

Mobile data collection pilot



LINKAGES Mozambique



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Background and context

Mobile Data Collection (MDC) involves using phones and tablets instead of paper forms for field data collection. With MDC, electronic forms are created and deployed through an app, which allows data collectors to use the form on their phones or tablets to collect data while out in the field. The data may be stored on the device or where connectivity is available, sent to a server where it is analyzed, and sent back to the data collectors in real time.

Linkages across the Continuum of HIV Services for Key Populations Affected by HIV Project (LINKAGES), is a five-year cooperative agreement funded by the United States Agency for International Development (USAID) under the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), and implemented by FHI360 in collaboration with PACT, IntraHealth International, and the University of North Carolina at Chapel Hill. LINKAGES aims to accelerate the ability of governments, organizations working with key populations at risk of HIV, and private-sector providers to plan and implement services that reduce HIV transmission among key populations and their sexual partners and extend the lives of those already living with HIV.

Currently, LINKAGES project partners collect individual-level outreach, testing and referral data using paper-based forms and occasionally unstructured documents (journals, notepads, scraps of paper, etc.). The reliance on paper-based data collection tools and the use of unstructured documents, creates room for errors, and omissions, which makes the data susceptible to compliance risks.

LINKAGES is exploring the use of MDC for collecting individual-level outreach, testing and referral data, which in addition to ensuring accuracy of the data, will facilitate tracking individual KP as he/she progresses through the continuum of prevention, care, and treatment (CoPCT¹) services. The effectiveness of individual level tracking relies on the implementation of a unique identifier code (UIC) system

Unique Identifier Code

Unique identifier codes (UIC) allow KP to be identified by either a set of alpha-numeric codes or other unique property of that individual that can be used to match related records for that individual only. In general, UICs fit into two broad categories, non-biometric and biometric.

The use of UICs may play an important role in the fight to end the AIDS epidemic. Where stigma and discrimination deter members of key populations from seeking care and treatment services, the use of a unique identifier can provide the needed assurance of privacy and confidentiality, while providing valuable individual level data

The electronic peer educator daily diary developed for this pilot integrates a client-generated UIC, which is constructed from, and relies on accurate client responses to specific prompts

¹ HIV continuum of prevention, care, and treatment services

Methodology

The methodology adopted prescribes a phased approach that moves from the current paper-based tools to a “mixed environment” consisting of the use of both paper and electronic tools, and ultimately to using real-time cloud based tools exclusively. For the first phase, electronic data capture tools will not immediately replace the paper-based tools, both will continue to be used interchangeably. The pilot is at phase I

Phase I

The first phase of the MDC pilot involves adaptation of the existing paper-based peer educator daily diary, and HTC form to electronic format for use by peer educators and counselors on mobile phones to collect outreach and testing data. Phase I is limited to Maputo city

An electronic version of the standard paper-based form (Livro de registo de ATSc) used nationally for reporting against HIV testing and counselling was created in Magpi. The electronic version of the “Livro de registo de ATSc” form was developed by Izidro Nhangala and Abel Muiambo² of LINKAGES Mozambique on Friday December 9; the form was deployed to the phones the same day!

The Livro de registo de ATSc was developed and deployed after data collectors had already been trained and dispatched to the field. Training of data collectors was based on the peer educator daily diary, so there was no opportunity to fully test the electronic version of the Livro de registo de ATSc before deploying it for use in the field. However, we feel very confident that the training received by data collectors guarantees a high chance of success

Phase II

The goal of Phase II of the pilot is to track successful referrals of individual KP as he/she progresses through the continuum of prevention, care, and treatment (CoPCT³) services. For this phase, Magpi sub-accounts⁴ will be created for each participating clinical site, and an electronic clinical services form will be accessible through each sub-account. A beneficiary’s unique identifier code is added to the electronic clinical services form for the clinical site to which the beneficiary has been referred. The service or services received by the beneficiary at a participating facility are indicated on the electronic clinical services form, and the form is uploaded to the server.

Phase III

The third and final phase of the MDC pilot involves the exclusive use of cloud-based data collection tools and real-time data. Data de-duplication, analysis and reporting will be performed utilizing the cloud-based system. All partners will have access to the system, real-time data will be available for analysis and generating customized dashboards

² It took Izidro and Abel less than an hour to develop the form!

³ HIV continuum of prevention, care, and treatment services

⁴ A sub-account can be created under an “umbrella” account, which is only available with an enterprise account, please follow this link for detailed information <http://home.magpi.com/new-magpi-umbrella-accounts/>

Timeline

Phase I

Activities	Duration (days)
Preparation	7
Training	2
Field Work	45

Phase II

Activities	Duration (days)
Preparation	5
Training	2
Field Work	30

Phase III

Activities	Duration (days)
Preparation	5
Training	2
Field Work	30

Which platform?

There are a number of mobile data collection applications (or platforms) that support creating and deploying electronic forms. Platforms for the most part integrate basic functionality, such as forms creation, use of skip logic, embedding audio and images, recording GPS coordinates, etc.; however, platforms vary in ease of use, cost, and features.

Two options for a mobile data collection platform were under consideration, CommCare and Magpi. A decision was made to evaluate both platforms in order to determine which one is best suited for the LINKAGES project.

The decision was made to conduct a pilot with Magpi since it offers limited free functionality for individual users, ease of setup, and intuitive form creation. Also, Magpi is unique in the way it combines data collection with the ability to broadcast SMS and audio messaging, which beneficiaries are able to access on their own phones. It further allows for dynamic timing of messaging and messaging schedules to update beneficiaries and data collectors in the field. Another useful feature is text to speech available in 17 languages which means that surveys can be sent to semi-literate users. The person with the role of “administrator” is able to set customizable roles and permissions for various users, and the entire platform is protected by Norton security.

Setting up Magpi and creating an electronic form

With Magpi, setting up, and creating an electronic form is relatively quick and easy.

To develop an electronic form for the pilot, we started with an existing peer educator daily diary in Portuguese language, and already in use and familiar to the peer educators. A quick start guide is available from Magpi that provides step-by-step guidance on creating an electronic form (https://drive.google.com/file/d/0B_H3CmcSNJc_QWhhamhLYWJMeDg/view?usp=sharing)

Integrating Unique Identifier Code

To enable peer educators quickly and easily construct a client-generated UIC, we integrated in the electronic form, a set of simple prompts

Province code	<i>(From table)</i>	Prompt 3	<i>Sex</i>
Prompt 1	<i>mother's maiden name</i>	Prompt 4	<i>Year of birth</i>
Prompt 2	<i>father's middle name</i>	Prompt 5	<i>Birth order</i>

The UIC is then constructed from the province code, first two letters of mother's maiden name, first two letters of father's middle name, sex, 2-digit year of birth, and birth order

Example

A female born in 1980, her mother's maiden name is Gonzalez, her father's middle name is Pedro, she is the third child of six children, and resides in Maputo Província.

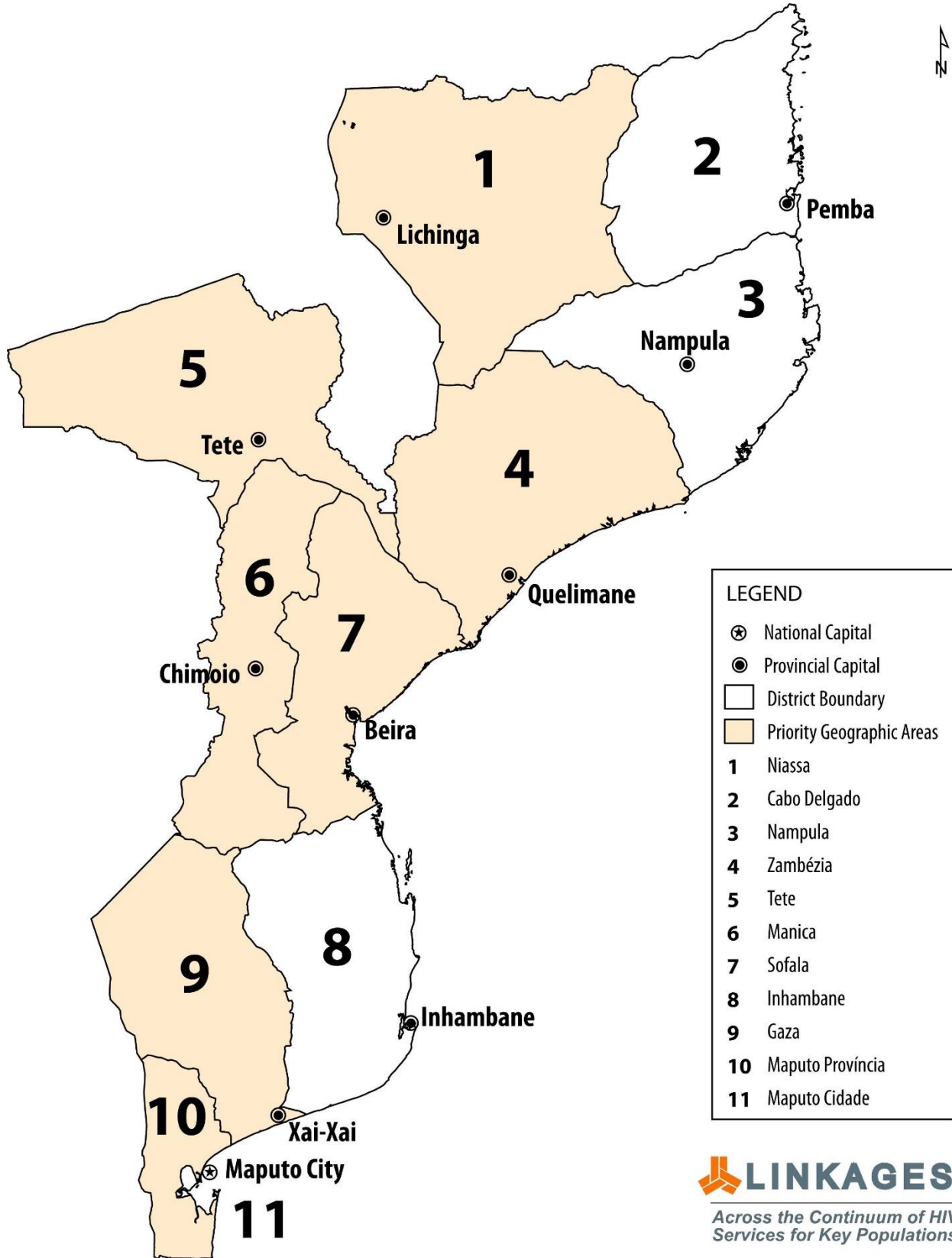
Province Code (from table)	Mother's maiden name	Father's middle name	Sex 1=Male 2=Female	Year of Birth	Birth Order
<u>11</u>	<u>Gonzalez</u>	<u>Pedro</u>	<u>2</u>	<u>1980</u>	<u>3</u>

The generated code for this person would be

11-GOPE-2-80-3

Nome do Província	Código ⁵	Nome do Província	Código
Gaza	9	Niassa	1
Manica	6	Sofala	7
Maputo Cidade	11	Tete	5
Maputo Província	10	Zambezia	4

⁵ Coding system used by the national statistics bureau



Choosing mobile phone features

We used 3⁶ inexpensive (under \$100) SIM-unlocked Android smartphones with basic features and not overly ostentatious in appearance (see appendix C for complete phone specs). Longer forms typically require more memory, which usually means a more expensive phone, however, these phones are adequate since the form used for the pilot contains 36 questions.

Most importantly, we made sure to select a phone with a GPS positioning feature, since we planned to also collect the geographic coordinates for hotspots where field activity will be conducted

Furthermore, we wanted to avoid the problems inherent in people using their personal phones, each with a different configuration and memory capacity, so we tested the form only on the phones that will be used in the field

The 3 mobile phones were designated PE01, PE02, and PE03, and Google Device Policy was installed on each phone to allow for remote administration

Local SIM cards with sufficient airtime were purchased and installed on the phones

Registering data collectors

Registering data collectors effectively sets up their Magpi account, which is required in order for them to access the electronic forms created in Magpi. It is highly recommended that data collectors be registered in advance of actual field activity, especially if many data collectors or other users are anticipated, so as to identify and address any potential issues.

Email accounts were setup in Gmail for PE01, PE02 and PE03, which were then used to register with Magpi

Preparing for field activity

In order to ensure successful field activity, we made sure to extensively test the form with and without connectivity, and to adequately train the data collectors

⁶ We purchased 2 phones and the third was donated by Parsa Sanjana

Training the data collectors

For the training, we brought together 8 peer educators; 4 from partner AMODEFA⁷, and 4 from partner LAMBDA⁸. Each peer educator was provided with a paper version of the electronic form, in order to familiarize them with the structure of the form and sequence of questions.

We dedicated two full days to training, which included practice data collection when there is no connectivity (offline mode), and later uploading the data to the server when connectivity is available

Day 1 training (at AMODEFA)

We began the session by asking peer educators to describe how they currently collect data, and whether they feel that mobile data collection will enhance their effectiveness and productivity. The discussion that followed was lively and spirited.

Data collection by both partners is entirely paper-based. An AMODEFA veteran peer educator explained that “we typically interview beneficiaries without writing anything down, and later we complete the paper form with the information we obtained” A LAMBDA community agent⁹ added, “we have to memorize a lot of information” All the peer educators were unanimous that mobile data collection would make it easier and more efficient for them to collect data, even while talking to a beneficiary

We then provided each peer educator with a paper version of the electronic form, which they were asked to complete. We recorded the average time it took to complete the form. Community agents from LAMBDA were able to complete the forms in under 7 minutes, while it took the peer educators of AMODEFA over 40 minutes to complete. One of the seasoned AMODEFA peer educators, we were informed, is semi-literate.

After completing the paper form, we asked for feedback from the peer educators. We received a number of suggestions, which are all listed in appendix B, and some of which have already been incorporated in the current form. One major feedback is regarding questions 12 and 13, which are used to construct the UIC. Peer educators are of the opinion that majority of beneficiaries may not be able to provide the answers to these questions

We asked the peer educators whether they thought it would be problematic to record responses on the phone while asking beneficiary questions, they said this did not present a problem. We recommended that since questions 1, 2, 3, 4, 5, 6, 7, 9, 10 and 11 (see appendix A) did not require responses from the beneficiary, these may be completed prior to commencing interaction with beneficiary.

⁷ Partner working predominantly with female sex workers (FSW)

⁸ Partner working predominantly with men who have sex with men (MSM)

⁹ LAMBDA prefers to refer to its peer educators as “community agents”

Next we had the peer educators complete the form on the mobile phones. The LAMBDA community agents were able to complete the form in less than 6 minutes. The AMODEFA peer educators struggled a bit with this activity, and took more than 30 minutes to complete the form. Although AMODEFA peer educators struggled to complete the form, they were nonetheless very enthusiastic, and actually wanted to take the phone out to the field that very day!

Day 2 training (at LAMBDA)

The second full day of training was held at LAMBDA office, attended by 16 community agents

We began the day's session with a review of the paper version of the electronic form. We also reviewed the changes to the form suggested by LAMBDA community agents during the previous day's exercise



LAMBDA community agents practice data collection on the phones

We then commenced with practice data collection on the phones. Although this was a larger group than we had on Day 1, we were still able to effectively work in 2 groups using the phones to enter data. Together with the LAMBDA community agents, we tried to simulate as many as possible, potential issues that might be encountered while in the field, and then identified appropriate solutions. By the end of the days training, most of the potential issues that could arise during field activity had been identified and addressed. The one recurring issue was that of connectivity, which is addressed in the section below.

Day 3¹⁰ (field activity)

We began actual field data collection on day 3; phones PE02, and PE03 were assigned to LAMBDA, and PE01 was assigned to AMODEFA. Field activity for the pilot will continue up until March 31, 2017.

¹⁰ I was not able to accompany LAMBDA community agents due to a powerful thunderstorm, which forced all field activity to be canceled

Peer educators have begun submitting data collected in the field using the mobile phones. Since the pilot is being conducted with the free version of Magpi, which has a 500-record limit for data submissions, we anticipate reaching this limit on or before the conclusion of the pilot on March 31, 2017.

Data submissions will be analyzed weekly and shared with LINKAGES Mozambique, and partners, and possibly with USAID Mozambique, which has shown much interest in the pilot



AMODEFA peer educators using the phone to collect data at a hotspot

Addressing connectivity issues – working offline

During the training sessions, we covered the aspect of offline data collection, which allows for storing the data collected on the device when poor network connections prevent instant data uploads to the server. Although offline data will be safely stored on the phones for as long as necessary, peer educators have been instructed to upload data from the field daily to avoid unexpected data loss. In the event SIM cards have exhausted available airtime, peer educators have the option to take the phones to the LINKAGES Mozambique M&E officer, who will then upload the data using the office Wi-Fi.

Important note

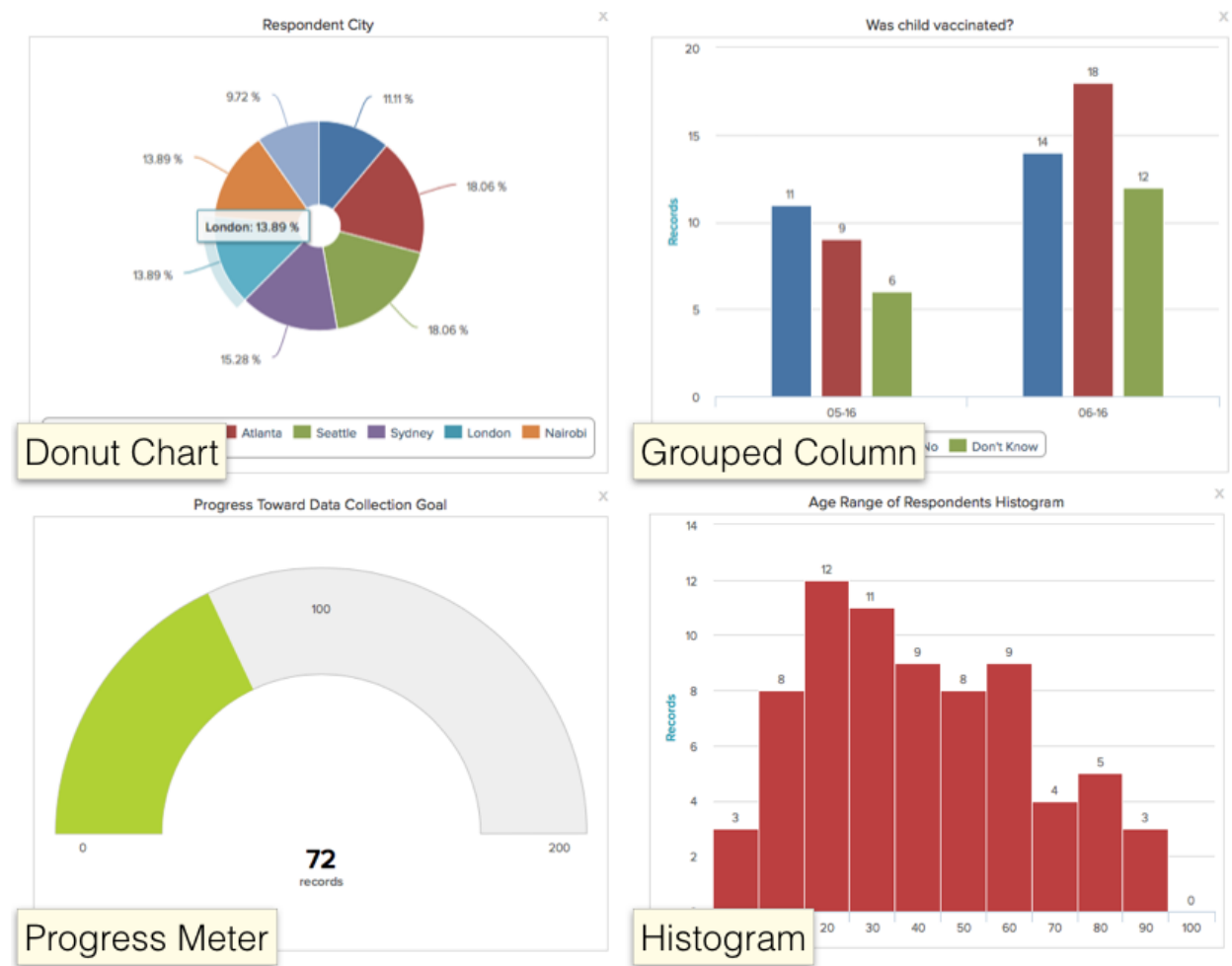
If connectivity is lost while a form is in the process of upload, no data is lost. The upload process will resume once connectivity is reestablished. Data on the phones will be stored safely for as long as necessary till whenever a connection is detected, and data upload initiated. This is important, since the plan is to extend the pilot to locations where connectivity may be intermittent.

Also, Magpi will automatically search for the lowest price connection among available mobile phone carriers.

Real time data use and microplanning

As mentioned earlier, the person with the role of “administrator” is able to set customizable roles and permissions for various users. For phase I of the pilot, the role of peer educators was set to “data collector”, which allows them to upload only, but not view the submitted data. For subsequent phases, peer educators, peer navigators, and community outreach coordinators will be assigned the role of “form manager” which will allow them to view in real-time, the data they submit.

Magpi provides powerful tools for real time data visualization, which supports microplanning and informed decision making



Conclusion

As of the writing of this report, there have been only a few days of field activity. Although peer educators have so far been submitting data to the server, we will begin analysis and dissemination of the data after the first full week of data collection and submissions. All field activity for the pilot are expected to be concluded by March 31, 2017

As the pilot moves into phases II and III, the estimated cost is outlined in the table below. Magpi offers various levels of accounts depending on need; for phases II and III, the enterprise account is recommended (more information on the enterprise account may be obtained at <http://home.magpi.com/new-magpi-umbrella-accounts/>)

Overview of Magpi enterprise account

Magpi enterprise accounts reduce the cost of large-scale, complex data collection activities, whether for a single project or across an entire organization. At the same time, they add many unique capabilities for analysis, reporting, and messaging.

Enterprise account recognizes that many organizations have multiple units that may need different Magpi accounts, and as such, want to be able to manage those accounts centrally. Any Magpi Enterprise account can invite other Magpi accounts to be their “sub-accounts” (an Enterprise account with sub-accounts is called the “umbrella” account for those sub-accounts) The umbrella account feature lets one Enterprise account manage and coordinate an unlimited number of sub-accounts – sharing forms, data, and credits.

Table 1: Estimated cost breakdown for phases II and III

Item	Unit Cost (USD)	Units	Total
Magpi enterprise account	834	12	10,000 ¹¹
User accounts	5	50	250 ¹²
Mobile phones	70	50	3,500
SIM cards	10	50	500
Airtime for SIM cards	5	50	250 ¹³
Technical Support	350	60	21,000
			35,500

¹¹ USD834 if paid monthly, USD10,000 if paid yearly

¹² Amount is for one month

¹³ Amount is for one month

Next Steps

Phase I is now well underway, and is expected to be concluded by March 31, 2017. Next steps include the implementation of phases II and III. Phase II will require subscription to a Magpi enterprise account at a cost of USD10,000 per year (please see cost breakdown in table 1 above) 60 days of technical support is anticipated at a cost of USD350/day. 50 mobile phones will be purchased at a total cost of USD3,500 to be distributed to peer educators, peer navigators, lay counselors and community outreach coordinators. To avoid issues with the use of personal email accounts, official email accounts will be setup for each participating user. Email account setup and maintenance for each user is USD5.00/month

Integrating risk assessment

The current form used in phase I of the pilot simply asks peer educators whether or not a risk assessment was done; however, for phase II, the form will integrate a short risk assessment component (about 10 to 20 key questions), that will enable peer educators to quickly identify high-risk individuals. Technical support, which has already been budgeted, will be provided for the implementation of phase II

Tracking successful referrals

Tracking successful referrals is the key to tracking individual KP as he/she progresses through the continuum of prevention, care, and treatment (CoPCT¹⁴) services, which is at the core of the LINKAGES project. Depending on the geographic location where outreach is conducted, peer educators and community agents may refer a beneficiary to any of the sixteen LINKAGES Mozambique TA clinical sites (see appendix A, question number 8)

Magpi sub-accounts¹⁵ will be created for each participating clinical site, and an electronic clinical services form will be accessible through each sub-account. A beneficiary's unique identifier code is added to the electronic clinical services form for the clinical site to which the beneficiary has been referred. When the beneficiary visits that health facility, the beneficiary's NID is appended to their UIC on the electronic clinical services form. The service or services received by the beneficiary at each subsequent visit to the health facility will be indicated on the electronic clinical services form, before it is uploaded to the server.

The community outreach coordinator will be responsible for ensuring that the data on individual KPs from each participating clinical site is keyed into the electronic clinical services form and uploaded to the server

¹⁴ HIV continuum of prevention, care, and treatment services

¹⁵ A sub-account can be created under an "umbrella" account, which is only available with an enterprise account, please follow this link for detailed information <http://home.magpi.com/new-magpi-umbrella-accounts/>

Appendix A – Paper version of the electronic peer educator daily diary

1. Nome do Província

Choose one response

- Gaza
- Manica
- Maputo Cidade
- Maputo Província
- Sofala
- Tete
- Zambezia

2. Distrito

3. Hotspot (*the original form had “Comunidade” which the peer educators felt was not particularly useful, so it was agreed to change to “Hotspot”*)

4. Localização (coordenadas de GPS)

5. Nome do/a Educador/a de Pares

6. Identificação

7. Nome da Organização Comunitária de Base (OCB)

Choose one response

- AMODEFA If this response, jump to 9
- ICRH If this response, jump to 9
- LAMBDA If this response, jump to 9

8. Nome da Facilidade

Choose one response

- Centro de Saúde de Cuamba, Niassa
- Centro de Saúde de Mandimba, Niassa
- Centro de Saúde 24 de Julho, Zambézia
- Centro de Saúde Mocuba sede, Zambézia
- Centro de Saúde Número 2, Tete
- Centro de Saúde Changara, Tete
- Centro de Saúde Inchope, Manica
- Centro de Saúde Eduardo Mondlane, Manica

- Centro de Saúde da Munhava, Sofala
- Centro de Saúde Ponta - Gêa, Sofala
- Centro de Saúde Chokwe, Gaza
- Centro de Saúde Macia, Gaza
- Centro de Saúde Matola II, Maputo Província
- Centro de Saúde Ressano Garcia, Maputo Província
- Centro de Saúde Alto Maé, Maputo Cidade
- Centro de Saúde do Porto, Maputo Cidade

9. Data de entrega

10. Assinatura do Assistente de M&A da OCB

11. Código do Província

Choose one response

- 1 – Niassa
- 4 – Zambézia
- 5 – Tete
- 6 – Manica
- 7 – Sofala
- 9 – Gaza
- 10 – Maputo Província
- 11 – Maputo Cidade

12. Nome maide da mãe

13. Nome do meio do pai

14. Ordem de nascimento

15. Ano de nascimento

16. Sexo

Choose one response

- Homem
- Mulher

17. Código único

18. Nome (Primeiro, Apelido)

19. Idade

(Phone number was added here after “Age” as requested by the peer educators during day 1 training)

20. Grupo a que pertence

Choose one response

- Homens que têm Sexo com outros Homens (HSH)
- Trabalhadora de Sexo (TS)
- Transgenero

21. Novo contato?

Choose one response

- Sim
- Não

22. Data de novo contato**23. Avaliação do risco de HIV**

Choose one response

- Sim
- Não

24. Data da avaliação do risco de HIV**25. Tipo de sessão**

Choose one response

- Grupo
- Individual

26. Duração da Sessão Um - Hora de Início**27. Duração da Sessão Um - Hora de Fim****28. Duração da Sessão dois - Hora de Início****29. Duração da Sessão dois - Hora de Fim****30. Duração da Sessão três - Hora de Início****31. Duração da Sessão três - Hora de Fim****32. Tema de Discussão**

Choose one response

- Prevenção HIV
- Aconselhamento e Testagem (ATS)
- Infecção de Transmissão Sexual (ITS)
- Uso de preservativo
- Violência Baseada no Género (VBG)
- Tratamento Anti-Retroviral (TARV)
- Circuncisão Masculina

33. Referências

Choose one response

- Infecção de Transmissão Sexual (ITS)
- Post-Violência Baseada no Género (VBG)
- Cuidados de HIV

34. Preservativos Dados - Lubrificante (coloque N°)

35. Preservativos Dados - Masculinos (coloque N°)

36. Preservativos Dados - Femininos (coloque N°)

37. End of Form

Appendix B – Feedback on data collection form

Question	Observation / suggested change	Issue addressed / form updated
	Move GIS stamp to question 1	
3. Comunidade	Seria posto administrativo e depois localidade?	Yes. The original form had “ Comunidade ” which the peer educators felt was not particularly useful, so it was agreed to change to “ Hotspot ”
	Make provision for beneficiary telephone number	Yes. Phone number was added after question 19 “ Idade ” as requested by the peer educators during day 1 training)
5. Nome da Organização Comunitária de Base (OCB)	Penso que esta classificação de OCB pode não ser adequada a estas organizações.	
6. Nome do/a Educador/a de Pares	A Lambda designa Agentes comunitários e não Educadores de Pares	
12. Nome de solteira da mãe	Não ficou claro	
13. Nome do meio do pai	Caso o pai tenha apenas 2 nomes como tratar?	
14. Ordem de nascimento	O que significa?	Yes
20. Novo contato?		
21. Data de novo contato		
31. Tema de Discussão Choose one response - Uso de preservativo	Seria importante incluir o lubrificante como tema a ser debatido e não só falar do uso do preservativo.	

Appendix C – Phone specifications



BLU Advance 5.0

Price on Amazon: \$70

Device type: Smart phone

OS: Android (5.1)

Form factor: Candybar

Color: Black

Physical size: 5.0 inches

Resolution: 480 x 854 pixels

Pixel density: 196 ppi

Technology: IPS LCD

Colors: 16 777 216

Touchscreen: Capacitive, Multi-touch

Features: Light sensor, Proximity sensor

Camera: 5 megapixels

Front-facing camera: 2 megapixels

Flash: LED

Software Features: Geo tagging

Camcorder: 1920x1080 (1080p HD) (30 fps)

Features: Video calling

System chip: MediaTek MT6580

Processor: Quad-core, 1300 MHz, ARM Cortex-A7
Graphics processor: Mali-400 MP
System memory: 0.75 GB RAM
Built-in storage: 4 GB
Storage expansion: microSD, microSDHC, microSDXC up to 64 GB
Battery Capacity: 1800 mAh
Battery Type: User replaceable, Li – Ion
Video playback supported formats: MPEG4, H.263, H.264
Speakers: Earpiece, Loudspeaker
Headphones connector: 3.5mm
Browser supported: HTML, HTML5
Built-in online services support: YouTube (upload), Picasa/Google+
Cellular
GSM: 850, 900, 1800, 1900 MHz
UMTS: 850, 1900, 2100 MHz
Data: HSDPA+ (4G) 21.1 Mbit/s, HSUPA, UMTS
2G Data: EDGE
Bluetooth: 4.0
Wi-Fi: Yes
Mobile hotspot: Yes
USB: USB 2.0
Connector: microUSB
Features: Mass storage device, USB charging
Charging connector: microUSB
Positioning: GPS, A-GPS
Navigation: Turn-by-turn navigation, Voice navigation
Other: Tethering, Computer sync, OTA sync