A GUIDELINE TO CONDUCT
an mHEALTH 'EXPLO'
IN HIV/TB PROJECTS
Southern Africa, v.1

A product of:

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FOREWORD

mHealth, or mobile health, is defined by the World Health Organization as *'medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices. It involves the use of voice, SMS, MMS, and other functionalities including WWW browsing, GPRS, 3G and 4G telecommunications, GPS, Wi-Fi, and Bluetooth technologies.'* (WHO, 2011)

Médecins Sans Frontières Belgium (MSF) started piloting mHealth initiatives in southern Africa in the frame of HIV/AIDS and Tuberculosis (HIV/TB) projects as of 2012. The primary aim for MSF to use mHealth was to improve the quality of HIV/TB care and, overall, the well being of the HIV/TB-infected patients.

In this Guideline we will give some basis to conduct an 'explo' to assess the opportunity for a proposed mHealth programme within any MSF HIV/TB project. We will describe how an 'explo' might become an efficacious method to gather, analyze and report data that is useful to gain insights into the characteristics of a specific context, and to more thoroughly understand the feasibility of moving ahead with mHealth.

Influenced by human-computer interaction and by applied anthropology, in this Guideline we will give the people responsible for the MSF projects in the Field some basic hints on how to conceptualize, design and make operational an mHealth 'explo'. If followed, the Field will be able to inform their decision to implement mHealth based on first-hand information collected in a systematic and target audience-centered manner.

WORKING DEFINITIONS

'EXPLO'_ There are many related terms that refer to the same concept of an 'explo'. We could name this exercise, which is crucial to ensure smooth program implementation and achievement of outcomes, as formative research, landscape analysis, ex-ante evaluation, or even as a needs assessment.

An 'explo', in this Guideline, is conceptualized as a visit to the Field with the aim to delve into the barriers and opportunities to mHealth demand creation and then design and implement a proposed mHealth intervention. A subsidiary aim of an 'explo' is to produce mHealth concepts and use cases, identify existing resources and potential partners, and draft a contingency plan should the anticipated problems emerge.

The 'explo', as contextualized in this Guideline, is to be lead and conducted by an 'explorer', who might be a national or expatriate staff from the project, a consultant from other mission, or even somebody giving a hand from another operational section.

eHEALTH_ In short, the broad term eHealth encompasses the use of information and communications technologies for development in support of health and health related fields, including health care services, health surveillance, health literature, and health education, knowledge and research.

In the last decade a burgeoning of new technologies that hold potential to be capitalized in the provision of HIV/TB care services have emerged. Depending on the type of technology or on the target audience of the services, eHealth is composed of other sub-components: eLearning, health informatics, mHealth and telemedicine.

Coaching the Field to understand what differentiates these sub-components is helpful to focus the scope of the 'explo' in the opportunities to implement mHealth in a specific project. This can include open new doors to the application of any new technologies for health others than mobile phones!

eLEARNING_ Use of electronic media, educational technology and information and communication technologies to provide education and training in electronic form for health professionals, patients and caretakers.

HEALTH INFORMATION SYSTEMS_ Systems to collect, store, analyze, transmit and retrieve health data. It can comprise information related to patients' health, disease surveillance, human resources for health, management of medical supplies and drug stocks, health programmes management, and any other data needed for research, reporting and planning purposes.

TELEMEDICINE Provision of health care services at a distance; can be used for inter-professional communication, patient communication, transmission and review of medical examinations, and remote consultation.

Finally, another term that abounds in the literature on eHealth, and that the Field may need to get familiar with, is **ICT4D**, which relates to all range of modern state-of-the-art **I**nformation and **C**ommunication **T**echnologies **for D**evelopment that are used to enable economic, cultural and social change and reduce the digital divide, the differences and imbalances between developed, less-developed and developing countries in their access to and use of technology to improve their education, health, security, and governance.

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mHEALTH FUNCTIONAL AREAS

As everyone understands now what mHealth and the other sub-components of eHealth stand for, it is time for the 'explorer' and the Field to sit together and find an answer to the following question:

<p align="center">How do you envision mHealth can be applied in this project?</p>

Most likely the Field will need additional input to answer this question and justify the rationale of investing in exploration of the possibilities to implement mHealth in the project.

Operations and Coordination must contribute to this discussion.

As some mHealth initiatives are very resource-intensive, it is wise to limit at the outset the scope of all proposals made by the Field to two or three that are, a priori, the most realistic ones considering the in-house capacity to further support implementation and monitoring of mHealth.

Coordination must share the vision the Field has, and be willing to support the Field by pooling the resources necessary to conduct an 'explo' to assess the potential to implement the proposed mHealth intervention that had been agreed upon.

The 'explorer' will be welcomed to provide an overview on the different functional areas of mHealth that have been described in the literature, as well as to brainstorm on the practical application of these functional areas in a real HIV/TB scenario. The 'explorer' can organize brainstorm sessions or decision tree exercises to assist Coordination and the Field in their joint discussion on which final mHealth proposals are worth being explored further.

Six functional areas for mHealth to improve provision of health services in a MSF HIV/TB project may be the following:

1. **mHealth for Education/Advocacy**
   Communication programs that utilize mobile technologies (text messages (SMS), voice mails…) in support of public health and behavior change campaigns.

   mHealth in MSF_ *Text messages (SMS) can be sent in bulk to the general population to encourage them to go to their clinics for HIV Counseling and Testing, promote consistent condom use, or to sensitize for respect towards HIV/TB-infected people.*

2. **mHealth for Patient Tracking**
   Use of mobile handsets (feature and smartphones, personal digital assistants…) to encode, store, transmit and retrieve patient clinical data by health workers, or by patients to access their own records.

   mHealth in MSF_ *Vulnerable migrants such as commercial sex workers, truck drivers and miners living with HIV/TB might make use of a SMS-based system to store their personal clinical information in a web-based platform and retrieve that information in a ubiquitous mode to ensure they can access their appropriate HIV/TB drug regime anytime they need it.*

3. **mHealth for Patient Support**
   Communication programs to the patient to monitor their health status, remind them of appointments with the health system, communicate medical examinations results, or ensure strict medication regimen adherence.

   mHealth in MSF_ *To reduce the daily burden at the health centers, as well as to prevent patients from unnecessary travels, days off work or leaving their families unattended, Viral Load results can be transmitted via text message to HIV-infected patients on ART.*

4. **mHealth for Surveillance**

   Use of mobile handsets to communicate data of disease incidence, outbreaks in epidemics, or health and logistic needs in an emergency scenario, often in association with geopositional systems and online backend applications for visualization, analysis and reporting.

   mHealth in MSF_ *In areas with high-prevalence of HIV co-infection with Drug-Resistant TB, community health workers may use mobile-enabled surveillance software to warn clinicians of suspected cases of TB so as to identify DR-TB outbreaks earlier.*

5. **mHealth for Program Monitoring**

   Mobile applications developed to support monitoring of health programmes and health systems by administrators, decision and policy-makers and different cadres of health programmes managers.

   mHealth in MSF_ *Remote antiretroviral (ARV) initiation centers can prevent drug stock-outs by using mobile apps that assist lay health workers to monitor stocks in hand, flag about-to-expire and about-to-rupture drugs, and fast-track orders of ARV supplies to the provincial depots.*

6. **mHealth for Health Personnel Support**

   Mobile software to provide capacity building, and support for diagnosis, treatment and patient monitoring activities by remote health personnel.

   mHealth in MSF_ *In low-resourced settings with lack of expertise in diagnosis of opportunistic infections, a mobile app that takes images of the fundus of the eye can assist in the differential diagnosis of HIV-related conditions with eye manifestations before they lead to irreversible blindness.*

It is to be noted that these functional areas might overlap when applied in a real mHealth scenario.

For instance; some innovations consisting of sending encouraging messages to HIV-infected people might impact positively their adherence with ARV regime and, at the same time, if these people feedback via text-message to their nurses on their adherence to ARVs, this intervention might be useful to carry out operational research, monitor trends in ARV adherence, prevent treatment failure, and improve linkage to healthcare services and motivate health personnel to follow-up their cohort of HIV-infected patients…
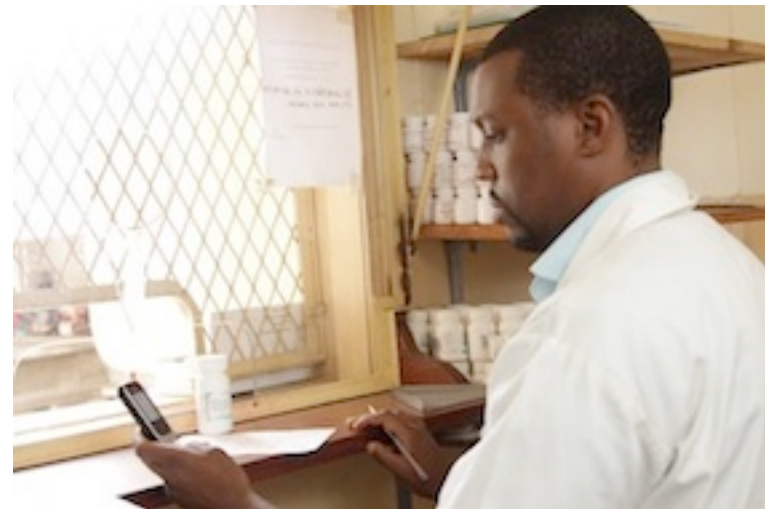
STEP 1: CONCEPTUALIZE!

The Field knows what mHealth is, what it can be applied to, and that it holds potential to improve program and patients outcomes. Importantly, the Field receives support from Coordination. So once a proposed mHealth intervention for a specific project to tackle a specific operational need has been agreed upon, the next questions are:

> Is this proposal **coherent**?
>
> Is this proposal **pertinent**?
>
> Is this proposal **opportune**?

THE STOMACH IS RUMBLING...

The Field sits at the kitchen table and achieves a general consensus that mHealth is an idea worth exploring, and that is **coherent** with the scope of the MSF HIV/TB project and with the vision of the MSF presence in a specific context.

If there is no consensus from scratch, or there are justifiable doubts about the rationale of trying mHealth as a strategy to improve program outcomes, the idea might eventually fall apart at a later stage.

Should the Field need more input or evidence based on how mHealth can help, the 'explorer' can assist by contacting with referral expertise to fuel internal debate and frame the coherence of mHealth prior to taking any further steps.

Finally, this is also the forum to agree on the target audience and how they will benefit or will be expected to play a role in the development of the intervention. The end users or beneficiaries, and back users or support personnel, must be defined now. They might be patients, health personnel, MSF staff, or any other stakeholder.

The target-audience must be involved from the very inception of the mHealth program. This means from the moment the 'explo' is planned. Counting on their active role as information and opinion-providers will ensure that the process of design and planning mHealth will be iterative and participative and that the final result is context-tailored and with higher chances to succeed!

... CLEAR THE KITCHEN TABLE

In addition to have the Field stating clearly what their aim is, it is worth to understand what has been done before or what is being done in the same geographic setting and/or in the same mHealth functional area.

The Field starts with the kitchen table cleared and then adds all picked ingredients, which are the following recommended pieces of knowledge:

- What evidence based is there available in the literature to support the Field proposal as an effective means to improve patients' or programs' outcomes?
- What operational and logistic challenges you can anticipate?
- What specific technical information you need to gather during the 'explo'?
- Which other stakeholders have proposed, tried and/or researched before what you aim to do?
- Who could be addressed as potential partners to implement the proposal?

The type of resources to map what has been done in your specific mHealth area might range from scholarly peer-reviewed literature to commercial leaflets from mobile handsets distributors.

The 'explorer' conducts systematically the following steps:

1- **Scholarly literature.**
   In decreasing level of evidence based, search for:
   ↓   Systematic Reviews

↓ Clinical Guidelines

↓ Original Research

↓ Textbooks

↓ And other Grey Literature (conference proceedings, posters…)

Some handy search full-text journal databases in which open-access literature can be located are:

- MEDLINE (PUBMED): http://www.ncbi.nlm.nih.gov
- sCIELO: http://www.scielo.org.za
- LILACS: http://lilacs.bvsalud.org/en/
- ISI Web of Knowledge: http://isiwebofknowledge.com
- AJOL (African Journals Online): http://www.ajol.info/

2- Organizational information.

Reports, guidelines and technical documents that derive from:

- Ministry of Health and other government organizations
- Multilateral agencies such as: UNICEF, WHO, World Bank, UNAIDS, or UNDP
- National radio-telecommunication agencies and mobile network operators and other handset manufacturers
- Other non-governmental organizations operating in the region
- And don't forget **MSF**!!!
  o Country document, project document, concept notes, visit reports, log-frame …

3- Contextual information.

Searching the Internet for news, videos, blogs, and other social media might be helpful to understand sociocultural characteristics, as well as strategies and resources to cope with wellbeing and ill health of your target population.

4- Commercial information.

Useful to know what type of tech resources (hardware, software, ICT4Ds…) are already in place in your setting. This involves searching through sites that pertain to:

- Mobile network operators
- Aggregators
- Technological partners
- Software and system developers
- App Store: Google Play and iTunes

A preliminary analysis of all the documentation gathered is helpful to determine how **pertinent**, relevant or apt the mHealth proposal is. As the 'explorer', you may use all this information to discuss with the Field if mHealth responds to a real need and can efficiently tackle a real problem.

… PREPARE STAPLE AND GRAVY

During the process of searching for resources on mHealth, other stakeholders who have dealt or are currently dealing with mHealth concepts will be identified. An inventory of government and other non-profit and for-profit stakeholders that will be visited during the 'explo' in order to gather data on their experiences must be prepared.

Benchmarking what other stakeholders are doing in the same environment is always useful, and is especially relevant when these other stakeholders are publicly sharing their lessons learnt, including the barriers and challenges they had found with mHealth.

This step is crucial to understand if the Field proposal is **opportune**.

If, for instance, the Government has put a moratorium to any new eHealth intervention because they are debating at the Parliament the new eHealth Policy to be launched soon… maybe it is not opportune to propose mHealth right now!

If, for instance, there is another organization that has just hired a whole team of software developers to design the same type of application you aim to design to, let's say, send HIV-infected patients text messages to remind them to attend their next visit to the clinician… maybe it is opportune to consider to partner with that organization and share the same application!

Understanding opportunities for and against mHealth in a specific context and in a specific moment will inform the layout of your 'explo'.

… AND SET THE TABLE!

Should the Field conclude that mHealth is **coherent, pertinent and opportune**, then you are now ready to set the table with all plates, cutlery and porcelain (your 'explo' tools and instruments) that will add up insights into whether, additionally, the Field proposal is also **AFASS:** Acceptable, Feasible, Accessible, Sustainable and Safe…

Use Case: Viral Load reminders

In Zimbabwe, patients are receiving reminders to return to their clinics to receive their Viral Load test results when these are above 1000 copies/ml and patients need to receive enhanced adherence support. To decide that this intervention was coherent, pertinent and opportune, many discussions were held within MSF and with other partners such as MoH, CHAI or Research Triangle Institute, which were sending HIV PCR results via SMS to the clinics. The literature was reviewed with the aim to identify potential harms to the HIV patients that could derive as a result of receiving SMS on their follow-up laboratory tests. The perceptions of the target users, the patients themselves, were assessed to determine whether this was an intervention they actually wanted to benefit from. Indispensably, MoH was addressed to find out if this activity could be integrated within their umbrella of routine HIV/TB care services.
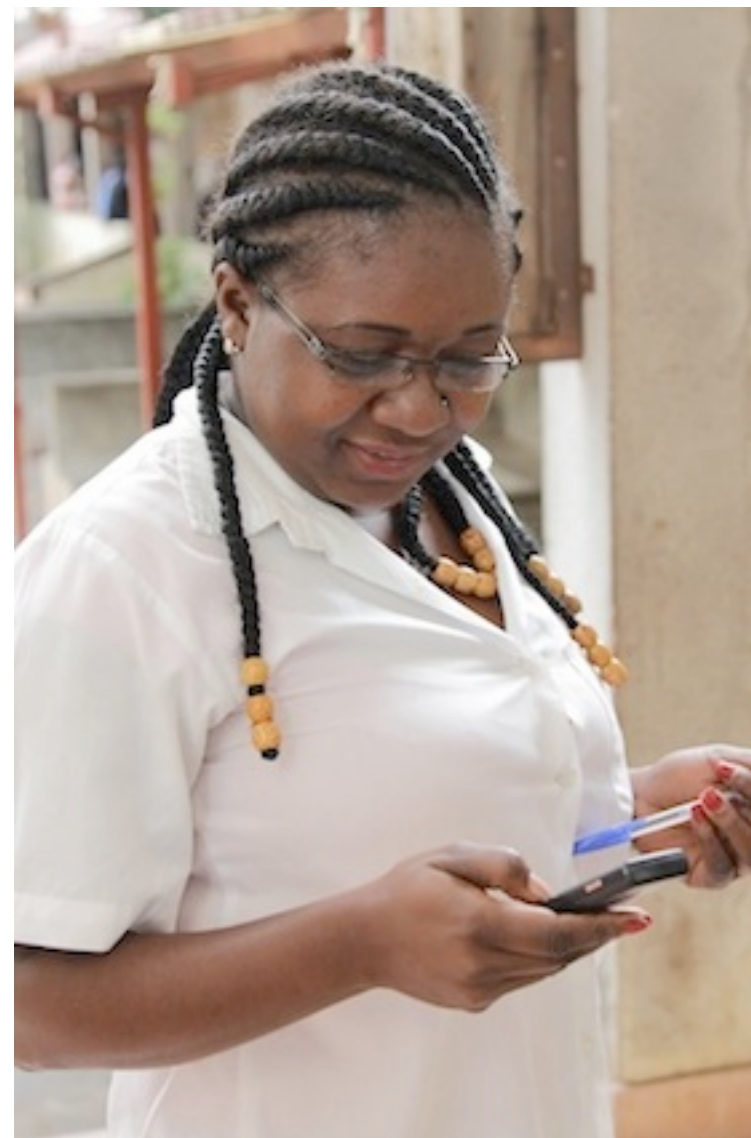
You also want mHealth to be AFASS!!!!

ACCEPTABLE_ Any ICT4D-based solution should be user-friendly, comfortable, intuitive and with the potential to be efficiently adopted and integrated by patients, caretakers and by health personnel in their daily routine.

FEASIBLE_ mHealth must be doable, easy-to-implement and manageable in low-resource settings with existing human and technological resources, and our expected outcomes of mHealth must be set and measured with a realistic mindset.

AFFORDABLE_ Any ICT4D-based solution must be affordable! The end-users (be it patients or health systems) should be able to afford once off and maintenance costs. mHealth systems must be cost-efficient and, in terms of cost-opportunity, opting for mHealth as opposed to any other cheaper system must render satisfactory program or patients outcomes.

SUSTAINABLE_ Systems must be interoperable with existing health information systems. Technology must be plug-and-play and potentially easily interfaced with other devices. Running costs of maintenance and troubleshooting systems must not impose a financial burden to local health institutions.

SAFE_ A safe mHealth system is secure for the patients and health workers (its adverse effects are minimum, the system complies with ergonomic principles, does not lead to any iatrogenic errors…) and it is robust (there is a high probability that a system works correctly, the number of times it fails per time unit is very low, and its related problems can be solved easily).

You should ask… Is the mHealth proposal AFASS?

STEP 2: DESIGN!

An mHealth 'explo' is, in short, a process of gathering information to assess how AFASS your idea is. The process must be conducted in a systematic way using/respecting the following four steps:

1. Conceptualize: you have already done this in the 1st Step!
2. Design the layout of your 'explo' visit: you do not want to miss any detail!
3. Plan all resources, your timeline, and data collection methods, and make operative your 'explo' in a real setting!
4. Share: get together all pieces, and share the results of the 'explo' back with the Field and other stakeholders and decide next steps…

DESIGN THE 'EXPLO' LAYOUT

The 'explo' layout is very project and context-dependent and its items might vary based on the type and scope of the mHealth proposal and its aimed target-audience.

The resource searching and the benchmarking exercise must have given you some hints on baseline information that you will want to collect. All these hints must be added up to the 'explo' layout that will guide the way in which you, as the 'explorer', are to gather and organize the data.

In this section we will propose a basic dataset of questions that you need to make in order to assess how AFASS your mHealth proposal is.

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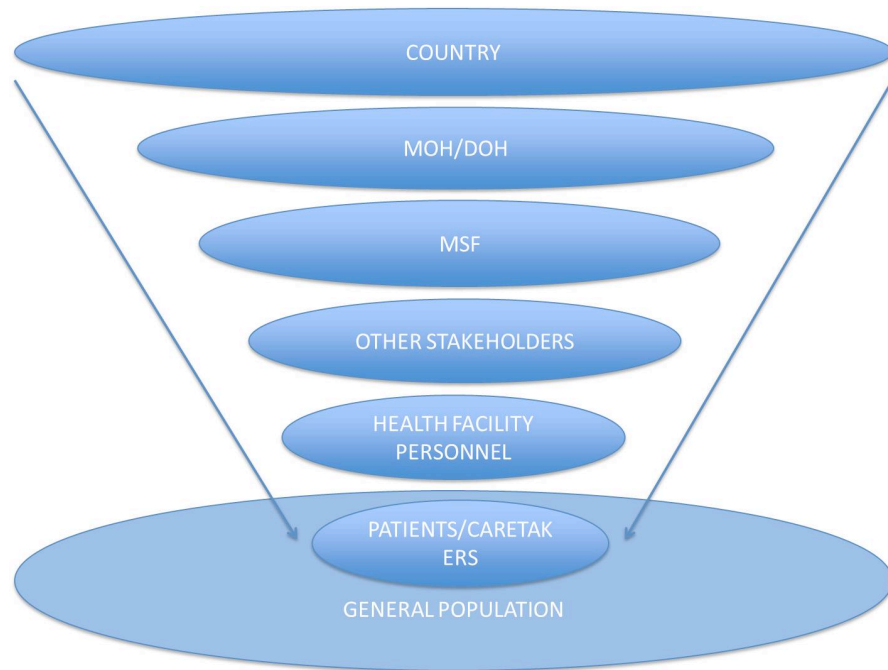
LEVELS OF DATA GATHERING

Based on who the beneficiaries and who the stakeholders are, you need to plan in advance at which levels you are to gather the information from, and schedule all meetings and visits according to your plan.

When defining your target-audience and the stakeholders, don't forget to include any possible end-user and back-user of the proposed activity (see ePassport at the right for an example). Then define which type of information you need to get from each group.

Data collection might be as broad as to get information on the country health indicators as to get first-hand information from the patients´ self-care habits.

KNOW THE COUNTRY!!!

You need to know the country where the mHealth proposal is planned to be implemented. General information on demography, security, economy and culture may inform and influence the design and implementation of mHealth.

Check Ministry of Health (MoH), UNDP, UNICEF, WHO and World Bank sites and pick the most relevant and most recent indicators to gain a deep insight into your context.

You will notice there are thousands of indicators!!!

Choosing which ones best suit your information needs is not an easy task. Debate with your team in the Field which socio-demographic or health indicators might be useful for you.

Considering that you aim to design an mHealth intervention as part of an MSF HIV/TB project, we recommend you to, at least, seek some of the following figures:

- Some HIV/TB country/region indicators:
  o Adult HIV prevalence (%)
  o Children living with HIV (thousands)
  o Women living with HIV (thousands)
  o People of all ages living with HIV (thousands)
  o Mortality (HIV+TB only) % (100.000 people)

- o HIV/TB co-infection rate (%) (Nb/%)
- o Incidence (HIV+TB only) (Nb/%)
- ICT4D country/region indicators:
  - o Mobile cellular subscriptions (per 100 people)
  - o Fixed broadband Internet subscribers (per 100 people)
  - o International Internet bandwidth (bits per second per Internet user)
  - o Internet users (per 100 people)
  - o Secure Internet servers (per 1 million people)
  - o Access to electricity (% population)
  - o Households with a computer (% population)

KNOW THE HEALTH SYSTEM!!!

In many settings MSF does not operate alone but rather supporting Ministries of Health (MoH), and, sometimes, other stakeholders. Thus, it is crucial to understand how feasible it is for your mHealth proposal to be integrated under the MoH umbrella of HIV/TB services to the population.

At this level, some relevant information that we consider you might be interested to discern is:

- Organizational:
  - o What are the Units at MoH-level that manage HIV/TB programs?
  - o How can you describe the organizational tree including regional, provincial or district sub-divisions?
  - o At District of Health (DoH)-level… who is who? Who manages HIV/TB programmes?
- eHealth within Ministry of Health:
  - o Is there a MoH eHealth or mHealth policy?
  - o Any national data security and privacy regulations?
  - o Does the country adhere to any international standard (e.g. HIPAA, DICOM,…)?

- o Which health information systems are in place to monitor the cohort of HIV/TB-infected patients? In which standards are these systems built? Do they interoperate? Who manages them?
- o Any past or current MoH or DoH experiences with mHealth or any other new technologies for health?
- Provision of HIV/TB services:
  - o What types of HIV/TB services are provided?
  - o Specifically on MSF-supported strategies:
    - At which CD4 count are patients initiated on ART?
    - Are HIV Counseling and Testing (HCT), ART initiation, CD4/Viral Load services decentralized?
    - Are HIV and TB services integrated?
    - Are HIV and antenatal care services integrated?
    - Are community support-based models present (e.g. community action groups)?
    - If not, which other MoH-supported community models of HIV care can you identify?
    - Are pre- or post-exposure prophylaxis, HIV self-testing or treatment-as-prevention offered?

KNOW MSF!!!

MSF itself might be your biggest ally to implement mHealth… or your biggest barrier! Internal organizational barriers have been identified across many mHealth pilots as one of the main causes that deter successful implementation of mHealth. Hence, before you take any smooth field collaboration for granted, you should investigate:

- What the history of MSF in the country has been (…and history with engaging in eHealth or ICT4D)?
- What is the vision and goals of the Mission? Can mHealth help the Mission to achieve that vision?

- What types of activities are being implemented within the projects in place? How will mHealth fit in the project logic model frame?
- What are the mission resources? Is there budget for mHealth?
- Which MSF partners can you contact to gather data from or involve in mHealth?
- Is there any current or planned collaboration with Ministry of Health, civil society organizations, academia, or any other non-governmental organizations with experience in eHealth?
- What are the in-house technical informatics, M&E, and mHealth expertise?
- What are the perceptions, knowledge and attitudes of national and expatriate staff towards mHealth?

KNOW OTHER STAKEHOLDERS!!!

You have already landscaped all agents working with ICT4D before you conduct your 'explo'. Try to answer the following question:

> If you were to implement mHealth, with whom could you **partner**?

Good partners might be found anywhere. Usually, Ministry of Health is a MSF partner in most HIV/TB settings. Other opportunities might be found in academia, mobile network operators (MNO), other non-for profit or civil society organizations, or in tech companies.

Even if no formal partnership is pursued, organizing meetings and interviews with these stakeholders might be useful to landscape which similar mHealth solutions or interventions have been tried or implemented in the country, and which other agents have worked with mHealth and can be requested for a meeting in order to learn from their own challenges, constraints and lessons learnt from the field.

A landscape of local stakeholders is useful to identify in-country technical capacity (software programmers, database developers, telecommunication experts…) to support in-house or external development, maintenance and troubleshooting of mHealth solutions. In contexts with a severe dearth of technical expertise, the 'explo' might provide the information needed to strengthen the decision to partner with those organizations that have development capacity. Or, if that capacity is entirely absent, to determine the unfeasibility to carry out your mHealth proposal.

Building a social network with other local players in mHealth and keeping that network alive via mHealth brunches, task force meetings, working groups or any other type of informal forums might be helpful to support implementation of the proposed mHealth activity.

Identify **local MNO** that are offering their services and products in the country and schedule a meeting with each one of them, to map:

- Range, type and fees of services and products they provide
- Ask for once-off and maintenance costs, time to activate services, length and type of commercial contracts
- Responsible/people to network with
- Support they provide to mHealth in the country

Other useful information that MNO can provide:

- Market penetration of landlines, mobile phones, ADSL
- Average monthly mobile phone expense for the target audience and type of services they contract with the MNO
- Female: Male ratio of phone use, phone sharing, purchase of airtime, and/or type of services consumed
- Contact with aggregators to set USSD, shortcode or reverse-billing services that MNOs use to work with
- Contact with handset manufactures, technical assistance providers, help desk support, market leaders

- Current mobile industry regulations and policies

KNOW THE HEALTH FACILITIES!!!

You must visit the scenarios where the mHealth intervention is to take place. The target audience might engage with the mHealth service in many different types of sites; government institutions, schools, hospitals, health centers, patient´s residences, markets, churches and other places in the community.

Any possible scenario should be thoroughly described.

Quite often, mHealth software and services might be managed at the health facilities where populations access HIV/TB services. Thus, some basic data to gather from health facilities might be:

- Human resources: nurses, lab and pharmacy staff, community health workers, health surveillance assistants…
- Communications (Internet, mobile phone clinic, landline…) and hardware in place: desktops, laptops…
- Electronic medical records or health information systems (pharmacy or laboratory management systems) and other paper-based facility and patients records
- Point of Care diagnostic tools and if they are equipped with connectivity packs to transfer data to web-based databases
- Flow of patients and daily caseload at different HIV/TB services
- Other community and religious support organizations collaborating with health facilities in provision of HIV/TB services to the population
- Use of alternative health services by the local population: sangomas, traditional healers and birth attendants…

KNOW THE HEALTH WORKERS!!!

In an mHealth intervention designed to support HIV services, usually the health personnel will be the ones that directly benefit from

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mHealth (e.g. from mobile data collection apps) or the ones that recruit eligible beneficiaries among the health system users (e.g. to send clinic appointment reminders to HIV/TB-infected patients).

To assess how AFASS an mHealth intervention is, you need to understand how mobile-literate the health workers are, and assess their perceptions and attitudes towards the introduction of new technologies into their daily routine. Sometimes it is simply unfeasible!

The end-users might be nurses, medical assistants, community or village health workers, laboratory technicians, data capturers… Because you have a priori identified who the target-audience is, you can design which specific information you are to gather from them.

It is especially relevant to understand how health workers engage and use new technologies and how they perceive the features, functionalities and design of different ICT4D that they might already hold some experience with:

- On mobile usage:
  o Who owns/controls/shares mobile phones?
  o What type of phones (basic feature, smartphones…)?
  o Who pays for the airtime and services they use?
  o Do costs affect their use choices (e.g. SMS preferred over voice or over Internet browsing…?
  o How many SIM cards do they have and for how long do they keep the same mobile phone number?
  o Do they use their mobile phones while at work? Do they take the mobile clinics to the market, to the patients' homes…?
  o Do they use forums, chats, emails or Internet browsing mobile functionalities?
  o Is there any difference between men and women in mobile services accessed and used?
  o How do they charge their mobile phones (at the clinic, at home, at work, at the shop…)?

- On specific phone functionalities/features?
  o If they were to use mobile data collection tools; would they prefer to use touch-sensitive screen handsets rather than keyboard handsets?
  o Would they prefer to connect to the app via wireless (Bluetooth, ZigBee, WiFi), GPRS, 3G, offline in store-and-forward mode…?
  o Would they prefer to manage health information via SMS, Internet, media or voice messages…?
- On specific mHealth interventions, and based on their daily workload or constraints detected in their work, would they prefer to be offered mHealth for:
  o Delivery of lab results via SMS
  o SMS to general population to sensitize against stigmatizing people that are HIV/TB-infected
  o Booking system or consultation appointment reminders
  o Tracing of lost-to-follow-up or transfer-out referrals
  o Algorithm-based or clinical decision aid apps
  o Mobile-based medical records or M&E tools…

If there is already a dataset of possible messages to send via SMS to the patients, it is worth to discuss them with your cadre of health workers, to ensure they are culturally appropriate and do not involve harms for the patients or caregivers:

- Does the mHealth proposal sound feasible to them?
- How do they think mHealth will benefit the patients?
- Will the patient flow/case load at the clinic improve?
- Do the messages hold the potential to improve patients' satisfaction with the health system and their uptake of health-seeking behavior?
- Do the messages sound acceptable?
- Are the messages sensitive with local cultural values and norms?

- Do they perceive any risk of gender-based violence as consequence of sending SMS to HIV-infected women?
- Do they perceive any risk of unintended HIV disclosure?
- How should informed consent from patients be sought?

KNOW THE PATIENTS!!!

If your mHealth proposal establishes that patients or caregivers are the end-users or direct beneficiaries, then it is crucial to understand how AFASS the systems and services they will interact with are. Many of your questions will be similar to the ones on mobile usage you made to the health workers (refer to Know the health workers!!! to review and adapt these questions).

Other information you might be interested in is if they had previous experience with mHealth services (e.g. received health information by phone, used self-monitoring apps to control their vital signs, used any mHealth service to book appointments with the nurses, request an ARV prescription, a lab test result…).

A Quick & Dirty mobile phone ownership, sharing and usage and acceptability of mHealth can be conducted with a group of patients gathered at the waiting room of the health facility. Let them raise hands and tally if:

- They own a mobile phone
- They have good network (can make a call inside the house)
- They share the phone with another person
- They have electricity/solar to charge the phone at home
- They use the phone to write and send SMS
- They use the mobile phone to browse Internet
- They´d like to receive voice/SMS with appointment reminders
- They´d like to receive voice/SMS with adherence reminders
- They´d like to use a Toll-free line to make health inquiries
- They´d like to receive voice/SMS with their lab results

APP SOFTWARE TESTING

Organizing an end-user app test is a crucial step in order to achieve success. Traditionally software and systems were tested in a lab. Ethnography, as a non-interventionist observational technique, has influenced a new method to observe the usage of mobile apps in the very sociocultural context in which they might finally be used by the end-users. Ethnography being the framework: participant observation and a semi-structured questionnaire are the tools that we recommend to conduct an end-user mobile app test. The main goal of the app test is to confirm the cultural compatibility and acceptability of the app interface, to discern how the usefulness of the app is perceived, and to receive feedback to improve the app functionalities and design.

If a range of possible mobile apps has been identified out of your resource search, or if time allows designing a demo of a mobile app, which could be used in your mHealth proposal, the 'explo' is the perfect moment to test it with the end-users. Just take the app with you to the field in a mobile handset, give the end-users a tour through the app functionalities, and ask them to play with the app and comply with a set of pre-defined tasks that you should have prepared in advance. While they attempt to do the 'exercises', just observe in silence and jot down any problems that might arise from the usage of the app and their performance with the tasks you ask them to do. Take note of the errors they make, their reactions and of any other aspect that might be of help to inform new requirements to improve in the design of the final app used during implementation.

Researchers might use interviews to make sense of what they observe, and observation to interpret their interview data. To complement the information you have observed when having the users testing the app, you can customize the following model of questionnaire to the characteristics of your app and your program:

Questions to assess mobile usage with end-users:	
Do you own yourself a cellphone?	Yes / No
What type of cellphone (low-range, smartphone…)?	_____
If a smartphone, what operating system is your smartphone (Windows, iPhone, Blackberry, Android)?	_____
If yes, for how long (years) have you owned it?	Nb_____
Rate how knowledgeable you are in using its basic functions (e.g. SMS, MMS, photo…)	1 2 3 4 5*
Rate how knowledgeable you are in using your smartphone functions and applications	1 2 3 4 5
Rate how knowledgeable you are in browsing over the Internet	1 2 3 4 5
Have the end-user play with the mobile app following a pre-defined set of tasks, and ask him/her:	
List all the problems you found with the interface	_____
How long (in minutes) did it take you to complete each one of the tasks requested?	Nb_____
Rate how well do you think you managed to perform the task of …?	1 2 3 4 5
How do you explain the errors you made with the app?	_____
What would you do to fix that error/find a solution?	_____
Would you want to use this application yourself?	Yes / No
Do you consider the system may be used to its full potential?	_____
Do you consider using this app as a burden or extra task?	_____

Did you identify any barriers to using this app at the Clinic?	_____
Read: "Please comment on your experience with using this app"	
On its DESIGN, score:	
Display of …	1 2 3 4 5
On its USER- FRIENDLYNESS, score:	
Ability to …	1 2 3 4 5
On FUTURE FEATURES to develop:	
Provide your opinion on the potential of this technology to improve… (e.g. HIV/TB services management, M&E, clinical benefits to patients…)	_____
Please provide your opinion on this technology's potential to inform decision-taking at Ministry/District-level	_____
How can we improve this technology in order to facilitate health care application?	_____
Are there any functions missing?	_____
Overview of the app:	
What are the negative features of this technology?	_____
For what type of health services would you use this app?	_____
Any additional support you would like to receive from us?	_____
Would you like to use this application yourself?	_____

* 1: Strongly disagree 2: Disagree 3: Neither disagree nor agree 4: Agree 5: Strongly: agree

MEDECINS SANS FRONTIERES
DOCTORS WITHOUT BORDERS

SAMU
SOUTHERN AFRICA MEDICAL UNIT

STEP 3: PLAN!

You know what information you need and you have prepared your 'explo' layout with all the basic data you need to gather to understand whether your mHealth proposal is AFASS or not.

You know **why** and you know **what**. It is time now, before you go to the field, to decide **how, where and when** to get that data

ALLOCATING RESOURCES FOR YOUR 'EXPLO'

Allocation of resources for your mHealth 'explo' must be shared with the Field before the visit. Send them a checklist in which you may distribute the resources you need in four areas:

a. **Financial** resources
   If you expect the Field to purchase any equipment that is not common to find in a MSF HIV/TB setting (e.g. an iPhone, a handheld GPS…) make your request now.
   This is also the moment to budget other additional expenses that are not part of the project running costs (e.g. fuel, drivers, Internet connection…) that you think you will need to carry out your 'explo' successfully.

b. **Human** resources
   Identify and define which will be the persons to liaise with when implementing your Field visit. Describe and share their a priori roles, functions and responsibilities.
   If you need specific support from any local or regional expertise (e.g. mHealth officer, regional mHealth coordinator, medical focal point, field coordinator, SAMU HIV/TB focal person) specify it in your 'explo' plan.
   Depending on the nature of the mHealth concept proposed, more interdepartmental work would be needed. For example; if the activity has a component of research, the mission epidemiologist may need to be involved. If the activity has a

component of patient support, the psychosocial responsible is to be involved.
   Any 'explo' plan should include a briefing and debriefing with, at least, the medical and logistician coordinator, and, at Field level, with the project coordinator and the medical focal point.

c. **Time** resources
   Define how much time you need to conduct the 'explo', and how much time you expect from the individuals or groups you have requested for support.
   As early as possible include in your 'explo' plan the specific time slots that involve organizing visits and meetings with other stakeholders, briefings with project responsible, or to conduct an app test with the target users.

d. **Technological** resources
   List, as exhaustively as possible, all types of information and communication technologies that you think you might need; hardware, software, mobile handsets, SIM cards, Internet connection, personal/wearable devices, point of care mobile-enabled monitoring tools, mobile apps, etc.

FORMATIVE RESEARCH

Formative research applies research methodologies to provide evidence to assist MSF to make better-informed decisions. Formative research aims to collect baseline information to inform programme planning, and also for lobbying other partners on the need to capitalize on mHealth to improve delivery of HIV/TB care services.

The 'explo', which is formative research, is the right moment to propose research questions that are worth operationalizing through the implementation of a future operational research. Operational research proposals need to be endorsed by an ethical review board. That is not the case for formative research, unless it is considered that the 'explo' involves any type of experimentation with human subjects, there are

plans to disseminate the findings, or there are solid ethical concerns that harms might arise from conduct of the 'explo'.

Qualitative research methods involve collecting, analyzing and generating theory from text, images, or sounds. Qualitative methods are useful to assess how feasible and acceptable a health intervention is in low-resource settings, which largely depends on the perceptions towards a specific issue by the target users of that intervention. We will describe the three methods that may be more useful for you to answer the question of how AFASS the mHealth proposal.

Interviews

One-on-one interviews are one of the methods that will give you more valuable information. Interviews are not informal chats! You have an agenda, you have specific information needs, and you will direct the interview to gain access to the interviewee's specific perceptions and knowledge towards the topics that you want to examine with him/her.

mHealth is not a common topic of conversation for many people (especially if you are targeting patients, lay health workers…). Thus, counting on a semi-structured topic guide with closed and open questions will help to focus the interview towards eliciting from the data the information you are interested in. An example of a semi-structured interview, which focuses on exploring the acceptability and usability of a tested mobile app, has been given in the previous section.

Group discussions

Group discussions help to explore dynamics that do not arise in one-on-one interviews. In this case, the 'explorer' facilitates the discussion, rather than interviews the group members. Consensus, differences, divisions and agreements might arise. All their views are expected to be representative of a bigger sample of individuals that share common characteristics to the group interviewees.

You will make use of natural group discussions when there are identified groups of naturally congregated individuals that can be addressed in their natural environments. For instance, groups of HIV patients attending adherence clubs, or groups of nurses working at a Kaposi Sarcoma ward already.

You can also purposively invite respondents that share the same characteristics (e.g. nurses from different health districts) but sometimes you want the opposite to elicit divergences and conflicts (e.g. sitting together nurses and patients to discuss how mHealth can improve clinician-patient relationships).

Observation

Overt observation of how health staff and patients behave, work and interact in the scenario where mHealth is to be implemented might render valuable information. Patient flows, organizational culture, communication between clinicians and patients, and attitudes towards new technologies are aspects that, to some individuals, are difficult to verbalize and narrate in an interview or group discussion.

Observation might be participant or non-participant based. Participant observation involves that as an 'explorer' you become an insider, fully immerse in the environment, and experience what the people surrounding you are experiencing. This method can be helpful, for instance, to understand and feel how the electronic health information systems in place benefit or make more difficult daily activities in a clinical setting.

STEP 4: SHARE!

There are multiple ways to share the outcomes of your mHealth 'explo'. Formats to disseminate the information you have gathered can range from letters from the field, progress report, 'explo' visit report, power point presentation, etc… As we remarked when we introduced you to how to prepare an 'explo' layout, the final report format will also be very project and context-dependent and the information included in it might vary according to the information needs of the project, the type of mHealth proposal and to your target audience.

You might want to prepare different types of reports to share your findings with MSF staff, with technical and informatics people, with your partners…. Regardless of the format you opt for, we recommend you remind yourself that one of the main aims of conducting an 'explo' is to assess how AFASS the mHealth proposal is.

Some of the basic information we recommend you to put together and share is:

1. **Summary** of mHealth concept, aim of the 'explo', budget and resources consumed, people involved, and all activities, visits and meetings held in the Field
2. **Analysis** of information gathered at the following levels:
   - Acceptability
     - Describe how different stakeholders' views on the mHealth proposal can become deterrents or opportunities to implement mHealth
     - Justify how mHealth can fit in the MSF project logic frame and help MSF achieve its vision in the context where mHealth is to be implemented
     - Propose measurable realistic short and long-term goals and a basic set of indicators that can be easily obtained from existing paper and/or electronic health information systems in the proposed mHealth setting
       - Foreseen beneficial or prejudicial impact that implementing mHealth is expected to have in the organizational culture of MSF and MoH
   - Feasibility
     - Describe the views from potential end- and back-end users to inform the design of the mHealth software to have it tailored to their needs and their mobile/computer literacy skills
     - Explain all technological and communication aspects that relate to the use and presence of ICT4D in the context and that can influence the design and implementation and maintenance of the mHealth solution
     - Define a realistic timeline to guide feasibility test, pilot and full implementation of mHealth as an integrated activity of the MSF project
     - Identify human expertise which is present and available (either in-house or in-country) to support design and implementation of mHealth
     - List all anticipated barriers and opportunities to implement mHealth, and propose solutions and tools to tackle any arising gap
   - Affordability
     - Include a budget in which all resources are detailed
     - Describe thoroughly the software and systems-related once-off, troubleshooting and maintenance direct and indirect costs
     - Explore which resources are non-existing in the Field and might be sought for in foreign markets
   - Sustainability
     - Landscape mHealth and ICT4D innovations as implemented by MSF and other stakeholders in the Field

- o Examine opportunities to create partnerships with tech companies, mobile network operators and other ICT stakeholders
- o Describe attitudes and views of MoH and other public institutions with regards to integration of mHealth within existing HIV/TB programmes
- Safety
  - o Include ethical analysis of harms that might derive from implementing mHealth
  - o Should ethical concerns be justifiable; propose a concept to be transformed into an operational research proposal to be approved at least by a local ethical review board
  - o List safeguard measures to minimize identified harms
  - o If safer for patients and end-users; explain other eHealth alternatives to mHealth
3. **Conclusion**: summary of main findings, recommendations for further exploration… and start thinking in next steps!!!

RESOURCES

Some useful reviews and guidelines

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GUIDELINE CREW