale	Baseline (N=52) N (percent)	Followup (N=46) N (percent)	p-value
My providers or case managers asked me how I was feeling emotionally and made a referral to a mental health provider, counselor, or support group if I needed help.	47 (90)	40 (89)	0.706
My provider asked me about my drug and alcohol use and made a referral if I needed help.	37 (76)	29 (66)	0.166

Table 28. Quality of life: All Participants

Item/Scale	Baseline (N=53) Mean (SD)	Followup (N=46) Mean (SD)	p-value
During the past 3 months, how much of the time has your physical health interfered with your social activities (like visiting with friends, relatives, etc.)?	4.11 (1.01)	4.31 (0.82)	0.162
During the past 3 months, how much of the time have your emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?	3.72 (0.98)	3.93 (1.10)	0.124
During the past 3 months, how much of the time have you experienced difficult sleeping, poor appetite, or excessive worrying?	3.26 (1.20)	3.52 (1.09)	0.123

Note: Rating scale ranges from 1 (all of the time) to 5 (none of the time).

Medical Record

We detected a statistically significant change in viral load from baseline to followup (p=.049), and a marginally significant change from baseline to followup in CD4 values (p=.10) (Table 29).

Table 29. Clinical data: All participants

Item/Scale	Baseline (N=41) Mean (SD)	Followup (N=40) Mean (SD)	p-value
CD4	539.34 (301.13)	584.26 (306.57)	.101
Viral Load	62650.34 (220896.82)	3196.85 (9454.04)	.049

Note: Viral load values were log transformed before conducting the statistical test to account for a skewed distribution. Mean values are presented here in original units for easier interpretation.

Qualitative Patient Interviews

Implementation policies and practices. We asked participants to describe their experiences with study enrollment. Members of our sample learned of the program primarily in two ways.

Four of the participants said they responded to flyers or postings they had seen about the study, whereas the other five mentioned being referred by clinic staff, including doctors, nurse practitioners, and the on-site Study Coordinator. We also asked participants for their thoughts on the enrollment process. Most felt that enrollment was easy and efficient.

Implementation effectiveness. At the time of the interview, seven of nine participants were still taking part in the pilot, and two had completed the study. When asked how often they read the text messages they received, six of the nine participants said they read "99 percent" or every single message. The other three participants also regularly read their messages. One of these participants said that "sometimes I let it go if I had already taken [my medication]." Another participant said he read every message in the beginning, but it dropped off because of perceived redundancy in and the number of messages.

Actual use of the information in the text messages was almost evenly split among the participants in this sample. Four participants reported using information they received in the text messages. Two of these were for medication reminders only. Among the other two, messages on exercise prompted one to begin his own regimen, and the other was encouraged by the messages to engage more with his provider, stating "I think there was one about 'don't be afraid to bug your provider with concerns' and maybe that brought me to bring something up that I would not have before." The messages, however, did generate awareness among most participants about available resources at HBHC, the most commonly mentioned being programs or support groups that they were not familiar with or had forgotten about.

Participants were asked for specific things they liked about the messages. Among the responses we received were the following examples:

- "I did like all the positive encouragement, self-esteem booster messages. I was recently diagnosed as HIV positive, and it's a pretty isolating disease, and I'm not out about my status, so it was nice to receive messages that are positive about people who are HIV positive."
- "I liked the humor in some of them, they were pretty funny, like I was down, and they would make me laugh. "
- "Those about getting together with help groups. If offered who to contact and I did like that part. It doesn't just bring up the problem, it brings up the solution too."

When asked about things they did not like about the messages, several participants mentioned that some of the messages they received, especially those about sex- or drug-related behaviors, were not applicable to them. One participant said, "One thing that I didn't like was there was a lot of stuff focused on partying and drinking, and I understand there's an audience for that. But I'm not someone that does those things and goes out drinking all the time. Those messages perpetuate the notion that as a gay man, that's something that I do all the time…. The messages would be better if they were more tailored." Another participant was confused about how to interpret the weekly adherence question, unsure about whether the question pertained to the number of doses missed or the number of days he missed a dose.

We asked participants to discuss any worries they had about privacy and receiving HIV-related text messages on their cell phones. Only two participants expressed some concern. One participant described taking advantage of the opportunity to create his own adherence reminder that did not mention medication; he used the phrase "que pasa" as his reminder message. Another talked about how other people use his phone and might see the messages. He suggested

having "the messages not being so straightforward…not right away say 'take your medication.'" He also recommended adding another step to get the message, such as pressing another button before the message actually appears. Another participant shared that he got so used to the reminder messages that he didn't have to pick up his phone to check. He said, "It was interesting that people would wonder why I was ignoring my phone at a certain time when I knew exactly what the message was."

Barriers to program implementation, maintenance, and stability. Participants reported few problems with sending or receiving text messages, and when problems were reported, they were resolved quickly. Interviewers contacted other study staff to seek resolutions to any technical issues. For example, one participant reported receiving multiple messages at once, resulting in him reading only the first message and ignoring subsequent messages. Upon further investigation, we determined that the participant had been sent messages at the appropriate times, but that circumstances beyond the program's control—such as the participant moving in and out of cell service range, or turning his phone off and then on—could result in multiple messages being received simultaneously. Another participant said that he had to contact his cell phone service provider to have a block on unsolicited text messages removed so that he could participate in the program.

Patient satisfaction. Overall satisfaction with the text messaging program was high in this small sample of participants, especially with the medication reminders. One participant even found the tone of the reminders satisfying, stating "I like the ones, like 'good morning' or 'sweet dreams,' so those were the ones I like—those that were 'kind'." The one participant not currently on medication shared the following: "The more motivational messages were more satisfying, because it wasn't just information but more community support. You don't get a lot of support from the community as someone who is HIV positive, so it's nice to have that. "

Participants were asked to comment on the timing of the messages. Generally, participants were satisfied and liked both the regularity of the timing and the ability to set the times for receiving medication reminder messages. "Always prompt," said one participant. "That's an important piece. When my phone would chime at 11:30 I would know exactly why. The consistency was good." Another participant, while liking the timing of his messages, did point out a potential weakness in receiving them at regular times: "When it's done at the same time, the messages start to feel robotic and detached. That's why I started to read them less…. Maybe if they were sent at different times during the day, it would be better."

When asked if they were satisfied with the number of messages they received, two participants reported they received too many messages. One individual suggested that participants should be able to opt out of message categories at different points during the study if they were not finding them useful.

A few participants commented on their satisfaction with the content of messages. One participant echoed a sentiment described about the messages creating a sense of support: "There was one [message] that was like 'you made all your medications' …. [My] first reaction was that I know that this is just a computer sending these. But there was really this 'wow, someone really cares if I take my medication or not and they are invested in this.' After 10 years on HIV you really start to get medication fatigue and there are not people who really support that you take your medications…. It was like someone who wanted to keep you healthy."

Recommendations for improvement. Participants offered a number of suggestions for how to improve the text messaging program:

- Participants recognized their messages had been tailored based on the questionnaire they had completed at the beginning of the program as well as their messaging preferences. As discussed earlier, some participants stated that the sex- and drug-related messages were not appropriate for them. Also, several participants suggested additional tailoring of the messages, with one recommending tailoring "in terms of where a person is in terms of length of time diagnosed—talking to your doctor, those types of things."
- Two participants recommended making the intervention more interactive, with either more questions or responses back from providers: "I thought that this would be a lot of questions and answers, but the only question was how many pills I had missed. I thought there was going to be more questions. I would have preferred something that was more interactive, so I could say 'Oh yeah, this happened to me yesterday.'"

Outcomes. We asked participants to share any changes they may have made in their lives as a result of participating in the program:

- **Medication adherence**—Six participants responded that adherence to their medication regimens improved while taking part in the text- messaging program. (One of the nine participants reported not currently being on medication and consequently did not receive adherence messages.) One participant attributed his improvement to the following: "Feeling like there was a third party interested in me doing the meds, and that I would report my numbers, made me more adherent." Another participant attributed his improved adherence to better health, saying, "It really helped. My last viral load was 85, which is next to undetectable. I wish that this would continue."
- **Appointment adherence**—Two participants responded that receiving text reminders were helpful in keeping clinic appointments. Not all participants had appointments scheduled within the program timeframe, and consequently did not have had the opportunity to receive these messages.
- **Patient involvement**—Two participants described that text messages designed to increase interaction with health care providers during clinical appointments prompted them to talk to their doctor. One of the participants said, "If I had an appointment, I didn't think about asking the question until I got the text message. A question I never thought about asking, did help me, because I actually did ask." Another participant reported liking the patient involvement messages but did not indicate he acted upon the messages. Several participants mentioned that the messages would be beneficial to individuals who are newly infected with HIV.
- **Access to resources**—As described earlier, none of the participants indicated that they joined any new support groups or accessed other community services, although most indicated that they learned about or were reminded about HBHC resources that were available to them, or that they were already taking part in these other programs. Again, several participants, particularly those who had been living with HIV for years, noted that these types of messages might be especially helpful to people who are newly infected with HIV. One participant shared that "More useful were social networking sites like HIV awareness sites and stuff like that. Groups where you can talk about HIV. I'm pretty comfortable but if there are people that are newly infected, just to have a support group…."

- **Diet and fitness**—Several participants reported making changes to eating and exercise routines while taking part in the text-messaging program. One participant said the messages helped get him started on an exercise regimen, and another described a change in meal habits: "I'm definitely eating breakfast now. It said breakfast is one the most important meals of the day. Before that, I would skip or just eat lunch." Another participant described a less direct, but still positive, connection between the messages and behavior: "Yeah, I guess I have been more fit and eating less crap and am still riding my bike in the middle of winter. And then also, I guess there are some things subconsciously you internalize through the messages. There has been some benefit definitely. "

Qualitative Clinic Staff Interviews

Organizational context. We asked providers if they felt the leadership at HBHC supported the text-messaging program. Although providers did not speak to leadership specifically, they generally felt that the program was supported by the organization. For example, they pointed to the visibility of study-related posters and flyers around the clinic and the availability of the on-site Study Coordinator as signs of organizational support.

Providers were less certain about whether HBHC had adequate staffing to carry out the program in the long-term. They perceived the role of providers in the program as limited, such as only referring patients to the Study Coordinator. As such, they were less aware of the other types of organizational resources that would be required.

Based on their limited understanding, two providers were unsure as to whether HBHC could sustain a text-messaging program, two providers thought resources were adequate, and one provider thought resources were inadequate. The providers who thought it was feasible to sustain a text-messaging program mentioned a similar effort that worked well with youth and felt this program could also be successful. Another provider, who was unsure if HBHC had the resources necessary, said that HBHC is a nonprofit and not everything can be "at the top of our list." The provider who thought staffing resources were insufficient stated that the program requires more time with the patient in the exam room to explain the text-messaging program, leading to slower patient turnover in the exam rooms.

Implementation policies and practices. We asked providers to describe how the program was implemented at HBHC. They stated that they learned of the program in different ways, including e-mails from the Study Coordinator mentioning that the study was ongoing and reminding them of the eligibility criteria, one-on-one contact with the Study Coordinator, and the program being mentioned at a research meeting. Providers said they were asked to refer any eligible patients to the Study Coordinator. Some providers said that initially they forgot to refer patients. However, the Study coordinator kept in close contact with the providers and also used flags in the Electronic Medical Records system to remind physicians, in particular, to assess their patients' eligibility and refer them to the Study Coordinator, if appropriate.
The Study Coordinator also offered training to help facilitate referrals from providers; however, most providers felt the reminder e-mails were sufficient.

Implementation climate. We explored the context in which the program was implemented; and specifically how amenable the providers and other staff were to the program. Among the five providers, four thought the staff wanted to participate in the program. The remaining provider said that other physicians were "in the middle" about wanting to participate because of the

number of other studies being conducted. Reasons why providers thought staff wanted to participate included the following:

- They thought it was a "good way to help patients, to help patients be compliant."
- It was an "easy study to implement. There were no risks to patients, really."
- "Everyone understands the importance of having this program."

Providers did not mention awareness of resistance from other providers, other than general demands on their time. Two providers did note that HBHC had undergone significant leadership changes in the 6 months prior to the interview, but they did not think that affected this program.

Implementation effectiveness. We asked providers their opinions about the program, specifically what they liked and did not like and what worked well and did not work well. Generally, the providers thought the referral process made it easy for them to refer patients to the program. Also, they said that the eligibility criteria were simple, which made it easier for them to make referrals for this study compared with other ongoing studies. One provider mentioned that they liked the informal tone of the text messages, and felt that using more casual discourse is more effective than using formal or clinical terms.

Some of the things providers did not like about the program included perceptions of its unsuitability for older patients who may not have the technological skills necessary to take advantage of a text-messaging program. Another criticism of the program was the requirement that program participants be aged 24 or older, feeling that it should have been made available to younger patients.

Barriers to program implementation, maintenance, and sustainability. We asked providers what barriers they foresaw in terms of implementing, maintaining, and sustaining a text-messaging program with HBHC patients. One provider said that oftentimes participants cell phones are disconnected, which would interrupt delivery of the text messages. Another provider said that not all eligible patients can afford to have a text-messaging plan or even a cell phone, reducing the number of patients who can be reached by a text-messaging program. One provider mentioned that staff turnover, coupled with multiple concurrent research studies, may be a barrier, noting that "keeping one thing in your mind is not always easy." Two providers said that physicians also often forget to refer patients into the program.

Facilitators to program implementation, maintenance, and sustainability. We asked providers what factors helped with implementing, maintaining, and sustaining a text-messaging program. Two providers mentioned the engagement of the on-site Study Coordinator and that her frequent reminders helped to facilitate the program. One provider said that if the program proved to be "helpful" to patients, clinic staff would "buy-in" to the program. Finally, providers said that seeing posters advertising the study to patients also helped with enrolling participants into the program. Often the patients would mention the program to their provider during their exam, prompting the provider to assess eligibility and refer them to the Study Coordinator, if appropriate.

Recommendations for improvements. One provider suggested that the message be made more creative and not "so copy-paste." That is, the provider felt the messages became somewhat redundant. It was also suggested that messages be sent on different days and at different times to make them less predictable. For example, instead of setting up the system to deliver a particular message class (e.g., social support) on a certain day and time, the provider suggested that the

system be set up to deliver message classes on alternating days and times to reduce predictability.

As for improvements related to recruitment and enrollment, one provider recommended allowing participants to enroll via text messaging rather than having to enroll in the study through the Study Coordinator. She also recommended lowering the enrollment age to 18 or 21 to reach younger patients who may benefit from a text-messaging program. Finally, one provider recommended communicating earlier with all providers before the study starts to familiarize staff with the program and generally working more to improve communication among the staff about the study. For example, the provider thought that their nonclinical staff should know about the program so that patients not receiving social services or clinical care could still learn about the program.

Outcomes. Generally, providers were unable to comment on specific ways in which the program benefited patients because most providers had not had seen their patients in the interval between enrollment and when the provider interviews took place. However, two providers thought patients were more compliant but were unsure, whereas two providers were more definitive in saying they thought there was an increase in medication adherence. Two providers said it would be interesting to look at the patients' CD4 count and viral load before and after the program to observe any changes. When answering, two providers also relayed experiences of their patients that they heard, indicating that they received positive feedback about the program from their patients since their enrollment.

Chapter 5. Conclusion

This chapter summarizes the key findings, limitations, lessons learned, and recommendations for future research.

Key Findings

We enrolled a total of 52 participants in the study and 46 completed the intervention and the followup survey (88.5 percent retention rate). A total of 6,888 messages were sent successfully to study participants during the intervention. The majority of the messages were unidirectional and noninteractive. However, we received 708 SMS responses to our process evaluation questions (e.g., weekly adherence assessment, message receptivity, and sex and substance use assessment) and as well as 317 unprompted SMS message acknowledgements from participants (e.g., "thanks").

Participants reported strong receptivity to both the messages and the intervention. These findings are consistent across multiple data sources, including the survey and qualitative interviews with patients, providers, and the on-site Study Coordinator. We detected a statistically significant change from baseline to followup in four key outcomes targeted by the intervention: medication adherence, HIV knowledge, social support, and reduction in number of sex partners. More specifically, we detected a statistically significant decrease in the number of missed medication days as well as a significant decrease in the number of participants who cited "simply forgot" as a reason for missing medication doses among those who received medication reminders. These findings also are consistent with participant responses during the qualitative interviews.

In addition, we detected a significant decrease in viral load from baseline to followup and a marginally significant increase in CD4 counts from baseline to followup among participants who received medication reminders. We detected a statistically significant increase in HIV knowledge and social support from baseline to followup. Participants also indicated increased social support during the qualitative interviews, and provided several examples of how the intervention promoted a feeling of social support. Among participants who received sexual risk-reduction messages, we detected a significant reduction in the number of reported sex partners from baseline to followup.

Limitations

This study had a number of limitations stemming from the fact that it was a proof-of-concept study. As such, we had a small sample size, no control group, and a short followup period, especially for clinical measures. In addition, study enrollment was restricted to individuals aged 25 or older because another study focused on individuals under age 25 was being implemented at the same time at our clinical site. Finally, RTI's IRB required that we allow participants to opt out of individual message classes, which is inconsistent with the way these types of interventions are typically delivered. Usually, a participant is given an explanation of the study upfront and then he or she chooses to participate or not to participate. Giving individuals the opportunity to opt out of certain message classes, even if they should have received those messages based on

their preintervention assessment, makes it more difficult to evaluate the intervention's overall effectiveness.

Lessons Learned

Numerous lessons learned resulted from the development, implementation, and evaluation of this proof-of-concept intervention, including insights into recruitment, message tailoring, text programming, message delivery, and study logistics. This knowledge gained will be invaluable to others embarking on a similar process and to efforts when/if the current intervention is brought to scale.

Recruitment

- Place advertisements in clinic exam rooms to prompt patients to ask their doctor's about the program.
- Find creative ways to inform and continually engage medical and nonmedical providers to keep the program on their radar screen.

Message Tailoring

- The Message Tailoring Form may be less time consuming if participants could choose the messages they do want to receive as opposed to marking the messages they do not want to receive.
- Participants who declined medication adherence texts altogether may not have done so if we had asked them if they want those messages before going through all of the other message classes.
- Further tailor the substance use messages so that participants who only use alcohol or only use other drugs would not receive messages for both.
- Some adherent participants would like to receive adherence messages even though they may not need them per se based on our definition (i.e., having missed one or more doses of medication in the past week).

Text Programming

- It was more time efficient to catch failed starts and other problems when the site could communicate directly with Intelecare.
- Automate as much as possible to reduce the potential for error.

Message Delivery

- Because of privacy concerns, it will be important to find ways to mask the content of the text messages so as to not "out" people's HIV status if others should see their phones. Possibly, participants could be prompted to press a digit to retrieve their text message.
- Vary the timing of message delivery so that they do not become too predictable.
- It will be important to develop ways to counter the potential for message fatigue, such as increasing the flexibility of the messaging system to alternate times and days when certain message classes are delivered. Also, keeping the content fresh by developing a

wider array of messages within classes may help to stave off message fatigue. Additionally, it may be helpful to explore ways to further customize the system so that participants can have more choice about the frequency and timing of messages they receive.

- Stagger delivery of process questions so participants are not inundated with messages they have to respond to within a short time span.
- Develop a wider array of text messages to keep the content fresh.
- In a few cases, participants reported receiving messages in a batch. We theorize that this resulted from either a participant regaining connectivity to their mobile network after a period of dead time or latency on the part of the mobile carrier's delivery of messages. Because neither condition could be fully assessed or prevented, we suggest notifying participants in advance that this may occur during the intervention.

Study Logistics

- It is a good idea to include remote followup in the study protocol from the outset in case participants move out of the area during the study period.
- Participants may switch cell numbers during the course of the study.
- Conduct provider interviews later in the study to give providers the opportunity to have had a followup visit with their patients enrolled in the study.
- We needed a followup way to verify that participants were receiving the text messages, as they will not necessarily call and let us know if they are not receiving the messages.

Recommendations for Future Research

The results, limitations, and lessons learned suggest several avenues for future research. First, a full-scale study with longer term followup is warranted to confirm the findings and to expand on this proof-of-concept study. Second, future research should include a larger sample, a control group, multiple sites, younger participants, and longer term followup. Third, the intervention and messaging should be expanded to include HIV-negative MSM and heterosexuals, and couples-based messaging should be explored. Fourth, more formative work should be conducted to inform the development/revision of messages and the delivery schedule. Finally, a larger qualitative component (i.e., larger sample size) should be included in the evaluation.

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Appendix A: Message Tailoring Algorithm

Baseline Survey
Messages by Topic Area

Topic	Question Number	No. Messages	Messages
Demographics	1, 2		
Texting/internet capabilities	4-18		
Adherence	22-27		
Adherent – Weekly Messages Messages delivered on Tuesday Question 24 =1, then this message set; else, no messages Adherence Question 24 also delivered weekly on Sunday (see last row of table Weekly Adherence Question)		12	Feeling good? Thank your meds. Pop it, don't stop it! Keep up the commitment to taking your meds! Practice makes perfect. Awesome job with your med schedule last week. U da man! Medication adherence keeps your viral load down. Keep it up this week! When you take your meds regularly, you're in control. Good job with your meds. Check your med supply and let us know if you need a refill. Call 773-388-8865. Another week of no missed doses! Treat yourself to something nice this week. He shoots! He scores! Perfect med adherence. Great job! A little birdie told me you didn't miss a dose all week. Keep up the good work! I heard it through the grapevine. Great job taking your meds. Whoomp! There It Is. Awesome job with your meds last week. You rock! Fantastic job taking your meds.

Topic	Question Number	No. Messages	Messages
Non-adherent – Weekly Messages Messages delivered on Tuesday Question 24=2-10 or Question 23=1 , set these message; Adherence Question 24 also delivered weekly on Sunday (see last row of table Weekly Adherence Question)		17	Meds do a body good. Stay on track this week. Having trouble remembering to take your meds? Ask your HB provider for ways to help you remember. Got meds? Call HB at 773-388-8865 if you need a refill before your next visit. Medication adherence means taking meds every day. It gets easier. Missing doses = missing out on better health. Be honest about what is getting in the way of taking your meds. We can connect you to the support you need. Call us at 773-388-8865. Set yourself up for success. Get your meds together for the week. Going out of town? Don't forget to pack your meds. You can take your meds discretely. Ask us how. Call 773-388-8865. How are you doing on your med supply? Call 773-388-8865 if you need a refill before your next visit. Missing doses? Maybe your treatment plan doesn't fit with your lifestyle or is unrealistic. Call 773-388-8865 to discuss options that may work better. Don't make changes to your medication schedule on your own. Call 773-388-8865 for advice on side effects. Your CD4 helps you fight infections. Keep it high. Take your meds on time. Your meds keep your viral load in check. Stay on schedule. If you're having side effects from your meds, don't take matters into your own hands. Call your HB provider and figure out a solution together. Stomachache? Headache? Feeling anxious? Can't sleep? Lower sex drive? Could be side effects from your meds. Call your HB provider and talk about it. If you make it through this week without missing a dose, treat yourself to something nice.

Topic	Question Number	No. Messages	Messages
Non-adherent Daily Messages – Other than morning or night) Messages delivered every day, depending on answer to Q23, Q24, Q26 Question 23 = 1 or Question 24=2-10 =this message set; else, no messages Question 26= 2,3,5,6 Adherence Question 24 also delivered weekly on Sunday (see last row of table 'Weekly Adherence Question')		12	This is your med reminder. Time for your meds. "Hint, hint" Time for your meds. Ding! Ding! Ding! Time for your meds. You have been poked! It's time for your meds. The time is now. Take your meds. Reminder – take your meds now (if you haven't already). Don't forget your meds. Stop, drop, and pop. Take your meds now. Laughter is the best medicine. And your meds are good for you too. It's time to take them. The clock says it's time for your meds. A little birdie told me it's time for your meds.
Non-Adherent Morning Messages Messages delivered every day, depending on answer to Q23, Q24, Q26 Question 23=1 or Question 24=2-10, then this message set; Question 26= 1 Adherence Question 24 also delivered weekly on Sunday (see last row of table 'Weekly Adherence Question')		12	Good morning! This is your reminder. Good morning sunshine! Don't forget your meds. This is your morning reminder. Have a great day! Start your day off right. Remember your meds. Don't forget your morning meds! It's going to be a great day. Remember your meds. Hope you have a great day. This is your meds reminder. It's the dawn of a new day. Have you taken your meds yet? Before you hit the streets, take your meds. Wakey, wakey sunshine. Don't forget your meds. Shower? Check! Breakfast? Check! Meds? Check! Time for your morning meds.

Topic	Question Number	No. Messages	Messages
Non-adherent PM messages Messages delivered every day, depending on answer to Q23, Q24, Q26 Question 23=1 or Question 24=2-10, then this message set; Question 26 = 4 Adherence Question 24 also delivered weekly on Sunday (see last row of table Weekly Adherence Question)		13	Good evening! This is your reminder. This is your evening reminder. Sleep well! Don't forget your evening meds! End your day on the right note. Take your meds. Nighty night. Don't forget to take your meds before you turn out the light. This is your nightly med reminder. Hope you had a great day. This is your med reminder. It's the end of the day. Have you taken your meds yet? Before you say good night, pop your meds. Before you hit the sheets or the streets, don't forget your meds. Before you call it a day, remember your meds. Meds before bed. Take them now.
HIV stigma	33-34		
KABs	37-38		
Self-efficacy	39-43		
HIV/STD history	19-21		

Topic	Question Number	No. Messages	Messages
Risk Behaviors:			
Sexual risk reduction Delivered Saturday Question 44 ≥ 2 receive messages; else, do not get these messages until reassessment at week 5 *and 9 see: *Monthly questions to trigger receipt of risk reduction messages but answers do not turn them off. See 'Sexual risk messages'.*	44-55	19	Ask your sex partners their status and tell them yours. No one should be surprised. Don't keep your status a secret. Ask your sex partners their status and tell them yours. Don't like to talk about your status? Some people post their status online to screen out guys who can't deal. Can this work for you? Talk with your partners about STDs. Hearing it from your partner beats hearing it from your provider. Secrets are not sexy, but being open is. Ask your partners about their status and tell them yours. Knowledge is power. Use yours to make responsible and healthy decisions about the way you have sex. There's always something more to learn about protecting yourself from STDs and reinfection. Keep educating yourself to take care of your health. Need help reducing your risk? We've got info for you. Call HB at 773-388-8865. Abstaining from sex might be the right choice for you. Contact HB to discuss abstinence and other options to stay healthy. Undetectable is respectable, but your partners are still infectable. Play safe. "He must be poz too" doesn't make it safe for you. STDs and reinfection aren't cute or fun. Think STDs are no big deal? Think again. HPV can cause cancer. Hepatitis and syphilis can kill. There's no such thing as a good sore. If you think you may have an STD, call 773-388-8865 to get checked. Got condoms? The health dept gave away more than 10 million last year. Call 773-388-8865 for free condoms near you. You are strong AND responsible. You've got the power to take care of your own health and protect others. Do the right thing. Play it safe. Agree and commit to being faithful. Call us at HB to discuss this and other ways to stay healthy. Condoms = peace of mind. Wear one and make sure your partner does too. Condoms are sexy. STDs and reinfection aren't. Talk to your partner about using condoms today. Be respectful and responsible. Talk with your partner about condoms. Ask your HB provider for tips on how to start the conversation.

Topic	Question Number	No. Messages	Messages
Alcohol/drug risk reduction Delivered Friday If Question 58 ≥ 3 or Question 59 ≥ 2 or Question 61 a-g = 1 or 3, then get messages; else, do not get these messages until reassessment at week 5 and 9 see: *Monthly questions to trigger receipt of risk reduction messages but answers do not turn them off. See 'Substance Use' messages.*	56-61	12	Is life moving too fast? If you're taking risks with your health that you would like to change, call 773-388-8865 to talk about options to keep you healthy. Party smart! Get your dance on. Be the sober buddy for the night. Going out tonight? Be safe. Party smart. Don't punish your body. Limit drinking and recreational drugs. Recreational drug use can affect your treatment. Talk to your HB provider about potential interactions. Using recreational drugs while taking certain medications can cause overdose and death. Talk to HB (773-388-8865) about potential interactions. Stop before you pop! Talk to HB about potential drug interactions. Call 773-388-8865 for info. Shake your groove thing – but do it safely. Drug and alcohol use can interact with your meds. Ask us how. Call 773-388-8865. Feeling guilty or ashamed about your drinking or drug use? Call 773-388-8865. We can help. If you think you have a problem with alcohol or drugs, help is just a phone call away. Call HB at 773-388-8865 to talk about your concerns. Think before you drink. Alcohol interacts negatively with certain medications. Call HB at 773-388-8865 for info on how to reduce alcohol use. You decide on how to party and when. Don't let anyone tell you what to do.
Sex and substance use risk reduction Delivered Saturday Question 45 = 2-6, then receive this message set; else no messages until monthly assessment at week 5 and 9 see: *Monthly questions to trigger receipt of risk reduction messages but answers do not turn them off. See 'Sexual risk and substance use messages'.*	45	4	No condoms? No way! Party n Play the right way. Protect yourself and your partner. Keep your partying in check to avoid the walk of shame the morning after. Stay in control - guys who are buzzed or high take more risks. Be aware! Alcohol and drug use can lead to risky sex. Call HB at 773-388-8865 for info on reducing risk for yourself and your partner.

Topic	Question Number	No. Messages	Messages
Smoking and HIV Delivered Thursday (we included these in with Health and Wellness messages) Question 56 = yes, then get messages; else=no messages	56-57	6	Cigarettes kill. Treatments to help you quit are available. Talk to your HB provider about options that may work for you. Smoking weakens the immune system. Quit today for better health. Talk to your HB provider about treatment options. Participating in groups may help you quit smoking. Contact HB at 773-388-8865 to learn more about groups and other resources to help you quit smoking. There are many ways to quit smoking. Talk to your HB provider about the ways that would work best for you. Some smokers are more likely to develop certain types of infections. Call HB at 773-388-8865 for info on treatments to help you quit smoking. Smoking doesn't making living any easier. Call HB at 773-388-8865 for resources to help you quit smoking.
General health and wellness	3, 62, 63	14	
Mental health Delivered Wednesday (no tailoring)	63	3	Everyone gets blue sometimes, but depression hurts the mind and body. Talk to your HB provider if you have been feeling blue for more than 2 weeks. Depression is common -- and treatable. Call HB at 773-388-8865 for treatment options that may work for you. Take care of yourself today. Eat healthy foods, don't stress out, get some exercise, and sleep well.
Oral health Delivered Wednesday (no tailoring)	38a	2	Common oral problems can be treated. Talk with your HB provider about what treatments might work for you. Mouth sores? Chronic bad breath? Dry mouth? Oral problems are common in people with certain conditions. Talk to your HB provider if you have any concerns.
Nutrition Delivered Wednesday (no tailoring)	38e,j	3	Eating healthy foods helps fight infections. Eat plenty of protein and carbohydrates and some good fats. Ask your HB provider for tips on nutrition. Eat! Eat! Maintain weight to prevent wasting, strengthen the immune system, and break down meds. Discuss diet with your provider. Are you eating at least 5 servings of fruits and vegetables daily? Talk to your HB provider about a food plan that may work for you.
Exercise Delivered Wednesday (no tailoring)	38g	2	Moderate exercise may help you stay healthier longer. Go outside and play! Easy does it. Before you start an exercise program, talk to your HB provider about your health. Make a plan that works for you.
Stress Delivered Wednesday (no tailoring)	64	2	Not hungry? Can't sleep? Worrying a lot? These may be signs of chronic stress. Talk to your HB provider about ways to relax. Chronic stress can make you sick. Eating healthy foods and exercising can help. Talk to your HB provider about a plan that may work for you.

Topic	Question Number	No. Messages	Messages
Food poisoning Delivered Wednesday (no tailoring)	38j	2	Protect yourself from food poisoning. Call HB at 773-388-8865 for guidance on buying, storing, and cooking food. It must have been something I ate! Food poisoning is no joke. Call HB at 773-388-8865 if you have nausea, vomiting, cramps, or diarrhea.
Social support Meeting notifications: See attached Social Support meeting list. General: Delivered Sundays (no tailoring)	30-32, 35-36	13	Meeting notification: [Name of group] meets [date] at [time] at [place]. Call [name] at [number] for more info. General: If you feel like you need help dealing with your condition, give us a call at 773-388-8865 or visit us at http://howardbrown.org/. HB has info on ways to deal with stress, cope with pain, and manage meds. Call 773-388-8865 or visit us at http://howardbrown.org/. Friends can be good medicine. If you need to talk, give a friend a call. If you need info on what to do to take care of yourself, call 773-388-8865 or visit HB at http://howardbrown.org/. You are not alone! Some people like online support groups. Visit us at http://howardbrown.org/ to see what's out there. Some people find it helpful to tell friends their status. Some people don't. You decide who knows what and when. Seeking help managing your condition also gives you the chance to share what you know with others. Support can be a two-way street. Connect with us on Facebook! Join the mailing list and get info on upcoming events. Click: http://www.facebook.com/. Worried about making ends meet? Call HB at 773-388-8865 for help finding the support you need. Scientists have proven that smiling makes you healthier. Share a laugh with a friend today. Sometimes it may feel like it – but you are not alone. Call HB at 773-388-8865 for information on support groups. Worried about telling friends and family your status? We can help you find the right words. Call HB at 773-388-8865.

Topic	Question Number	No. Messages	Messages
Patient involvement Delivered Thursdays (no tailoring)	65-77	17	You and your HB provider are a team. Work together to get the best care. Strong. Supportive. Trusting. These are important in any good relationship—especially with your HB provider. Do you need to know more about how to prevent or lessen symptoms or side effects of your meds? Ask. We can help. It's your life we're talking about. Be a part of EVERY decision about your health care. If you've got questions for your HB provider, write them down and take them to your next visit. Be assertive. Tell your HB provider if you have any concerns, even if they don't ask. Ask your provider questions. If you don't understand the answer, keep asking until you do. Ask questions. It's not annoying. You and your HB provider will be glad you did. A CD4 count tells you how your immune system is doing. Higher numbers are better. If you don't know or understand your numbers, ask your HB provider. If you don't know why you are taking your prescribed meds, ask your HB provider. This is your life! You are a major player on your health care team. Visit us at http://howardbrown.org/ to keep up with new developments and programs. You're the MVP of your health care team. Work with your HB provider for a winning season. One way to learn about your condition is to attend workshops or events. Visit us at http://howardbrown.org/ to learn more. Ask for copies of your labs to take home. When you are prescribed a new med, ask how it will effect the ones you are already taking. No one will take your health as seriously as you do. Ask your HB provider what screenings, labs, or tests you should get and when.

Topic	Question Number	No. Messages	Messages
Process Questions Delivered on Thursdays at the week indicated			Week 6 - How often do you read the text messages you get from HB? Text 1=always, 2=usually, 3=sometimes, 4=never Week 6 – Do you like the messages you are receiving from HB? 1=yes, 2=no Week 7 - How often are the HB messages sent at the right times? Text 1=always, 2=usually, 3=sometimes, 4=never Week 7 - How do you feel about the number of text messages you get from HB? Text 1= too many, 2=about right, 3=not enough Week 8 - Are the message topics you get from HB interesting to you? Text 1=very, 2=somewhat, 3=a little, 4=not at all Week 8 - How often do you use the info in the text messages from HB? Text 1=always, 2=usually, 3=sometimes, 4=never Week 9 - How helpful are the text messages you get from HB? Text 1=very, 2=somewhat, 3=a little, 4=not at all Week 9 - Do you feel like the HB messages were written for you? Text 1=yes, 2=no
Substance use messages Monthly questions to trigger receipt of risk reduction messages during message delivery period: Question delivered on Sunday of week 5 and week 9 If yes or don't remember = messages delivered for next 4 weeks. *ONCE MESSAGES TURNED ON, DO NOT TURN OFF*			In the past 4 weeks have you had 5 or more drinks of alcohol within a couple of hours (e.g., 2–4 hours)? 1=yes, 2=no, 3=don't remember In the past 4 weeks have you used recreational drugs (e.g., pot, meth, cocaine or heroin)? Yes=1, 2=no, 3=don't remember
Sexual risk messages Monthly questions to trigger receipt of risk reduction messages during message delivery period: Question delivered on Sunday of week 5 and week 9 If yes or don't remember= messages delivered for next 4 weeks *ONCE MESSAGES TURNED ON, DO NOT TURN OFF*			In the past 4 weeks have you had sex *without a condom* with any of your sex partner(s)? 1=yes, 2=no, 3=don't remember

Topic	Question Number	No. Messages	Messages
Sexual risk and substance use messages Monthly questions to trigger receipt of risk reduction messages during message delivery period: Question delivered on Sunday of week 5 and week 9 If yes or don't remember = messages delivered for next 4 weeks *ONCE MESSAGES TURNED ON, DO NOT TURN OFF*			In the past 4 weeks have you used alcohol or drugs before or during sex? 1=yes, 2=no, 3=don't remember
Appointment Reminder Messages Messages delivered on ad hoc basis			Remember your appt @ HB at [time] on [day]. Bring your questions. Call us at [number] if u can't make it. Remember your appt @ HB at [time] on [day]. Bring your questions. Call us at [number] if u can't make it.
Weekly Adherence Question Delivered on Sunday Weekly question to trigger receipt of non-adherent messages during message delivery period. If ≥ 1, then set messages. See logic for: ● Non-adherent – Weekly Messages ● Non-adherent Daily Messages – Other than morning or night) ● Non-Adherent Morning Messages ● Non-Adherent PM Messages			Over the past 7 days, on how many days did you miss a dose of medication? Please text us back the number of days you missed a dose (0-7).

Appendix B: Message Tailoring Form

Script

This study is designed so we only send you messages we think you will need based on your answers to the online survey you just completed. We do not know yet which of these messages you would be eligible to receive, so we will present you with all categories of the messages. For each category, we will review five example text messages. For each group of five messages, I will ask if you are willing to receive similar text messages on your cell phone during your participation in the study. You may decline to receive any type of message we review now. During the study, if you decide that you no longer wish to receive certain types of messages, just contact me and I will make sure we stop sending you those texts.

All text messages originating from Howard Brown will begin with "<HB>" so you know the message is coming from us.

Medication Adherence Messages
If you have recently been prescribed your first course of ARVs, have a history of noncompliance with your medications, or if you report any missed doses during the past three months, you will be eligible to receive the medication adherence reminder messages.

Since you will likely receive many of these messages over 90 days, we want to offer you the choice of how these reminders are written. Even if you are adherent, we will send you encouraging messages regarding your treatment.

Please take a moment to review the messages in the table below and indicate which, if any, you WOULD NOT be willing to receive during the study period.

COORDINATOR SHOWS THE PARTICIPANT THE MEDICATION REMINDER TABLE, ASSISTS THE PARTICIPANT BY READING WITH THEM, IF NEEDED.

DAILY REMINDERS	Do not send me the following messages:
<HB>This is your Rx reminder	
<HB>This is your Txt for Rx	
<HB>Time for Rx	
<HB> *nudge* Time for Rx	
<HB>Ding! Ding! Ding! Time for Rx	
<HB>You have been poked! It's Rx time	
<HB>REMINDER - Take your Rx now.	
<HB>Don't forget your Rx	
<HB>Laughter is the best medicine. But yours is good for you too. Time for Rx	
<HB>We are watching the clock for you. Time for Rx	

MORNING REMINDERS	Do not send me the following messages:
<HB>Good morning! This is your reminder	
<HB>This is your morning reminder. Have a great day!	
<HB>Start your day off right. Remember your Rx	
<HB>Don't forget your Rx before you brush your teeth this morning	
<HB>It's going to be a great day (we hope!). Take your Rx	

EVENING REMINDERS	Do not send me the following messages:
<HB>This is your reminder. Have a great night!	
<HB>This is your evening reminder. Sweet dreams!	
<HB>This is your nightly Rx reminder	
<HB>Hope you had a great day. This is your Rx reminder	
<HB>It's the end of the day. Have you had your Rx yet?	
<HB>Don't forget your Rx before you brush your teeth tonight.	
<HB>Before you say goodnight, pop your Rx	
<HB>Before you hit the sheets or the streets, don't forget your Rx	
<HB>Before you pack it in for the day, remember your Rx	
<HB>Time for Rx before rest.	
<HB>Meds before bed. Take it now	

Would you prefer to customize your own medication adherence reminder?
COORDINATOR RECORDS THE REMINDER HERE:

_____

_____

Based on the examples of medication adherence messages above, are you willing to receive these types of messages on your cell phone during the study period?

Yes…………………………………………………………………..☐

No…………………………………………………………………...☐→FLAG MED

Risk Behavior (Sex)
Based on your responses to the online survey, you may be eligible for risk reduction messages that focus on sexual behavior.

Example risk behavior messages include:
- <HB>Secrets can be sexy. Except when you are hearing them from your doctor. Ask your partners about STDs.
- <HB>"He must be poz too" does not make it safe for you. STDs and reinfection are not cute.
- <HB>Got condoms? The health dept gave away more than 10 million last year. Call xxx-xxxx to find some near you.
- <HB>Don't like to talk about your status? Start posting it in online profiles. Screen out the guys who can't deal.
- <HB>Don't ask and don't tell? For peace of mind for you and others, talk about it. No one should be surprised.

Based on the five examples of risk behavior messages above, are you willing to receive these types of messages on your cell phone during the study period?

Yes…………………………………………………………………..☐

No…………………………………………………………………...☐→FLAG RISK1

Risk Behavior (Substance Abuse)
Based on your responses to the online survey, you may be eligible for risk reduction messages that focus on substance use.

Example risk behavior messages include:
- <HB>Avoid the walk of shame the morning after. Keep your drinking and partying in check, so you don't end up a wreck (or with one).
- <HB>Like to get wrecked? You might infect. (Or get another nasty bug.)
- <HB>Party smart! Drink lots of water. Get your dance on. Pick (or be) the sober buddy for the night.
- <HB>Don't let drinking or drugs ruin a perfectly good ARV cocktail.
- <HB>Your liver is good to you - Don't punish it! Limit drinking or recreational Rx.

Based on the five examples of risk behavior messages above, are you willing to receive these types of messages on your cell phone during the study period?

Yes…………………………………………………………………..☐

No…………………………………………………………………...☐→FLAG RISK2

Patient Involvement

All study participants will receive messages designed to encourage them to be more active participants in their own health care.

Example patient involvement messages include:
- <HB>There's no better way to become an expert. Attend workshops and events so you can find out as much as you can about this disease.
- <HB>What's the blue one for? If you don't know what each of your prescribed medications does, ASK!
- <HB>You and your HB doc are a team; you need to work together to get the best care.
- <HB>Strong. Supportive. Trusting. These are the characteristics of any good relationship—especially with your HB doc.
- <HB>Get assertive. Will you tell your HB doc if you have any concerns even if they don't ask?

Based on the five examples of patient involvement messages above, are you willing to receive these types of messages on your cell phone during the study period?

Yes……………………………………………………………….. ☐

No…………………………………………………………... ☐ ➔FLAG Pt ACT

Social Support

All study participants will receive messages designed to promote social support and informing you of social networking opportunities in the area.

Example social support messages include:
- <HB>Friends can be good medicine. If you need a lift, give someone a call.
- <HB>Develop a support network of family members, friends, or coworkers who can remind you to take your medication.
- <HB>Keep things open! Telling friends your status is easier than keeping it a secret. No more making excuses and you just might find the support you need.
- <HB>We have info on ways to cope with stress, how to manage pain, how to manage your Rx. Call us or visit our website. We are here for you.
- <HB> If you need help knowing what to do to take care of yourself, call us. We can point you in the right direction.

Based on the five examples of social support messages above, are you willing to receive these types of messages on your cell phone during the study period?

Yes……………………………………………………………….. ☐

No…………………………………………………………... ☐ ➔FLAG SOCIAL

Appointment Adherence

All study participants will receive HBHC appointment reminders during the study period.

Example appointment reminders include:

<HB> Can't wait 2 see you @ [insert time] on [day]. Call us @ xxx-xxx-xxxx if u can't make it.

Based on this example of an appointment reminder message, are you willing to receive these types of messages on your cell phone during the study period?

Yes…………………………………………………………….. ☐

No…………………………………………………………... ☐ →FLAG APPT

Appendix C: Preintervention Survey

SMS Survey

You will need to provide an answer to every question in order to complete the survey. If you do not want to answer a particular question, select the refuse option. You will be able to move through the survey by clicking on the 'Next' and 'Back' buttons shown at the bottom of the screen. Please DO NOT use your Internet browser's back button because it will kick you out of the survey.

If you have any problems completing the survey or have questions concerning how to answer any of the questions, please inform Nicky Martin.

Demographics

1. (*q1*)Which category best describes your educational background?

   Did not complete high school.. ☐
   High school diploma or GED .... ☐
   Some college or associates degree .... ☐
   Bachelor's degree .... ☐
   Master's, doctoral, or other professional degree .... ☐
   Refuse to answer .... ☐

2. (*q2*)What is your current relationship status? Are you…

   Single... ☐
   Married to a man .... ☐
   Married to a woman .... ☐
   In a relationship with a man .... ☐
   In a relationship with a woman .... ☐
   Separated, divorced, or widowed .... ☐
   Refuse to answer .... ☐

3. (*q3*)In general, would you say your health is:

   Excellent.. ☐
   Very good... ☐
   Good .... ☐
   Fair .... ☐
   Poor .... ☐
   Refuse to answer .... ☐

Use of Technology

The next questions are about your cell phone and cell phone usage. When answering these questions think about your personal, or primary, cell phone.

4. (*q4*)Does your cell phone have a full-size keyboard with letters or do you have to use the number keys to type text messages?

   Phone has a full-size keyboard... ☐
   Use number keys to type text messages .... ☐
   Don't know... ☐
   Refuse to answer .... ☐

5. (*q5*)Does your cell phone plan include a text messaging package?

   Yes.. ☐
   No ➔ **Skip to Q7**.. ☐
   Don't know... ☐
   Refuse to answer .... ☐

6. (*q6*)Do you have an unlimited texting plan?

Yes ➔ **Skip to Q8** .... ☐
No .... ☐
Don't know .... ☐
Refuse to answer .... ☐

7. (*q7*)How many messages can you send or receive each month?

0 ➔ **Skip to Q12** .... ☐
1-10 .... ☐
11-20 .... ☐
21-30 .... ☐
31-40 .... ☐
Over 40 .... ☐
Don't know .... ☐
Refuse to answer .... ☐

8. (*q8*)On average, how many text messages do you <u>send</u> each day?

Less than 1 per day .... ☐
1-10 .... ☐
11-20 .... ☐
21-30 .... ☐
31-40 .... ☐
Over 40 .... ☐
Don't know .... ☐
Refuse to answer .... ☐

9. (*q9*)On average, how many text messages do you <u>receive</u> each day?

Less than 1 per day .... ☐
1-10 .... ☐
11-20 .... ☐
21-30 .... ☐
31-40 .... ☐
Over 40 .... ☐
Don't know .... ☐
Refuse to answer .... ☐

The next few questions ask about cell phones and cell phone use. Think about your personal, or primary, cell phone when answering these questions.

10. (*q10*)Would you say that you receive too few, too many, or about the right number of text messages each day?

Too few messages .... ☐
Too many messages .... ☐
About the right number of messages .... ☐
Refuse to answer .... ☐

11. (*q11*)How often do you read the text messages you receive each day?

Always .... ☐
Most of the time .... ☐
Sometimes .... ☐
Never .... ☐
Refuse to answer .... ☐

12. (*q12*)Can you send and receive pictures on your cell phone?

Yes .... ☐
No .... ☐
Don't know .... ☐
Refuse to answer .... ☐

13. (*q13*)What company is your cell phone carrier?

Verizon .... ☐
Sprint .... ☐
T-Mobile .... ☐
AT&T (Cingular) .... ☐
MetroPCS .... ☐
U.S. Cellular .... ☐
Tracfone .... ☐
Boost Mobile .... ☐
Virgin Mobile .... ☐
STI Mobile .... ☐
Net 10 .... ☐
(*q13.a*)Other: Specify: _____☐
Don't know .... ☐
Refuse to answer .... ☐

Internet Access

14. (*q14*)Does your cell phone have internet access?

Yes .... ☐
No ➔ **Skip to Q16** .... ☐
Don't know .... ☐
Refuse to answer .... ☐

15. (*q15*)Do you use your cell phone to send or receive e-mails?

Yes .... ☐
No .... ☐
Refuse to answer .... ☐

16. (*q16*)Do you have a computer at home?

Yes.. ☐
No ➔ **Skip option "At home" Q18** .... ☐
Refuse to answer .... ☐

17. (*q17*)Do you use the internet?

Yes.. ☐
No ➔ **Skip to Q19**... ☐
Refuse to answer .... ☐

18. Do you access the internet… (*Formatted as a grid on survey*)

(*q18.b*)At home?... ☐
(*q18.c*)At work? .... ☐
(*q18.d*)At someplace other than home or work (e.g., café, library)? .... ☐
(*q18*.e)On your cell phone?.. ☐
(*Not In Survey*)I do not use the internet .... ☐
(*response option for all questions*)Refuse to answer .... ☐

Health and Wellness

Now we are going to switch gears and talk a little bit about your health and wellness. The next few questions are about being tested for HIV and STDs.

19. What month and year did you get your first positive test for HIV? If you can't remember the month or year, please give your best guess. |__|__| |__|__|__|__|
                         (*q19.a1*) Month (*q19.a2*)Year

Don't know.. ☐
Refuse to answer .... ☐

If the respondent enters a year prior to 1985: "This test was not available before 1985. Please enter a year that is between 1985 – 2010. Click on the continue button to return to this question." DISALLOW DATES IN THE FUTURE.

20. (*q20*)Have you ever been diagnosed with a sexually transmitted infection other than HIV?

Yes.. ☐
No ➔ **Skip to Q22**... ☐
Refuse to answer ➔ **Skip to Q22**.. ☐

21. (*q21*)When were you last diagnosed with a sexually transmitted infection other than HIV?

1-3 months ago .... ☐
4-6 months ago .... ☐
7-12 months ago .... ☐
More than 12 months ago.. ☐
Refuse to answer .... ☐

Adherence

22. (*q22*)Are you currently taking any medications that a doctor has prescribed to treat HIV?
    Yes.. ☐
    No ➔ **Skip to Q29**.. ☐
    Refuse to answer ➔ **Skip to Q29** .... ☐

23. (*q23*)When did you first start taking medications to treat HIV?
    1-3 months ago .... ☐
    4-6 months ago .... ☐
    7-12 months ago .... ☐
    More than 12 months ago... ☐
    Refuse to answer .... ☐

24. (*q24*)Many people don't take their medication perfectly all the time. Over the past 7 days, on how many days did you miss a dose of your medication? (0–7) |__|
    Don't know... ☐
    Refuse to answer .... ☐

25. (*q25*)How frequently do you take medications to treat HIV?
    Once a day.. ☐
    Twice a Day .... ☐
    Three Times a Day .... ☐
    Four times a Day .... ☐
    More than four times a Day.. ☐
    Refuse to answer .... ☐

26. (*q26*)At what time(s) do you take your HIV medication each day? Mark all that apply.
    Morning... ☐
    Lunchtime.. ☐
    Dinnertime... ☐
    Bedtime .... ☐
    (*q26.a*)Other (specify_____).. ☐
    Refuse to answer .... ☐

People may miss taking their medications for various reasons. Here is a list of possible reasons why you may have missed taking any medications within the past <u>month</u>. Please mark all that apply.

27. In the past month, did you miss taking your medications because you:

	Yes	No	Refuse to answer
(*q27.a*)a. Were away from home	☐	☐	☐
(*q27.b*)b. Were busy with other things	☐	☐	☐
(*q27.c*)c. Simply forgot	☐	☐	☐
(*q2.7d*)d. Had too many pills to take	☐	☐	☐
(*q27.e*)e. Wanted to avoid side effects	☐	☐	☐
(*q27.f*)f. Did not want others to notice you taking medication	☐	☐	☐
(*q27.g*)g. Had a change in daily routine	☐	☐	☐
(*q27.h*)h. Felt like the drug was toxic/harmful	☐	☐	☐
(*q27.i*)i. Fell asleep/slept through dose time	☐	☐	☐
(*q27ja*)j. Felt sick or ill	☐	☐	☐
(*q27.k*)k. Felt depressed/overwhelmed	☐	☐	☐
(*q27.l*)l. Had problem taking pills at specified times	☐	☐	☐
(*q27.m*)m. Ran out of pills	☐	☐	☐
(*q27.n*)n. Felt good	☐	☐	☐
(*q27.o*) o. Were drunk or high	☐	☐	☐

These next questions are about how confident you feel to follow your HIV medication plan. Responses range from 0 (Not at all sure) to 10 (Totally sure).

28.   How sure are you that you can…. (0= not at all sure and 10=totally sure)

	Not at all sure 0	1	2	3	4	5	6	7	8	9	Totally sure 10	RF
(q28.a)a. Follow the instructions correctly for a large number and variety of prescription medications?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q28.b)b. Take your medications as they are prescribed?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q28,c)c. Work with your provider to reach agreement on the best medication for you overall?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q28.d)d. Discuss openly with your provider any problems that may be related to your medications?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

These next questions are about how confident you feel to follow your treatment plan. Here, treatment plan refers to things you do to deal with HIV other than taking HIV medications, such as diet and exercise or taking vitamins. Responses range from 0 (Not at all sure) to 10 (Totally sure).

29.   How sure are you that you can... (0= not at all sure and 10=totally sure)

	Not at all sure 0	1	2	3	4	5	6	7	8	9	Totally sure 10	RF
(q29.a)a. Stick to your treatment plan even when side effects begin to interfere with daily activities?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q29.b)b. Integrate your treatment plan into your daily routine?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q29.c)c. Stick to your treatment plan even when your daily routine is disrupted?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q29.d)d Stick to your treatment plan when you aren't feeling well?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q29.e)e. Continue with your treatment plan even when you are feeling discouraged about your health?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Social Support

30. People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?

	None of the time	A little of the time	Some of the time	Most of the time	All of the time	Refuse to answer
(q30.a)a. Someone you can count on to listen to you when you need to talk	☐	☐	☐	☐	☐	☐
(q30.b)b. Someone to give you information to help you understand a situation	☐	☐	☐	☐	☐	☐
(q30.c)c. Someone to give you good advice about a crisis or personal problem	☐	☐	☐	☐	☐	☐
(q30.d)d. Someone who understands your problems	☐	☐	☐	☐	☐	☐
(q30.e)e. Tangible support like money or food	☐	☐	☐	☐	☐	☐
(q30.f)f. Someone to take care of you if you were sick	☐	☐	☐	☐	☐	☐
(q30.g)g. Someone who shows you love and affection	☐	☐	☐	☐	☐	☐
(q30.h)h. Someone to have a good time with	☐	☐	☐	☐	☐	☐
(q30.i)i. Someone to get together with for relaxation	☐	☐	☐	☐	☐	☐

31. (q31)Do you currently attend any support groups?

Yes.. ☐
No ➔ **Skip to Q33**... ☐
Refuse to answer ➔ **Skip to Q33**... ☐

32. (*q32*)In general, how satisfied are you with the overall support you get from the support groups you attend?

Very dissatisfied .... ☐
Somewhat dissatisfied .... ☐
Somewhat satisfied .... ☐
Very satisfied .... ☐
Refuse to answer .... ☐

HIV Stigma

These next items are about some of your experiences, feelings, and opinions on how people with HIV feel and how they are treated.

33. Please tell me the extent to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Refuse to answer
(*q33.a*)a.In many areas of my life, no one knows that I have HIV	☐	☐	☐	☐	☐	☐
(*q33.b*)b.Since learning I have HIV, I feel set apart and isolated from the rest of the world	☐	☐	☐	☐	☐	☐
(*q33.c*)c.Most people with HIV are rejected when others find out	☐	☐	☐	☐	☐	☐
(*q33.d*)d.Since learning I have HIV, I worry about people discriminating against me	☐	☐	☐	☐	☐	☐
(*q33.e*)e.I never feel the need to hide the fact that I have HIV	☐	☐	☐	☐	☐	☐

These next set of questions assume that you have told other people that you have HIV or that others know. This may not be true for you. If the item refers to something that has not actually happened to you, please imagine yourself in that situation.

34. Please tell me the extent to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Refuse to answer
(q34.a)a.I have been hurt by how people reacted to learning I have HIV	☐	☐	☐	☐	☐	☐
(q34.b)b.I regret having told some people that I have HIV	☐	☐	☐	☐	☐	☐

35. (q35)Whom have you told that you are gay, bisexual, or queer? (Check all the boxes that apply.)
☐Male sex partner(s)
☐Female sex partner(s)
☐ Mother
☐ Father
☐ Other Relative
☐Any gay friends
☐ Any straight friends
☐ Any co-workers
☐ Any neighbors
☐ Anyone else
☐None of the above
☐ Refuse to answer

36. (q36)Whom have you told that you are HIV positive? (Check all the boxes that apply.)
☐ Main Partner(that is, a partner you would call your spouse, lover, significant other, or life partner)
☐ Non-Main Partner(s) (that is, somebody you did not consider to be a spouse, lover, significant other, or life partner)
☐ Mother
☐ Father
☐ Other Relative
☐ Any gay friends
☐ Any straight friends
☐ Any co-workers
☐ Any neighbors
☐ Anyone else
☐None of the above
☐ Refuse to answer

Attitudes/Beliefs

37. Please tell me the extent to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Refuse to answer
(*q37.a*)a. It is important to tell your sex partners that you have HIV.	☐	☐	☐	☐	☐	☐
(*q37.b*)b. It is important to keep learning about HIV, its treatment, and new developments in HIV research.	☐	☐	☐	☐	☐	☐
(*q37.c*)c. Drug or alcohol use can increase the risk for passing HIV to others because people are more likely to do risky behaviors when they are drunk or high.	☐	☐	☐	☐	☐	☐
(*q37.d*)d. Being in a relationship with another HIV positive person can lead to a closer, more understanding relationship.	☐	☐	☐	☐	☐	☐
(*q37.e*)e. Monogamy is an effective prevention strategy.	☐	☐	☐	☐	☐	☐
(*q37.f*)f. It is important for my health to keep my doctor's appointments.	☐	☐	☐	☐	☐	☐
(*q37.g*)g. If both sexual partners are HIV positive, they don't need to use condoms during sex.	☐	☐	☐	☐	☐	☐

HIV Knowledge

38. In this section are statements about HIV. Please indicate whether the statements are true, false, or if you don't know the answer.

	True	False	Don't know	Refuse to answer
(*Not in baseline*)a. Once someone's HIV viral load results are "undetectable," they should stop taking their HIV medications.	☐	☐	☐	☐
(*q38.a*)b. Certain oral health problems, such as oral candidiasis and herpes simplex, are common in people with HIV/AIDS.	☐	☐	☐	☐
(*q38.b*)c. If a person does not take their HIV medications at the right time of day, they can become resistant to their HIV medications.	☐	☐	☐	☐
(*q38.c*)d. HIV is cured when someone's HIV viral load is "undetectable."	☐	☐	☐	☐
(*q38.d*)e, If someone's viral load is "undetectable", they don't need to use condoms during sex.	☐	☐	☐	☐
(*q38.e*)f. Eating a high-fat diet helps people with HIV/AIDS digest their medications.	☐	☐	☐	☐
(*q38.f*)g. People who have HIV can get re-infected with a drug resistant type of HIV.	☐	☐	☐	☐
(*q38.g*)h. Exercise is always unsafe for people with HIV/AIDS.	☐	☐	☐	☐
(*q8.h3*)i. Recreational drugs can make a person's HIV medications less effective.	☐	☐	☐	☐
(*q38.i*)j. It is best for a person to stop taking their HIV medications as soon as they feel better.	☐	☐	☐	☐
(*q38.k*)k. Taking HIV medications regularly protects people from getting common illness, such as food poisoning.	☐	☐	☐	☐
(*q38.l*)l. After a few months, it becomes less important for people to take their HIV medications at the right time of day.	☐	☐	☐	☐

Self-Efficacy

Please tell us the extent to which you agree with the following statements.

39. (*q3*)I am confident that I can refuse to have sex if my partner doesn't want to use a condom.

Strongly disagree .... ☐
Disagree .... ☐
Neither agree nor disagree .... ☐
Agree .... ☐
Strongly agree .... ☐
Refuse to answer .... ☐

40. (*q40*)I am confident that I can protect myself from STDs.

Strongly disagree .... ☐
Disagree .... ☐
Neither agree nor disagree .... ☐
Agree .... ☐
Strongly agree .... ☐
Refuse to answer .... ☐

41. (*q41*)I am confident that I can protect myself from getting infected with another strain of HIV.

Strongly disagree .... ☐
Disagree .... ☐
Neither agree nor disagree .... ☐
Agree .... ☐
Strongly agree .... ☐
Refuse to answer .... ☐

42. (*q42*)I am confident that I can protect my partners from getting HIV from me.

Strongly disagree .... ☐
Disagree .... ☐
Neither agree nor disagree .... ☐
Agree .... ☐
Strongly agree .... ☐
Refuse to answer .... ☐

43. (*q43*)I am confident that I can use condoms consistently with my sex partners.

Strongly disagree .... ☐
Disagree .... ☐
Neither agree nor disagree .... ☐
Agree .... ☐
Strongly agree .... ☐
Refuse to answer .... ☐

Sexual Behaviors

These next questions are about your sexual behavior in the past 3 months. Remember all of your answers are kept private.

44. (*q44*)Over the past 3 months, how many people did you have oral, vaginal, or anal sex with?

   0 ➔ **Skip to Q56** .... ☐
   1 .... ☐
   2-5 .... ☐
   6-10 .... ☐
   11-15 .... ☐
   16-20 .... ☐
   Over 20 .... ☐
   Refuse to answer .... ☐

45. (*q45*)Over the past 3 months, how often did you use alcohol or drugs before or during sex?

   Never .... ☐
   Rarely .... ☐
   Sometimes .... ☐
   Most of the time .... ☐
   Every time .... ☐
   Refuse to answer .... ☐
   ....

46. (*q46*)In the past 3 months, have you had sex with: (Choose all that apply)

   Men .... ☐
   Women .... ☐
   Trans-men .... ☐
   Trans-women .... ☐
   Refuse to answer .... ☐

47. (*q47*)In the past 3 months, how many main sex partners—that is, a partner you would call your spouse, lover, significant other, or life partner—did you have oral, vaginal, or anal sex with?

   0 ➔ **Skip to Q51** .... ☐
   1-5 .... ☐
   6-10 .... ☐
   11-15 .... ☐
   16-20 .... ☐
   Over 20 .... ☐
   Refuse to answer .... ☐

48. (*q48*)Do you currently have a main sex partner?

Yes.. ☐
No➔ **Skip to Q51**.. ☐
Refuse to answer➔ **Skip to Q51** .... ☐

49. (*q49*)What is your main partner's HIV status?

My main partner is HIV-negative .... ☐
My main partner is HIV-positive .... ☐
My main partner has not been tested for HIV .... ☐
My main partner has not told me their HIV status.. ☐
Refuse to answer .... ☐

50. (*q50*)Does your main partner know your HIV status?

Yes.. ☐
No.. ☐
Don't know.. ☐
Refuse to answer .... ☐

51. (*q51*)In the past 3 months, how many non-main partners – that is, somebody who you did not consider to be a spouse, significant other, or life partner – did you have oral, vaginal, or anal sex with?

0 ➔ **Skip to Q54** .... ☐
1-5... ☐
6-10... ☐
11-15... ☐
16-20... ☐
Over 20 .... ☐
Refuse to answer .... ☐

52. (*q52*)In the past 3 months, how many of your non-main partners told you their HIV status?

0.. ☐
1-5... ☐
6-10... ☐
11-15... ☐
16-20... ☐
Over 20 .... ☐
Refuse to answer .... ☐

53. (*q53*)In the past 3 months, how many of your non-main partners did you tell your HIV status to?

0 .... ☐
1-5 .... ☐
6-10 .... ☐
11-15 .... ☐
16-20 .... ☐
Over 20 .... ☐
Refuse to answer .... ☐

Now we would like you to think about the sex you have had with <u>all</u> of your partners (main <u>and</u> non-main partners) in the past 3 months.

54. (*q54*)In the past 3 months, how many times did you have sex – oral, vaginal, or anal – with *any* of your sex partner(s)?

1-5 .... ☐
6-10 .... ☐
11-15 .... ☐
16-20 .... ☐
Over 20 .... ☐
Refuse to answer .... ☐

55. (*q55*)In the past 3 months, how many times did you have sex – oral, vaginal, or anal – *without a condom* with any of your sex partner(s)?

0 .... ☐
1-5 .... ☐
6-10 .... ☐
11-15 .... ☐
16-20 .... ☐
Over 20 .... ☐
Refuse to answer .... ☐

Smoking Status

56. (*q56*)Do you smoke cigarettes?

Yes .... ☐
No➔ **Skip to Q58** .... ☐
Refuse to answer➔ **Skip to Q58** .... ☐

57. (*q57*)Are you seriously considering stopping smoking within the next three months?

Yes .... ☐
No .... ☐
Refuse to answer .... ☐

Substance Use

People have various health habits. The following questions ask about alcohol and drug use.

58. (*q58*)On average, how often in the past 3 months have you had a drink containing alcohol (e.g., a glass of beer or wine, a mixed drink, or any other kind of alcoholic beverage)?

    Never ➔ **Skip to Q60** .... ☐
    Once a month .... ☐
    2 or 3 times a month .... ☐
    Once or twice a week .... ☐
    3 or 4 times a week .... ☐
    Nearly every day .... ☐
    Daily .... ☐
    Refuse to answer .... ☐

59. (*q59*)On average, how often in the past 3 months have you had 5 or more drinks of alcohol within a couple of hours (e.g., 2–4 hours)?

    Never .... ☐
    Once a month .... ☐
    2 or 3 times a month .... ☐
    Once or twice a week .... ☐
    3 or 4 times a week .... ☐
    Nearly every day .... ☐
    Daily .... ☐
    Refuse to answer .... ☐

60. Have you ever used… (Mark all that apply.)

	Yes	No	Refuse to answer
(*q60.a*)a. Marijuana?	☐Go to Q61a	☐	☐
(*q60.b*)b. Cocaine (powder, crack, or freebase)?	☐Go to Q61b	☐	☐
(*q60.c*)c. Heroin?	☐Go to Q61c	☐	☐
(*q60.d*)d. Methamphetamine?	☐Go to Q61d	☐	☐
(*q60.e*)e. MDMA (ecstasy)	☐Go to Q61e	☐	☐
(*q60.f*)f. GHB (liquid X)	☐Go to Q61f	☐	☐
(*q60.g*)g. Ketamine (special K)	☐Go to Q61g	☐	☐

61. Have you used any of the following within the past 3 months?

	Yes	No	Refuse to answer
(*q61.b*)a.Marijuana?	☐	☐	☐
(*q61.c*)b.Cocaine (powder, crack, or freebase)?	☐	☐	☐
(*q61.d*)c.Heroin?	☐	☐	☐
(*q61.e*)d. Methamphetamine?	☐	☐	☐
(*q61.f*)e. MDMA (ecstasy)	☐	☐	☐
(*q61.g*)f. GHB (liquid X)	☐	☐	☐
(*q61.h*)g. Ketamine (special K)	☐	☐	☐

These questions are about how you feel and how things have been with you during the past three months. For each question, please give the one answer that comes closest to the way you have been feeling.

62. (*q62*)During the past 3 months, how much of the time has your physical health interfered with your social activities (like visiting with friends, relatives, etc.)?
    All of the time .... ☐
    Most of the time .... ☐
    Some of the time .... ☐
    A little of the time .... ☐
    None of the time .... ☐
    Refuse to answer .... ☐

63. (*q63*)During the past 3 months, how much of the time have your emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?
    All of the time .... ☐
    Most of the time .... ☐
    Some of the time .... ☐
    A little of the time .... ☐
    None of the time .... ☐
    Refuse to answer .... ☐

64. (*q64*)During the past 3 months, how much of the time have you experienced difficult sleeping, poor appetite, or excessive worrying?
    All of the time .... ☐
    Most of the time .... ☐
    Some of the time .... ☐
    A little of the time .... ☐
    None of the time .... ☐
    Refuse to answer .... ☐

Quality Outcome/Patient Satisfaction

These next questions are about your experiences with Howard Brown Health Center.

65. (*q65*)How long have you received medical care here?
    Less than 1 year .... ☐
    1 to 2 years .... ☐
    3 to 5 years .... ☐
    More than 5 years .... ☐
    Refuse to answer .... ☐

66. (*q66*)When was your last visit?
    Less than 1 month ago .... ☐
    1 to 2 months ago .... ☐
    3 to 6 months ago .... ☐
    More than 6 months ago .... ☐
    Refuse to answer .... ☐

67. Think about your <u>last</u> experience with your Howard Brown health care providers. Now, please tell me the extent to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly Agree	Refuse to answer
(q67.a)a.My providers made sure I understood what my lab test results (such as CD4 and viral load) meant for my health.	☐	☐	☐	☐	☐	☐
(q67.b)b.My providers spent enough time with me.	☐	☐	☐	☐	☐	☐
(q67.c)c.I asked my providers all of the questions I had about my HIV care.	☐	☐	☐	☐	☐	☐
(q67.d)d.I felt comfortable talking about personal or intimate issues with my providers.	☐	☐	☐	☐	☐	☐
(q67.e)e.I was involved in making decisions about my health care with my providers.	☐	☐	☐	☐	☐	☐
(q67.f)f. When I asked my providers questions about my HIV care, I understood their answers.	☐	☐	☐	☐	☐	☐
(q67.g)g. I found my providers to be accepting and non-judgmental of my life and health care choices.	☐	☐	☐	☐	☐	☐

This next series of questions are about communication with your health care provider. Please answer yes or no for each statement.

68. (*q68*)My providers explained the side effects of my HIV medications in a way I could understand.
    Yes .... ☐
    No .... ☐
    I am not taking any medications prescribed by my doctor to treat HIV .... ☐
    Refuse to answer .... ☐

69. (*q69*)My providers suggested ways to help me remember to take my HIV medications.
    Yes .... ☐
    No .... ☐
    I am not taking any medications prescribed by my doctor to treat HIV .... ☐
    Refuse to answer .... ☐

70. (*q70*)My providers explained to me what kinds of medical tests I should be getting and how often I should get them.
    Yes .... ☐
    No .... ☐
    Refuse to answer .... ☐

71. (*q71*)My providers talked to me about how to avoid passing HIV to other people and how to protect myself from getting infected again with HIV.
    Yes .... ☐
    No .... ☐
    Refuse to answer .... ☐

72. (*q72*)My providers talked to me about how to protect myself from getting STDs or how to avoid passing them on to others if I already had one.
    Yes .... ☐
    No .... ☐
    Refuse to answer .... ☐

73. (*q73*)My providers or case managers asked me how I was feeling emotionally and made a referral to a mental health provider, counselor or support group if I needed help.

Yes .... ☐
No .... ☐
Refuse to answer .... ☐

74. (*q74*)My providers asked me about my drug and alcohol use and made a referral if I needed help.

Yes .... ☐
No .... ☐
Refuse to answer .... ☐

75. (*q75*)I would rate my providers' knowledge of the newest developments in HIV medical standards as

Excellent .... ☐
Very good .... ☐
Average .... ☐
Fair .... ☐
Poor .... ☐
Refuse to answer .... ☐

76. (*q76*)I would rate the quality of care at this clinic in comparison to other clinics I know about as:

Much better .... ☐
Better .... ☐
The same .... ☐
Worse .... ☐
Much worse .... ☐
Don't know .... ☐
Refuse to answer .... ☐

77. (*q77*)I would recommend this clinic to my HIV-positive friends with similar needs.

Definitely yes .... ☐
Maybe .... ☐
Definitely not .... ☐
Refuse to answer .... ☐

Appendix D: Postintervention Survey

SMS Survey

You will need to provide an answer to every question in order to complete the survey. If you do not want to answer a particular question, select the refuse option. You will be able to move through the survey by clicking on the 'Next' and 'Back' buttons shown at the bottom of the screen. Please DO NOT use your Internet browser's back button because it will kick you out of the survey.

If you have any problems completing the survey or have questions concerning how to answer any of the questions, please inform Nicky Martin.

Demographics

1. (*q1*)What is your current relationship status? Are you…

Single...☐
Married to a man ....☐
Married to a woman ....☐
In a relationship with a man ....☐
In a relationship with a woman ....☐
Separated, divorced, or widowed ....☐
Refuse to answer ....☐

2. (*q2*)In general, would you say your health is:

Excellent..☐
Very good...☐
Good ....☐
Fair ....☐
Poor ....☐
Refuse to answer ....☐

Use of Technology

3. (*q3*)Have you experienced any disruptions in your cell phone service in the past 3 months (e.g., new carrier or phone number)?

Yes..☐
No ....☐
Refuse to answer ....☐

4. (*q4*)Have you made any changes to your cell phone service in the past 3 months?

Yes..☐
No ....☐
Refuse to answer ....☐

If Q3 or Q4 = yes, continue; else skip to 7.

5. (*q5*)Did the disruption or change in your cell phone service affect your ability to send or receive text messages?

Yes..☐
No ....☐
Don't know...☐
Refuse to answer ....☐

If Q5 = yes, continue; else skip to 7.

6. (*q6*)How long was your ability to send or receive text messages affected?

    Less than 1 week .... ☐
    1 – 2 weeks .... ☐
    3 – 4 weeks .... ☐
    More than 4 weeks .... ☐
    Don't know .... ☐
    Refuse to answer .... ☐

Health and Wellness

Now we are going to switch gears and talk a little bit about your health and wellness.

7. (*q7*)Have you been diagnosed with a sexually transmitted infection other than HIV in the past 3 months?

    Yes... ☐
    No .... ☐
    Refuse to answer .... ☐

8. (*q8*)Are you currently taking any medications that your doctor has prescribed to treat HIV?

    Yes... ☐
    No ➔ **Skip to Q13** .... ☐
    Refuse to answer ➔ **Skip to Q13** .... ☐

9. (*q9*)In the past 3 months, has your doctor made any changes to which HIV medications you take or when you take them?

    Yes... ☐
    No .... ☐
    Refuse to answer .... ☐

10. (*q10*)Many people don't take their medication perfectly all the time. Over the past 7 days, on how many days did you miss a dose of your medication? (0–7) |__|

    Don't know .... ☐
    Refuse to answer .... ☐

People may miss taking their medications for various reasons. Here is a list of possible reasons why you may have missed taking any medications within the past <u>month</u>. Please mark all that apply.

11. In the past month, did you miss taking your medications because you:

	Yes	No	Refuse to answer
(*q11a*)a. Were away from home	☐	☐	☐
(*q11b*)b. Were busy with other things	☐	☐	☐
(*q11c*)c. Simply forgot	☐	☐	☐
(*q11d*)d. Had too many pills to take	☐	☐	☐
(*q11e*)e. Wanted to avoid side effects	☐	☐	☐
(*q11f*)f. Did not want others to notice you taking medication	☐	☐	☐
(*q11g*)g. Had a change in daily routine	☐	☐	☐
(*q11h*)h. Felt like the drug was toxic/harmful	☐	☐	☐
(*q11i*)i. Fell asleep/slept through dose time	☐	☐	☐
(*q11j*)j. Felt sick or ill	☐	☐	☐
(*q11k*)k. Felt depressed/overwhelmed	☐	☐	☐
(*q11l*)l. Had problem taking pills at specified times	☐	☐	☐
(*q11m*)m.Ran out of pills	☐	☐	☐
(*q11n*)n. Felt good	☐	☐	☐
(*q11o*)o. Were drunk or high	☐	☐	☐

These next questions are about how confident you feel in your ability to follow your HIV medication plan. Responses range from 0 (Not at all sure) to 10 (Totally sure).

12. How sure are you that you can... (0= not at all sure and 10=totally sure)

	Not at all sure 0	1	2	3	4	5	6	7	8	9	Totally sure 10	RF	NA
(q12a)a. Follow the instructions correctly for a large number and variety of prescription medications?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q12b)b. Take your medications as they are prescribed?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q12c)c. Work with your provider to reach agreement on the best medication for you overall?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q12d)d. Discuss openly with your provider any problems that may be related to your medications?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

These next questions are about how confident you feel in your ability to follow your treatment plan. Here, treatment plan refers to things you do to deal with HIV other than taking HIV medications, such as diet and exercise or taking vitamins. Responses range from 0 (Not at all sure) to 10 (Totally sure).

13. How sure are you that you can... (0=not at all sure and 10=totally sure)

	Not at all sure 0	1	2	3	4	5	6	7	8	9	Totally sure 10	RF
(q13a)a. Stick to your treatment plan even when side effects begin to interfere with daily activities?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q13b)b. Integrate your treatment plan into your daily routine?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q13c)c. Stick to your treatment plan even when your daily routine is disrupted?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q13d)d. Stick to your treatment plan when you aren't feeling well?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q13e)e. Continue with your treatment plan even when you are feeling discouraged about your health?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Reaction/Receptivity to Messages

These next questions ask your opinions about the text messages you received as part of the study.

14. Please tell me the extent to which you agree or disagree with the following statements about the messages you received.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Refuse to answer
(q14a)a. Overall, I liked the text messages.	☐	☐	☐	☐	☐	☐
(q14b)b. I learned something new from the text messages.	☐	☐	☐	☐	☐	☐
(q14c)c. The text messages were easy to understand.	☐	☐	☐	☐	☐	☐
(q14d)d. I was interested in the message topics.	☐	☐	☐	☐	☐	☐
(q14e)e. I trusted the information in the messages.	☐	☐	☐	☐	☐	☐
(q14f)f. The text messages were convincing.	☐	☐	☐	☐	☐	☐
(q14g)g. The messages said something important to me.	☐	☐	☐	☐	☐	☐
(q14h)h. The messages grabbed my attention.	☐	☐	☐	☐	☐	☐
(q14i)i. The messages told me something I didn't already know.	☐	☐	☐	☐	☐	☐
(q14j)j. The messages were confusing.	☐	☐	☐	☐	☐	☐
(q14k)k. I did not like getting the messages.	☐	☐	☐	☐	☐	☐
(q14l)l. The messages were persuasive.	☐	☐	☐	☐	☐	☐
(q14m)m. The messages were very appealing to me.	☐	☐	☐	☐	☐	☐
(q14n)n. I felt like the messages were designed for me.	☐	☐	☐	☐	☐	☐
(q14o)o. The messages promoted behaviors that are difficult for me to do.	☐	☐	☐	☐	☐	☐
(q14p)p. The messages motivated me to change my behavior.	☐	☐	☐	☐	☐	☐
(q14q)q. The messages would motivate people living with HIV to act in ways that would prevent giving HIV to others.	☐	☐	☐	☐	☐	☐
(q14r)r. The messages contradicted what I know about HIV prevention.	☐	☐	☐	☐	☐	☐
(q14s)s. The messages helped me to remember to take my HIV medication.	☐	☐	☐	☐	☐	☐
(q14t)t. The messages motivated me to be involved in my health care.	☐	☐	☐	☐	☐	☐
(q14u)u. I learned about services or resources available to me from the messages.	☐	☐	☐	☐	☐	☐
(q14v)v. The messages gave me good advice.	☐	☐	☐	☐	☐	☐

15. (*q15*)How would you describe the text messages? Choose all that apply.

Accurate .... ☐
Annoying .... ☐
Believable .... ☐
Complex .... ☐
Effective .... ☐
Embarrassing .... ☐
Clever .... ☐
Clear .... ☐
Condescending .... ☐
Dishonest .... ☐
Familiar .... ☐
Farfetched .... ☐
Creative .... ☐
Inappropriate .... ☐
Informative .... ☐
Interesting .... ☐
Irritating .... ☐
Offensive .... ☐
Original .... ☐
Pointless .... ☐
Realistic .... ☐
Silly .... ☐
Stigmatizing .... ☐
Worth remembering .... ☐
None of the above .... ☐
Refuse to answer .... ☐

16. On a scale of 0 to 10, where 0 is the worst possible message and 10 is the best possible message, please give an overall rating to the categories of messages you received:

	Worst possible message 0	1	2	3	4	5	6	7	8	9	Best possible message 10	I did not receive this type of message	Refuse
(q16a)a. Appointment reminders	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q16b)b. Medication reminders	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q16c)c. General health and wellness	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q16d)d. Preventing risky sexual behaviors	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q16e)e. Preventing or reducing alcohol/drug use	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q16f)f. Social support	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q16g)g. Smoking cessation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(q16h)h. Being actively involved in my health care	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

17. (q17)How often did you read the text messages you received from the study?
Always.. ☐
Usually .... ☐
Sometimes .... ☐
Never .... ☐
Refuse to answer .... ☐

18. (q18)How often did you use the information that was in the messages?
Always.. ☐
Usually .... ☐
Sometimes .... ☐
Never .... ☐
Refuse to answer .... ☐

19. (*q19*)How concerned were you that people could see the text messages you got from the study?

Very .... ☐
Somewhat .... ☐
A little .... ☐
Not at all .... ☐
Refuse to answer .... ☐

20. (*q20*)How helpful were the text messages that you received?

Very .... ☐
Somewhat .... ☐
A little .... ☐
Not at all .... ☐
Refuse to answer .... ☐

21. (*q21*)How satisfied were you with the messages you received?

Very .... ☐
Somewhat .... ☐
A little .... ☐
Not at all .... ☐
Refuse to answer .... ☐

22. On a scale of 0 to 10, where 1 is the worst and 10 is the best, how would you rate the following:

	Worst 0	1	2	3	4	5	6	7	8	9	Best 10	Refuse to answer
(*q22a*)a. The number of messages you received	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(*q22b*)b. The timing of the messages you received	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(*q22c*)c. The content of the messages you received	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

23. (*q23*)How important is it to have programs like this one where people can receive information from their health care providers through text messages?

Very .... ☐
Somewhat .... ☐
A little .... ☐
Not at all .... ☐
Refuse to answer .... ☐

Social Support

24. People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?

	None of the time	A little of the time	Some of the time	Most of the time	All of the time	Refuse to answer
(q24a)a. Someone you can count on to listen to you when you need to talk	☐	☐	☐	☐	☐	☐
(q24b)b. Someone to give you information to help you understand a situation	☐	☐	☐	☐	☐	☐
(q24c)c. Someone to give you good advice about a crisis or personal problem	☐	☐	☐	☐	☐	☐
(q24d)d. Someone who understands your problems	☐	☐	☐	☐	☐	☐
(q2)4ee. Tangible support like money or food	☐	☐	☐	☐	☐	☐
(q24f)f. Someone to take care of you if you were sick	☐	☐	☐	☐	☐	☐
(q24g)g. Someone who shows you love and affection	☐	☐	☐	☐	☐	☐
(q24h)h. Someone to have a good time with	☐	☐	☐	☐	☐	☐
(q24i)i. Someone to get together with for relaxation	☐	☐	☐	☐	☐	☐

25. (q25)Have you attended any support groups in the past 3 months?

Yes .... ☐
No ➔ **Skip to Q27** .... ☐
Refuse to answer ➔ **Skip to Q27** .... ☐

26. (q26)In general, how satisfied were you with the overall support you got from the support groups you attended in the past 3 months?

Very dissatisfied .... ☐
Somewhat dissatisfied .... ☐
Somewhat satisfied .... ☐
Very satisfied .... ☐
Refuse to answer .... ☐

HIV Stigma

These next items are about some of your experiences, feelings, and opinions on how people with HIV feel and how they are treated.

27. Please tell me the extent to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Refuse to answer
(q27a)a. In many areas of my life, no one knows that I have HIV	☐	☐	☐	☐	☐	☐
(q27b)b. Since learning I have HIV, I feel set apart and isolated from the rest of the world	☐	☐	☐	☐	☐	☐
(q27c)c. Most people with HIV are rejected when others find out	☐	☐	☐	☐	☐	☐
(q27d)d. Since learning I have HIV, I worry about people discriminating against me	☐	☐	☐	☐	☐	☐
(q27e)e. I never feel the need to hide the fact that I have HIV	☐	☐	☐	☐	☐	☐

These next set of questions assume that you have told other people that you have HIV or that others know. This may not be true for you. If the item refers to something that has not actually happened to you, please imagine yourself in that situation.

28.   Please tell me the extent to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Refuse to answer
(*q28a*)a. I have been hurt by how people reacted to learning I have HIV	☐	☐	☐	☐	☐	☐
(*q28b*)b. I regret having told some people that I have HIV	☐	☐	☐	☐	☐	☐

29.   (*q29*)Whom have you told that you are gay, bisexual, or queer? (Check all the boxes that apply.)

Male sex partner(s) .... ☐
Female sex partner(s) .... ☐
Mother .... ☐
Father .... ☐
Other Relative .... ☐
Any gay friends .... ☐
Any straight friends .... ☐
Any co-workers .... ☐
Any neighbors .... ☐
Anyone else .... ☐
None of the above .... ☐
Refuse to answer .... ☐

30.   (*q30*)Whom have you told that you are HIV positive? (Check all the boxes that apply.)

Main Partner (that is, a partner you would call your spouse, lover, significant other, or life partner) .... ☐
Non-Main Partner(s) (that is, somebody you did not consider to be a spouse, lover, significant other, or life partner) .... ☐
Mother .... ☐
Father .... ☐
Other Relative .... ☐
Any gay friends .... ☐
Any straight friends .... ☐
Any co-workers .... ☐
Any neighbors .... ☐
Anyone else .... ☐
None of the above .... ☐
Refuse to answer .... ☐

Attitudes/Beliefs

31. Please tell me the extent to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Refuse to answer
(*q31a*)a. It is important to tell your sex partners that you have HIV.	☐	☐	☐	☐	☐	☐
(*q31b*)b. It is important to keep learning about HIV, its treatment, and new developments in HIV research.	☐	☐	☐	☐	☐	☐
(*q31c*)c. Drug or alcohol use can increase the risk for passing HIV to others because people are more likely to do risky behaviors when they are drunk or high.	☐	☐	☐	☐	☐	☐
(*q31d*)d. Being in a relationship with another HIV positive person can lead to a closer, more understanding relationship.	☐	☐	☐	☐	☐	☐
(*q31e*)e. Monogamy is an effective prevention strategy.	☐	☐	☐	☐	☐	☐
(*q31f*)f. It is important for my health to keep my doctor's appointments.	☐	☐	☐	☐	☐	☐
(*q31g*)g. If both sexual partners are HIV positive, they don't need to use condoms during sex.	☐	☐	☐	☐	☐	☐

HIV Knowledge

32. In this section are statements about HIV. Please indicate whether the statements are true, false, or if you don't know the answer.

	True	False	Don't know	Refuse to answer
(*q32a*)a. Once someone's HIV viral load results are "undetectable," they should stop taking their HIV medications.	☐	☐	☐	☐
(*q32b*)b. Certain oral health problems, such as oral candidiasis and herpes simplex, are common in people with HIV/AIDS.	☐	☐	☐	☐
(*q32c*)c. If a person does not take their HIV medications at the right time of day, they can become resistant to their HIV medications.	☐	☐	☐	☐
(*q32d*)d. HIV is cured when someone's HIV viral load is "undetectable."	☐	☐	☐	☐
(*q32e*)e. If someone's viral load is "undetectable", they don't need to use condoms during sex.	☐	☐	☐	☐
(*q32f*)f. Eating a high-fat diet helps people with HIV/AIDS digest their medications.	☐	☐	☐	☐
(*q32g*)g. People who have HIV can get re-infected with a drug resistant type of HIV.	☐	☐	☐	☐
(*q32h*)h. Exercise is always unsafe for people with HIV/AIDS.	☐	☐	☐	☐
(*q32i*)i. Recreational drugs can make a person's HIV medications less effective.	☐	☐	☐	☐
(*q32j*)j. It is best for a person to stop taking their HIV medications as soon as they feel better.	☐	☐	☐	☐
(*q32k*)k. Taking HIV medications regularly protects people from getting common illnesses, such as food poisoning.	☐	☐	☐	☐
(*q32l*)l. After a few months, it becomes less important for people to take their HIV medications at the right time of day.	☐	☐	☐	☐

Self-Efficacy

Please tell us the extent to which you agree with the following statements.

33. (*q33*)I am confident that I can refuse to have sex if my partner doesn't want to use a condom.

Strongly disagree .... ☐
Disagree .... ☐
Neither agree nor disagree .... ☐
Agree .... ☐
Strongly agree .... ☐
Refuse to answer .... ☐

34. (*q34*)I am confident that I can protect myself from STDs.

Strongly disagree..☐
Disagree...☐
Neither agree nor disagree...☐
Agree ....☐
Strongly agree ....☐
Refuse to answer ....☐

35. (*q35*)I am confident that I can protect myself from getting infected with another strain of HIV.

Strongly disagree..☐
Disagree...☐
Neither agree nor disagree...☐
Agree ....☐
Strongly agree ....☐
Refuse to answer ....☐

36. (*q36*)I am confident that I can protect my partners from getting HIV from me.

Strongly disagree..☐
Disagree...☐
Neither agree nor disagree...☐
Agree ....☐
Strongly agree ....☐
Refuse to answer ....☐

37. (*q37*)I am confident that I can use condoms consistently with my sex partners.

Strongly disagree..☐
Disagree...☐
Neither agree nor disagree...☐
Agree ....☐
Strongly agree ....☐
Refuse to answer ....☐

Sexual Behaviors

These next questions are about your sexual behavior in the past 3 months. Remember all of your answers are kept private.

38. (*q38*)Over the past 3 months, how many people did you have oral, vaginal, or anal sex with?

    0 ➔ **Skip to Q52** .... ☐
    1 .... ☐
    2-5 .... ☐
    6-10 .... ☐
    11-15 .... ☐
    16-20 .... ☐
    Over 20 .... ☐
    Refuse to answer .... ☐

39. (*q39*)Over the past 3 months, how often did you use alcohol or drugs before or during sex?

    Never .... ☐
    Rarely .... ☐
    Sometimes .... ☐
    Most of the time .... ☐
    Every time .... ☐
    Refuse to answer .... ☐

40. (*q40*)In the past 3 months, have you had sex with: (Choose all that apply)

    Men .... ☐
    Women .... ☐
    Trans-men .... ☐
    Trans-women .... ☐
    Refuse to answer .... ☐

41. (*q41*)In the past 3 months, how many main sex partners — that is, a partner you would call your spouse, lover, significant other, or life partner — did you have oral, vaginal, or anal sex with?

    0 ➔ **Skip to Q46** .... ☐
    1-5 .... ☐
    6-10 .... ☐
    11-15 .... ☐
    16-20 .... ☐
    Over 20 .... ☐
    Refuse to answer .... ☐

42. (*q42*)Do you currently have a main sex partner?

Yes...☐
No➔ **Skip to Q46**..☐
Refuse to answer➔ **Skip to Q46**..☐

43. (*q43*)What is your main partner's HIV status?

My main partner is HIV-negative ....☐
My main partner is HIV-positive ....☐
My main partner has not been tested for HIV...☐
My main partner has not told me their HIV status...☐
Refuse to answer ....☐

44. (*q44*)Does your main partner know your HIV status?

Yes...☐
No...☐
Don't know..☐
Refuse to answer ....☐

45. (*q45*)Did your main partner participate in this study?

Yes...☐
No...☐
Don't know..☐
Refuse to answer ....☐

46. (*q46*)In the past 3 months, how many non-main partners — that is, somebody who you did not consider to be a spouse, significant other, or life partner — did you have oral, vaginal, or anal sex with?

0 ➔ **Skip to Q50** ....☐
1–5..☐
6–10..☐
11–15..☐
16–20..☐
Over 20..☐
Refuse to answer ....☐

47. (*q47*)In the past 3 months, how many of your non-main partners told you their HIV status?

0..☐
1–5..☐
6–10..☐
11–15..☐
16–20..☐
Over 20..☐
Refuse to answer ....☐

48. (*q48*)In the past 3 months, how many of your non-main partners did you tell your HIV status to?

0 .... ☐
1–5 .... ☐
6–10 .... ☐
11–15 .... ☐
16–20 .... ☐
Over 20 .... ☐
Refuse to answer .... ☐

49. (*q48*)Were any of your non-main partners in the study?

Yes .... ☐
No .... ☐
I don't have any non-main partners .... ☐
Don't know .... ☐
Refuse to answer .... ☐

Now we would like you to think about the sex you have had with <u>all</u> of your partners (main <u>and</u> non-main partners) in the past 3 months.

50. (*q50*)In the past 3 months, how many times did you have sex—oral, vaginal, or anal—with *any* of your sex partner(s)?

1–5 .... ☐
6–10 .... ☐
11–15 .... ☐
16–20 .... ☐
Over 20 .... ☐
Refuse to answer .... ☐

51. (*q51*)In the past 3 months, how many times did you have sex—oral, vaginal, or anal—*without a condom* with any of your sex partner(s)?

0 .... ☐
1–5 .... ☐
6–10 .... ☐
11–15 .... ☐
16–20 .... ☐
Over 20 .... ☐
Refuse to answer .... ☐

Smoking Status

52. (*q52*)Do you smoke cigarettes?

Yes .... ☐
No ➔ **Skip to Q54** .... ☐
Refuse to answer ➔ **Skip to Q54** .... ☐

53. (*q53*)Have you seriously considered stopping smoking in the past 3 months?

Yes.. □
No .... □
Refuse to answer .... □

Substance Use

People have various health habits. The following questions ask about alcohol and drug use.

54. (*q54*)On average, how often in the past 3 months have you had a drink containing alcohol (e.g., a glass of beer or wine, a mixed drink, or any other kind of alcoholic beverage)?

Never ➔ **Skip to Q56**.. □
Once a month .... □
2 or 3 times a month .... □
Once or twice a week .... □
3 or 4 times a week... □
Nearly every day .... □
Daily .... □
Refuse to answer .... □

55. (*q55*)On average, how often in the past 3 months have you had 5 or more drinks of alcohol within a couple of hours (e.g., 2–4 hours)?

Never .... □
Once a month .... □
2 or 3 times a month .... □
Once or twice a week .... □
3 or 4 times a week... □
Nearly every day .... □
Daily .... □
Refuse to answer .... □

56. Have you used any of the following within the past 3 months?

	Yes	No	Refuse to answer
(*q56a*)a. Marijuana	□	□	□
(*q56b*)b. Cocaine (powder, crack, or freebase)	□	□	□
(*q56c*)c. Heroin	□	□	□
(*q56d*)d. Methamphetamine	□	□	□
(*q56e*)e. MDMA (ecstasy)	□	□	□
(*q56f*)f. GHB (liquid X)	□	□	□
(*q56g*)g. Ketamine (special K)	□	□	□

These questions are about how you feel and how things have been with you during the past three months. For each question, please give the one answer that comes closest to the way you have been feeling.

57. (*q57*)During the past 3 months, how much of the time has your physical health interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time .... ☐
Most of the time .... ☐
Some of the time .... ☐
A little of the time .... ☐
None of the time .... ☐
Refuse to answer .... ☐

58. (*q58*)During the past 3 months, how much of the time have your emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time .... ☐
Most of the time .... ☐
Some of the time .... ☐
A little of the time .... ☐
None of the time .... ☐
Refuse to answer .... ☐

59. (*q59*)During the past 3 months, how much of the time have you experienced difficult sleeping, poor appetite, or excessive worrying?

All of the time .... ☐
Most of the time .... ☐
Some of the time .... ☐
A little of the time .... ☐
None of the time .... ☐
Refuse to answer .... ☐

Quality Outcome/Patient Satisfaction

These next questions are about your experiences with Howard Brown Health Center.

60. (*q60*)When was your last visit to the Howard Brown Health Center?

Less than 1 month ago .... ☐
1 to 2 months ago .... ☐
3 to 6 months ago .... ☐
More than 6 months ago.. ☐
Refuse to answer .... ☐

61. Think about your <u>last</u> experience with your Howard Brown health care providers. Now, please tell me the extent to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly Agree	Refuse to answer
(*q61a*)a. My providers made sure I understood what my lab test results (such as CD4 and viral load) meant for my health.	☐	☐	☐	☐	☐	☐
(*q61b*)b. My providers spent enough time with me.	☐	☐	☐	☐	☐	☐
(*q6qc*)c. I asked my providers all of the questions I had about my HIV care.	☐	☐	☐	☐	☐	☐
(*q61d*)d. I felt comfortable talking about personal or intimate issues with my providers.	☐	☐	☐	☐	☐	☐
(*q61e*)e. I was involved in making decisions about my health care with my providers.	☐	☐	☐	☐	☐	☐
(*q61f*)f. When I asked my providers questions about my HIV care, I understood their answers.	☐	☐	☐	☐	☐	☐
(*q61g*)g. I found my providers to be accepting and non-judgmental of my life and health care choices.	☐	☐	☐	☐	☐	☐

This next series of questions are about communication with your health care provider. Please answer yes or no for each statement.

62. (*q62*)My providers explained the side effects of my HIV medications in a way I could understand.
    Yes .... ☐
    No .... ☐
    I am not taking any medications prescribed by my doctor to treat HIV .... ☐
    Refuse to answer .... ☐

63. (*q63*)My providers suggested ways to help me remember to take my HIV medications.
    Yes .... ☐
    No .... ☐
    I am not taking any medications prescribed by my doctor to treat HIV .... ☐
    Refuse to answer .... ☐

64. (*q64*)My providers explained to me what kinds of medical tests I should be getting and how often I should get them.
    Yes .... ☐
    No .... ☐
    Refuse to answer .... ☐

65. (*q65*)My providers talked to me about how to avoid passing HIV to other people and how to protect myself from getting infected again with HIV.
    Yes .... ☐
    No .... ☐
    Refuse to answer .... ☐

66. (*q66*)My providers talked to me about how to protect myself from getting STDs or how to avoid passing them on to others if I already had one.
    Yes .... ☐
    No .... ☐
    Refuse to answer .... ☐

67. (*q67*)My providers or case managers asked me how I was feeling emotionally and made a referral to a mental health provider, counselor or support group if I needed help.
    Yes .... ☐
    No .... ☐
    Refuse to answer .... ☐

68. (*q68*)My providers asked me about my drug and alcohol use and made a referral if I needed help.

Yes.. ☐
No .... ☐
Refuse to answer .... ☐

69. (*q69*)I would rate my providers' knowledge of the newest developments in HIV medical standards as

Excellent.. ☐
Very good... ☐
Average .... ☐
Fair .... ☐
Poor .... ☐
Refuse to answer .... ☐

70. (*q70*)I would rate the quality of care at this clinic in comparison to other clinics I know about as:

Much better .... ☐
Better .... ☐
The same .... ☐
Worse .... ☐
Much worse .... ☐
Don't know... ☐
Refuse to answer .... ☐

71. (*q71*)I would recommend this clinic to my HIV-positive friends with similar needs.

Definitely yes .... ☐
Maybe... ☐
Definitely not.. ☐
Refuse to answer .... ☐

Thank you for completing this survey. Please notify study staff to continue with your visit.

Appendix E: Patient Interview Guide

Introduction

Hello, my name is [_____] from RTI International, a nonprofit research firm, and [Name] is also on the phone. RTI is evaluating the text messaging program that is being piloted with Howard Brown patients. As part of the evaluation process, we are talking with up to 9 people who are participating in the program to learn more about their experiences with and opinions about the program. Is this still a good time to talk? Our discussion should take about 45 minutes, please let me know if you need to go earlier.

Before we get started, I just wanted to mention a couple of procedural issues. Please know that you can choose to not answer questions and can stop this interview at any time with no problem. I also would like to point out that none of your comments will be linked with your name.

Since some of these questions I am going to ask you are of a sensitive nature, I would like to make sure you are in a private location for having this kind of discussion with me.

May we proceed with the interview now?

Thank you again for your time and help. Let's begin!

Implementation Policies and Practices

1. How were you approached and enrolled into the text messaging program? What did you think about the enrollment process?

Implementation Effectiveness

2. Are you still participating in the program?

> If not, did you complete the program or did you choose to stop participating before the end of the program?

>> If chose to stop early: Why did you decide to stop participating in the program before it ended?

3. How often did you read the text messages that you received as part of the program?

4. Did you use any of the information in the text messages? How?

5. Was there anything you especially liked/disliked about the messages? What?

6. How convincing were the messages that you received?

7. To what extent did the messages you get tell you something that you didn't already know?

8. Were there times when the messages you got were confusing or hard to understand? Can you give me an example?

9. Did you ever worry about your privacy because of getting the text messages? Tell me a little bit more about your concerns? How could those concerns be addressed?

Barriers to Program Implementation, Maintenance and Sustainability

10. Did you encounter any problems with sending or receiving the text messages as part of the program? Did you run into any other problems or obstacles related to the text messaging program? What were those?

Patient Satisfaction

11. How satisfied are/were you with the text messages you received? Were you more/less satisfied with certain message topics than others? Which ones and why?

12. How do you/did you feel about the timing of the text messages? Number of messages? Content?

13. Overall, how do you think the text messaging program is going/went? What did you like about it? What did you dislike? What worked? What didn't work? How would you do it differently?

Recommendations for Improvement

14. What should we do differently if we were starting over with this program? What features of the program should be changed? Why? How?

Outcomes

15. Did you make any changes in your life as a result of getting the text messages? For example, have you been better about taking your medication or going it to your medical appointments? How about asking questions and/or being involved in your treatment? Join a support group or club? Change anything related to the way you eat, exercise?

Those were all the questions that I had. Did you have any additional comments or thoughts to add before we go? Thank you very much for taking the time to talk with us today.

Appendix F: Clinic Staff Interview Guide

Introduction

Hello, my name is [_____] from RTI International, a nonprofit research firm, and [Name] is also on the phone. RTI is evaluating the text messaging program that is being piloted with Howard Brown patients. As part of the evaluation process, we are talking with up to 9 clinic staff members to learn more about their experiences with and opinions about the program. Is this still a good time to talk? Our discussion should take about 45 minutes, please let me know if you need to go earlier.

Before we get started, I just wanted to mention a couple of procedural issues. Please know that you can choose to not answer questions and can stop this interview at any time with no problem. I also would like to point out that none of your comments will be linked with your name.

May we proceed with the interview now?

Thank you again for your time and help. Let's begin!

Background

1. How would you summarize your current work with PLWH at Howard Brown?

Organizational Context

2. What kind of support is the program getting from leadership at Howard Brown?

3. Do you feel that staffing is adequate at Howard Brown to implement the text messaging program with patients? How about to sustain it? Can you tell me a bit more about that?

Implementation Policies and Practices

6. How was the text messaging program rolled out or disseminated within the clinic? What do you think about the process? Could anything have been done differently?

7. What training was available? What did it consist of? Who offered the training?

Implementation Climate

8. Do staff feel the program is supported by leadership? Why/why not?

9. Do staff want to participate in the program? Why/why not?

10. Under what context and environmental factors was the program implemented?

    a. Was there anything going on at the clinic at the time the program was being implemented that may have affected implementation?

Implementation Effectiveness

11. Overall, how do you think the text messaging program is going/went? What did you like about it? What did you dislike? What worked? What didn't work? How would you do it differently?

Barriers to Program Implementation, Maintenance and Sustainability

12. What are the significant barriers to implementing a program like this in a health center like Howard Brown? How could these barriers be addressed?

13. What kinds of challenges did the program face? To what extent were those challenges overcome?

Facilitators to Program Implementation, Maintenance, and Sustainability

14. What factors facilitated and supported the implementation?

Patient Satisfaction

15. In your opinion, how are patients who are participating in the program reacting to the text messages?

16. What aspects of the messages did patients like? Dislike?

17. How do patients/did patients feel about the timing of the text messages? Number of messages? Content?

Recommendations for Improvement

18. What should we do differently if we were starting over with this program? What features of the program should be changed? Why? How?

19. What would you recommend to a clinic interested in starting a program like this?

Outcomes

20. In your opinion, what are the main lessons learned from pilot testing the program at Howard Brown?

21. Have you noticed any changes in the patients who participated in the program related to their medication adherence or appointment attendance, involvement in their health care, or social support system?

Those are all the questions that I had. Did you have any additional comments or thoughts to add before we go? Thank you very much for taking the time to talk with us today.

Appendix G: Medical Record Documentation Form

RTI Text Messaging Study
Participant Labs Documentation Form

Staff:_____ Pt. ID:_____ Date:_____

Study Visit	Type of Lab Work	Result	Date of Lab Work
Enrollment	CD4		
	Viral Load		
Followup	CD4		
	Viral Load		

Upcoming Medical Appointments

Date	Time