



Daily short message service surveys detect greater HIV risk behavior than monthly clinic questionnaires in Kenya

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Disclosures

I have no conflicts of interest to report.



New Technology for Health

- Mobile phones are common in Africa
- In Kenya:
 - 26 million own mobile phones (pop. \approx 41 mil) ¹
 - 18 million use phones for banking, business, paying bills ¹



New Technology for Health

- Mobile technology for health in Africa
 - SMS reminders for ART adherence ^{1,2}
 - SMS to collect health data from patients^{3,4}
- Short message service (SMS, i.e. text message) may reduce measurement bias
 - Recall & social desirability bias



Study Aim

Objective: To compare PrEP adherence & sexual behavior data collected through daily SMS surveys to monthly interviewer-administered questionnaires

Hypothesis: Daily SMS surveys reduce recall & social desirability biases & yield greater reports of unprotected sex missed PrEP doses



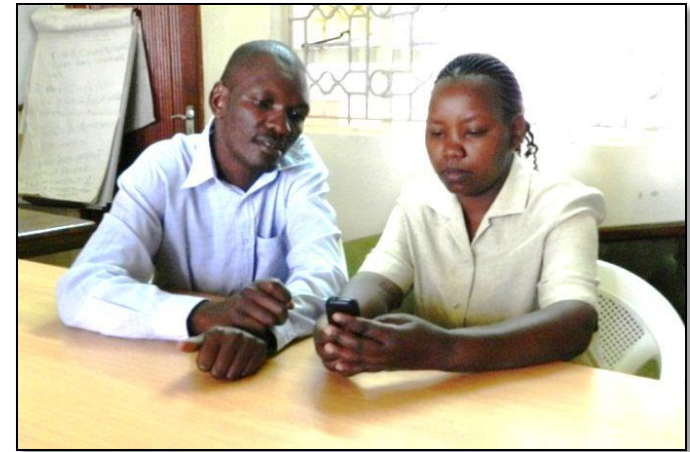
Context: The Partners PrEP Study

- Randomized controlled trial of PrEP among 4,758 HIV serodiscordant couples in 9 sites in Kenya & Uganda
- SMS Survey at Thika, Kenya site
- December 2011-April 2012, when PrEP known to be efficacious



Context: Daily SMS Surveys

- Eligibility criteria:
 - HIV-uninfected & taking PrEP
 - Literate
 - Owned a mobile phone
 - Knew how to send & receive SMS
 - Regular access to electrical outlet
 - High response rate (≥ 5 daily surveys) during week 1
- Automated daily SMS surveys for 60 days
- Compensated with “airtime” 2x week



Context: Daily SMS Surveys¹

- SMS data collection of sensitive health information is feasible & acceptable
 - High response rates (>90%)
- Self-reported PrEP adherence was high
 - Sexual activity a strong predictor
 - Not associated with unprotected sex
- Self-reported unprotected sex was infrequent, but common (~50% ever)
- Difficulty predicting sex



Daily SMS Survey

Monthly Clinic Questionnaire

Sex

Did you have sex yesterday?

In the past month, how many times did you have sexual intercourse with your study partner? with someone other than your study partner?

Condom use

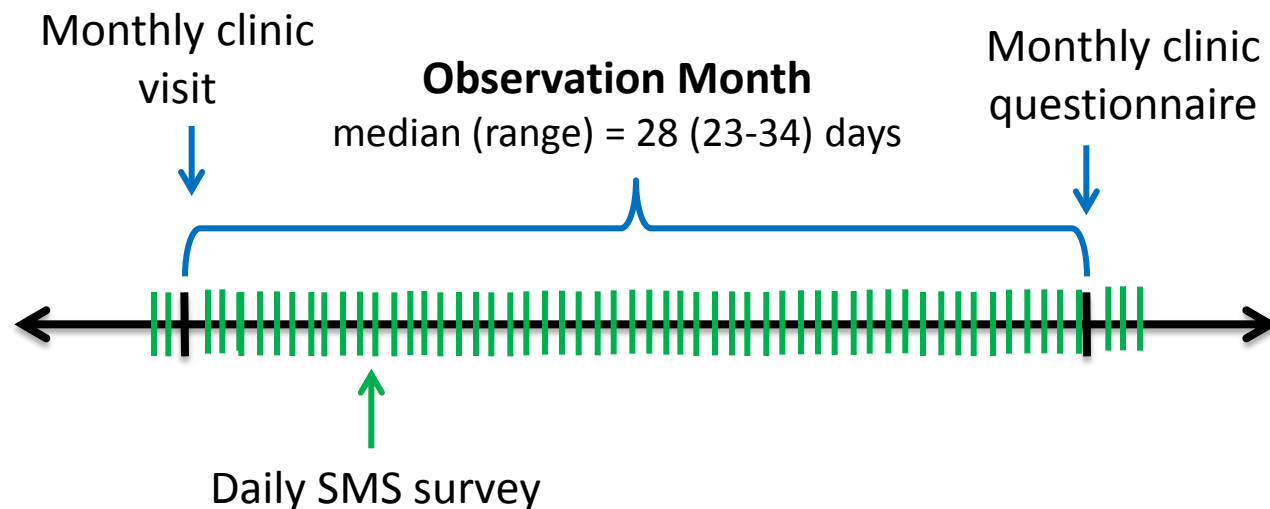
Did you or your partner use a condom when you had sex?

How many times was a condom used? (# with study partner + # with another partner)

PrEP use

Did you remember to take your study pill yesterday?

In the past month, how many days did you take neither of the study tablets?



Statistical Methods

- *To compare reports for any missed PrEP, any sex & any unprotected sex:*
 - Percent agreement
 - McNemar's χ^2
- *To compare reports for number of missed PrEP doses, sex acts & unprotected sex:*
 - Concordance correlation coefficients
 - Generalized linear latent and mixed models to calculate incidence rate ratios for count outcomes

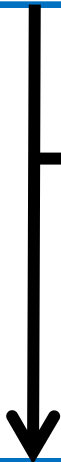


SMS Study Participants Included in Comparison Analysis

94 participants had > 1 monthly clinic visit during SMS survey enrollment



179 monthly clinic visits during enrollment in SMS study



34 monthly clinic visits excluded:

- 8 had <21 days or >35 days between clinic visits
- 26 had <21 SMS surveys completed between clinic visits

145 monthly clinic visits among 85 participants included for comparison to SMS survey data



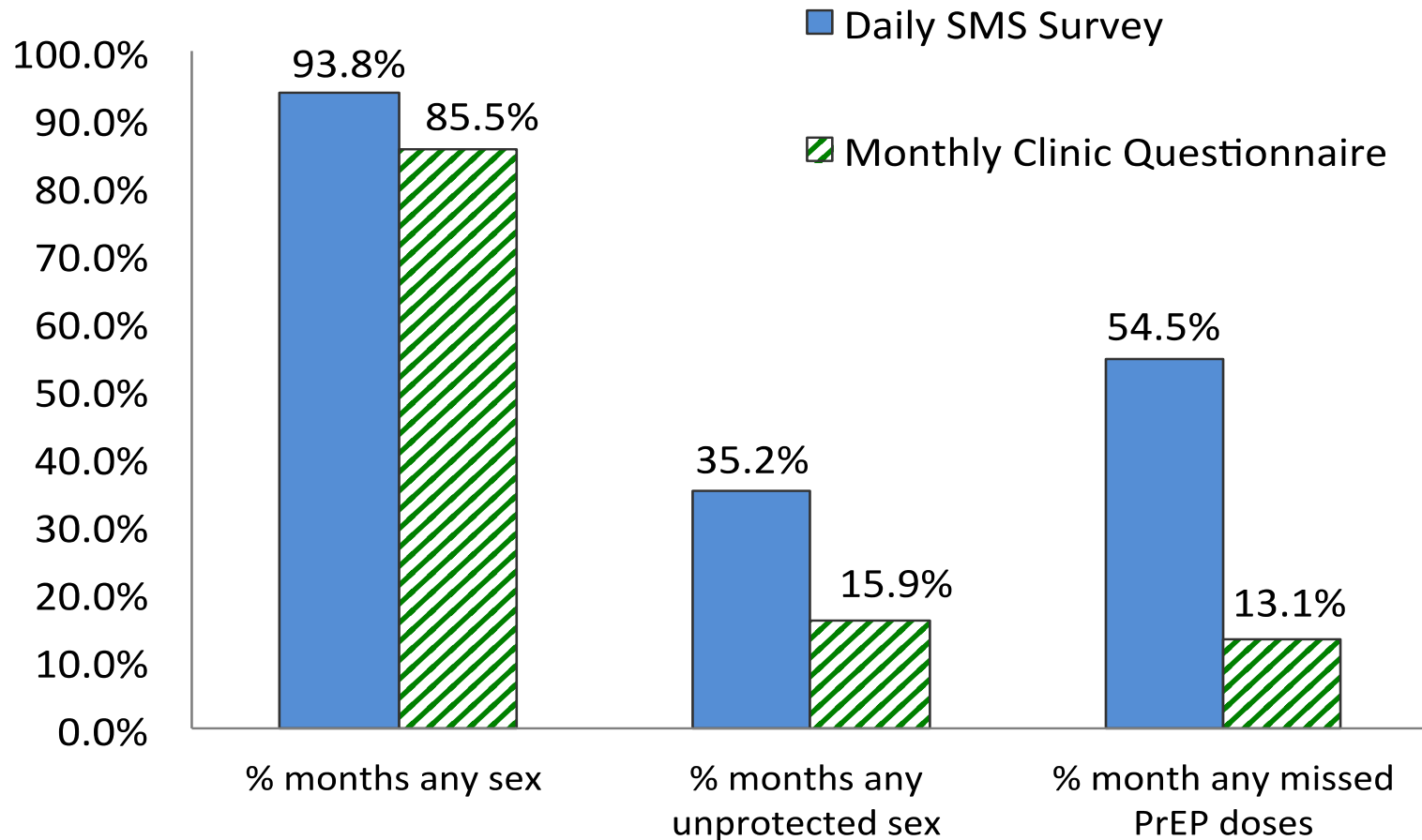
Participant Characteristics (N=85)

	N (%) or Median (IQR)
Male	65 (76.5%)
Age, years	33 (31-37)
Married	82 (96.5%)
More than one wife*	7 (8.2%)
Living with study partner	81 (95.3%)
Number of children with study partner	1 (0-2)
Number of years in school	11 (8-12)
Earning any income	80 (94.1%)
Running water in the home	39 (44.9%)
Time spent in Partners PrEP Study, years	2.2 (1.7-2.4)
Weekly alcohol use reported at Partners PrEP Study enrollment	21 (24.7%)
HIV-infected study partner on antiretroviral therapy**	26 (30.6%)
Reported sex with someone other than study partner, past month**	7 (8.2%)

*Reported through interviewer-administered questionnaire at clinic visit prior to enrollment in SMS survey.



Frequency of Reporting Any Sex, Any Unprotected Sex & Any Missed PrEP, by Survey Method (n=145)



All significantly greater over daily SMS, according to McNemar's χ^2 test statistic at $P < 0.01$



Comparison of Daily SMS Surveys & Monthly Questionnaires (n=145)

	Daily SMS Median (Range)	Monthly Questionnaire Median (Range)	Incidence Rate Ratio (95% CI)	P	Concordance Correlation Coefficient
Number of sex acts	9 (0-32)	5 (0-22)	1.5 (1.3-1.7)	<0.00 1	0.5
Number of unprotected sex acts	0 (0-14)	0 (0-21)	1.2 (0.8-1.8)	0.4	0.6
Number of missed PrEP doses	1 (0-7)	0 (0-5)	5.1 (3.0-8.5)	<0.00 1	0.10

Study Limitations

- Small, selected population limits generalizability
 - Clinical trial, literate, owned phone, high response during week 1
- Survey questions serve as reminders for condom use & adherence
- Accuracy of self-reported behaviors unknown



Key Findings

- Sex, unprotected sex, & missed PrEP doses reported on more days through daily SMS surveys
 - 24% of observations-months had reports of unprotected sex & 45% had any missed PrEP by SMS but not by monthly questionnaire
 - Most likely reflects under-reporting on monthly questionnaires
- Both methods: majority report perfect PrEP adherence or small number of missed PrEP doses
- Daily SMS surveys may capture more frequent reports of HIV risk behavior, greater accuracy



Summary & Implications

- SMS may offer new method for measuring behaviors related to HIV risk & adherence
 - Privacy, reduced recall period
 - Greater reporting of HIV risk behaviors & non-adherence
 - Examine patterns of risk and pill-taking
 - Capture behaviors in real-time to enable response
- Large-scale daily SMS survey of PrEP adherence & sexual behavior in Partners Demonstration Project in Kenya & Uganda
 - 1 week before, 1 week after quarterly clinic visits
- Consider research question, timing, literacy, & cost



Acknowledgments

- Partners PrEP Study team
- Study participants
- Dimagi
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 - Bill & Melinda Gates Foundation

Tuesday, 10:15am: Session 12, Oral Abstract 317, Jessica Haberer
Adherence to PrEP in the Partners Demonstration Project



Thank you!



Survey Questions

•Daily questions:

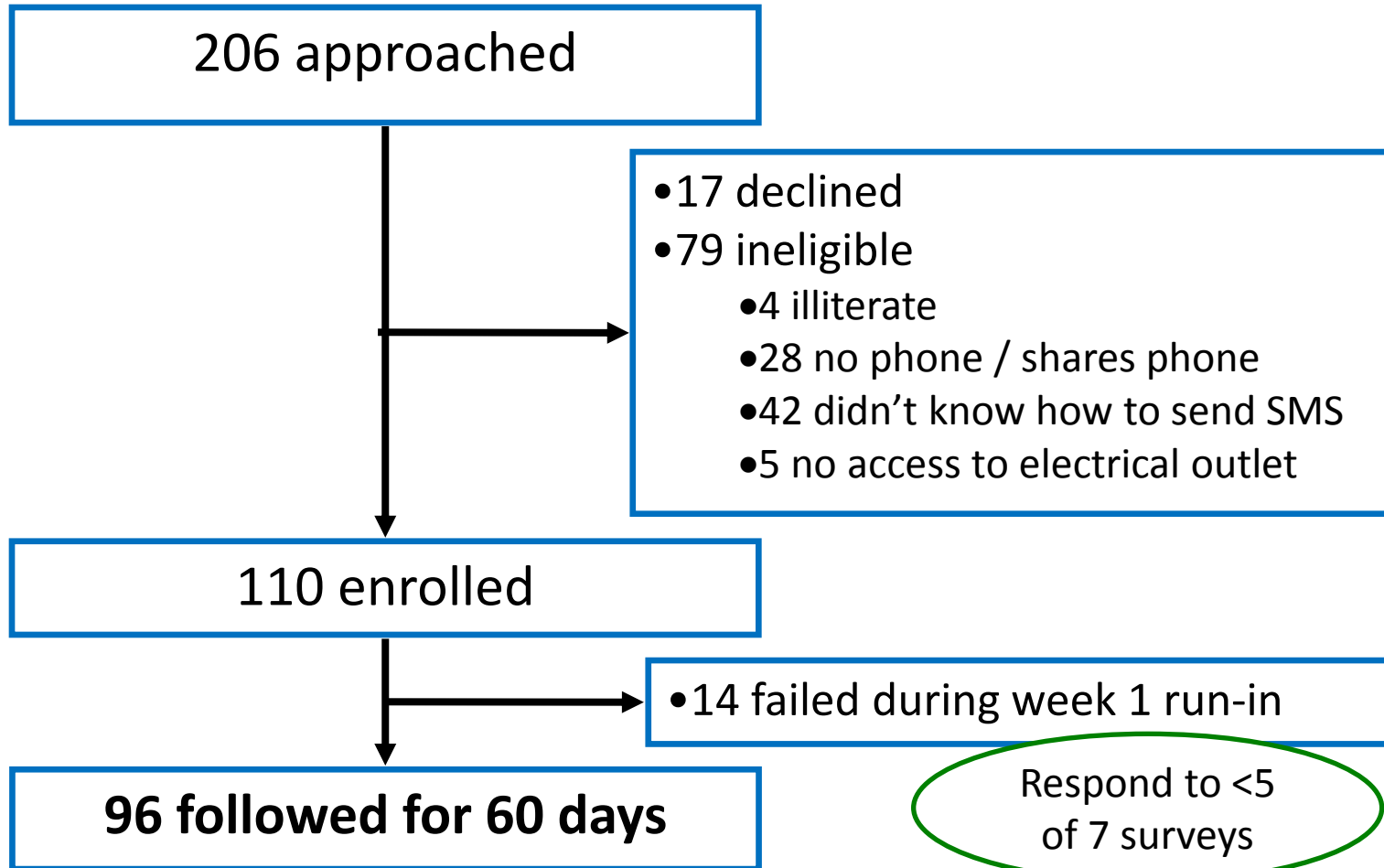
1. What is your secret password?
2. Did you have sex yesterday?
3. Did you or your partner use a condom when you had sex?
4. Do you think you will have sex tomorrow?
5. Did you remember to take your study pill yesterday?

Please respond

- *1: yes,*
- *2: no,*
- *3: I choose not to respond.*



Flow of Enrollment



Participant Characteristics (N=96)

	N (%) or Median (IQR)
Male	72 (75.0%)
Age, years	33.3 (30.9 – 37.3)
Married	93 (96.9%)
Living with study partner	91 (94.8%)
Number of children with study partner	1 (0-2)
Number of years in school	11 (8-12)
Electricity available in the home	46 (48.9%)
Time spent in Partners PrEP Study, years	2.1 (1.7-2.4)
HIV-infected study partner on antiretroviral therapy*	29 (30.2%)
Number of sex acts, prior month*	4 (2-8)
Any unprotected sex with study partner, prior month*	8 (8.3%)
Any sex with other partners, prior month*	7 (7.3%)
Any unprotected sex with any sexual partner, prior month*	13 (13.5%)

*Reported through interviewer-administered questionnaire at clinic visit prior to enrollment in SMS survey.



SMS Survey Response Rates

96 participants * 60 days = 5,760 surveys planned



5,412 surveys distributed



327 surveys not answered

**5,085 surveys answered
(94.0% of surveys distributed)**

