Demonstration Site Summary

Text Messaging to Improve Linkage, Retention and Health Outcomes among HIV-positive Young Transgender Women: Text Me, Girl!

Friends Research Institute, Inc.

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Use of Social Media to Improve Engagement, Retention, and Health Outcomes along the HIV Care Continuum

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

The overall goal of *Text Me, Girl!* was to evaluate the efficacy of a text-messaging intervention to improve linkage to and retention in HIV care, increase ART adherence and virological suppression, and improve health outcomes along the HIV Care Continuum among young adult trans women, aged 18-34.

A meta-analysis estimated the odds of becoming HIV positive to be 34.2 times higher for trans women than other U.S. adult populations, and further evidence demonstrated that new HIV infection may be particularly common among trans women aged 20-29 years. Studies of young (i.e., 15-24 years) trans women have shown HIV positivity rates ranging from 19-22%. The Los Angeles County HIV Prevention Plan identified the following co-factors that contribute to trans womens' high risk for HIV infection: substance use, incarceration, sex work, mental health issues, unemployment, STIs, poverty, stigma and discrimination, transphobia, racism, immigration status, language, educational attainment, violence and sexual assault, and homelessness. Further, trans women more likely than cisgender women to delay HIV care including ART uptake and adherence, and are less likely to achieve virological suppression.

To address these health disparities we designed, *Text Me, Girl!*, a 90-day theory-based, trans-specific, text-messaging intervention. Over the course of the 90-day intervention, participants received 270 theory-based text messages (three messages per day) that were targeted, tailored, and personalized specifically for young trans women living with HIV. Each text message was scripted along the HIV Care Continuum and each had a theoretical foundation.

Text Me, Girl! demonstrated advancement along the HIV Care Continuum by improved ART uptake, ART adherence, and viral suppression, all of which significantly increased at 6-month follow-up evaluation and sustained through 18-month follow-up evaluation.

INTRODUCTION

Rationale & Description of Need/Scope of Problem

HIV Disparities among Young Trans Women

Though HIV surveillance data are often not collected for transgender (hereafter: trans) persons in the U.S.,[1] meta-analytic and aggregated jurisdictional data suggest that HIV prevalence rates among trans women are higher than other adult populations in the U.S. (18.4%-30.6%[2; 3] vs. 0.3%-0.4%)[4] with the odds of becoming HIV positive estimated to be 34.2 times higher for trans women than other U.S. adult populations.[2] Evidence suggests that new HIV infection may be particularly common among trans women aged 20-29 years,[5] and recent studies of young (i.e., 15-24 years) trans women have shown HIV positivity rates ranging from 19-22%.[6; 7] Rates of unidentified HIV infection and unstable/nonexistent access to medical care are also sharply elevated among trans women,[3; 8-11] impacting not only the health of HIV-positive trans women not receiving HIV care, but also increasing the HIV transmission risks to members of their sexual and drug-/hormone-using social networks. Trans women with HIV often experience complex psychosocial factors resulting from their gender identity, gender presentation, and HIV serostatus, which often manifests as discrimination, prejudice, stigmatization, and socioeconomic marginalization.[12]

Disparities in HIV Care among Trans Women

As a result, trans women have a nearly seven times higher likelihood in delaying medical care after a HIV-positive diagnosis than cisgender women.[13] Multi-layered stigma, accompanied by an inability to pay for care and misinformation about the need for anti-retroviral treatment (ART), often contributes to low linkage to and retention in care outcomes among young trans women;[11; 14] one study found that trans women with higher exposure to stigma and

discrimination were also over three times more likely to engage in HIV transmission behavior than their peers.[15] Given these factors, the National HIV/AIDS Strategy has defined trans women as a priority population in the fight against HIV transmission in the U.S.[16]

Local Epidemiology

In Los Angeles County (LAC), studies have demonstrated HIV prevalence among trans women ranging from 24% to 37%,[17-20] rates comparable to or higher than other trans women populations across the U.S. and other high-income countries,[21] and more than 40% greater in magnitude than the rate observed nationally among men who have sex with men.[22] Nationally, the CDC reports that trans women demonstrate the highest percentage of newly identified HIV-positive persons in the country.[23] Despite comprising only a tiny fraction of the total population in LAC, trans individuals are estimated to make up nearly 5% of all HIV-infected individuals not linked into HIV care in the County.[24] The LAC HIV Prevention Plan identified the following co-factors that contribute to trans womens' high risk for HIV infection: substance use, incarceration, sex work, mental health issues, unemployment, STIs, poverty, stigma and discrimination, transphobia, racism, immigration status, language, educational attainment, violence and sexual assault, and homelessness.[17; 18; 25]

Target Audience

The intervention was designed for young trans women living with HIV for whom there were individual or structural barriers to achieving excellent HIV health outcomes, were hard-to-reach, underserved, and/or underinsured. The intervention was designed to address or at least be sensitive to these factors: being a woman of color, using substances, engaging in sex work, and/or experiencing periods of homelessness and/or cycles of short-or-long-term incarceration.

Social Media Intervention Overview: *Text Me, Girl!*

To address these health disparities among young trans women living with HIV, the broad goals of this project were to design and implement an innovative text-messaging intervention, entitled *Text Me, Girl!*, to assess the impact of a 90-day theory-based, trans-specific, text-messaging intervention to improve linkage to and retention in HIV care, increase ART adherence and virological suppression, and improve health outcomes along the HIV Care Continuum. Over the course of the 90-day intervention, participants received 270 theory-based text messages that were targeted, tailored, and personalized specifically for young trans women living with HIV. Each text message was scripted along the HIV Care Continuum and each had a theoretical foundation (see Table 1). Participants received three messages per day within a 10-hour graduated and automated delivery system. Following the 90-day theory-based, trans-specific text-messaging intervention, participants were able to opt-in or opt-out of continued weekly post-intervention messages for ongoing retention and engagement support derived from the HRSA-funded UCARE4LIFE library (i.e., not theory-based and not trans-specific).

INTERVENTION DESCRIPTION

Intervention Approach and Theoretical Framework

Intervention Approach

Entry to the intervention included an initial welcome message. This initial message was not a HIV care message but was rather used to determine that the technology platform system was registered to the participant's cell phone or social media platform or email inbox, and that transmission was successful (e.g., "Thanks for your participation!" or "Welcome! We'll be texting you for the next 3 months."). All text messages were transmitted every day including

weekends, in real-time, within a 10-hour period (i.e., an outgoing text message approximately every five hours). The optimum text-messaging hours were determined to be 12:00PM to 10:00PM with messages transmitted at 12:00PM, 5:00PM, and 10:00PM. However, a participant was allowed to alter the predetermined default text-messaging schedule by personalizing her 10-hour texting period to fit her individual schedule. To maintain interest and enthusiasm for the intervention, participants did not receive the same scripted text message twice. To further personalize the intervention, participants chose to receive the intervention messages via text messages or email. Following the 90-day intensive text-messaging intervention, participants had the option to receive a weekly text message about 1) linkage/retention in HIV Care; and/or, 2) ART medication adherence. These text messages were no theory-based nor trans-specific, but were drawn from the HRSA-funded UCARE4LIFE text library.

Theoretical Framework

Text Me, Girl! used three theories of behavior change that have demonstrated efficacy across more than three decades of empirical research, and have proven to be particularly effective for technology-based HIV prevention: **Social Support Theory**,[26-30] **Social Cognitive Theory**,[31; 32] and the **Health Belief Model**.[33; 34] Technology-Based interventions that employ more than one theoretical mechanism of behavior change produce superior results.[35-37] Each of the three daily text messages were grounded in one of the three theories applied to steps in the HIV Care Continuum. There are **two primary core elements** to the *Text Me, Girl!* text messaging intervention, which include: 1) text message content along the HIV Care Continuum; and, 2) the theoretical foundations. Additionally, there are **six secondary core elements**, which include the three stages along the HIV Care Continuum: 1) HIV positivity/physical and emotional health; 2) linkage/retention in HIV care; and, 3) ART medication adherence/viral load

suppression. And, the three theoretical foundations: 4) Social Support Theory; 5) Social Cognitive Theory; and, 6) Health Belief Model. To maintain the effectiveness of the text messages, these six primary and secondary core elements should not be modified.

Social Support Theory: Social Support Theory[38-40] guided messages were sent to encourage instrumental, emotional, and informational assistance. Social support theory states that supportive actions from trusted others (or even the perception that such support is available) acts as a buffer to the stress of difficult life events,[41] and that this buffer improves individuals' coping performance when dealing with such events. Trans women who report high level of social support also report lower HIV risk behaviors.[42; 43]

Social Cognitive Theory: Social Cognitive Theory is a psychosocial theory of behavior change which states that self-efficacy (i.e., the belief/perception that one is able to achieve desired outcomes) plays a central role in the enactment of healthy behavior change[44] in mediating casual relationships among personal determinants,[45; 46] behavior, and environmental influences. Self-efficacy is theorized to influence which goals people choose to set, the expectations of success or failure associated with those goals, and the perceived barriers to impediments to achieving those goals. Messages guide participants to develop self-regulation skills, suggesting practice and feedback opportunities, and encourage engaging social support resources to maintain prevention behavior, for example, through affirmative messages for viral load monitoring and ART medication adherence.

The Health Belief Model: These type of messages target individuals' beliefs regarding threats to their health and their beliefs that specific health behaviors can reduce these threats influence their likelihood of engaging in protective health behaviors.[47-49] For example, messages

highlights the threats of untreated HIV if one is non-adherent and also the health benefits of remaining ART adherent, or messages about the risks of a trans body not protected against HIV.

Adaptation

Key characteristics that do not conflict with the primary or secondary core elements can be modified for adaptation. Key characteristics of *Text Me, Girl!* include the use of trans-specific content, references to trans culture, and references to substance use or sex work. The following is an example of a *Text Me, Girl!* message that falls under the core elements of Linkage/Retention in HIV Care and used Social Cognitive Theory: “Stay on top of your numbers, now that’s Trans Pride!” By removing the key characteristic of “Trans Pride” and inserting an affirmative message for another target population, the core elements are maintained yet the key characteristics are modified. Tailored text messaging content addresses the specific needs of the population, which maximizes the acceptability of the intervention content for participants such as verbiage, content, delivery schedule, and medium of delivery. *Text Me, Girl!* intervention was purposely designed to have optimal malleability for adaptation, the intervention could easily be adapted and implemented in any setting.

Community Engagement

Community Advisory Board

FCC has an existing trans-specific CAB, which convenes on a biannual basis. The CAB is multi-cultural and composed of trans individuals and allies, social service providers including our community partners, treatment and research professionals, evaluation professionals, community members, consumers, current and past participants, and gatekeepers. With the addition of *Text Me, Girl!*, the CAB included membership that reflected the demographics of the intervention, including younger trans women who were living with HIV. FCC recruited new CAB

membership through local community-based organizations that work specifically with young trans women, including Children's Hospital Los Angeles, as well as outreach and referrals from existing CAB members. CAB members received a full dinner at each meeting (not funded through this initiative) and were incentivized with a $40 gift card of their choice (e.g., Amazon, Target, Starbucks) to thank them for their time.

CAB members provided feedback on all stages of project development, implementation, and interpretation of findings. Two CAB meetings were held during the formative stage of *Text Me, Girl!* to ensure the text messages were culturally relevant in regards to language, terminology, text message topics, delivery system, and dosage. The CAB meetings were also utilized to provide feedback on intervention refinement as well as the development of recruitment materials, recruitment strategies, and input on community mapping for street- and venue-based outreach.

IMPLEMENTATION

Pre-implementation Activities

Prior to full implementation of *Text Me, Girl!* formative work to develop and refine intervention components and technology was needed, as was the hiring and training of staff and the development of project protocols and procedures.

Text-Message Development and Feedback

Much of the formative stage focused on providing feedback on the text messages' content. The research team received detailed feedback from both focus group participants and CAB members. During the focus groups and CAB meetings, participants/members were provided with drafts of text messages from the different stages in the HIV Care Continuum and based on the three theoretical paradigms guiding the intervention. The focus groups/CAB meetings specifically helped construct the details to ensure a culturally competent intervention.

For example, participants/members were presented with the text message, “take your HIV meds,” which reflected Social Support Theory and was appropriate for those along the HIV Care Continuum who were linked to care and prescribed ART. Feedback then helped adjust the wording to, “Trans Pride is taking your HIV meds,” which ensured the verbiage resonated with the participants in a culturally sensitive and meaningful way. Following that period, the research team took the 270 trans-specific text messages and made minor edits to apply a theoretical base to each message. The process to finalize these messages involved three steps: First, the messages were designed to be equally distributed along the HIV Care Continuum of 1) HIV Positivity/Physical and Emotional Health, 2) Linkage/Retention to HIV Care, and 3) ART Medication Adherence/Viral Load Suppression. Second, each messages was structured to represent one of three theoretical domains 1) Social Support Theory, 2) Social Cognitive Theory, and 3) Health Belief Model. Third, once the text messages included 1) trans cultural competency, 2) equal distribution along the HIV Care Continuum, 3) equal distribution of the three behavioral theories, and were all approved by the CAB, the research team created the order of delivery so that the messages delivery would follow the proposed one message/care continuum/day, and one message/theoretical foundation/day. Finally, the text message library, in proper delivery order, was sent to Qualtircs (qualtrics.com), an online survey and technology platform company, for development of the delivery platform.

Message Bank or Library Schedule

The message bank of library was sorted such that text messages were distributed evenly across the HIV Care Continuum and theoretical foundations. This created a standardized text-messaging intervention with a consistent and unified dosing mechanism across the HIV Care Continuum and theoretical foundations. The text messages were scheduled for a 90-day window

based on specific dates relative to the creation date the participant was added to the directory, i.e., participant enrollment date.

Text-Message Gateway Provider

A short message service (SMS) gateway provider must be identified and subcontracted with to send the messages, e.g. Twilio, Qualtrics, or smaller scale services if numbers of participants allow. In the demonstration project, Qualtrics hosted the text-messaging application on their HIPPA secure server and leveraged their platform to design and deploy the text messages. First, Qualtrics imported the directory of enrolled participants into their contact management software and each participant was given a creation date. Second, Qualtrics developers created an automated system that referenced the list of text messages in the message library provided by the project team. Third, Qualtrics uploaded the library (i.e., 270 scripted text messages in the order created by the project team). Once the test messaging platform was established, non-project staff beta tested the text messaging intervention to identify any errors and resolved issues related to message delivery.

Staffing Rolls

Principal Investigator (PI): The PI was responsible for the overall management of the project; project implementation; participant safety; oversaw all program management tasks; assisted with staff hiring and training; attended Community Advisory Board (CAB) meetings; worked with the Project Director, evaluation team, and CAB in the development of the text message library; worked with the evaluation team, project staff, and CAB in the interpretation of findings; worked with the evaluation team in preparation of conference presentations and manuscript development.

Project Director: The Project Director was responsible for the day-to-day operations of the project; assisted with staff hiring and training; supervised and coordinated all project activities;

oversaw program monitoring activities including program performance indicators; reviewed participant files for quality assurance; conducted in-service trainings at local CBOs and networked with community gatekeepers to enhance community awareness of *Text Me, Girl!*; substituted for absent Research Assistants; maintained all program supplies; worked with the CAB and project staff on the development and implementation of the project; facilitated CAB meetings.

Research Assistants: The Research Assistants conducted street- and venue-based outreach to recruit participants and locate participants for follow-up evaluations; conducted screening/intake interviews with potential participants to determine eligibility; obtained informed consent, collected data using questionnaires and standardized assessment tools, assisted participants in administering the ACASI; tracked and retained participants and located missing participants for follow-up evaluations; managed participant tracking and retention; implemented and logged all activities; attended CAB meetings.

Process Evaluator: The Process Evaluator oversaw all aspects of the program evaluation including operationalizing process and outcomes indices analysis design and revision; worked with the PI, the Project Director; attended CAB meetings; worked with the PI, Project Director, Data Manager, Research Assistants, and CAB in the interpretation of findings; worked with the PI and Data Manager in preparation of conference presentations and manuscript development.

Data Manager: The Data Manager supervised data management staff and activities; worked with the PI, Project Director, Process Evaluator, project staff, and CAB in the interpretation of findings; worked with the PI and Process Evaluator in preparation of conference presentations and manuscript development.

Additional Pre-implementation Activities

Pre-implementation activities included the development and refinement of project procedures and protocols such as the Standard Operating Procedures. Approximately three months prior to implementation, a Research Coordinator and two Research Assistants were hired. Once hired, project staff were trained on project procedures and protocols, including outreach, and readiness for implementation was gauged through role plays and observations of project procedures (i.e., enrollment, obtaining consent, completing paperwork, randomizing participants, etc.)

Implementation Activities

Marketing

Three marketing recruitment materials were developed: A recruitment flyer, a postcard, and, a business card. In order to develop the marketing recruitment materials, a graphic artist was chosen through a graphic artist outsource website. Over 100 logo designs were submitted by approximately 32 graphic artists, and the final logo design was chosen by the Principal Investigator and two trans staff, both of whom were young adults within the target age range. Following the selection of the logo design, and over the course of several months, the graphic artist worked with the Principal Investigator and trans staff to develop flyer designs that integrated the “look” of the logo. At each iteration of flyer design development, the Principal Investigator met with young trans staff to modify as needed. Once a draft of the flyer was finalized, it was presented to the CAB, and suggestions from the CAB, which were very minor, were given to the graphic artist and the final flyer was created.

Outreach and Recruitment

To ensure enrollment targets were met and a diversity of participants were enrolled, the study utilized five recruitment strategies. Recruitment strategies included: 1) Online recruitment: Online banner ads and digital flyers were placed through geo-mapping on websites and social media that target trans women; 2) Print media for trans women or that trans women read; 3) Street- and Venue-based Outreach: Two Research Assistants utilized a semi-structured time-space sampling methodology to conduct street- and venue-based outreach identified through the CAB and ongoing community mapping at locations where young trans women congregate such as fast food restaurants, public parks, public libraries, thrift and other bargain retail stores, bus stops and train stations, cruising boulevards, and community-based organizations where young trans women seek services. The Research Assistants received extensive training on appropriate outreach strategies, safety in the field, and maintaining participant confidentiality. Additionally, outreach was utilized as a means to build and maintain ongoing trust and rapport with the populations and, thereby, recruit into the project. 4) Poster Advertisement: Project posters were posted at collaborating community-based organizations, which contained details about how to contact a Research Assistant for further information regarding the project. 5) Participant-incentivized Snowball Sampling: Participants enrolled in the project were asked to recruit a maximum of three potential new participants. Current participants received a small gift valued at approximately $2 (e.g., eyelashes, earrings, make-up) when they brought a potential participant to the site and received a $20 gift card if an eligible participant enrolled.

Implementation

Entry to the intervention included an initial welcome message. This initial message was not a HIV care message but was rather used to determine that the technology platform system was registered to the participant's cell phone or social media platform or email inbox, and that

transmission was successful (e.g., “Thanks for your participation!” or “Welcome! We’ll be texting you for the next 3 months.”). All text messages were transmitted every day including weekends, in real-time, within a 10-hour period (i.e., an outgoing text message approximately every five hours). The optimum text-messaging hours were determined to be 12:00PM to 10:00PM with messages transmitted at 12:00PM, 5:00PM, and 10:00PM. However, a participant was allowed to alter the predetermined default text-messaging schedule by personalizing her 10-hour texting period to fit her individual schedule. To maintain interest and enthusiasm for the intervention, participants did not receive the same scripted text message twice. To further personalize the intervention, participants chose to receive the intervention messages via text messages or email. Following the 90-day intensive text-messaging intervention, participants had the option to receive a weekly text message about 1) linkage/retention in HIV Care; and/or, 2) ART medication adherence. These text messages were not theory-based nor trans-specific, but were drawn from the HRSA-funded UCARE4LIFE text library.

LESSONS FROM THE FIELD & IMPLEMENTATION TIPS

Challenges/Barriers

In spite of successful implementation of the project, some challenges were experienced. There was an initial challenge soon after recruitment began of engaging potential participants to screen for the project. Potential participants were hesitant to screen for a project that had community awareness of serving young trans women living with HIV due to the stigma related to HIV status among trans women, specifically young trans women. Many members of the young trans community were hesitant to disclose their HIV-positive serostatus to people they did not know or were familiar with, which made recruitment difficult. However, to help address this issue staff created outreach packets that included flyers for both *Text Me, Girl!*, which targeted

HIV-positive trans women, as well as a PrEP project that targeted HIV-negative trans women. This strategy removed the assumption that a potential participant was HIV positive when speaking to a Research Assistant; thus, reducing stigma. In addition, project staff conducted consistent outreach to those venues that were successful in order to build rapport with the community members. By simply showing up to the same outreach sites repeatedly over time, the young trans women became familiar with the project staff which, in turn, built the trust for them to disclose their serostatus and screen for the project.

Venue-based Recruitment

It was also determined, through trial and error, that many of the initial locations were inappropriate for outreach thus making recruitment efforts difficult. For instance, clubs and bars, though originally determined as key outreach locations, proved to be less successful as many of the trans women in these venues were working the sex trade. Also, college campuses proved to be unsuccessful as there were few "out" trans women living with HIV on college campuses.

Social Media Recruitment

Furthermore, recruitment efforts were expanded beyond street- and venue-based outreach. For instance, staff advertised the project via social media and Facebook advertising. Additionally, a print media ad in the magazine Adelante was run during June, which is Trans Pride month in Los Angeles. However, because face-to-face interactions were so important for building trust and rapport among the participants, it was discovered that online and website recruitment were less successful mechanisms for reaching young trans women.

Mobile Phone Access

A major barrier regarding to retention was the inability to consistently deliver the intervention in its entirety due to interruptions in participants' cell phone service, usually due to

lack of funds or lack of phone (due to loss, theft, or sale). To help address the challenge of interruptions in cell phone access, participants were provided with referrals to obtain a free government phone, for which many of our participants qualified, and were given the option to receive the text messages via an email account rather than via a cell phone. Since most of the cell phone programs require a state identification card to apply and many of our participants did not have a state issued ID, project staff provided a reduced or no-fee ID application, for those who qualified. Additionally, for those participants who changed their phone number or asked to change from one method of delivery to another (i.e., from cell phone to email or vice versa), the technology company, Qualtrics, allowed project staff to update participant contact information an unlimited number of times.

Incarceration

Another barrier to retention was the high rate of short- and/or long-term incarceration experienced by the participants. While incarcerated, it was not possible for participants to receive text messages via their cell phones. However, since participants were able to opt to receive the intervention via e-mail instead of a text message, there was more flexibility to engage with the messages, allowing participants to view the messages at their convenience, and without the need of a cell phone.

Mobile Phone or Email Options

An unanticipated challenge related to retention, which resulted in two withdrawals, both participants cited the reason for their withdrawal was a direct result of their boyfriend having access to their cell phones. Whether fear of disclosing HIV status, trans identity, or other reasons, it is important that participants are offered methods of receiving the messages that ensure their safety and wellbeing (i.e., email rather than cell phone).

MONITORING AND EVALUATION

Aims for Local Evaluation

The overarching goal of *Text Me, Girl!* was to develop and implement a text-messaging intervention that would result in improved health outcomes impacting the HIV Care Continuum for young trans women living with HIV aged 18-34.

Trans-Specific Assessment Measures

However, it was also critical to understand the impact of structural- and individual-level trans-specific factors that could be moderators of intervention outcomes. Therefore, the project adopted the *Los Angeles Transgender Health Survey*, originally developed in 1997 by Dr. Cathy Reback, the Principal Investigator, and colleagues as part of their local evaluation. Specific domains from the *Los Angeles Transgender Health Survey* that were utilized in the local evaluation included legal history; substance use; trans-specific health care including gender confirmation procedures; sexual risk behaviors by partner type, by partner's HIV status, and by pre/post gender confirmation surgeries; psychological and legal issues; gender identity verification; sexually transmitted infections; and, HIV self-efficacy.

Outcome Indicators

The primary outcomes measured as part of *Text Me, Girl!* included linkage to HIV primary care, the prescribing of ART medication, retention in HIV primary care, adherence to ART medication, and the reduction in viral load, including the achievement and sustainment of full viral suppression. Details on the assessment of these outcomes can be found in Table 5. All assessments were administered either onsite or in a location of the participant's choice (e.g., their

home, coffee shop, public library) at baseline, 3-months, 6-months, 12-months, and 18-months post-baseline.

Monitoring Progress

Progress was monitored by the Research Coordinator/Evaluator on a daily basis, and consolidated into a Weekly Progress Report. The Weekly Progress Report was distributed to all project staff on a weekly basis, and included up-to-date information on progress made toward project goals and objectives including inquiries, enrollments, active participants, and evaluation-related milestones (i.e., follow-up assessments).

Participants for Local Evaluation

The project enrolled 130 young trans women living with HIV. Information on inclusion criteria can be found in the "Target Audience/Target Population" section. While participants were randomized into either the immediate intervention or the delayed intervention, all participants were contacted to complete assessments at baseline, 3-, 6-, 12-, and 18-months post-baseline. Assessments were not given to young trans women who were not enrolled in *Text Me, Girl!*

Methods for Local Evaluation

For the local evaluation, the randomized controlled design used repeated assessments at baseline, and at 3-, 6-, 12-, and 18-months. A common concern of behavioral interventions is that benefits gained during the intervention erode rapidly at the completion of the intervention period. Therefore, the first follow-up evaluation was scheduled immediately upon intervention completion, at 3-months post-enrollment, and participants continued to be followed every six months beginning at 6-months post-enrollment in order to capture potential erosion effects. The main analyses for the project utilized an "intent-to-treat" approach to evaluate the short-,

intermediate-, and long-term effects of the text-messaging intervention for increasing linkage to and retention in HIV care, ART adherence, and virological suppression.

The local evaluation consisted of a survey delivered via ACASI (computer assisted self-interview), which took approximately 30 minutes to complete. Although it was not possible to track whether or not participants read individual text messages, the messaging service provider, Qualtrics, was able to verify delivery of text messages. To assess participant intervention engagement, the Research Assistants sent a text message once a month asking, "How many text messages did you read in the last 30 days," with a response on a Likert scale of "All" to "None." This question was also asked in the first follow-up assessment after the text-messaging intervention, which was the 3-month assessment for immediate and the 6-month assessment for delayed.

To track process/progress indicators such as follow-up evaluations, the data manager developed a proprietary electronic tracking and monitoring tool called the ePSR (electronic-Participant Status Report), which was an Excel spreadsheet that includes information on each participant's progress through the study. Upon enrollment, each participant was entered into the ePSR and their follow-up due dates auto-populated using a prewritten formula. Additional electronic files were created to track and monitor the intervention exposure text messages (including when participants were due to receive messages, whether the participant responded to the intervention exposure text messages, and recorded the response), as well as the participant-incentivized recruitment (including who recruited whom, whether the potential participant enrolled, and the incentive given).

Intervention Exposure Measurement

Evaluating a unidirectional text-messaging intervention can be difficult because there is no direct way to assess intervention exposure. At the time that *Text Me, Girl!* was implemented, the technology company was unable to verify receipt of messages or if messages were read. Therefore, the monthly intervention exposure text was created and implemented and, thus, the project relied upon participants to self-report the frequency at which they read the text messages.

Evaluation Results

From November 18, 2016 through May 31, 2018, 130 participants enrolled in *Text Me, Girl!* Participants self-identified their race/ethnicity as 43% Hispanic/Latin, 40% African American/Black, 12% Caucasian/White, and 5% multiracial/other race. The age range was 19 through 34 years, with a mean age of 29.5 (SD=3.8) years. Forty-one percent reported less than a high school diploma/GED, and 44% reported housing instability in the previous 6 months.

At baseline, 22% of the participants had never been in HIV care and, among those who had previously been in HIV care, 16% had dropped out. Furthermore, at baseline, 51% of the participants had not initiated ART and, of those who did initiate ART, 95% reported suboptimal medication adherence. At baseline 62% of the participants reported recent (i.e., past 6 months) attendance to a HIV care visit; this rate was sustained through 6-month (68%), 12-month (72%), and 18-month (59%) follow-up evaluations. Additionally, ART initiation increased from 49% at baseline, to 67% at 6-month follow-up, 74% at 12-month follow-up, and 77% at 18-month follow-up evaluation. This was accompanied by significant increases in self-reported “excellent” ART medication adherence, which increased from 5% at baseline, to 33% at 6-months, and to 44% at 18-month follow-up evaluation. Finally, only 35% of the participants reported virological suppression at baseline, 50% of the participants reported virological suppression at 6-month follow-up, and this rate was sustained through 12-month (49%) and 18-month (51%) follow-up

evaluations (all changes over time $p < 0.05$). Intervention exposure assessments carried out 3- and 6-months post-enrollment (n = 105) indicated that 72% of participants read at least some of the theory-based text messages they received, and 30% reported reading all of the text messages.

Multivariate regression of HIV care continuum outcomes on participant sociodemographics indicate that each level of increased exposure to the *Text Me Girl!* intervention was associated with an estimated 15%-60% increase in the odds of retention in HIV care (adjusted odds ratio [aOR] = 1.36; 95% Confidence Interval [CI] = 1.15-1.60), an estimated 27%-79% increase in the odds self-reported viral suppression (aOR = 1.51; 95% CI = 1.27-1.79), and a corresponding 34%-141% estimated increase in the odds biomarker-confirmed viral suppression (aOR = 1.80; 95% CI = 1.34-2.41) at a given time point. Furthermore, at the 18-month follow-up evaluation, retention in *Text Me Girl!* was associated with an estimated 265% increase in the odds being currently on ART (aOR = 3.65; 95% CI = 2.00 – 6.65), with an estimated 722% increase in the odds of reporting "excellent" ART adherence (aOR = 8.22; 95% CI = 4.18 – 16.18), with an estimated 158% increase in the odds of self-reported virological suppression (aOR = 2.58; 95% CI = 1.34 – 4.98), and with an estimated 19% increase in the estimated odds of biomarker confirmed viral suppression (aOR = 1.19; 95% CI = 1.04 – 1.35).

Conclusions

Exposure to unidirectional, theory-based text messaging was associated with increased advancement along the HIV Care Continuum among this sample of young adult trans women living with HIV. Despite experiencing several health disparities including low educational attainment, low income, housing instability, substance use, and engagement sex work, participants demonstrated significant increases in ART uptake, significant improvements in ART

adherence, and significant increases in achievement of an undetectable viral load, and these improvements were durable through 18-month follow-up.

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INTERVENTION APPENDIX

Table 1: Text Message Intervention Design by HIV Care Continuum and Theoretical Foundation

Theoretical Foundations	# of HIV Positivity/ Physical and Emotional Health Messages	# of Linkage/ Retention in HIV Care Messages	# of ART Medication Adherence/ Viral Load Suppression Messages	**Total # of Messages per HIV Care Continuum and Theoretical Foundations:**
# of Social Support Theory Messages	30	30	30	90
# of Social Cognitive Theory Messages	30	30	30	90
# of Health Belief Model Messages	30	30	30	90
Total:	90	90	90	270

Table 1 describes the text message intervention design by HIV Care Continuum and theoretical foundation.

Table 2: *Text Me, Girl!* Intervention Typology

Program Summary	**Social Media Intervention Overview**	**Evaluation Summary**
Friends Research Institute (Los Angeles, CA) ***Program Name*:** *Text Me, Girl!* ***Target Population*** **Age**: 18-34 **Gender:** Trans women **Race/Ethnicity**: All **Sexual Orientation** All ***Sample Size*:** 130 ***Language:*** English ***Setting*: C**ommunity research site ***Intervention type*:** Adapted from prior intervention Stand alone Comparison group - Yes ***Inclusion Criteria*** **Unaware of HIV status**: No **Newly Diagnosed**: Yes **Not linked/engaged in care**: Yes **Not retained in care/Out of care**: Yes **Not adherent to HIV medication**: Yes **Not virally suppressed**: Yes	***Technology Platforms*** **Facebook**: Yes **Mobile App**: No **Social Media**: Yes – Twitter, Instagram, YouTube **Social Networking Sites/Apps**: Yes **Text Messaging**: Yes, automated **Website**: No ***Functions*** **Communication**: Yes (unidirectional, automated) **Education**: Yes (automated) **Gaming**: No **Information**: Yes (automated) **Reminders** **general** (other than HIV care): No **medical appointments**: Yes (no specific day/time) **medication adherence**: Yes (no specific day/time) **Self-monitoring / tracking**: No **Skills building**: Yes **Social support/networking**: Yes	***HIV Health Outcome Measures*** **Increase HIV testing/ Positivity rate/ HIV awareness**: No **Improve linkage/engagement in care**: Yes **Improve retention in care**: Yes **Improve medication adherence**: Yes **Improve viral suppression**: Yes **Improve utilization of support services**: Yes **Improve health literacy**: Yes ***Other Ryan White Part Funding*** No

Table 2 provides information on the intervention typology for *Text Me, Girl!* including the program summary, social media overview, evaluation summary.

Table 3: Year 1 Goal, Objectives, and Activities

Goal 1: To conduct formative evaluation to develop a text messaging intervention that will result in improved health outcomes impacting the HIV Care Continuum for HIV-positive young trans women aged 18-34.

Objective	Action Steps Taken
Objective 1.1 By [date], develop protocol and procedures.	***Action Steps:*** Develop protocol and procedures for intervention; train staff, as appropriate (Person(s) responsible: Project Director [PD], Research Coordinator [RC] Principal Investigator [PI])
Objective 1.2 By [date], obtain IRB approval.	***Action Steps:*** Develop human subjects application; submit to IRB(s); revise and resubmit, as needed (Person(s) responsible: PD, PI, Evaluator)
Objective 1.3 By [date], conduct 2 focus groups with a total of 16 trans women (8 HIV-positive trans women aged 35+ to develop the theory-based trans-specific text messages.	***Action Steps:*** Develop focus group questions; schedule and conduct focus groups; analyze focus group data; synthesize focus group information into intervention components (Person(s) responsible: PD, PI, Evaluator)
Objective 1.4 By [date], conduct 2 Community Advisory Board (CAB) meetings to refine the theory-based trans-specific text messages.	***Action Steps:*** Develop CAB agendas; schedule and conduct CAB meetings; synthesize information gathered at CAB into intervention components (Person(s) responsible: PD, PI, Evaluator)
Objective 1.5 By [date], pilot test technology delivery and approach with agency staff.	***Action Steps:*** Designate agency staff to receive text messages and utilize technology delivery; synthesize information given by pilot testers and incorporate into intervention components (Person(s) responsible: PD, PI, Evaluator, Data Manager)
Objective 1.6 By [date] finalize 270 theory-based trans-specific text messages.	***Action Steps:*** Develop 270 theory-based trans-specific text messages; refine through focus groups and CAB meetings; finalize and program text messages into technology platform (Person(s) responsible: PD, PI, Technology Company)
Objective 1.7 By [date], finalize technology delivery and approach.	***Action Steps:*** Develop text messaging platform; once pilot tested, program into final technology delivery and approach (Person(s) responsible: PD, PI, Technology Company)
Objective 1.8 By [date], hire 2 full-time Research Assistants (RAs).	***Action Steps:*** Post positions to recruit RA applicants; hire 2 RAs; train RAs in core HIV Care Continuum competencies, intervention, and IRB, HIPAA, etc. (Person(s) responsible: PD, PI)

Illustration 1: Recruitment Flyer