

Online Supplement

Supplemental Methods

Procedures

We did not collect identifying information or reasons for patient visits from general outpatients at the rural clinics.

Interviewers recorded all survey data in electronic databases (CommCare, hosted by Dimagi, Cambridge, MA, USA, and REDCap, hosted by University of California, San Francisco, USA) using mobile tablets and all analyses were performed STATA 12 (StataCorp 2011, College Station, TX, USA).

Study design and population sample

We carried out focus groups and key informant interviews at index patient homes between October and November 2014. We targeted adult household contacts of index patients.

Research team

Research staff with basic training in qualitative methods carried out focus group discussions and interviews in settings familiar to participants. A bachelors-trained social scientist (JG) led focus group discussions and interviews with contacts, with assistance of a note taker. All focus group discussions and in-depth interviews were audio-recorded with participant permission and the research team had the recordings professionally transcribed.

Recruitment

A consecutive sample of households of new adult index TB patients referred by LHWs were visited after verbal consent was obtained from the index patient. To obtain a wide range of perspectives, households were randomly assigned to have data collected before or after contact investigation was conducted. Households were recruited until data saturation was achieved; defined as the point at which each subsequent interview no longer yielded new themes.

Data collection and study instruments

To establish an empirical evidence base and to facilitate data collection on implementation of household contact investigation, separate interview guides for each of the three stakeholder groups were developed (Online Supplement Appendices). Each included six to eight open-ended questions

exploring barriers and facilitators of contact investigation and associations between behavioural determinants and completion of three key TB contact investigation activities identified in conversations with the National TB Program Manager and Zonal TB Supervisor: arranging household visits through index TB patients; visiting households to screen contacts for TB symptoms and TB risk factors and refer them to health centers; and performing clinical assessment and TB diagnostic testing of all at-risk contacts at health centers (Table A.3). Interview and discussion guides were drafted in English, and piloted and refined with a convenience sample of non-participating health workers. A professional interpreter translated the guide for contacts into Luganda, the local language, and these were reviewed by the field research team (all of whom were bilingual) for accuracy; and were piloted and refined. The same guides were used for both the focus groups and interviews. Before each session, the facilitator introduced the research team and explained our objectives. The team took notes and summarized findings for participants at the end of each session. Following data collection, the project manager (IA) and a social scientist (JG) prepared summary reports of all notes. All focus group discussions and in-depth interviews were audio-recorded with participant permission and the research team had the recordings professionally transcribed.

Analysis

Study investigators (AC, LD) debriefed the research team between sessions, and supervised them in categorizing emergent themes. We applied an open coding approach to the responses to the question about preferences for mobile health communications. Two individuals (IA, JG) coded all transcripts using Dedoose, Version 6, (SocioCultural Research Consultants, Manhattan Beach, CA), an online application for collaborative qualitative data analysis. All coding differences were resolved by discussion.

Protection of human subjects

Household contacts recruited during protocol development provided verbal rather than written consent for surveys, interviews, and focus group discussions because we did not collect personal-health identifiers. Contacts recruited during the randomized trial provided written informed consent for surveys, interviews, and focus-group discussions along with other activities which we required collection of personal-health identifiers. We did not record any personal-health identifiers for either study population except participant signatures on consent forms.

Supplemental Results

The 83 households represented 58% of the 143 households with an enrolled index patient. During the enrollment period for the randomized trial, 104 of 1098 (9%) eligible index patients lacked access to a mobile phone. We enrolled 203 of 242 eligible patients at four rural, primary-care clinics. We excluded 39 clinic patients with incomplete data. Phone ownership did not differ significantly by age in the clinic setting: 71% of contacts 45 years or older were phone owners compared to 77% under 45 (difference 6%, 95% CI -9-21, $p=0.44$).

In October and November 2014, we recruited 14 consecutive index TB patients with one or more household contacts; all of whom gave consent for household visits. We recruited 36 contacts (range 1-8 per household); all consented. Sessions lasted 30-60 minutes with contacts. We held one focus group for one household with four contacts present. In all other households, we interviewed contacts one at a time.

Preferences for content of SMS communicating TB-related personal-health information

Two additional quotations explain patient preferences for the detailed message content.

"[The detailed message] tells you exactly why you need to go to the hospital." (Interview 13)

"The important thing is to tell me about the sickness so I can get medication instead of being unclear." (FGD 1)

Appendix S1: Household Contact Survey.

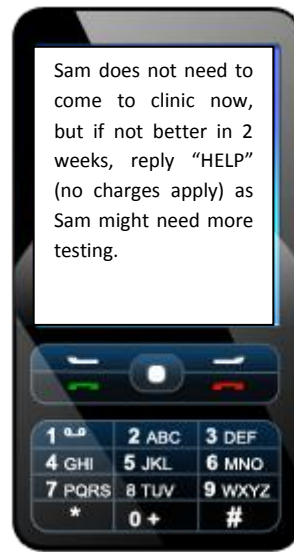
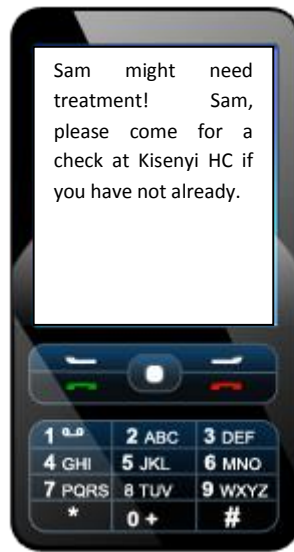
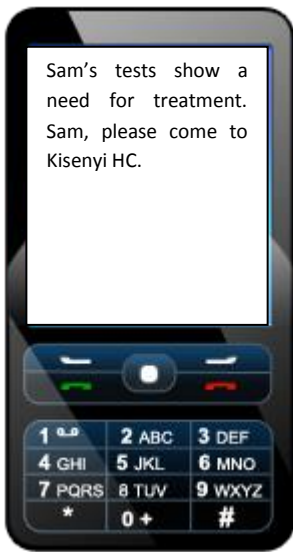
HOUSEHOLD CONTACT SURVEY (HHCS)

1. Date of interview	1. DATE	MONTH	YEAR										
2. What is your age in years?			2.										
3. What is your gender?	Male (0) Female (1)	3.											
4. Would you allow us to scan your fingerprint on an electronic tablet to track your visits to the clinic?	No (0) Yes (1)	4.											
5. Can you read in English?	No (0) Yes (1)	5.											
6. Can you read in Luganda?	No (0) Yes (1)	6.											
7. Can you type using a mobile phone keyboard in English?	No (0) Yes (1)	7.											
8. Can you type using a mobile phone keyboard in Luganda?	No (0) Yes (1)	8.											
9. Do you have your own SIM card? How many SIM cards do you use regularly?	List number of cards: 0, 1, 2 , or >2	9.											
10. Which networks do you use? (list all, may list more than 1)			10.										
a. MTN network?	No (0) Yes (1)	a.											
b. UTL network?	No (0) Yes (1)	b.											
c. Orange network?	No (0) Yes (1)	c.											
d. Warid or Airtel network?	No (0) Yes (1)	d.											
11. Have you ever stopped using a phone number, for any reason? (Skip to next numbered question if No)	No (0) Yes (1)	11.											
a. When was the last time you stopped using a phone number?	List number of months ago	a.											
12. Do you have your own mobile phone?	No (0) Yes (1)	12.											
a. If not, do you have access to a mobile phone on a daily basis through any of your close contacts? (Skip to next numbered question if No)	No (0) Yes (1)	a.											
b. If it is not your phone, whom does it belong to?	<table border="1"> <tr> <td>0 Spouse/Partner</td> <td>5 Friend:</td> </tr> <tr> <td>1 Sibling</td> <td>6 Neighbor</td> </tr> <tr> <td>2 Parent</td> <td>7 Boss / Co-worker</td> </tr> <tr> <td>3 Child</td> <td>8 Shop-owner</td> </tr> <tr> <td>4 Other relative</td> <td>9 Other</td> </tr> </table>	0 Spouse/Partner	5 Friend:	1 Sibling	6 Neighbor	2 Parent	7 Boss / Co-worker	3 Child	8 Shop-owner	4 Other relative	9 Other	b. If 9, specify	
0 Spouse/Partner	5 Friend:												
1 Sibling	6 Neighbor												
2 Parent	7 Boss / Co-worker												
3 Child	8 Shop-owner												
4 Other relative	9 Other												
c. Yesterday, for how many hours was the phone near you, and powered ON?	List number of hours: (0-24)	c.											
IF PARTICIPANT LACKS PHONE AND SIM, STOP SURVEY HERE													
13. Do you know how to receive an SMS?	No (0) Yes (1)	13.											
14. Do you know how to send an SMS?	No (0) Yes (1)	14.											
15. In the past 7 days, on how many days did you send ≥ 1 SMS?	List number of days:(0-7)	15.											
16. Is there any reason you wouldn't receive an SMS if we sent one to you?	<table border="1"> <tr> <td>0 No, I would receive it</td> <td>5 Phone not with me</td> </tr> <tr> <td>1 No phone / No SIM</td> <td>6 Don't know how</td> </tr> <tr> <td>2 Phone not on</td> <td>7 Poor reception</td> </tr> <tr> <td>3 Phone not charged</td> <td>8 Phone not working</td> </tr> <tr> <td>4 SIM not in phone</td> <td>9 Other</td> </tr> </table>	0 No, I would receive it	5 Phone not with me	1 No phone / No SIM	6 Don't know how	2 Phone not on	7 Poor reception	3 Phone not charged	8 Phone not working	4 SIM not in phone	9 Other	16. Mark any Y If 9, please specify	
0 No, I would receive it	5 Phone not with me												
1 No phone / No SIM	6 Don't know how												
2 Phone not on	7 Poor reception												
3 Phone not charged	8 Phone not working												
4 SIM not in phone	9 Other												
17. Would it ever take ≥ 1 day for you to check for an SMS? How many days?	List 0 or number of days	17.											
18. In the last 7 days, on how many days did you make or receive ≥ 1 phone call?	List number of days:(0-7)	18.											
19. Have you ever received a mobile money payment (e.g. MTN Money, Airtel Money, Warid Pesa)?	No (0) Yes (1)	19.											

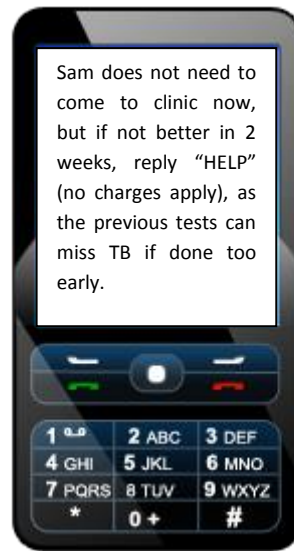
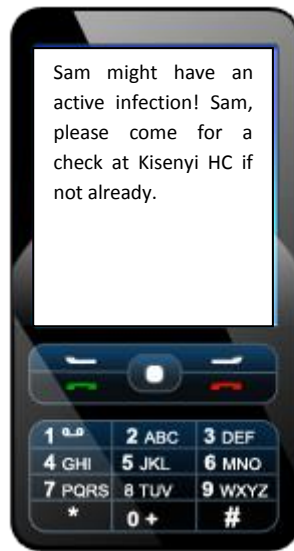
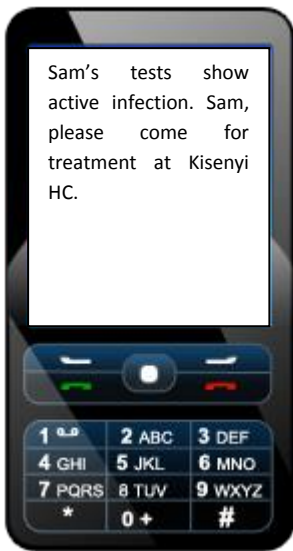
20. Would you be willing to receive <u>any of the following</u> on the phone you use?	No (0) Yes (1)	20.
a. Laboratory test results by SMS?	No (0) Yes (1)	a.
b. A new request to come to clinic by SMS?	No (0) Yes (1)	b.
c. A reminder to come to clinic by SMS?	No (0) Yes (1)	c.
d. A reminder to take your medicine by SMS?	No (0) Yes (1)	d.
21. In which language would you prefer to receive SMS like these?	Neither (0) English (1), Luganda(2), Other (9)	21. <small>If 9, please specify</small>
22. To how many of your SIM cards should the SMS be sent?	List number of SIM cards	22.
23. At which time of day would you prefer to receive an SMS? Use 24-hour clock, with 0 hrs for midnight & 23 hrs for 1 hour before midnight.	Enter hour of the day: (0-23) or Anytime (99)	23.
24. Would you be willing to receive <u>any of the following</u> on the phone you use?	No (0) Yes (1)	24.
a. Laboratory test results by a recorded voice call?	No (0) Yes (1)	a.
b. A new request to come to clinic by a recorded voice call?	No (0) Yes (1)	b.
c. A reminder to come to clinic by a recorded voice call?	No (0) Yes (1)	c.
d. A reminder to take your medicine by a recorded voice call?	No (0) Yes (1)	d.
25. In which language would you prefer to receive a recorded voice call like these?	Neither (0) English (1), Luganda(2), Other (9)	25. <small>If 9, please specify</small>
26. To how many of your SIM cards should the recorded voice calls be sent?	List number of SIM cards	26.
27. At which time of day would you prefer to receive a voice message? Use 24-hour clock, with 0 hrs for midnight & 23 hrs for 1 hour before midnight.	Enter hour of the day: (0-23) or Anytime (99)	27.

<p>28. We would like you to tell us which words you prefer for different types of SMS. Below are three examples. Which type of message do you prefer?</p>	<p>Simple (0) More information (1) Detailed (2) Cannot read (3)</p>	<p>28.</p>
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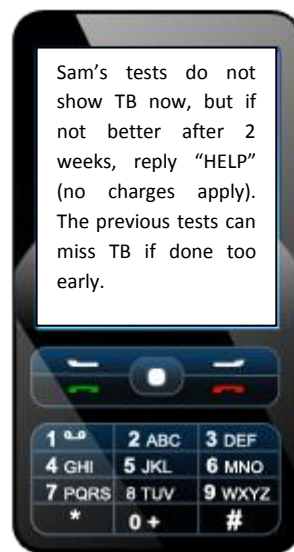
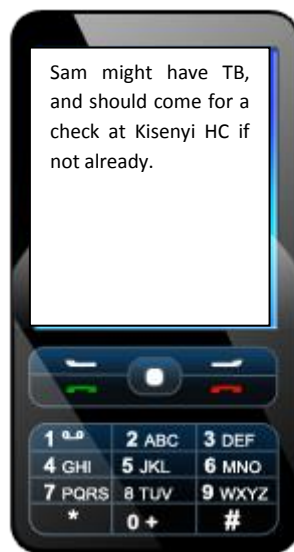
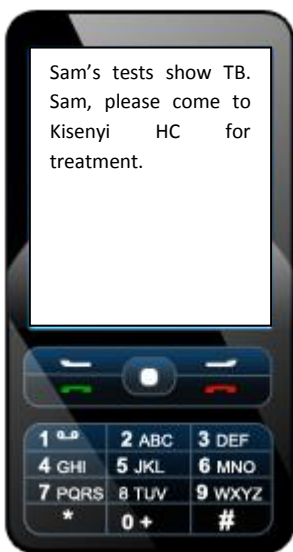
A *simple* message without details:



Slightly *more information*:



A *detailed* message:



UGANDA TB SURVEILLANCE PROJECT

Clinic-based Patient Survey

INTRODUCTION: Thank you for accepting to take part in this short survey. This survey is part of an on-going SIMPLE-TB study at this facility which is aimed at determining the feasibility and cost effectiveness of the single-sample streamlined TB diagnosis and treatment. To streamline diagnosis and testing, the study is aimed at improving the speed of microscopy testing and daily referral of sputum samples for GeneXpert testing. Ultimately, we hope to link patients to treatment by utilizing the text messaging service. The purpose of this survey is to try and establish whether patients would be willing to share their mobile phone numbers with Health workers to facilitate communication between the patients and health-care providers concerning their health care.

DEMOGRAPHIC INFORMATION

Age: in completed years

Gender: Male Female

Marital status: Single Married/Cohabiting Divorced/Separated Widow/Widower
 Unknown

Level of Education: None Primary level Secondary level Tertiary level
 University Unknown

Date of Interview	dd	mm	yy	
		NO (0)	Yes (1)	Unknown (9)
1) Do you own a mobile phone? <i>(If yes, skip to question 2)</i>				
1b) If No above, do you have access to a mobile phone? <i>(if No skip to question 23)</i>				
1c) If yes above, what is your relationship with the person whose phone you have access too? <input type="checkbox"/> Spouse <input type="checkbox"/> Family member <input type="checkbox"/> Friend <input type="checkbox"/> Other, Specify				
2) Can you retrieve a text message from a phone?				
3) Can you read SMS text messages sent to your phone?				
4) Can you send SMS text messages to others?				
5) Are you on any list that blocks SMS messages sent to your phone?				
6) If asked to give a telephone number when you visit the health center, would you be comfortable providing one?				

6a) If No in (6) above, give reasons why			
7) Would you be willing to receive your test results via SMS text message on your phone?			
7a) If No in (7) above, give reasons			
7b) If No in (7) above, would you be willing to receive an SMS text message asking you to come back to the health center (i.e., without any specific test results included)?			
8) Would you reply to an SMS message sent from the Health Center?			
9) If No in (8) above give reasons why?			
10) Do you always have network connection at home or work?			
11) Are you able to always keep your phone battery charged?			
12) Do you always keep your phone switched on?			
13) In the past month, how many days have you not been able to receive SMS messages on that phone due to (lack of battery, no access to contact person)			
14) Do you share your mobile phone with anyone?			
14a) If yes, whom do you share it with?			
15) How many text messages do you receive on an average day?			
16) How many of those are from people who are not your personal contacts?			
17) How many text messages do you send on an average day? <i>(Skip if answered No to qn4)</i>			
18) Do you read messages from numbers unknown to you or not in your contact list?			
19) How many SIM cards do you use regularly <i>(list number of SIM cards 0,1,2, >2)</i>			
20) What network company provides your service (i.e. Airtel, Africell, MTN etc. <i>List all that apply if patient has more than one SIM card</i>)			
21) What is your language of preference for receiving SMS text messages? Specify. <i>(Skip if answered No to question 3)</i>			
22) Are you able to receive SMS text messages sent to someone else's phone?			
22a) If Yes, whose phone? (specify relationship):			
22b) If Yes, do you know their mobile number?			

22c) If Yes, would you be comfortable receiving an SMS message with your medical test results on their phone?			
22d) If No to 22c, would you be comfortable receiving an SMS text message to come back to the health center (i.e., without any test results included) on their phone?			
<i>Applies only to those who do not have/cannot access a phone</i>			
23) Have you ever lost a phone or had it damaged			
24) If you had a phone, would you be comfortable providing your telephone number when you visit the health center? If No, give reasons why?			

Thank you for your Participation.

(Front)

Appendix S3. Household Contact Focus Group Discussion / In-depth Interview Guide*

*Questions used in this analysis are placed in bold font below.

Systematic Screening for TB in Households of TB Patients (TB Contact Investigation)

Household Contact Focus Group Discussion / In-depth Interview Guide

The topic for today's discussion is "Systematic Screening for TB in Households of TB Patients." This is when community health workers visit the homes of community members who have a TB patient in their household to see interview them to determine whether others in the household have TB symptoms and might also have TB disease. We are working with the Uganda National TB and Leprosy Programme (NTLP) and with Ministry of Health (MoH) personnel from the Kampala Capital City Authority (KCCA) clinics to evaluate how well this activity is going and to learn how we can improve it using new approaches. The information that you share in this focus group will help us do this.

1. Have any health workers from the Track TB Program recently visited your home to provide information and support for TB care for your household? What happened when they came to your house? [PROCESS 1]
2. What you think the risk of TB is among people living in the same household as a patient diagnosed with active TB? What are the chances that someone who has symptoms of TB also has HIV? [KNOWLEDGE]
3. How easy or difficult was it (or would it have been) for you to go to the clinic to be tested and evaluated for TB, if you had been (or ever were in the future) asked to do so by the community health worker? [OPPORTUNITY, MOTIVATION]
4. What did you think of the care and services that you received (or do you think of the services there in general)? [PROCESS 2]
5. If you needed it, how would you feel about our collecting a sputum specimen from you at home rather than having you come to clinic to give that specimen? [PROCESS 1a] How would you feel about our offering you voluntary HIV counseling and testing in your home? [PROCESS 1b]
6. How would you feel about our recording information from you using an electronic tablet? How would you feel about our scanning your fingerprint to help us track your visits to the clinic? [PROCESS 0]

Now we are going to take a break from the discussion. We are going to ask you a few questions individually about your use of mobile phones. We will then finish the discussion by talking about your answers together.

7. **How would you feel if we sent you an SMS with the results of your sputum examination and advice about the need to come to clinic for additional evaluation or treatment, instead of having you go back to clinic to get this information or having a health worker come to deliver it? Which words do you prefer for the sample SMS included in the survey? [PROCESS 1c]**

That is all the questions we have for you today. Is there anything else that YOU think is important about this topic that we haven't asked about?

Overall, what were your thoughts about the interview?

(Front)

Prompts and Follow-up Questions

This side provide specific prompts and/or follow-up questions to help focus and/or redirect respondents as needed to make sure that they are addressing the issues we are interested in exploring.

1. [PROCESS 1] “Have CHW come to ask about TB at home”
Prompts/Follow-up:
How did you feel /would you feel about having a CHW come into your home to interview you about TB symptoms?
2. [KNOWLEDGE] “Risk of TB in the home”, “Risk of HIV in someone who has symptoms of TB”
Prompts/Follow-up:
Please draw on information you received from the community health worker, and on your general understanding of TB.
3. [OPPORTUNITY, MOTIVATION] “Traveling to the clinic”
Prompts/Follow-up:
 - a. What would have made this easier?
 - b. Difficulties finding time or funds to take transport?
4. [PROCESS 2] “Visiting the clinic”
Prompts/Follow-up:

Is there anything the health workers could have done to make this easier?
5. [PROCESS 1a, PROCESS 1b] “Providing sputum at home”, “HIV Testing at Home”
Prompts/Follow-up:
 - a. What concerns, if any, would you have about the safety of this?
 - b. What concerns, if any, would you have about standing outside your home to do this?
6. [PROCESS 0] “Providing personal-health information and fingerprint scan to tablet”
Prompts/Follow-up:
Would you have any privacy concerns?
7. [PROCESS 1c] “Receiving text messages”
Prompts/Follow-up:
 - a. Show sample SMS content and ask for feedback on wording. Which messages do you prefer?
 - b. Is there anything we could do to address these concerns (e.g. requiring a password to access an SMS?)
 - c. If you are unable to read, how acceptable would it be for someone else to help you read SMS notifications on your phone? Would you have any privacy concerns, for example if the SMS include personal-health details?