A pilot study of daily SMS surveys of sexual behavior and PrEP use among Kenyan HIV discordant couples

Kathryn Curran\textsuperscript{1}, Nelly Mugo\textsuperscript{2}, Ann Kurth\textsuperscript{3}, Kenneth Ngure\textsuperscript{2}, Renee Heffron\textsuperscript{1}, Connie Celum\textsuperscript{1}, Jared Baeten\textsuperscript{1}

\textsuperscript{1}University of Washington, \textsuperscript{2}Kenyatta National Hospital, \textsuperscript{3}New York University
Background: Pre-exposure prophylaxis (PrEP)

- Daily oral PrEP significantly reduces HIV infection\(^1-3\)
- Adherence is critical for efficacy\(^4-7\)
- Relationship between PrEP use and sex

\(^1\)Grant 2010, \(^2\)Baeten 2012, \(^3\)Thigpen 2011, \(^4\)Haberer 2011, \(^5\)Donnell 2012, \(^6\)Bangsberg 2012, \(^7\)Van Damme 2012
Background: mHealth in Africa

- Mobile phones are common in Africa
- Mobile technology for health in Africa
  - SMS reminders for ART adherence $^{1,2}$
  - SMS to collect health data from patients$^{3,4}$

$^1$Lester 2010, $^2$Pop-Eleches 2011, $^3$Haberer 2010, $^4$Mark 2010
Research Objective

- To use daily SMS surveys to measure sexual behavior and PrEP use in “real time”
Context: The Partners PrEP Study

- Randomized controlled trial of PrEP among 4758 HIV serodiscordant couples in 9 sites in Kenya & Uganda
- Pilot of SMS Survey at Thika, Kenya site
- Data collected December 2011 - April 2012
Methods: SMS Survey

- Eligibility criteria:
  - HIV-uninfected & taking PrEP
  - Literate
  - Owned a mobile phone
  - Knew how to send and receive SMS
  - Regular access to electrical outlet
  - High response rate (≥5 daily surveys completed) during week 1
- Completed practice survey at enrollment
- Automated daily SMS surveys for 60 days
- Compensated with “airtime” 2x week
  - 50 KSH/completed survey (≈ $0.50)
  - 5 KSH/SMS
Survey Questions

- **Daily questions:**
  1. What is your secret password?
  2. Did you have sex yesterday?
  3. Did you or your partner use a condom when you had sex?
  4. Do you think you will have sex tomorrow?
  5. Did you remember to take your study pill yesterday?

- **Please respond**
  - 1: yes,
  - 2: no,
  - 3: I choose not to respond.
Flow of Enrollment

206 approached

- 17 declined
- 79 ineligible
  - 4 illiterate
  - 28 no phone / shares phone
  - 42 didn’t know how to send SMS
  - 5 no access to electrical outlet

110 enrolled

- 14 failed during week 1 run-in

96 followed for 60 days

Respond to <5 of 7 surveys
## Participant Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N (%) or Median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>72 (75.0%)</td>
</tr>
<tr>
<td>Age</td>
<td>33 (31 – 37)</td>
</tr>
<tr>
<td>Married</td>
<td>93 (96.9%)</td>
</tr>
<tr>
<td># children with study partner</td>
<td>1 (0-2)</td>
</tr>
<tr>
<td># years in school</td>
<td>11 (8-12)</td>
</tr>
<tr>
<td>Earning any income</td>
<td>90 (93.8%)</td>
</tr>
<tr>
<td>Have electricity at home</td>
<td>46 (48.9%)</td>
</tr>
<tr>
<td>Time in Partners PrEP Study (years)</td>
<td>2.1 (1.7-2.4)</td>
</tr>
</tbody>
</table>
SMS Survey Response Rates

96 participants * 60 days = 5760 surveys planned

5,485 surveys distributed

398 surveys not answered

5,087 surveys answered (92.7% of surveys distributed)
Distribution of Total # of Unanswered Surveys per Participant

median (IQR) of total # uncompleted surveys = 2 (1-5)
## Sexual Behavior

<table>
<thead>
<tr>
<th>Category</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days sex reported</td>
<td>1,692/5,087 (33.3%)</td>
</tr>
<tr>
<td>Days unprotected sex reported</td>
<td>248/5,087 (4.9%)</td>
</tr>
<tr>
<td>Participants ever reported unprotected sex</td>
<td>45/96 (46.9%)</td>
</tr>
</tbody>
</table>
## PrEP Adherence

<table>
<thead>
<tr>
<th>Description</th>
<th>N (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days reported missed PrEP dose</td>
<td>216/5,087 (4.3%)</td>
</tr>
<tr>
<td>Participants ever reported missed PrEP dose</td>
<td>68/96 (70.8%)</td>
</tr>
<tr>
<td>Participants reported taking PrEP ≥ 80% of days</td>
<td>88/96 (91.7%)</td>
</tr>
</tbody>
</table>
Proportion reporting taking PrEP by time in study (days)

Did you remember to take your study drug yesterday?

- Yes
- No
- Choose not to respond
Preliminary Results: Exit Survey

Out of 87 (of 96) completed exit surveys:

- **97%** described study as *very or somewhat easy*
- **78%** preferred to answer questions by *SMS*
- **97%** reported *willing* for another *SMS survey*
- **11%** reported *SMS read by someone else*

- Survey reminded to take PrEP & use condoms
Implementation Challenges & Study Limitations

- Manual reimbursement of airtime

- Lost phones

- Mid-study block on surveys to one phone provider
  - Provider stopped delivery of all bulk SMS from outside Kenya

- Small, selective population limits generalizability
  - Clinical trial, literate, owned phone, high response week 1
Conclusions & Future Analyses

- SMS data collection of sensitive health information is feasible, acceptable, and for many preferable
  - Incentives & airtime reimbursement are critical
  - Privacy & frequency may improve accuracy
  - May save time & money

- Self-reported PrEP adherence was high
- Self-reported unprotected sex was infrequent, but common

Future analyses:
- Correlation of PrEP adherence & sex
- Correlation of anticipated & actual sex
- Comparison of daily SMS data to monthly clinic data
Acknowledgments

- Study participants
- Partners PrEP Study Team
- Technology partner, Dimagi
- Funding:
  - National Institutes of Health R21 NR012663 & D43 TW000007
  - Bill & Melinda Gates Foundation