mHealth for Adolescents and Young People Living with HIV: Best practices, tools, and case studies

Unfinished Business II Virtual Support Working Group Report, South Africa

Paediatric-Adolescent Treatment Africa (PATA)

Table of Contents

Introduction

Mobile health (mHealth) has been a promising source of health care innovation for adolescents and young people living with HIV (AYPLHIV) in sub-Saharan Africa for over 20 years. Advances in wireless and smartphone technology have created new avenues for virtual support options that promote ART adherence, improve sexual and reproductive health (SRH) education, provide psychosocial support, and enhance care overall. A heightened sense of urgency for virtual support emerged in 2020 as the Covid-19 pandemic threatened to strain, if not completely disrupt, essential health care. After South Africa instituted a national lockdown in March 2020, health facilities and community-based organisations (CBOs) mobilised to implement emergency response plans for decongesting health facilities to limit the exposure of people living with HIV (PLHIV) to Covid-19, while also ensuring that these clients were retained on treatment. These emergency measures included the use of mHealth interventions for virtual case management and support groups.

PATA facilitated a Virtual Support Working Group (VSWG) with the representative members of the Unfinished Business II (UBII) consortium: Wits RHI, Anova Health Institute (Anova), AIDS Foundation South Africa (AFSA), and Health Systems Trust (HST) from June to December 2020. The aim of the working group was to strengthen continued comprehensive care for AYPLHIV through mHealth strategies, focussing on case management and the delivery of support groups and Youth Care Clubs (YCC). Originally launched by the ELMA Foundation in 2016, the Unfinished Business initiative aims to improve national paediatric ART coverage in South Africa by identifying effective systems for finding, referring, tracing, initiating, and case-managing children and adolescents with HIV.

The pandemic lockdown became a period of rapid innovation for the UBII partners as they utilised new mHealth tools such as SMS and WhatsApp messaging, case management telehealth calls, and virtual support groups over WhatsApp or Facebook Live, whilst also leveraging existing national hotlines, multimedia resources, and mobile applications. Taking a consortium approach, the VSWG held regular workshops and meetings between June and September 2020 to strengthen continued comprehensive care for AYPLHIV through these tools.

In an effort to decongest facilities to limit exposure of Covid-19 and ensure children and adolescents living with HIV were retained in care and adherent on treatment, UBII partners introduced and adapted platforms offering virtual support. This resulted in a period of rapid innovation and integration of mobile health (mHealth) tools such as SMS and WhatsApp messaging, case management tele-calls, the facilitation of virtual WhatsApp or Facebook Live groups whilst also leveraging existing national hotlines or other mHealth applications where possible. In these adaptations several lessons and implementation considerations were gathered. This happened as the extant literature and publicly available documentation on best practices for mHealth for PLHIV proved extremely limited regarding the specific topics of mHealth approaches in South Africa, the use of high interaction mHealth interventions, and mHealth tools tailored for young people.

It is therefore important to consolidate and write up of promising practise, shared learnings and provides insights into different strategies or tools needed to strengthen case management and group facilitation using mHealth technologies and platforms. To this end, this report presents the learnings from the VSWG with the following key components:

- A review of the literature findings mHealth interventions for AYPLHIV in South Africa
- Case studies of mHealth interventions and learnings from three of the UBII implementation partners
- A map of the mHealth interventions and tools available in South Africa, and the best practices associated with each intervention
- A compilation of the mHealth resources available and recommended for South African organisations

mHealth: A review

Technology readiness and South Africa

Health organisations around the world have been experimenting with technological innovation for enhanced health care delivery in the form of mobile health (mHealth) interventions since the 1990s. As mHealth interventions rely on wireless and mobile device technology to link patients and providers, they hold particular promise for those facing formidable barriers to care due to availability, geography, cost, and infrastructure. The past decade has therefore seen an increase in mHealth approaches among organisations and health facilities serving HIV-affected communities in sub-Saharan Africa where these barriers are prominent. In this time, health researchers and providers observed that the advent of text messaging, the rise of social media, and the increase in mobile phone penetration across the region cultivated positive attitudes toward digital health services among people living with HIV (PLHIV), and particularly among adolescents and young people (AYP).

In sub-Saharan Africa, 77% of the population have SIM connections while 45% of the population subscribe to mobile services.[1] However, the conflation of device ownership, mobile internet usage, and proximity to an internet connection can obscure the reality of access to internet and mobile services on the ground where challenges and barriers persist. The nature of mobile connectivity, of course, has implications for the format and structure of mHealth interventions. Nevertheless, South Africa is among the top five countries in the region for mobile internet connectivity in terms of infrastructure, affordability, consumer readiness, and content and services.[2] Here, 91% of adults have mobile phones, half of which are smartphones.[3] Penetration is similarly high amongst the youth: 72% of those between the ages of 15 and 24 have cell phones in South Africa.

In the smartphone era, mHealth research and development work for PLHIV has focused largely on isolated interventions, such as automated SMS messages or telephonic services providing reminders about appointments and ART adherence information. The push for more interactive tools and expansive mHealth systems has been tempered by various barriers to technology, the capacity of health services to manage or coordinate, and the dominance of traditional in-person health services. For instance, in a 2011 WHO survey on mHealth, nearly 60% of African member states reported operating costs and infrastructure as the greatest barriers to mHealth implementation.[4] As a result, innovation in digital alternatives was more emergent than urgent until 2020, when efforts to decongest health facilities in response to the Covid-19 pandemic heightened the need for mHealth approaches and differentiated service delivery (DSD) platforms.

mHealth in the pandemic

The state-wide lockdown instituted in South Africa in March 2020 introduced a host of challenges for health providers who faced the dual challenge of managing a public health crisis and ensuring the continuity of essential services, including HIV prevention, case finding, and ongoing treatment and care for AYPLHIV.[5,28]

Causes of care disruption as reported by PATA partners amidst the Covid-19 pandemic[6]

Access	Resources	Relationships
• Transportation. The suspension of transportation services meant that many were not able to access health facilities to refill ARVs, receive counselling, or access vital SRH services. • Information. The lack of information about the effects of Covid-19 created fear and anxiety among clients, driving many to stay home rather than risk exposure and possible infection by going to health facilities. • Disruption. State-mandated closures of schools, with intermittent health facility closures, meant that testing and education services were disrupted entirely for a period of time, increasing risks. • Connectivity. Low access to internet, data, or computers was a limiting factor in providing virtual services. • Traceability. Many organisations were not prepared with the appropriate systems for tracking patients remotely to ensure continuity of care.	• PPE. Limited access to the correct PPE at times, in both health facilities and communities, made it difficult for health providers to safely provide services. • Food security. Food scarcity posed a fundamental health threat that impacted on nutritional status and treatment adherence. • Commodities. Without access to contraceptives, testing kits, menstruation products, and other SRH commodities, risk of pregnancy, HIV transmission, and STI infection increased. • Unemployment. Particularly for single mothers who were already struggling to provide for their families, loss of income due to lockdown closures strained their ability to access or purchase essential SRH products and medications for themselves and their children. Job loss increased risks for women and young girls, forcing many into unsafe transactional sexual relations.	• Disconnection. Social distancing and confinement mandates inhibited in-person support services. • Isolation. The social isolation facing AYPLHIV threatened their emotional wellbeing, impacted on mental health, and increased likelihood of engaging in unsafe sexual activity. • Violence. Home confinement mandates and job loss have led to a "shadow pandemic" of increased violence against women and children. • Burnout. The demands of addressing Covid-19 and providing essential services continue to take an emotional toll on health providers.

When confronted by disruptions to HIV service delivery and essential care for AYPLHIV within their own network, PATA launched the Covid-19 Emergency Response Fund (ERF) in April 2020. The ERF provided emergency support to 27 clinic-community partners and supported continuity of care by adapting DSD approaches for AYPLHIV and developing Covid-19 readiness activities. The ERF CBOs and health facilities largely focused these efforts on PPE delivery, in-community ARV refills, and virtual tools and programming. Their mHealth

interventions included telephonic consultations, social media information campaigns, and virtual support groups, which they rapidly deployed to address the urgent needs of decongesting health facilities, ensuring ART access, disseminating important Covid-19 health information, and addressing mental health risks.[6] In each case of effective mHealth deployment, the partners were integrating off-the-shelf digital tools (e.g. WhatsApp) with their existing resources, relationships, and capabilities, rather than adopting unfamiliar tools to carry out new activities or programmes.

Take-away: The extraordinary pressure introduced by the Covid-19 pandemic on the health system has intensified the need for broader, more effective mHealth interventions to provide services to AYPLHIV. Based on the mHealth learnings of the PATA ERF partners, it is recommended that as a general strategy, health providers should leverage local partnerships, networks, and existing infrastructure to reach AYPLHIV through mHealth platforms.

mHealth Strategies

mHealth interventions can be applied in different areas of the health care system to support service delivery and operational efficiency. For health facilities and CBOs providing care to AYPLHIV, their mHealth strategies – and the specific interventions they adopt – are constrained by the available technologies and the ability of AYPLHIV to access and use those technologies.

mHealth strategies across the health care system and example applications
(adapted from the WHO[7])

mHealth Strategies and Applications			
Technologies			
	Software Systems	Telehealth	Mobile Apps	Social Media and Websites
Cost			Mobile finance tools for clients	
Quality	Health provider training	Provider-to-provider communication	Decision support algorithms	Psychosocial support
Demand	Client health education	Appointment reminders	Virtual support groups	Posting of IEC materials
Supply	Equipment and medication supply management	Telemedicine, hotlines	Human resource management	Health facility information
Accountability	Client registration and electronic medical records	Screening tools	Data collection and reporting	Electronic forms for registration, data collection, screening

PLHIV have focused on using virtual support tools to enhance interactive services, such as support groups, counselling services, and peer-to-peer communication. Nor have they been targeted specifically at children or young people. Rather, most mHealth strategies have aimed at increasing retention and adherence through less interactive, transactional interventions such as appointment reminders, automated messages promoting ART adherence, and dissemination of standard health information.[8,29,30] A 2020 literature review of mHealth interventions in low- and middle-income countries observed that the impact of these kinds of SMS and interactive voice response (IVR) interventions on actual patient outcomes of retention and adherence was ambiguous.[9] Telephone calls, by contrast, which can be more interactive and personalised, were found to be well received and effective for providing virtual counselling.

Two exhaustive reviews of mHealth interventions for HIV in sub-Saharan Africa[10] and lower-income countries more broadly[9] find that there is limited data from these countries. The studies that are available often contain small samples, short follow-up periods, and vary from country to country, making it difficult to find best practices for mHealth in South Africa specifically. Moreover, longitudinal studies showing the long-term impacts of these interventions are not available. As a result, researchers have suggested that multiple mHealth interventions should be used and that they should not replace traditional interventions, but rather supplement them. Given the limited local data set, mHealth studies from the global community may provide a foundation for South African health providers to adapt their mHealth strategies.

Take-away: A range of technologies are available and applicable to enhance case management and virtual support services. The limited study of these technologies for AYPLHIV in South Africa, or similar contexts, means health providers may need to build on global mHealth strategies and examine the emergent findings of local organisations to tailor their mHealth strategies to the local context. The overriding mHealth strategy recommendation is to supplement traditional interventions for AYPLHIV with multiple mHealth approaches, rather than replace them entirely.

Client perspective

In spite of the scant data overall, individual case studies reveal how clients experience different mHealth interventions. In general, recent studies have suggested that PLHIV are receptive to mHealth interventions, and that women and young people in particular are interested in these alternatives.[11,22,31] Starting with the most basic and least interactive interventions, a 2019 study of adult PLHIV in Uganda showed SMS health tips were used by 85% of clients, leading researchers to conclude that such SMS interventions represent a low-risk, low-cost intervention.[12] In a study of similar SMS/IVR interventions (i.e. reminders and adherence messages) in South India, clients reported that these mobile services made them feel supported and cared for.[13] However, clients still wanted those services to be tailored to the unique needs of each client (e.g. more adherence messaging for clients that actually struggle with adherence, and less for those who do not struggle). Overall, clients regularly expressed interest in greater interaction with mHealth tools.

The demand for greater interaction in mHealth tools is a recurring theme across global studies.[14] Perhaps the most relevant two studies for the VSWG in terms of similarities in context, intervention type, client profile, and time, come from a research group in Nigeria. In a 2018 examination of support group curriculum delivered to AYPLHIV via private Facebook groups, users reported that what they valued most about the programme was the ability to learn and share with their peers, and that they desired even greater group interaction through the mHealth platform.[15] In a follow-up study that incorporated client feedback into the social media-based support

group and compared results to a control group, the researchers found there was no appreciable positive impact on retention.[16] However, the positive feedback from participants suggested that the value of virtual support groups falls outside the standard reporting metrics.

The imperative of interactivity in mHealth interventions arises from a variety of conditions. One is need-based: low literacy rates amongst vulnerable clients in South Africa make aural services like telephone calls and video chats preferrable to text-based interventions.[17] Another factor is the different participation modes created for users. For instance, some studies indicate that "lurkers" – people who do not actively post in group chats or discussions but who are still exposed to the interaction of others – can still benefit greatly from the intervention.[18]

More than anything, however, the demand for greater interactivity in mHealth might reflect the value placed on in-person psychosocial services, which have been expanding in recent years. Peer-to-peer counselling, support groups, and community outreach programmes have been integral to the success of innovative DSD models, particularly for those individuals who struggle most with adherence.[19] For instance, a study of support groups in Nigeria found that group participants experienced less stigma, had better adherence, and engaged in less risky behaviour.[20] Indeed, a review of the most effective DSD approaches across sub-Saharan Africa found that in South Africa specifically, the interventions with the greatest impact on suppression and retention have been adherence clubs and community clubs.[21]

Particularly in the context of the pandemic, mHealth initiatives in sub-Saharan Africa are aimed at the primary objective of treatment retention. Importantly, however, studies have shown that interventions aimed at, for instance, health education or psychosocial support can also lead to secondary psychological benefits for clients. These include increased self-confidence, empowerment, self-efficacy, satisfaction, and quality of life.[22,23,24]

Take-away: AYPLHIV value interactive mHealth interventions, not only as a resource for obtaining vital treatment, but as a way of connecting with peers, feeling supported, and satisfying psychological needs. Less interactive, one-size-fits-all approaches, (e.g., SMS reminders), are relatively useful and affordable to implement as a basic mHealth measure but are limited in impact. Though many interactive interventions (e.g., virtual support groups, mobile apps) are in their experimental stages, the emerging data indicates that health providers should prioritise mHealth strategies that are responsive and designs that can be tailored to the needs of different client profiles.

Intervention design

As organisations design and select features for new mHealth interventions, they might find themselves hindered by a pre-existing knowledge gap in the structure, processes, and practices of effective programme models. Even prior to the pandemic, technology had been integrated into many peer-based models supporting AYPLHIV in sub-Saharan Africa. And yet, there is very little documentation or reporting about the operational models of these programmes, or how technology is being used, which would contribute to the project implementation science and establish best practices across the field.[25] Nascent findings from studies investigating specific features of mHealth interventions and programmes may offer a starting point for implementing virtual support services now.

Enabling features

Custom messaging. One recurring finding is the need to tailor interventions to different client profiles based on their adherence level. For instance, a study of effective mHealth interventions in China showed that for SMS approaches, optimal adherents benefitted most from positive messaging content, whereas struggling adherents benefitted most from reminders and data-informed counselling.[19] The findings imply that clients should be grouped according to their baseline adherence level in order to receive the most effective messaging. Similarly, for social media-based support groups, it is recommended that the intervention content be tailored by age, delimiting between PLHIV aged 15-19, and those aged 20-24.[13]

Client reports. An intervention that was found to be effective across clients was individual monthly adherence reports. In a study in China, clients viewed these as report cards that motivated them to maintain adherence or warn them when they were slipping, and they liked the feeling of being supervised by health providers.[19]

Role of facilitator. For those who still struggle with adherence, data-informed counselling can be used to help them overcome personal barriers.[19] Notably, in a study in China, a positive relationship with the individual clinician, counsellor, or facilitator was an important moderator of success for making the client feel comfortable and receptive. A study of social media-based support groups for AYPLHIV in Nigeria also highlighted the facilitator role. They found the support group with the lowest participation also had the facilitator who was worst with posting sessions in a timely matter.[16] Hence, ensuring that counselling facilitators are prepared and practice care with providing information is key.

Barriers

In practice, there are still significant barriers to mHealth for AYPLHIV in low- and middle-income countries.

Cost. An ever-present barrier amongst AYPLHIV in sub-Saharan Africa, which was prominent in the PATA Covid-19 Emergency Response Fund programme,[6] is the cost of mobile data to access online services. Given the high penetration of standard mobile phones (rather than smartphones), telehealth in the form of phone calls from providers to clients is considered an effective alternative that provides AYPLHIV with some form of psychosocial support while limiting the cost to clients.

Connectivity. As most mobile penetration in sub-Saharan Africa is concentrated in urban areas, the barriers of internet connectivity and device access in rural or peri-urban areas are quite rigid. In some regions, household access to electricity for charging devices is a related barrier to connectivity. This suggests that CBOs and health facilities must inevitably supplement mHealth interventions with in-person services or else consider allocating resources to innovative approaches to infrastructure development in their target communities (e.g., village phone kiosks[26]).

Privacy. mHealth interventions are intended to make services more convenient and accessible for AYPLHIV by reaching clients in their homes. However, this delivery method can make it difficult for clients to find secure, private spaces to take phone calls or use mobile services.[26] Forced disclosure is a long-standing concern for AYPLHIV, but it might be heightened when clients cannot leave their home spaces to receive services and treatment in neutral, discrete health facilities.

Summary

The mHealth interventions available to support AYPLHIV are built on the technological foundation collectively forged by global health actors over the past decade. A review of these foundations reveals that there is still much to learn about the use of mHealth for psychosocial support and how to make those applications as effective and engaging as possible for AYPLHIV. The DSD approaches deployed by UBII partners as part of their Covid-19 response add to the global findings about the opportunities and barriers for mHealth interventions in South Africa, and, in particular, interventions designed for AYPLHIV. The learnings of the UBII implementation partners and their ideas for future mHealth innovations will be explored in the following case studies.

Case Studies

Wits RHI Youth Care Club

Increasing retention and adherence through group-based clinical and psychosocial support

Key activities

ARV refills, clinical and psychosocial care and referrals, SRH services, and in-facility support groups

Scope

22 sites across Tshwane, Gauteng Province

mHealth interventions

- Virtual support groups
- Online resources

Key technologies

- WhatsApp groups
- Facebook Messenger
- B-wise website
- MTV Shuga series

Key learnings and outcomes

The challenges of connectivity, text-based communication in groups, and data costs make it difficult to substitute digital tools for in-person psychosocial services. Wits RHI ultimately resumed socially distanced face-to-face support groups and retained mHealth tools for less interactive services, such as client reminders.

Next steps

Creating digital tools that allow AYPLHIV to access and seek out their own health information on demand.

Case Study 1: Wits RHI

To support the YCC model, Wits RHI has developed an implementation guide that provides useful activities for training staff to effectively put the model into practice.

Wits RHI

Wits RHI developed the Youth Care Club (YCC) model as a group-based differentiated model of care that integrates clinical and psychosocial services for AYPLHIV. Key to the YCC model is creating closed groups stratified by age, but mixed in terms of ART status (newly initiated, suppressed and unsuppressed viral load) to ensure peer-based support and learning. When Covid-19 threatened to disrupt YCC operations across the Tshwane metropolitan area, Wits RHI developed a strategy to address the key objectives of decongesting health facilities and ensuring that group members continued to receive the comprehensive adolescent and youth service package (ARV refills, adherence support groups, and sexual and SRH services).

Their strategy involved creating detailed implementation processes that incorporated the use of two readily available and accessible platforms: WhatsApp as a communication platform for groups and Facebook Messenger as a platform for conducting interactive sessions that were previously done on sight. The topics in the Wits RHI YCC workbook were used as sources of discussion content for the groups.
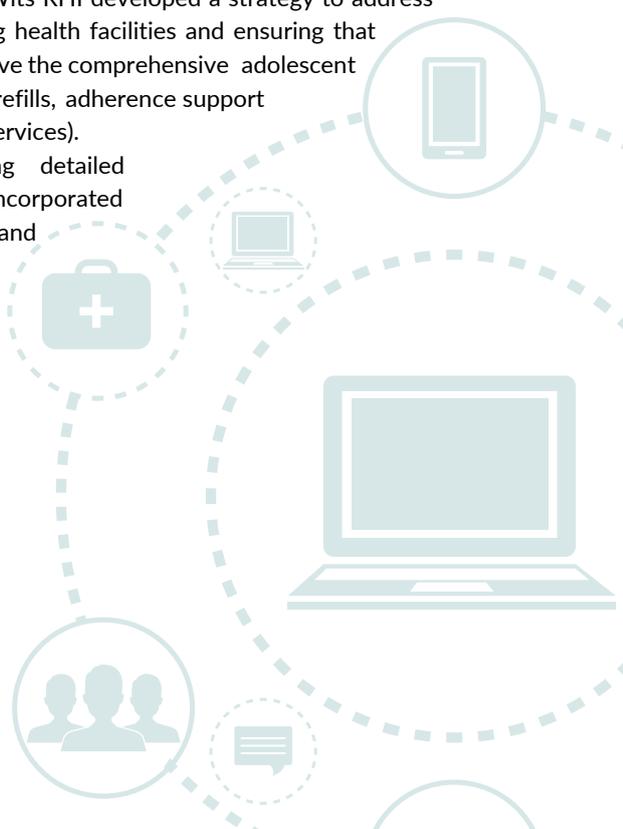
Behind the scenes

Wits RHI took a systematic approach to sorting its cohorts of clients to prioritise different intervention models based on the YCC clients' needs and limitations (e.g., if they had access to a smartphone) and/or internet access. The standard operating procedure developed for this purpose involved the following steps:

- A three-question survey to find out how the YCC clients would like their medication to be delivered during the Covid-19 period:
  1. Do you have a smartphone and internet access?
  2. Which of the following models of central chronic medication dispensing and distribution (CCMDD) do you prefer? (Various options listed for clients to select)
  3. Would you be comfortable with two monthly virtual YCC sessions for adherence support and checking in with you?

- Decanting of the 18–24-year-olds meeting the criteria to decongest facilities

- Using WhatsApp groups to conduct virtual YCC sessions to ensure adherence. Refer to B-wise/ Wits RHI Comms for youth-friendly graphics – topic teaser to be shared prior the session. Virtual sessions to be conducted at times convenient for the participants

- Engaging the treatment supporter and caregivers in the 12–17-year-old group and the unsuppressed clients

- Screening and referring gender-based violence (GBV) and child abuse cases to psychosocial support during virtual YCC sessions

- Integrating SRH services in all modalities (virtual YCC and face-to-face YCCs)

- YCC clients who are unable to come for treatment collection can have their medication dropped off by community health workers

The different intervention models combine the CCMDD method with the adherence support method – telephonic check-ins, virtual YCC (VYCC) support sessions over WhatsApp, and face-to-face support. Ultimately, however, the challenges of reaching all group members and coordinating meeting times that suits everyone proved insurmountable. As the facilitators observed, the apparent benefit of using technology to reach clients wherever they are is sometimes outweighed by the additional burden virtual services place on clients. Where previously clients needed only to show up to a safe and protected space at a specified time to receive essential care, they now had to plan their data usage, ensure they had connectivity, coordinate a convenient time, and find a private location to get the same care. Under the VYCC model, clients have to do more planning and organising to attend the support sessions. As a result, project staff found that the best mHealth configuration for their YCCs was to use WhatsApp to send reminders to clients while resuming with socially distanced in-person groups to provide adherence support.

The YCC workbook was the core source of content, graphics, and information used by facilitators for session planning. B-wise was recommended to clients for complementary support. It is a platform that was created by the SA Ministry of Health as an ideal resource that is based on the Stepped Care Model (SCM) for SRH, which integrates the diverse topics that are relevant to AYP under a single brand and platform. It can therefore be used by YCCs as a full-picture, off-the-shelf resource for SRH information and support.

Troubleshooting

Connectivity: Internet connectivity proved a challenge for holding group sessions over video calls on WhatsApp. The facilitators moved over to Facebook Messenger for video sessions, which proved a more effective platform.

Communication: The alternative of using text-based communication on WhatsApp groups to discuss important topics proved less than ideal as threads could get messy and difficult to track. This brought coordinators back to the use of one-on-one telephonic check-ins and socially distanced (and outdoor when possible) in-person group sessions, which they found were the best forms of support for group members.

Outstanding issues

Data: Although Wits RHI encouraged the use of the resources freely available on the B-wise website, data costs still proved a barrier for clients to use these tools effectively.

Platforms: Coordinators felt that another barrier to clients embracing the existing HIV and SRH support tools is their nature as being targeted, standalone platforms. They suggested that AYP are more interested in support that is integrated into the generic platforms that they are already using, such as Instagram and YouTube.


I actually started my treatment during Covid and I haven't really attended the physical YCC. But when I do go to the clinic, I meet a group of people who go there for the same reason as I do. Even though it's not for long, it's a very comfortable experience. You get to have that shupport, you know, and courage to keep going in life. Our facilitator is very hands-on and helful.

I enjoyed physical YCC a lot. It was easy to follow up, interacting with my facilitator. I feel I learned a lot as compared to the VYCC.

Honestly, when Covid attacked I wasn't really worried because I thought this also falls under essential services. When YCC was introduced it was a huge change that was even hard to adapt to.
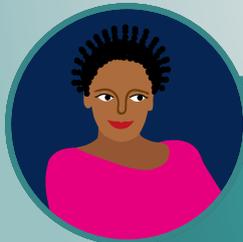
The VYCC I'd love to participate in them but the problem I have is data. But hopefully one day I will be part of it.
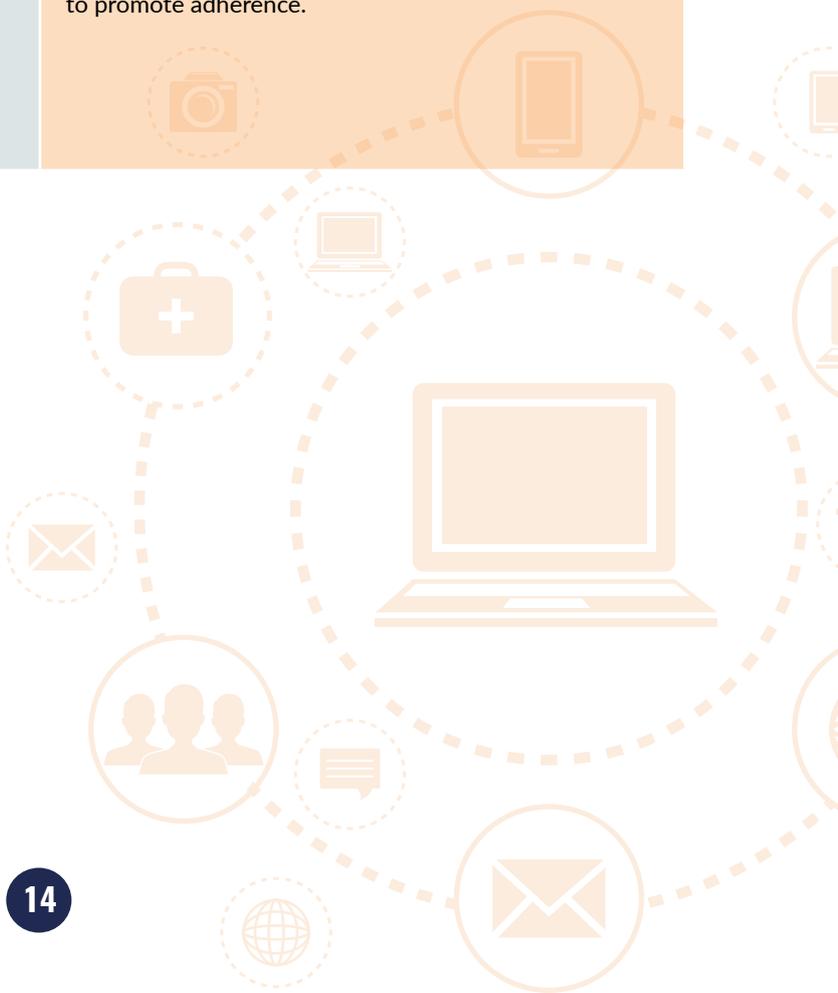
For me I find VYCC very difficult to adhere to firstly because of data.

As heard on the Wits RHI YCC WhatsApp groups

Wits RHI's mHealth agenda

Based on their learnings from the VSWG, Wits RHI wants to focus on empowering AYPLHIV to be more proactive about accessing their own health information and taking control of their care and treatment action.

Barriers for AYPLHIV	mHealth opportunity to pilot within the organisation
• AYPLHIV have been successfully retained in treatment through WhatsApp reminders (estimated 95% retention rate combated to 60% before the use of WhatsApp), and ART distribution has been navigable. • However, the virtual support activities during Covid-19 suggest that AYP are not prepared (with connectivity and device access) and/or sufficiently interested in using the available digital tools to access support services. • AYPLHIV are also very dependent on clinic staff for information – they are receivers more than pursuers of health information.	Wits RHI posits that, in addition to the ever-present data challenges which they would need to overcome to make mHealth services sustainable, the digital tools like the chatbot or virtual support groups were too unfamiliar to their YCC members. Wits RHI would like to explore how it could make digital platforms more attractive and accessible to AYPLHIV in terms of either modifying the features or enhancing their own communication and training around the use of such tools.
Key concerns for acceptability, feasibility, and sustainability of mHealth model	**mHealth opportunity to explore with a consortium**
• Selected tools should be integrated into existing platforms that AYP already use • Features for providing referrals or screening for specific interventions are needed • The platforms must empower AYPLHIV to initiate queries and receive information in a timely manner	Wits RHI would like to explore the development (or availability) of an app that allows AYPLHIV to track and check their viral loads and status digitally. Currently, most clients need to request this data from clinic staff. The goal of the proposed mHealth tool would be to empower AYPLHIV to take greater ownership of their own health and feel more in control of their information to promote adherence.

Case Studies

Case Study 2: Anova Health Institute and the Youth Care Club

The monthly edition of the Cool Comms letter is posted to the My Future First community Facebook page where any young people can access important information about Covid-19, health facilities, and HIV care.

Anova

Anova adopted the Youth Care Club (YCC) model from Wits RHI to provide ARV refills, clinical care and referrals, and youth-led support groups for AYPLHIV. Following a small-scale trial of YCC in Johannesburg, Anova began rolling out the programme at 25 facilities across Gauteng in January 2020. YCC services were already underway in these locations in March when the lockdown mandates threatened to severely hinder their early progress. Programme leaders feared they might lose newly onboarded clients and that lockdown conditions would likely introduce new psychosocial issues for young people. Anova responded with two mHealth measures to ensure continuity of the YCC for young people: the Cool Communications newsletter (Cool Comms) and WhatsApp-based support group sessions. Both innovations attempted to merge an mHealth approach with traditional media to maintain connections with as many AYPLHIV as possible. Anova continues to tweak this model to enhance efficacy and support the larger objectives shared by UBII and policymakers.

Behind the scenes

Prior to the pandemic, YCC relied on youth ambassadors to lead monthly support group sessions. As the primary points of contact for their group members, ambassadors had members' contact information and were able to ensure that all were onboarded onto a virtual platform, and no one was "lost" or left behind. Given the abruptness of the lockdown mandates, and the uncertainty it immediately created for health providers to continue delivering services, the mobile app WhatsApp was selected as the virtual communication platform for its ubiquity and accessibility among most clients. This proved crucial to disseminating important information at a time when lockdown conditions made it very difficult for those in vulnerable communities to obtain accurate, useful information about both Covid-19 and their health care.

To address the most pressing information gap, the Cool Comms newsletter was initially envisaged as a way of disseminating Covid-19-related health information to members. Young people were not sure how their care would continue or what was happening at health facilities. The monthly circular was shared via WhatsApp groups and posted on the My Future First community Facebook page. Hard copies of the newsletter were included in the medication packs that clients collected each month to address possible gaps in mobile connectivity.

At the same time, Anova began adapting its monthly support group curriculum for a virtual format and compiling guidelines for youth ambassadors to lead online support groups. They then realised that the Cool Comms letters could be aligned with the curriculum as an additional support group resource, particularly for those experiencing internet failure or privacy issues during live, online group sessions. Cool Comms now disseminates Covid-19 information, provides health facility information, and summarises the monthly support session content.

Troubleshooting

Data: Data costs are a persistent issue for Anova's clients. Unable to implement a zero-cost or reverse-charge model for clients on their existing platform, Anova rather tried to condense session media and content to use as little data as possible. They presented session information in a photo format, which they posted within WhatsApp groups, and made their group sessions shorter.

Group size: The standard YCC model calls for group sizes of 15-20. WhatsApp group calls are limited to groups of 8, requiring leaders to run twice as many groups as normal. Anova suggests there may have been an advantage to this smaller group size in creating more intimate spaces for young people to feel secureand recommends smaller groups going forward.

Personal lifelines: Anova ensures that clients have access to a facilitator who can link them with the appropriate resources on-demand. Helpline numbers are given in each issue of Cool Comms with an internal Adolescent Hotline, which is available to young people requiring supportive counselling or additional information.

Outstanding issues

Technology: While WhatsApp has been well suited to the current context, alternative platforms may be more useful to address persisting barriers of data costs and the limited interactivity of the features.

Capacity-building: One of Anova's goals is the expansion of the mental health component in YCCs. One specific aim is to ensure YCCs can provide more comprehensive mental health screening and appropriate referral of patients where necessary. The implementation of a brief mental health screening tool delivered via a USSD platform or hardcopy for self-completion will facilitate the early identification of mental health difficulties that are frequently overlooked.

Tools: Integrate mental health screenings into the support group model to enhance psychosocial support through referrals or clinical care

Measurement: Current measurement and evaluation focus on retention and viral load suppression, but additional assessment of the experiences of both clients and youth ambassadors on key areas (e.g., support group impacts and online facilitation), can inform future priorities.

Anova's mHealth Agenda

Based on their learnings from the VSWG, Anova wants to focus the mHealth agenda on mental health offerings for AYPLHIV.

Barriers for AYPLHIV	mHealth opportunity to pilot within the organisation
Mental health support for AYPLHIV and young people more generally: • Finding more direct ways of addressing the mental health needs of AYPLHIV is an ongoing concern that predates the Covid-19 pandemic. • The integration of mental health care into primary care in South Africa has been slow in general and there are few services or interventions that target young people specifically. • Many mental health issues first emerge in early adolescence, making this a critical stage for providing care.	Anova is currently engaged in the development of a brief mental health (BMH) screening tool. This will be delivered via a USSD platform, and the results of the screening will be sent directly to a designated individual (e.g., youth ambassador, counsellor, social worker) for referral and follow-up where indicated. The screening tool will obtain consent for completion and follow-up. Adolescent-friendly language will be used throughout with the privacy of respondents assured.
Key concerns for acceptability, feasibility, and sustainability of mHealth model	**mHealth opportunity to explore with a consortium**
• Mental health must be de-stigmatised • Adolescent mental health literacy must be increased among health providers and community members • Awareness of mental health intervention options and referral pathways must be build • Facilities must expand psychosocial packages to address mental health issues (e.g. problem solving, self-efficacy, coping skills, parenting) • Adolescent mental health strategies must be aligned with existing policy • Promotion and prevention initiatives in adolescent mental health must be strengthened • Tools or processes must be developed to facilitate early diagnosis of mental health problems • Data costs must be minimised or eliminated for clients (e.g. MomConnect platform)	Anova is interested in creating a working group that will focus on development and validation of a mental health screening tool for adolescents. Currently, most screening activities are broad, and usually done in person at the health facility (e.g. the "faces" assessment used in YCCs). Brief mental health screening tools must be explored as a priority in building capacity for mental health services at health facilities.

Case Studies

AFSA

Increasing retention and adherence by providing individual and group-based psychosocial support to AYPLHIV and their caregivers

Key activities

Case finding for children and AYPLHIV, in-home one-on-one support, and off-site group support.

Scope

Two districts in KwaZulu-Natal

mHealth interventions

- Virtual support groups
- Teleconferencing

Key technologies

In addition to staying connected with AYPLHIV, AFSA also prioritised support groups for caregivers, who proved to be some of the most active participants in terms of asking questions and offering each other support.

Next steps

Eliminating the practical barriers of cost and anonymity for AYPLHIV to use group-based digital communication platforms.

Case Study 3: AFSA
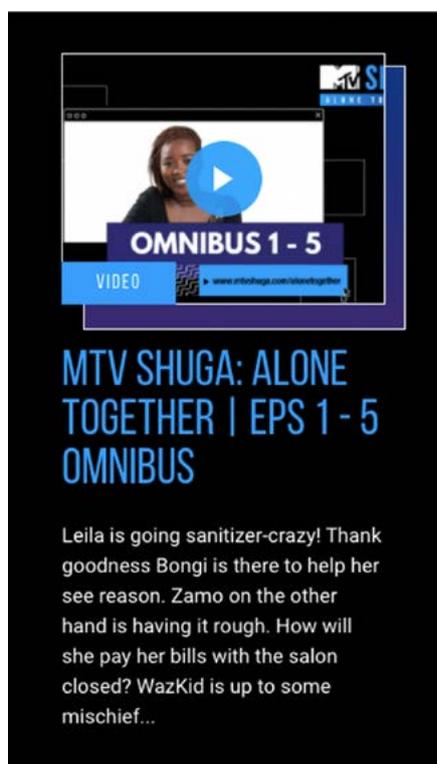
Group members were encouraged to explore the archive of resources for SRH on the MTV Shuga series website, as well as the new Covid-19 series "Alone Together", launched in 2020.

AFSA

For its UBII programme, AIDS Foundation of South Africa (AFSA) uses the Mngani Case Management Model to identify children and adolescents with HIV in the districts of eThekwini and uMgungundlovuand initiate and retain them in ART treatment. Their case-finding approach focuses both on health facility referrals and community-based identification, both of which rely heavily on in-person processes. Their case management processes, meanwhile, made limited use of mHealth interventions prior to lockdown. Although they had done telehealth services before, it was not a major part of their programme. The VSWG was therefore an essential part of their Covid-19 virtual support planning. With its case-finding work threatened by the lockdown mandates, AFSA focused on the retention and continued support of current clients through WhatsApp groups, where they disseminated text- and media-based content for support group discussion. To enhance support to children and adolescents, AFSA also created WhatsApp groups for their caregivers to receive vital information, ask questions, and voice concerns. The disruption prompted by Covid-19 has highlighted to AFSA the vulnerability of its connections to partner health facilities and communities, but also introduced an opportunity to strengthen those bonds. AFSA thinks the public health crisis has positioned CBOs well to learn from this trial of mHealth interventions and become more proactive in implementing working solutions.

Behind the scenes

For its online support groups, AFSA adapted the content from its in-person support groups, which use the YCC curriculum. Due to anonymity concerns and concerns for client well-being, the curriculum was modified to eliminate sensitive topics such as depression and mental health, which were reserved for one-on-one discussions. The MTV Shuga series was also used to stimulate discussion and educate group members. In light of data and connectivity challenges, the sessions were limited to text-based discussion based on the different curriculum topics. Managing participation, however, proved challenging.

Participation during the sessions was very limited at times, with only two out of six participants posting on some occasions. While there are many practical reasons for why this may be, facilitators nonetheless felt ill-prepared to lead groups with this new material. Although facilitators were trained in the YCC model prior to implementing the virtual groups, they found it was insufficient. The combination of implementing new material on a new platform with a new approach introduced too many variables at once. AFSA addressed the concerns by assigning two facilitators to each group to ensure better group management and session facilitation.

The success of the caregiver groups suggested that the text-based group platforms could be an effective mHealth tool when barriers of connectivity, data, and time constraints were not a concern. Caregivers asked questions about disclosing to children, side effects of treatments and missing doses, and getting assistance to collect medication. Their overwhelming response proved vital in raising issues that AFSA was not aware of or did not expect.

Troubleshooting

Access: AFSA estimates that they were only able to reach 50% of clients in their target group of 15–19-year-olds due to access issues (i.e., devices, data, and internet connectivity). AFSA added a teleconferencing option to help mitigate some access issues, but the challenge to reach everyone virtually persisted. AFSA concluded that maintaining some in-person support sessions was necessary.

Feedback: Based on the challenges they observed during Covid-19, AFSA plans to conduct a survey with its clients about the virtual support tools and platforms to better understand their experiences of the tools and what they need.

Outstanding issues

Participation: At times, participation on the WhatsApp group (which was limited to text communication) was extremely low with only a few members posting during some sessions. The facilitators posit many reasons for this, which would need to be addressed in future approaches: slow typing, conflicting priorities at home, privacy issues, and inconvenient timing.

Content: The facilitators learned that there were limits to the range of topics that could be safely and effectively discussed on digital platforms. It was not possible to engage with the sensitive topics of mental health and depression virtually, at least not on the available platforms.

Health facility relationship: AFSA uses health facility data to identify children and youth who are virally unsuppressed, newly initiated to ART, or early ART defaulters for case management. Although the flow of referrals from the clinic actually improved over the lock-down, it would be useful to conduct an evaluation of how mHealth could be applied to improve the ways of working with health facilities.

Group members discuss their concerns and experiences with ART in their virtual support group on WhatsApp

AFSA's mHealth Agenda

Based on their learnings as part of the VSWG, AFSA is most interested in eliminating the practical barriers to group-based digital communication platforms.

Barriers for AYPLHIV	mHealth opportunity to pilot within the organisation
• The prohibitive effect of device access and data costs on participation in virtual groups is well-established but was a substantial barrier for AFSA members. • Even for those who have smartphones, virtual support groups on platforms like WhatsApp were only effective during lockdown because the members already knew one another. • Confidentiality concerns on most of the common digital platforms make it difficult to on-board new AYPLHIV to groups.	To address the common issue around data costs, AFSA is currently exploring options for group data plans for members. In addition, they are piloting a USSD to include those who were not previously able to access virtual services due to data or airtime costs. The service sends educational information about HIV, allows clients to request call-backs for further support, and to choose their preferred case manager (male or female).
Key concerns for acceptability, feasibility, and sustainability of mHealth model	**mHealth opportunity to explore with a consortium**
Reverse-billing options are high-priority for any mHealth intervention.	AFSA is most interested in joining a consortium for an in-depth exploration of implementing the Ringa Nathi platform, which addresses the participant confidentiality issue by enabling anonymous groups.

mHealth Mapping Tool

The core activity of the VSWG was the convening of regular workshops where UBII partners explored the tools available for implementing virtual support groups, shared learnings from their own mHealth strategies, and derived best practices and guidelines for service delivery adaptation. Outside organisations were also invited to give presentations showcasing different platforms, tools, and mHealth examples. External workshop contributors included:

- Avert, presenting on the Boost platform for community health workers, the Ringa Nathi platform for AYPLHIV, and their Young Voices project

- SHM Foundation, presenting on the Project Insaka text message groups for women and mothers living with HIV, the Project Khuluma platform for AYPLHIV in South Africa, and the Project Zvandiri platform for community adolescent treatment supporters (CATS) in Zimbabwe

- Praekelt on the existing apps YoungAfricaLive, B-wise, TuneMe, Ringa Nathi, and Springster, and MomConnect, as well as on the Ministry of Health apps from Turn (HealthAlert, HealthCheck, and HealthWorkerAlert)

- mothers2mothers on the Virtual Mentor Mothers Platform for peer mentors to connect with mothers living with HIV

- Roger Bedford, Maxine Rosenfield, and Beate Steller on telephonic counselling skills for facilitators and the Counselling Tutor skills platform

The presentations from these organisations provided the VSWG members an opportunity to explore the most relevant and accessible mHealth tools for their projects and consider the benefits and drawbacks for their own work. The key outcome of this exploration was a map of mHealth interventions for virtual support and case management, and the best practices associated with each.

Mapping Tool: A Matrix of mHealth tools and strategies

Telephonic Interventions				
Intervention	**In Practice**	**Benefits**	**Limitations**	**Best Practices**
Telephonic support or hotline service **Description: Phone calls** from organisation for case management, staying connected, and following up with clients; **Phone calls** from clients to get information and support **Purpose:** Check-ins can support adherence counselling, appointment reminders, and information dissemination	Linkage officers, case managers, or peer supporters can call to provide one-on-one support, or to track and trace when a scheduled appointment is missed. **All UBII partners** utilise this to some extent. MOH supported linkage officers are provided data/airtime. **Examples:** • **Anova**. YCC Hotline • **m2m**. Peer-to-peer check-in calls • **Zvandiri**. Peer-to-peer check-in calls	• Direct and personal phone call • Can take place at a negotiated convenient time • Direct one-to-one communication is easier to initiate and organise than groups • Can be used as a peer support intervention • Client can call into hotline for support as needed	• Client requires airtime and access to personal/private phone • One-on-one interventions are time-consuming and human-resource intensive; not realistic to manage entire case load • Call may require arranged timing to ensure privacy • Hotlines are reliant on clients initiating engagement	**For calls, prioritise cases** and make calls on a scheduled rotational basis or on a needs-to basis. Calls should have clear objectives: *Scheduled* • High VL • Newly disclosed • Check-ins *Needs-to* • Alert-referral, e.g. mental health or social protection • LTFU trace **Helplines/hotlines** should be used by clients for urgent response in case of emergency or specific queries.
SMS *(short message service) messaging* **Description: Text messages** from organisations to clients en masse or individually with reminders for appointments, closed group, or family days **Purpose:** SMSs can provide motivational messaging and share information or links to information and resources	Linkage officers, case managers, or peer supporters can send individual SMS from phone and forward onward. With a bulk messaging package, contact information and message content can be captured in an Excel spreadsheet and e-mailed or uploaded for immediate sending.	• Client does not need data or internet to receive message • Anonymity of group members • Messages can be scheduled against a set time • Organisations can send SMSs in bulk to large groups from a phone or directly from a computer database • Programme can provide analytics	• SMSs contains only text (no pictures or videos) and are limited to 160 characters • Text-heavy; not very interactive or personalised • Initiator requires SMS bundle and android featured phone • Not zero-rated; it costs approximately 50c per individual SMS, 25c for bulk SMS	These tools are useful, but organisations should **explore zero-rated (no cost) SMS tools** and platforms for clients that ensure: • an inexpensive way to send bulk messaging to clients based on a package • sharing generic, but essential, public health messaging such as HIV/TB/SRHR and Covid-19
Bot-enabled SMS **Description:** Same as above but with additional feature of being programmed to understand questions from clients for bi-directional communication **Purpose:** Bots can enable interactive messaging to provide answers to clients and execute basic tasks	Messages and audiences are centrally managed. Bots can be deployed via phone SMS or transferred to WhatsApp. **Examples:** • **Praekelt.** MomConnect or CovidConnect bots as supported by the Ministry of Health • **m2m.** m2m tools	• Client can register, opt in, or opt out • Requires a cellular network but internet is not needed • Friendlier and more accessible • Time-saver • Can provide bulk messaging with level of predictive response • Individual Q&A interaction • Can provide user analytics	• Although slightly more interactive, similar issues as above • Bot can give a simple, pre-defined answer, but not personalised responses • Not conducive for bi-directional conversation in groups	Same as above. Bots are ideal for **sharing generic information and key public health messaging** to large groups.

WhatsApp-based Interventions

Intervention	In Practice	Benefits	Limitations	Best Practices
WhatsApp groups **Description:** Internet-based app that allows digital text, chat, and media sharing (voice messages, photos, and video) with individuals or groups **Purpose:** WhatsApp enables digital multi-media communication through a platform that is already ubiquitous in South Africa	Linkage officers, case managers, or peer supporters can text or call individuals, as well as set up defined groups to send messages, share media or links, and have group discussions. **UBII partners utilise WhatsApp** to support group chats, send motivating messaging, send ART or clinic visit reminders, and share links to information and or resources. **Example:** **Zvandiri.** Virtual support groups (text-based) managed by CATS/peer supporters in the absence of physical support groups; supported by a session guide	• WhatsApp is widely used and accepted as communication platform by a majority of people • Bi-directional and interactive communication within a group • Groups are managed by one admin • No airtime is needed; no cost on cellular network • Can be voice- and video-enabled • Multimedia possible with gifs, memes, links, or videos • Can do group call with small groups (up to 8) but primarily used as a group text-based communication platform	• Client requires a smartphone device, mobile connection, and data or Wi-Fi access to use • Not anonymised: names and numbers of group members are shared in an established group • Groups set up by one admin (phone number), which can create challenges when person leaves • Groups are open to abuse and or bullying; they need to be curated and moderated by admin to safeguard against privacy and confidentiality risk • Group calls limited to 8 members but due to higher data use, not conducive to video/voice-enabled features; interaction remains largely text-based • Long-term sustainability challenges with cost for users; data vouchers cannot guarantee data is used for the intended purpose	Facebook Live sessions should be **organised in advance and facilitated by regular group facilitator against a set agenda.** Facilitators should institute group rules (e.g., only those speaking leave cameras and mikes on for improved quality).
Anonymous WhatsApp groups **Description:** A standard WhatsApp group that incorporates TURN technology **Purpose:** This tool enables an anonymous digital support group on a popular existing platform	**Example:** **Avert and Praekelt.** Ringa Nathi is a digital support group that is moderated, led by different topics, and held each week. The facilitator has accurate information through a 'digital helpdesk' that uses Artificial Intelligence (AI) to provide the best answers to queries raised.	• Client can opt in or opt out to 10-person group • Anonymity: Client identity and number are confidential • Groups held same time each week • Backend is virtual, not human-resource intensive • Programmed AI facilitation	• Client requires smartphone device, and data or internet to use • Data costs together with fee for the customised technology, such as TURN (but may be more affordable as consortium) • AI can only be applied to Q&A related to HIV and viral load • Backend is virtual (not managed by actual group or facilitator), which may limit the type and level of interaction and conversation	These apps are readily available and **can be shared as a complementary service to provide already existing information.** This is useful as an mHealth service for both clients and community health workers.
WhatsApp chatbot **Description:** An inter-active service where clients can solicit and receive information from a chatbot on the WhatsApp platform **Purpose:** The chatbot provides vital health information and service referrals to clients on demand	New and existing clients can receive health information and service referrals on demand. **Examples:** • **Praekelt.** MomConnect or CovidConnect bots • **m2m.** Virtual Mentor Mother Platform (VMMP) shares important Covid-19 education, HIV prevention, ECD, and maternal health information	• Uses existing acceptable platform like WhatsApp to share important health information • Friendly and accessible • Time-saver • Can provide bulk messaging with level of predictive Q&A interaction and chatbot answers • Client anonymity is protected • Can provide user analytics	• Not zero-rated; client requires data or internet access to use • Information distributed is generic, not personalised • Tool not sufficiently bi-directional for conversation in groups	These tools are most suitable for **supporting or mentoring an established 'internal' group**, i.e., for a small number of staff or peer supporters. They offer a supportive, anonymised digital platform for small groups to share concerns or receive remote support and mentorship.

Mobile App-based Interventions

Intervention	In Practice	Benefits	Limitations	Best Practices
Facebook Live **Description:** A feature of the Facebook social network that uses the camera on a computer or mobile device to broadcast real-time video **Purpose:** Facebook Live can be used for virtual information sessions and support groups	Live broadcasters can decide who on Facebook can see their video and use this during a planned session, meeting, or event. **Example:** **WITS RHI**. YCC online sessions	• Sessions can be run and established in a closed group – so they can be contained • Camera and sound can be utilised for more interactivity and connection	• Client must have or create a Facebook account to use the feature • Client requires stable internet access to use effectively	Facebook Live sessions should be **organised in advance and facilitated by regular group facilitator against a set agenda.** Facilitators should institute group rules (e.g., only those speaking leave cameras and mikes on for improved quality).
Existing mobile phone apps **Description:** Mobile communication and information apps designed for adolescents and young people **Purpose:** These apps provide general open group support and helpful information targeting AYP	**Examples:** • **Praekelt**. B-wise (formerly YoungAfricaLive) and TuneMe provide SRHR for AYP • **Springster and Girl Effect**. Big Sis is a chatbot that is integrated into Facebook Messenger to inform girls and young women about SRHR	• Apps are openly available and downloadable • Apps distribute information • Apps have some chatroom features	• Client requires a smartphone device, and data or internet access, in order to download the app (even if data requirement is low)	These apps are readily available and **can be shared as a complementary service to provide already existing information.** This is useful as an mHealth service for both clients and community health workers.
Customised open-source mobile apps **Description:** An existing open-source app that has been configured to meet the unique needs of the organisation, namely increased anonymity and confidentiality **Purpose:** These apps enable facilitated, closed, and anonymised group support through a digital communication platform	Organisations can partner with providers of open-source technology solutions to create custom apps with unique features (e.g. language translations, anonymity). **Example:** SHM Foundation. Khuluma pilot in SA and Zvandiri Lounge in Zimbabwe use the open-source RocketChat to allow closed groups recruited from hospitals/clinics or CATS (peer supporters)	• Creates randomised and anonymised intimate group of 10-15 • Client can use pseudonym; their number is hidden from other group members • Enables rich, unstructured conversation that is monitored and curated against a set of topics • Backend monitored • Messaging and conversation analytics available • Data costs can be managed from a central source and data can be sent directly to device	• Client requires a smartphone device and data (in this instance, the device must be provided to the user) • Data costs (loaded monthly on phones), along with fee for the customised technology (RocketChat) • Sustainability: phone, data, and customisation costs make this prohibitive at scale or over the long term	These tools are most suitable for **supporting or mentoring an established 'internal' group**, i.e., for a small number of staff or peer supporters. They offer a supportive, anonymised digital platform for small groups to share concerns or receive remote support and mentorship.
Customised apps for targeted support **Description:** Mobile apps designed from scratch to deliver specific services **Purpose:** These apps can provide reminders and motivations, built-in resources, accurate information, and access to e-learning	**Example:** PATA. ABCD pilot enabled peer-led support sessions for pregnant and or young mothers living with HIV	• Games, incentives, and rewards can makes these tools fun for clients to use • Options are available to support self-management, self-monitoring • Push factors enable integrated on-device reminders and notifications • Opportunities for e-learning are available • The apps can be used offline	• Costly to develop and customise • Client requires smartphone, Wi-Fi/internet to download analytics • Will take time to develop– linked to individualised downloads and can be costly	Organisations should **explore existing apps that could be customised further rather than start from scratch.**

Data-light/Data-free Interventions

Intervention	In Practice	Benefits	Limitations	Opportunities
Existing data-light mobile phone apps and website **Description:** Off-the-shelf mobile phone apps and desktop websites that are created and maintained by third parties, and accessible to anyone **Purpose:** These tools provide technical information regarding HIV treatment and public health	**Example:** • Avert. Boost provides easy, up-to-date, visual, and interactive materials on HIV, sexual health, and Covid-19 • Jembi and MOH. HIV Clinical Guide app for South Africa • UCT HIV Medicines Information Centre. SA HIV/TB Hotline App	• Data-light and free to download for offline use • Available to individuals and organisations • Regularly updated with the latest information on HIV, sexual health, and Covid-19 • Promote learning and development with free-to-access hub of resources to support ongoing learning for community health workers and health providers	• Client requires smartphone device to download and use • May not be country- or region-specific • Some apps will require data to use all functions • Delay in technical updates	These tools are available and **can be shared as a complementary service for sharing already existing information to health providers, community health workers, and peer supporters.**
Reverse-billing technology **Description:** The mobile data usage for the digital communication platform (voice- and video-enabled) is reverse-billed to the organisation **Purpose:** These tools enable #datafree access for meeting on a virtual platform	Existing or new closed support groups meet virtually utilising the same support group meeting tools and session outlines. Anonymity is not required. Reverse-billing technology allows data-free, zero-airtime access for meeting participants. **Example:** Veedo. South African platform for webinars, video chatting, and live streaming	• Participant does not require airtime or data balance to use • Participant logs in, so access is password-protected • App is available in browser, so participant does not need to download app • Useable on smartphone or PC with camera and microphone • Most virtual form of being able to connect voice/video remotely and utilise and conduct support groups as per existing content/curriculum	• Client requires a smartphone or PC • High running costs: cost of the server (e.g. time/ad hoc daily charge of R3000) as well as the data costs linked to each meeting (e.g., data costs for a group of 15 can range from R300 for 1.5 hours with only one webcam on, up to R2500 with all 15 webcams on) • Embedding videos is not available at present (e.g., for integration with MTV Shuga) • Will be expensive but could share link to a data-free web link as option	This option **could be explored as a consortium or group who could share server costs across one or two days a month, whilst running all virtual groups across these days** (with up to five groups of up to 20 being run at the same time, throughout each of the days). This way, everyone saves on server cost but would still need budget/sponsor to cover data cost and will require extensive coordination and operational support.
Cloud-based technology that eliminates data costs **Description:** Messaging app that allows digital text and chat between individuals or groups **Purpose:** Provides a data-free messaging channel to engage with clients and potential leads	**Example:** Moya App is like WhatsApp with no data cost	• Moya is data-free and can also be used to send and receive text messages if the client has no airtime or data balance • Moya is supported on most networks in SA • Separate screens for personal or group chats • Can create established groups and send pdf image with no cost for the receiver • Bot integration is possible • Can sponsor messaging campaign with no data cost barrier for end users • Campaigns have pricing per message, or cost per user per month for unlimited messages • Lower cost than SMS or WhatsApp	• Client requires a smartphone • Safeguarding: client name/number visible • Back-end advertising (retail); Pay for campaigns – linked to support group/programme • Outside a pdf campaign poster, sending/receiving videos or other content will have data costs for sender and receiver (*currently being adapted, to follow up*) • Not for video or group calling • Acceptability of new platform to clients remains unclear	Cloud-based tools are a **cost-effective way to facilitate messaging and digital chat without data or internet**. But organisations need to explore safeguarding and anonymity concerns, and how cloud-based tools can provide media/video that can be reversibly billed to the sender.

Resources

Tools

Type	Tool	Link
Open-source Communication Platform	RocketChat	https://rocket.chat
Zero-rate Platforms	Veedo app Moya app B-wise website (from Praekelt)	https://veedo.live https://moya.app https://bwisehealth.com
Hotlines	Lovelife (from B-wise)	https://bwisehealth.com
Chatbots	Virtual Mentor Mother Platform (VMMP) (from M2M) MomConnect (from Praekelt)	https://m2m.org/2020/08/06/tech-for-good https://www.praekelt.org/momconnect
Anonymous WhatsApp Groups	Ringa Nathi (from Avert and Praekelt)	https://www.avert.org/ringa-nathi-digital-support-groups-young-people-living-hiv
Mobile Apps	B-wise (South African National Department of Health & partners) TuneMe (from Praekelt) Big Sis (from Springster and Girl Effect) Boost (from Avert) SA HIV/TB Hotline App (from UCT) HIV Clinical Guide (from Jembi Health Systems) My Journey (from MyPrep)	https://bwisehealth.com http://tuneme.org/footers-global-site-1/about/ http://za.heyspringster.com/sections/my-body/meet-big-sis-springster-v2/ https://boost.avert.org/ http://www.mic.uct.ac.za/MIC/HotlineApp https://play.google.com/store/apps/details?id=com.medicalappstudio.hivclinicalguide
Websites	Avert Young Voices project MyPrep	https://www.avert.org/hubs/young-voices-africa https://www.myprep.co.za

Guides and Reports

Guide	Link	Creator
Youth Care Club (YCC) Model implementation SOP, training guides, and workbooks	http://aviwe.wrhi.ac.za/youth-care-club-2/	Wits RHI
Virtual YCC Workbook	(In development stage – link to be updated)	Anova
ABCD Toolkit	http://teampata.org/portfolio/the-abcd-of-thinking-healthy/	PATA
ABCD mobile app Evidence Brief	http://teampata.org/portfolio/evidence-brief-caring-during-covid-19-supporting-mental-health-among-vulnerable-adolescents-and-young-people/	PATA

Implementation Partner Details

Organisation	Key Links
Anova Health Institute Youth Care Club	Facebook handle: MyFutureFirstSA https://www.anovahealth.co.za
AIDS Foundation of South Africa (AFSA)	https://www.aids.org.za/programme/hiv-combination-prevention-programme
Wits RHI Youth Care Club	Facebook handle: WitsRHI http://www.wrhi.ac.za

Supporting Partner Details

	Partner	Link
Project Partners	Praekelt Foundation	https://www.praekelt.org
	The SHM Foundation	https://www.shmfoundation.org
	Avert	https://www.avert.org
	Girl Effect	https://global.girleffect.org
Technology Partners	Jembi	https://www.jembi.org
	Veedo	https://veedo.live
	RocketChat	https://rocket.chat
	Zlto	https://www.zlto.co

References

[1] GSMA. (2020). Mobile internet connectivity 2020: sub-Saharan Africa factsheet. *GSM Association*. Retrieved from https://www.gsma.com/r/wp-content/uploads/2020/09/Mobile-Internet-Connectivity-SSA-Fact-Sheet.pdf

[2] GSMA. (2020). The mobile economy: sub-Saharan Africa 2020. *GSM Association*. Retrieved from https://www.gsma.com/mobileeconomy/wp-content/uploads/2020/09/GSMA_MobileEconomy2020_SSA_Eng.pdf

[3] Elliott, R. (2019). Mobile phone penetration throughout sub-Saharan Africa. *GeoPoll*. Retrieved from https://www.geopoll.com/blog/mobile-phone-penetration-africa/

[4] World Health Organization. (2011). mHealth: new horizons for health through mobile technologies: second global survey on eHealth. *Global Observatory for eHealth*, 3.

[5] Waterfield, K.C., Shah, G.H., Etheredge, G.D., & Ikhile, O. (2021). Consequences of COVID-19 crisis for persons with HIV: The impact of social determinants of health. *BMC Public Health*, *21*(299), 1-7.

[6] PATA. (2021). COVID-19 emergency response fund (ERF) case study report. *PATA*. Retrieved from http://teampata.org/portfolio/covid-19-emergency-response-fund-erf-case-study-report/

[7] Mehl, G., & Labrique, A. (2014). Prioritizing integrated mHealth strategies for universal health coverage. *Science*, *345*(6202), 1284-1287

[8] L'Engle, K.L., Green, K., Succop, S.M., Laar, A., & Wambugu, S. (2015). Scaled-up mobile phone intervention for HIV care and treatment: Protocol for a facility randomized controlled trial. *JMIR Research Protocols*, *4*(1), 1-8.

[9] Demena, B.A., Artavia-Mora, L., Ouedraogo, D., Thiombiano, B.A., & Wagner, N. (2020). A systematic review of mobile phone interventions (SMS/IVR/Calls) to improve adherence and retention to antiretroviral treatment in low- and middle-income countries. *AIDS Patient Care and STDs*, *34*, 59-71.

[10] Juma, K., Reid, M., Roy, M., Vorkoper, S., Temu, T.M., Levitt, N.S., Oladepo, O., Zakus, D., & Yonga, G. (2018). From HIV prevention to non-communicable disease promotion efforts in sub-Saharan Africa: A narrative review. *AIDS*, *32*, S63-S73.

[11] Gbeasor-Komlanvi, F.A., Chokpon, A.C., Zida-Compaore, W.I.C., Sadio, A., Bali, L.G., Hounou-Adossi, A.F.E., Mensah, E., Patassi, A., Lepere, P., & Ekouevi, D.K. (2020). Acceptability of the use of mobile phones for HIV management in Togo. *Santé Publique*, *32*(2), 253-262.

[12] Oseku, E., Nabaggala, M.S., Naggirinya, A.B., Ahumuza, T., Lamorde, F.M.M., Asiimwe, D.B., King, R., Owarwo, N., Laker, E., Orama, R., Castelnuovo, B., Kiragga, A., Byonanebye, & D.M., Parkes-Ratanshi, R. (2019). Using interactive voice response for PLHIV on Art: Patient interaction with mHealth. *Journal of Health Informatics in Africa*, 81-84.

[13] Rodrigues, R., Poongulali, S., Balaji, K., Atkins, S., Ashorn, P., & De Costa, A. (2015). 'The phone reminder is important but will others get to know about my illness?' Patient perceptions of an mHealth antiretroviral treatment support intervention in the HIVIND trial in South India. *BMJ Open*.

[14] Sherman, E., Clauson, K.A., Elrod, S., Eckardt, P., Alkhateeb, F., & Jacobs, R. (2018). Patient perceptions of text messaging to improve antiretroviral therapy adherence: A qualitative study of patients in a Ryan White Clinic. *Journal of the International Association of Providers of AIDS Care*, *17*, 1-6.

[15] Dulli, L., Ridgeway, K., Packer, C., Murray, K.R., Mumuni, T., Plourde, K.F., Chen, M., Olumide, A., Ojengbede, O., & McCarraher, D.R. (2020). A social media-based support group for youth living with HIV in Nigeria (SMART connections): Randomized controlled trial. *Journal of Medical Internet Research*, *22*(6), 1-17.

[16] Dulli, L., Ridgeway, K., Packer, C., Plourde, K.F., Mumuni, T., Chen, Idaboh, T., M., Olumide, A., Ojengbede, O., & McCarraher, D.R. (2018). An online support group intervention for adolescents living with HIV in Nigeria: A pre-post test study. *JMIR Public Health Surveillance*, *4*(4), 1-17.

[17] Crankshaw T., Corless, I.B., Giddy, J., Nicholas, P.K., Eichbaum, Q., & Butler, L.M. (2010). Exploring the patterns of use and the feasibility of using cellular phones for clinic appointment reminders and adherence messages in an antiretroviral treatment clinic, Durban, South Africa. *AIDS Patient Care STDS*, *24*(11), 729-734.

[18] Mo, P., & Coulson, N.S. (2010). Empowering processes in online support groups among people living with HIV/AIDS: A comparative analysis of 'lurkers' and 'posters'. *Computers in Human Behavior*, *26*(5), 1183-1193.

[19] Sabin, L.L., Mansfield, L., DeSilva, M.B., Vian, T., Li, Z., Wubin, X., Gifford, A.L., Barnoon, Y., & Gill, C.J. (2018). Why it worked: Participants' insights into an mHealth antiretroviral therapy adherence intervention in China. *The Open AIDS Journal*, *12*, 20-37.

[20] Tumwikirize, S., & Mokoboto-Zwane, S. (2016). Participation in PLHIV support groups: Does it enhance behavioural outcomes? *HIV: Current Research*, *1*(1), 1-6.

[21] Long, L., Kuchukhidze, S., Rosen, S., Pascoe, S., Huber, A., Fox, M., & Nichols, B. (2020). Retention in care and viral suppression in differentiated models of HIV treatment delivery in sub-Saharan Africa: Few estimates, similar results. *Journal of the International AIDS Society, 23*(11).

[22] Rapid Response Service. (2014). Online counseling and support groups for people living with or affected by HIV/AIDS. *Rapid Review, 80*, 1-5.

[23] Côté, J. Rouleau, G., Ramirez-Garcia, P., & Bourbonnais, A. (2015). Virtual nursing intervention adjunctive to conventional care: The experience pf persons living with HIV. *JMIR Research Protocols, 4*(4), 1-13.

[24] Guo, Y., Hong, Y.A., Cai, W., Li, L., Hao, Y., Qiao, J., Xu, Z., Zhang, H., Zeng, C., Liu, C., Li, Y., Zhu, Seng, Y., & Penedo, F.J. (2020). Effect of a WeChat-based intervention (Run4Love) on depressive symptoms among people living with HIV in China: a randomized controlled trial. *Journal of Medical Internet Research, 22*(2), 1-15.

[25] Mark, D., Hrapcak, S., Ameyan, W., Lovich, R., Ronan, A., Schmitz, K., & Hatane, L. (2019). Peer support for adolescents and young people living with HIV in sub-Saharan Africa: Emerging insights and a methodological agenda. *Current HIV/AIDS Reports, 16*(6), 467-474.

[26] Chang, L.W., Kagaayi, J., Arem, H., Nakigozi, G., Ssempijja, V., Serwadda, D., Quinn, T.C., Gray, R.H., Bollinger, R.C., & Reynolds, S.J. (2011). Impact of a mHealth intervention for peer health workers on AIDS care in rural Uganda: A mixed methods evaluation of a cluster-randomized trial. *AIDS and Behavior, 15*(8), 1776-1784.

[27] Guo, Y., Hong, Y.A., Qiao, J., Xu, Z., Zhang, H., Zeng, C., Cai, W., Li, L., Liu, C., Li, Y., Zhu, M., Harris, N.A., & Yang, C. (2018). Run4Love, a mHealth (WeChat-based) intervention to improve mental health of people living with HIV: a randomized controlled trial protocol. *BMC Public Health, 18*.

[28] Govender, K., Cowden, R.G., Nyamaruze, P., Armstrong, R.M., & Hatane, L. (2020). Beyond the disease: contextualized implications of the COVID-19 pandemic for children and young people living in Eastern and Southern Africa. *Frontiers in Public Health, 8*, 1-9.

[29] Wagner, N., Ouedgraogo, D., Artavia-Mora, L., Bedi, A., & Thiombiano, B.A. (2016). Protocol for a randomized controlled trial evaluating mobile text messaging to promote retention and adherence to antiretroviral therapy for people living with HIV in Burkina Faso. *JMIR Research Protocols, 5*(3), 1-13.

[30] Catalani, C., Philbrick, W., Fraser, H., Mechael, P., & Israelski, D.M. (2013). mHealth for HIV treatment & prevention: A systematic review of the literature. *The Open AIDS Journal, 7*, 17-41.

[31] Mo, P., & Coulson, N.S. (2010). Living with HIV/AIDS and use of online support groups. *Journal of Health Psychology, 15*(3), 339-350.

Acknowledgements