

Community-supported models of care for people on HIV treatment in sub-Saharan Africa

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Abstract

OBJECTIVES Further scale-up of antiretroviral therapy (ART) to those in need while supporting the growing patient cohort on ART requires continuous adaptation of healthcare delivery models. We describe several approaches to manage stable patients on ART developed by Médecins Sans Frontières together with Ministries of Health in four countries in sub-Saharan Africa.

METHODS Using routine programme data, four approaches to simplify ART delivery for stable patients on ART were assessed from a patient and health system perspective: appointment spacing for clinical and drug refill visits in Malawi, peer educator-led ART refill groups in South Africa, community ART distribution points in DRC and patient-led community ART groups in Mozambique.

RESULTS All four approaches lightened the burden for both patients (reduced travel and lost income) and health system (reduced clinic attendance). Retention in care is high: 94% at 36 months in Malawi, 89% at 12 months in DRC, 97% at 40 months in South Africa and 92% at 48 months in Mozambique. Where evaluable, service provider costs are reported to be lower.

CONCLUSION Separating ART delivery from clinical assessments was found to benefit patients and programmes in a range of settings. The success of community ART models depends on sufficient and reliable support and resources, including a flexible and reliable drug supply, access to quality clinical management, a reliable monitoring system and a supported lay workers cadre. Such models require ongoing evaluation and further adaptation to be able to reach out to more patients, including specific groups who may be challenged to meet the demands of frequent clinic visits and the integrated delivery of other essential chronic disease interventions.

keywords HIV/AIDS, antiretroviral therapy, community health services, retention in care

Introduction

At the end of 2012, 9.7 million people were receiving antiretroviral therapy (ART) in low- and middle-income countries, more than three quarters of whom live in sub-Saharan Africa (UNAIDS 2013). Continuing to provide ART to a large and growing cohort poses a significant challenge to health systems in a region where there is a shortage of clinical staff (WHO 2006); this challenge is highlighted by substantial rates of attrition reported across ART programmes (Fox & Rosen 2010; Kranzer *et al.* 2012). The pace of ART enrolment will likely further increase in the coming years with recommendations

issued by WHO in 2013 to expand the eligibility criteria for ART initiation, meaning that around 28.6 million people are now considered eligible for ART (UNAIDS 2013; WHO 2013).

The last decade has seen a progressive decentralization of ART care from hospitals to health centres, and more recently out into the community, as a way to improve access to care for patients and spread the workload for healthcare workers (Mills *et al.* 2006; Bedelu *et al.* 2007; Bemelmans *et al.* 2010; Fatti *et al.* 2010; Kredo *et al.* 2013). The challenges of further scaling up ART to those in need and improving retention in care for those on ART require continued adaptations in the models of

healthcare delivery to the reality of people's lives. The 2013 WHO Consolidated guidelines recommend that provision of ART can be maintained in the community, but operational guidance is needed for this to happen in practice (WHO 2013). As national, provincial and district teams address the various challenges, lessons from innovative models of ART delivery can help shape the next stages of HIV care and treatment scale-up.

This article describes a number of community-supported models of ART delivery developed by Médecins Sans Frontières (MSF) together with Ministries of Health (MoH) in public health facilities in sub-Saharan Africa to support ongoing efforts to manage an ever growing cohort of people on ART.

Benefits of community ART delivery

Several studies have assessed the feasibility of separating ART delivery from clinical visits by establishing models of ART delivery at the community level. In these models, health centres and hospitals serve as referral sites in case of clinical need. In Uganda, survival and virological suppression in a home-based ART delivery model were similar to facility-based ART (Jaffar *et al.* 2009); these outcomes lasted up to 5 years (Okoboi *et al.* 2014). In western Kenya, community-based care provided by people living with HIV/AIDS (PLHIV) resulted in similar clinical outcomes as usual care, but with half the number of clinic visits (Wools-Kaloustian *et al.* 2009; Selke *et al.* 2010). In Tanzania, a model of ART delivery by community-based volunteers linked to trained medical workers has led to fewer patients being lost to follow-up from treatment (Roura *et al.* 2009).

From a patient perspective, the main benefit of a community approach to ART delivery is to reduce the financial and time costs associated with frequent clinic visits. Another objective is to encourage community-based peer support. The relationship between social support and improved adherence to treatment is well established (Rueda *et al.* 2006; Ware *et al.* 2009), and the engagement of people living with HIV in service delivery can provide an additional accountability mechanism to ensure continuity and quality of care (Monitoring Essential Medicines Consortium 2013).

From a health system perspective, reducing clinic contact required for clinically stable ART populations and refocusing resources towards managing sick patients with complex clinical problems is a key objective, with anticipated reduction of staff workload and improvements in quality of care and programme outcomes (Decroo *et al.* 2013). There is no agreed definition of stable patient, but broadly, this requires that the patient has been taking

ART successfully for a minimum period of time, has no concurrent illness, has experienced a degree of immune recovery and is demonstrated to be adherent to ART (Meintjes *et al.* 2012).

Different strategies for different contexts

Models of ART delivery are context specific and dependent on a range of factors, including patient barriers to retention in care, the extent of service decentralization and task shifting to lay health worker cadres, HIV prevalence, the availability of safe and simple ART regimens, health service capacity, and regulatory or logistical constraints to ART delivery. In this article, four related approaches to simplifying ART delivery are summarised in Table 1. Key features of each model are provided in Table 2, and outcomes are summarised in Table 3.

Reducing appointment frequency in Malawi

Médecins Sans Frontières has been supporting HIV and TB activities in Chiradzulu district in Malawi (population 320 000) since 1997. Since ART was first introduced in 2001, HIV care has been progressively decentralised from the hospital to 10 health centres in order to support scale-up and improve retention in care. By mid-2013, a total of 27 607 active patients were on ART. In 2008, a new protocol for appointments was established (McGuire *et al.* 2011), allowing stable adult patients to attend the clinic once every 6 months for clinical assessments instead of every 1–2 months for patients in regular ART care. Health surveillance assistants (HSAs), who are paid community health workers and part of the MoH, provide three-monthly ART refills at health centres. Eligibility and adherence are monitored continuously according to a standardised assessment tool. When problems arise, HSAs refer patients back to the clinical staff for consultations.

Between January 2008 and mid-2013, 8528 patients have been enrolled in the six-monthly appointment (SMA) system (manuscript in preparation). Approximately one-third (2722) of enrollees have returned to regular care on at least one occasion, of whom 516 (19%) have resumed participation to date. The main reasons for returning back to regular care for extended periods are pregnancy and breastfeeding.

Although interruptions are common, 8040 (94.3%) of cumulative enrollees remain active in the ART cohort after 36 months, with a median follow-up of 25 months [IQR: 13–43] since their first enrolment. This compares to 83% retention after 36 months for patients eligible for, but not enrolled in the SMA system. Among SMA participants, loss to follow-up and mortality rates at 1, 2

Table 1 Summary of strategies for alternative models for delivery of long-term ART

Key objective	Appointment spacing and fast-track drug refill	Adherence clubs Facility-based clubs	Community-based clubs	Community ART distribution points (PODI)	Community ART groups (CAGs)
<i>Patient perspective</i>					
Reduce costs (time and transport)	Reduction of clinical visits Less time spent at clinic for drug refill	Reduction of clinical visits Less time spent at clinic for drug refill	Reduction of clinical visits Reduction of distance for drug refill	Reduction of clinical visits Reduction of distance for drug refill	Reduction of clinical visits Reduction of distance for drug refill
Increase peer support	No	At club in health facility	At club in community	At distribution point by expert patient	At CAG meeting in community
Enhance community participation	No	Potentially	Potentially	Potentially	Yes
<i>Healthcare service perspective</i>					
Reduce workload					
Nurse	Yes	Yes	Yes	Yes	Yes
Pharmacist	Yes	Yes	No	Yes	Yes
Counsellor/CHW/expert patient	Not applicable	No	No	No	No
Maintain/improve health outcomes					
Adherence	Unknown	Yes	Unknown	Unknown	Unknown
Retention	Yes	Yes	Unknown	Yes	Yes
Improve self-management of patients	Individual patient empowerment	Adherence support	Adherence support and tracing	Organisation of services for drug refill, adherence support, tracing and testing	Drug refill, adherence support, tracing, testing

and 5 years since enrolment were 1.3%, 2.98% and 7.8%, and 0.4%, 0.9% and 2.8%, respectively. The programme is currently undertaking a comparative analysis against patients who have qualified for the SMA programme, but remained in usual care.

Other countries, including Uganda, South Africa and Zimbabwe, have taken a similar approach, adapting pharmacy regulation and practice to allow for longer supplies of antiretroviral drugs in combination with spaced appointments (Nakiwogga-Muwanga *et al.* 2014).

Adherence clubs in South Africa

In Khayelitsha, South Africa, ART provision started in 2001 and by mid-2013 more than 25 000 people remained in care. As the number of patients on ART increased rapidly in the country, the loss to follow-up rate also began to rise (Boulle *et al.* 2010; Cornell *et al.*

2010). In response, several service adaptations were implemented to relieve pressure on clinics by moving towards a nurse-based, doctor-supported decentralised model of care and by developing out-of-clinic approaches to adherence support for stable patients.

Facility-based ART adherence clubs were piloted in 2007 as a way to decongest facilities by shifting consultations and ART collections for stable patients to clubs organised by peer educators at the clinic. Groups of up to 30 patients meet every 2 months for less than an hour. Participation is offered to all adults who have been on ART for at least 12 months and are considered clinically stable with an undetectable viral load. In these groups, essential tasks such as weighing patients and symptom-based general health assessments are carried out and recorded by a peer educator and/or lay counsellor who acts as the club facilitator. As pharmaceutical regulation requires a dispensing licence, antiretroviral (ARV) drugs

Table 2 Key features of models

	Appointment spacing and fast-track drug refill	Adherence clubs		Community ART distribution points (PODI)	Community ART groups (CAGs)
		Facility-based clubs	Community-based clubs		
Country	Malawi	South Africa	South Africa	DRC	Mozambique
Context	Rural	Urban	Urban	Urban	Rural
Active ART cohort	27 607 (7/2013)	25 991 (6/2013)		5028 (7/2013)	16 362 (7/2013)
Programme initiation	1/2008	11/2007	5/2012	12/2010	2/2008
Eligibility	Adult (≥ 15 years) on 1st line ART ≥ 12 months w/ CD4 count ≥ 300 , without OI/side effects, pregnancy or breastfeeding*	Adult on 1st line ART ≥ 12 months with two undetectable viral load		On 1st line ART ≥ 6 months w/CD4 count ≥ 350 , without OI/side effects	On 1st line ART ≥ 6 months w/CD4 count ≥ 200 , without OI/side effects
Frequency of ART refill	Every 3 months	Every 2 months		Every 3 months	Monthly
Mode of ART refill	Individually at clinic	Collectively at lay worker-led club		Individually at distribution point	Collectively at patient-led CAG
Frequency of clinical visit	Every 6 months for clinical consultation, yearly viral load	Yearly for viral load and clinical consultation		Yearly for CD4 and clinical consultation	Every 6 months for combined drug refill, clinical consultation, CD4

ART, antiretroviral therapy; OI, opportunistic infection.

*Continuation reviewed every 6 months per eligibility guidelines.

are pre-packaged by pharmacy staff, labelled for each participant and brought to the group by the club facilitator. Any patient reporting weight loss or other symptoms suggesting illness or drug side effects is referred back to the main clinic for assessment by a nurse. All club participants see a nurse twice a year for blood tests and clinical check-up. The club facilitator is also responsible for completion of the club register as the patient files are only drawn for the annual clinical check-up (Wilkinson 2013).

A cohort analysis comparing patient outcomes of those joining adherence clubs (502) and those who were eligible but remained in standard care (2327) found that over 40 months, club participation reduced the number of patients lost to care by 57% [adjusted hazard ratio (HR) 0.43, 95%CI 0.21–0.91] and virological rebound by 67% (HR 0.33, 95%CI 0.16–0.67) (Luque-Fernandez *et al.* 2013). The improved outcomes in the adherence clubs were determined to be the result of shorter waiting times, higher acceptability of services and consequently fewer missed clinic appointments. A cost-effectiveness study showed the cost per patient year was US\$58 in the ART club model, *vs.* US\$109 in the mainstream model of care. (Bango *et al.* 2013).

This model was taken up by the City of Cape Town and Western Cape health services in 2011, and by June 2013,

all 10 Khayelitsha clinics were running 221 facility-based clubs accounting for almost a quarter (23%) of patients on ART. In total, 776 adherence clubs had been implemented across Cape Town supporting approximately 18 700 patients, which represents one in five (19%) of all ART patients in care in the metropolitan area.

Since May 2012, MSF has piloted an extension of this model into the community, with clubs meeting in patients' homes or at community venues, with pre-packed drugs and blood specimen collection carried out at community health points. As of July 2013, there were 10 community clubs in Khayelitsha.

Community ART distribution points in DRC

In DRC's capital Kinshasa (population 10 million), patients can pay high transport costs to reach the few health facilities providing ART in the city. Patients also need to pay for their consultations, which together with transport can result in up to \$40 monthly expenses, almost half of a Congolese average monthly salary. As a consequence, many patients only enter care with advanced HIV illness.

In this low-ART coverage context, MSF together with a local network of people living with HIV established

Table 3 Outcomes to date

	Appointment spacing and fast-track drug refill		Adherence clubs		Community ART distribution points (PODI)	Community ART groups (CAGs)
	Malawi Retrospective cohort analysis	South Africa Cohort analysis and comparison club care <i>vs.</i> mainstream model of care	Facility-based clubs	Community-based clubs		
Country	Malawi	South Africa	South Africa	South Africa	DRC	Mozambique
Outcomes documentation	Retrospective cohort analysis	Cohort analysis and comparison club care <i>vs.</i> mainstream model of care	Cohort analysis and comparison club care <i>vs.</i> mainstream model of care	Community-based clubs	Retrospective cohort study (survival analysis)	Retrospective cohort study (survival analysis)
Duration of follow-up (median per person)	2.5 [1.3–4.3] months	39 months [38–39] for those study participants (<i>n</i> = 502)	39 months [38–39] for those study participants (<i>n</i> = 502)		9.16 months [5.9–12.4]	19 months [10–29]
Mortality	0.9%, 2.8% at 24 and 60 months since enrolment	<1% at 40 months	<1% at 40 months		0.8% at 24 months	2.1 per 100 person-years
Loss to follow-up	3%, 8% at 24 and 60 months since enrolment	2.8% at 40 months	2.8% at 40 months		7.6% at 24 months	0.1 per 100 person-years
Retention in care in programme*	94.3% at 36 months	97% at 40 months in club (<i>n</i> = 502) <i>vs.</i> 85% in mainstream care (<i>n</i> = 2327)	97% at 40 months in club (<i>n</i> = 502) <i>vs.</i> 85% in mainstream care (<i>n</i> = 2327)		94.9% at 6 months 89.3% at 12 months 82.4% at 24 months	97.7% at 12 months, 96.0% at 24 months, 93.4% at 36 months, 91.8% at 48 months
Costing data	Not available	\$58 p/patient year in club <i>vs.</i> \$109 in mainstream model of care (service provider perspective)	\$58 p/patient year in club <i>vs.</i> \$109 in mainstream model of care (service provider perspective)		Transport costs three times higher for hospital care <i>vs.</i> community distribution point. Average 12 min waiting time at community distribution point for ART	49.6% reduction of clinic visits with reduction of 62% in ART refill visits
Patients currently enrolled (% active ART cohort)	5869 (21%)	5909 (23%)	5909 (23%)		2162 (43%)	8181 (50%) 17 272 patients in CAGs countrywide (October 2013)

* Retention in care: total number of patients on ART care followed in the programme (excluding those who are transferred out).

community ART distribution points in Kinshasa, free of charge, bringing drug delivery closer to patients' homes from late 2010 onwards. These distribution points are managed by PLHIV who are trained to provide ART refills, adherence support and follow-up of basic health indicators. Stable patients on ART attend the distribution point every 3 months for drug refill and report to the health service annually for clinical consultation and blood drawing for CD4 count testing. Referral to clinic care is done by the lay worker, and patients who do not show up for their appointments are traced by the peer counselors by phone or through the network of local support groups. The distribution points also offer free HIV testing and counselling at community level.

As of July 2013, 2162 patients had been referred to one of the three community ART distribution points – representing 43% of patients on ART. A cohort survival analysis between October 2010 to May 2013 shows that 89.3% of patients ($n = 1935$) were retained after 12 months and 82.4% at 24 months post-transfer to the distribution points (Kalenga *et al.* 2013). Mortality was <1%, although there may be some misclassification among patients lost to follow-up (7.6% at 24 months). While this study made no direct comparisons, these results compare favourably with reported retention rates of 75–85% at 12 months elsewhere in DRC (Loando 2009; Koole *et al.* 2012).

The average cost of human resources expenditure per patient is lower at community distribution points than at the clinic, while transport costs for patients are about three times lower compared with hospital-based care. There are also considerable time savings: patients at the community ART distribution points spend an average of 14 min collecting ART refills compared with 85 min at the hospital (Jouquet 2011).

The MoH has recognised the distribution points as one of the good practices for community-based access to ART in their recent national strategic plan as well as their recent application to the Global Fund to Fight AIDS, Tuberculosis and Malaria (CCM, DRC 2013; PNMLS 2013).

Community ART Groups in Mozambique

By the end of 2012, close to 300 000 patients had been initiated on ART in Mozambique. However, just 74% were alive on ART after 12 months and 51.6% after 3 years of ART initiation (Ministry of Health Mozambique 2009; Wandeler *et al.* 2012). In 2008, this high attrition figure, combined with increasing numbers of patients required to travel to a health facility every month to collect drugs and the limited number of clinics

still providing ART, prompted the government with support from MSF to launch a pilot programme of community-based ART distribution and adherence monitoring in Tete Province (Decroo *et al.* 2011).

In this programme, stable patients organise themselves into groups of six, taking turns to collect ARVs every month for group members. Each member has contact with the clinic every 6 months for a medical check and CD4 count testing, and in case of problems, patients self-refer to clinic or are referred by other community ART group (CAG) members (Decroo *et al.* 2011). A retrospective cohort study between February 2008 and December 2012 found that of 5729 CAG members, mortality and loss to follow-up rates were, respectively, 2.1 and 0.1 per 100 person-years. Retention was 91.8% at 48 months (Decroo *et al.* 2014).

Results from a qualitative study found high levels of acceptance among patients as CAGs reduced the cost and time burden on patients and provided peer support as a way to support adherence. CAGs strengthened community participation through information sharing and linking people to care. Challenges involve the limited access to CAGs for patients at high risk of loss to follow-up due to strict inclusion criteria, as well as the lack of sustained support for lay workers that have been critical for CAGs to function well (Rasschaert *et al.* 2014).

Médecins Sans Frontières has further refined the model for children and adolescents. Children are included as 'dependent members' in CAGs, meaning that they join the CAG representative on the trips to the clinic to receive their monthly clinical visit and drug refill. As of March 2012, 312 children below the age of 15 were members of 225 different CAGs, representing 6% of all CAG members. Retention among children in CAGs was 94% (Decroo *et al.* 2012).

The CAG model has also been successful in linking people who test HIV positive to ART care. In a pilot project in Changara district, Mozambique, CAG members were recruited as paid community counsellors to offer HIV testing to family or community members of CAG participants and refer them to CD4 testing at the nearby clinic. By September 2013, 3168 were tested with 273 (8.6%) testing positive, 115 (42%) of whom were eligible for ART and from these, 102 (89%) started ART.

After this early success, the MoH recommended in July 2011 that CAGs be incorporated into the national HIV care strategy and launched a national CAG pilot programme (Decroo *et al.* 2009; Rasschaert *et al.* 2014) and over 17 000 people were receiving ART in CAGs by the end of 2013. Challenges faced by MoH in the scale-up of CAGs include a lack of lay cadre to ensure links between the community groups and the health facilities.

Several MoH of neighbouring countries – including Malawi, Lesotho, South Africa and Zimbabwe – have begun piloting CAGs. The model has been further adapted to these contexts through adaptation and simplification of procedures, tools and visit schedules to national standards and intensive collaboration with local networks of people living with HIV. Similar high retention in CAGs is observed in these programmes, while acceptance of CAGs is especially high in rural settings (Baert *et al.* 2013). A study in Malawi shows the decongestion of health facilities through CAGs, as clinic visits reduced by 49.6% for CAG members between the pre- and post-CAG enrolment period. This was mainly related to a decreasing number of ART refill visits, while health seeking behaviour for other health problems did not seem to have substantially changed (Billaud *et al.* 2013).

Discussion

These different community supported models have shown good patient outcomes for patients stable on ART. Where assessed, outcomes are similar to or better than comparable cohorts of patients who remain in standard care, and there is some evidence of cost saving.

As is commonly the case for the introduction of new interventions, all the models described in this review received initial support from an international NGO (MSF). Nevertheless, subsequent expansion has been achieved as part of MoH national plans with limited international partner support (Decroo *et al.* 2013; Wilkinson 2013; WHO 2014), which is encouraging in terms of scalability and sustainability. Important lessons continue to be learned from the ongoing roll-out of these models at scale.

In a technical update released in 2014, WHO put forward a number of critical enablers for the success of community models of care, including the need for a reliable and flexible ARV drug supply system, appropriate lay cadres to support these models and adapted approaches for monitoring and evaluation (WHO 2014). Firstly a reliable drug supply is needed for these models to function. In Thyolo district, Malawi, supply chain weaknesses leading to ART stock-outs led temporarily to a decrease in incentive for patients to join CAGs. Reducing health service contact will likely require a change in prescribing policies to permit ART dispensing of more than a month's supply. This is currently allowed in most countries, but limited by insufficient volumes in drug supply or delays or shortage in funding. The recent switch in most countries to a first-line ART regimen – tenofovir + lamivudine/emtricitabine + efavirenz – provided as

a fixed-dose combination for all adults can be expected to simplify drug supply and improve adherence, further supporting community-based models of care (Ramjan *et al.* 2014; WHO 2014).

In each of these models, community workers are involved in new key tasks that support these community models in establishing, training, monitoring and facilitating the groups, as well as performing some basic clinical responsibilities such as symptom-based general health assessments. The limited engagement of lay staff in many countries has been identified as a threat to the national roll-out of the CAGs in Mozambique (Rasschaert *et al.* 2014). Given the precedents for such lay dispensing in other areas of health care, such as the model of community case management of malaria (Chanda *et al.* 2011), and WHO's recent recommendation that trained and supervised community health workers dispense ART between regular clinic visits (WHO 2013), such restrictions should be lifted. A critical challenge in many countries is the lack of a framework to support lay or basic trained workers as part of the overall health service, with corresponding remuneration and retention packages and adequate supervision often lacking (Ledikwe *et al.* 2013; Mwai *et al.* 2013). A major stumbling block for MoH is the unwillingness to include a new cadre in their wage bill envelope with already existing cadres facing difficulties with remuneration and retention.

Self-managed care is dependent on reliable referral to health professionals if the patient's health deteriorates as well as maintaining a minimal contact with health services (every 6–12 months) to ensure a minimum level of clinical and biological monitoring. This is all the more important in resource-limited settings where mortality rates among people on ART continue to be higher than in developed countries (UNAIDS 2013). Part of ensuring this minimal level of clinical management was achieved in these models by equipping patients to provide peer adherence support and education on how to identify potential signs and symptoms such as TB, other common opportunistic infections, significant weight loss or ARV-specific toxicity.

Community stakeholders have been consulted in the planning and implementation of community-based models in DRC and the recent pilot of CAGs in Malawi, Zimbabwe and Lesotho. Early experience shows that the collaboration with local networks of PLHIV has the potential to stimulate stronger demand of accountability from the health system, through a 'watchdog' to monitor drug stock-outs or other breakdowns in quality of patient care. The current trend of reduced funding from international partners for these networks is a concern (CIVICUS 2013).

Finally, monitoring and evaluation is an essential part of any community model. Accountability for patient clinical management, defaulter tracing and ARV management will need to be preserved while maintaining a troubleshooting capacity when confronted with inevitable individual patient or patient groups' problems.

Conclusions

Community-supported models of ART delivery aim to respond to the need to provide care to an ever increasing number of people on ART. Observed benefits for patients include reduced transport costs, improved peer support and increased community participation to support adherence. More rigorous research on patient outcomes in community-supported models of care in comparison with standard models of care is needed to validate the effectiveness of such strategies. From a health system perspective, advantages include a reduction of workload for clinical staff whilst improving health outcomes, plugging various leaks of the cascade and encouraging patients' autonomy. Where it has been assessed, costs and health provider workload for HIV care have been reduced.

Certain strategies such as appointment spacing and extended drug supplies benefit all patients who are stable and adherent and as such could be offered in most settings. Additional strategies that involve participation in groups such as adherence clubs or community ART groups, implying disclosure of HIV status, can be offered, but participation will always be voluntary and the choice of model will be context dependent. Providing extended drug supplies in combination with a group strategy will make it possible for patients to choose the model that best suits their needs.

Realistic planning and flexible adaptations are crucial; otherwise, the shortcomings of the health system will be carried over into community care. Key enabling factors include flexibility of drug supply, a reliable monitoring system, clear referral mechanisms between the community and health facility, provision of free care to access HIV-related services and supervision and remuneration for lay workers involved in supporting these models. Implementing science research on the roll-out of these models by MoH will help to assess the feasibility of such roll-outs as well as the conditions that need to be in place for these models to succeed.

Community-based ART delivery models may come at an initial cost, but are likely to be cost savings over traditional facility-based models of care, and there is already some evidence that this is the case. Over time, there will likely be a need for further simplification of ART delivery within the community, including more flexible entry crite-

ria as well as strategies directed towards patients with specific needs and at high risk of loss to follow-up, such as children, pregnant women, commercial sex workers and migrants, and the integrated delivery of other essential chronic disease interventions.

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M. Bemelmans *et al.* HIV community care models

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M. Bemelmans *et al.* **HIV community care models**

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