What are the essential components of HIV treatment and care services in low and middle-income countries: an overview by settings and levels of the health system?

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Objectives: To review and summarize the essential components of HIV treatment and care services in low and middle-income countries (LMICs).

Methods: Literature review and reflection on programmatic experience.

Findings: There is increasing recognition that the essential 'package' of HIV care must include early identification of HIV-positive people in need of care, appropriate initial and continued counselling, assessment of HIV disease stage, treatment with HAART for those who need it, monitoring while on treatment for efficacy, adherence and side-effects, detection and management of other complications of HIV infection, provision of sexual and reproductive health services as well as careful record-keeping.

The impressive scale-up of HIV treatment and care services has required decentralization of service provision linked to task-shifting. But the future holds even greater challenges, as the number of people in need of HIV care continues to rise at a time when many traditional donors and governments in the most-affected regions have reduced budgets.

Conclusion: In the long-term, the increased demand for HIV-care services can only be satisfied through increased decentralisation to peripheral health units, with the role of each type of unit being appropriate to the human and material resources available to it. HIV-care services can also naturally integrate with the care of chronic noncommunicable diseases and with closely related services like mother and child health, and thus should promote a shift from vertical to integrated programming. Staff training and support around a set of evidence-based policies and guidelines and a reliable supply of essential medicines and supplies are further essential components for a successful programme.

Background

Globally about 1.8 million HIV-related deaths occurred in 2009 among 33 million people living with HIV and AIDS [1]. In low and middle-income countries (LMICs), HIV/AIDS remains the third leading cause of death and although HIV-related mortality in LMICs has been declining as a result of increased access to treatment, decreases in HIV transmission have not kept pace with this [1]. Consequently, the number of people living with HIV, and of those requiring treatment, is anticipated to continue increasing over the foreseeable future.
In the past 10 years, impressive progress was made in increasing access to HIV care in LMICs, where 6.65 million people were receiving antiretroviral therapy by the end of 2010 [2]. In these countries, faced with a devastating HIV epidemic and hundreds of thousands of patients in need of life-saving HIV care, the rapid roll-out of HIV treatment was of necessity designed as an emergency response. The roll out of HIV treatment in LMICs has probably been the 'largest public health experiment ever performed' since it occurred in the absence of evidence on programmatic effectiveness and in parallel with clinical and operational research to inform evolving practices [3].

Because of key differences in patient profiles and in health system resources, practices developed in high-income countries (HICs), which have longer experience in treating HIV, cannot be directly extrapolated to LMICs. Different LMICs have therefore tried a variety of operational approaches, met various challenges and experienced varied degrees of success. What have we learned from all this and which components can be recommended to form part of a basic package of HIV-care services?

Methods

For this article, we examined public health policy documents, reports on HIV treatment programmes and peer-reviewed publications on the roll-out of HIV care in Africa. We also drew on our own experience from research and care programmes as collaborators in the UK DFID-supported Evidence for Action Research Programme [Institutions collaborating in the Evidence for Action consortium are the International HIV/AIDS Alliance; Lighthouse Trust, Malawi; London School of Hygiene and Tropical Medicine; Medical Research Council Uganda Research Unit on AIDS; Medical Research Council Clinical Trials Unit/University College London; National AIDS Research Institute of India; and Zambia AIDS-related TB Project (ZAMBART)], and as collaborators in the implementation of national HIV care programmes in Africa. We have extracted the key lessons we learned on the essential components of treatment and care; models of care; contributions by different levels of the health service and key managerial requirements.

Observations and recommendations

Essential components of a basic package of HIV care and treatment

Identification of people in need of care

The key to entry into HIV care is identification of HIV infection through counselling and testing. It is still not unusual for HIV infections to be identified too late, such as when an opportunistic infection in late stage HIV forces a patient to seek medical attention, or as a result of a partner or a child becoming ill with AIDS. Earlier detection of HIV infection through provider-initiated counselling is increasingly being adopted and has two key advantages: earlier initiation of treatment results in improved clinical outcomes [4,5], and also contributes to reduced vertical and horizontal transmission of HIV [6].

Management of newly identified HIV infection: counselling and psychosocial support

Coping with newly diagnosed HIV infection is a stressful situation during which patients require appropriate counselling and clear information as to next steps [7]. This is essential preparation for what is going to be a lifelong association with the health services and effective counselling is crucial for the success of care: it enables patients to 'live positively', adjust their lifestyle and subsequently adhere to treatment. Subsequent continued counselling also reinforces 'positive prevention' whereby onward HIV transmission to sexual or injecting partners and to infants is reduced through partner reduction, use of condoms, sterile injecting equipment, and/or contraception.

An essential adjunct to HIV testing and counselling is assessment for the stage of HIV infection and for HAART eligibility using clinical algorithms, supplemented, where available, by CD4 count testing. During this process, patient and provider determine that treatment is required and institute monitoring, depending on disease stage. Counselling must include discussion of the possible side-effects of HAART and education on symptoms of possible opportunistic infections to facilitate good adherence and care seeking in event of side effects.

Many programmes advise that patients be supported by a treatment companion to provide support and remind them about taking their medicines. Disclosure of HIV status to a trusted person also reduces many patients' psychological burden. However, compelling patients to disclose may deter them from starting HAART [8]. It is probably best to strongly recommend choosing a treatment companion, but not to insist on this as a condition for accessing care. If chosen, treatment companions should participate in at least one counselling session with the HIV-positive patient to fully understand their responsibilities.

Management of opportunistic infections and other HIV-related infections

HIV-related opportunistic infections are significant causes of morbidity and mortality and their prevention and treatment is a fundamental part of continued HIV care. Patients and clinicians should always be alert to the possibility of infectious complications of HIV, and must
be taught to prevent and detect them. Cotrimoxazole and isoniazid preventive therapy has become increasingly adopted as essential components of HIV care because prophylactic treatment with cotrimoxazole reduces the risk of bacterial infections, hospitalizations and malaria [9–11], while preventive isoniazid therapy reduces incident tuberculosis [12,13]. Although not yet part of most guidelines, primary prophylaxis with fluconazole prevents cryptococcal meningitis associated with advanced stage HIV infection [14]. A comprehensive clinical service is therefore one that includes infectious diseases screening as well as access to essential antimicrobial medicines to treat and prevent infectious complications of HIV.

**Antiretroviral therapy**

Despite its costs, timely initiation of HAART is among the most cost-effective disease-specific therapeutic interventions in healthcare today [15]. HAART maintains or reinstall a functional immune system, and drastically reduces HIV-related morbidity and mortality, as has been shown in both HICs and LMICs. HAART should be started as soon as patients are eligible, monitored carefully, and continued for life. Essential elements of HAART services include: screening for treatment eligibility; provision of drugs according to national treatment guidelines; retention of patients in care; and careful monitoring of patients for efficacy of HIV treatment, adherence to HIV treatment possible side effects of HIV treatment and incident infectious complications or cancers [16]. Because HAART provision is still a relatively new health intervention, education of providers, patients and communities as a whole is important. Further to this, as experience with large-scale provision of HIV care in LMICs is still growing, care programmes should be systematically evaluated to inform further roll-out. For this reason, careful record keeping and regular reporting of key demographic and clinical data using standardized data collection tools is of essential importance.

**Sexual and reproductive health**

Most patients in HIV care are young and still of reproductive age and women are generally a majority in treatment cohorts in Africa. It is essential that sexual and reproductive healthcare be incorporated into basic HIV care, as screening and treatment for sexually transmitted infections, and appropriate prevention and management of incident pregnancies all contribute to the prevention of HIV infection. Stated desire for children increases significantly when the health outlook of HIV-positive women improves in the first 2–3 years on HAART [17,18] so increasingly, counselling within HIV care needs to include information on reproductive choices and on the management of HIV during and after pregnancy. In addition, family planning services should be made easily available for HIV-positive persons who wish to postpone conception.

**Noninfectious complications of long-term HIV infection**

As people with HIV survive longer, previously unrecognized complications of increased incidence of cancers and noncommunicable diseases will begin to emerge. Chronic HIV infection has been associated with excess age-related morbidity when compared with HIV-negative populations [19] and exposure to HAART with an increased risk of metabolic precursors of cardiovascular disease. From observational studies in LMICs, these non-AIDS clinical complications of HIV-infection, such as heart disease, diabetes, liver disease and cancer are gaining increasing importance [20]. The implication for health services is that they will need to prepare for provision of these long-term healthcare needs.

**Mental healthcare and psychosocial support**

HIV infection is often associated with common mental disorders (CMDs) that are both treatable and require treatment. Point prevalences of CMDs between 43.7 and 82.6% have been reported by studies in African populations [21,22]. Screening for CMDs should therefore become an essential component for HIV care, as should access to psychiatric treatment if required. A recent study in Zambia has shown that a simple screening tool for CMDs can be administered with adequate validity by nonclinicians and even by trained lay workers [23].

Most people with chronic, life-threatening conditions benefit from psychosocial support. Health services should offer basic psychosocial support both to the patient themselves and to their carers, and should provide linkages to other sources, such as peer support groups, treatment buddies, and community-based organizations providing material and/or psychosocial support.

**Nutritional support**

HIV can have profound nutritional effects with depression of appetite, nausea, diarrhoea, loss of weight, and micronutrient deficiencies [24,25]. Conversely, when patients first start on effective HAART, their appetite usually increases dramatically. Also, several of the ART drugs are better tolerated on a full stomach [26,27]. Health workers should be able to provide appropriate nutritional advice to their HIV-positive patients, with a special focus on the specific nutritional complications of antiretroviral therapy, and, where feasible, linkage to local organizations that may provide nutritional support.

**Laboratory support**

Laboratory monitoring of patients on HAART serves several purposes: to identify patients who are at risk for antiretroviral (ARV) toxicity so as to substitute their treatment, to determine whether treatment is effective, to detect treatment failure so as to switch to an alternative regimen, to detect opportunistic infections and other HIV-related illnesses and cancers. National guidelines in
Africa variably list a full blood count, biochemical tests for liver and renal function, CD4 counts and viral load testing as essential or desirable monitoring tests for patients on HAART, although providing access to these monitoring tests, especially in peripheral non-specialist health facilities, is an important health system challenge. Similarly definitive diagnosis of a number of late stage opportunistic infections and cancers is beyond the scope of most peripheral primary care health facilities. It is therefore vital that health workers be trained to recognize clinical indicators of complications of HIV and its treatment so as to refer if appropriate.

The Development of AntiRetroviral Therapy in Africa showed that regular routine laboratory tests for ARV toxicity, once treatment has been initiated, does not give additional survival benefit among patients who are carefully monitored using clinical principles [28]. In this respect, it may be more cost-efficient to use full blood counts and liver and renal function tests when ARV toxicity is suspected on clinical grounds, once health workers are trained in clinical screening methods.

Routine CD4 count and viral load monitoring have not been a universal part of HIV care in LMICs, mainly due to costs and the limited availability of the required laboratory expertise and infrastructure. However, with the recent demonstration of the benefits of earlier initiation of HAART [6] access to CD4 counts will become increasingly important, to enable earlier detection of patients who are not yet exhibiting clinical signs of advanced HIV infection but who would benefit from treatment. Likewise, the need for viral load testing in order to correctly detect treatment failure and initiate switches to an alternative HAART regimen is gradually being recognized [29,30]. In order to expand HIV care in resource-limited settings, therefore, development of low-cost, and ideally point-of-care, CD4 count and viral load tests will be critical.

Models of care

Service integration

HIV care in many LMICs developed as an emergency response within special AIDS control programmes. As for other large-scale health problems, such dedicated disease programmes have a number of advantages in terms of planning, logistics and dedicated funding.

Without this vertical model of prevention and care, the response to the epidemic may well have been delayed and less adequate.

In the next phase of expanded long-term HIV care, however, service delivery will need to become more integrated. This should result in substantial cost and operational savings since there is considerable overlap between the essential care needs of long-term HIV care and the mainstream health services.

The essential needs of long-term HIV care already require patients to utilize other disease services, such as tuberculosis (TB) services, family planning and cancer screening and treatment services. Because HIV care is a life-long intervention from a service delivery point of view, it has a lot in common with the care of common noncommunicable diseases (NCDs), such as diabetes and hypertension. The experience now being gained through decentralising HIV care can therefore be put to use for the long-term management of all chronic illnesses at the primary healthcare level, and vice versa [31].

Contributions by different levels of the healthcare system

The organization of the healthcare system usually centres around the district hospital. However, many routine acute clinical and prevention services are provided by health centres, from where more complicated cases are referred to the hospital. At community level, in order to deliver services close to people’s homes, outpatient care is also available from local dispensaries, focusing on frequent and easy to manage conditions. In areas, where dispensaries do not exist, outpatient care is also given by community health workers (CHWs). The role of CHWs is mainly in health promotion, both at individual and public health level. Tertiary referral hospitals handle complicated cases that require specialist management, ideally after referral from district hospitals. In reality though, the outpatient departments of district and even tertiary hospitals also provide primary care to nearby populations.

Decentralized HIV care

In a decentralized model of HIV care, each level of the healthcare system should play a role that is defined by the human and material resources available to it. For example, CHWs encourage community members to seek HIV counselling and testing and direct them to where this is accessible from dispensaries or health centers and sometimes available in the community through door to door testing initiatives. Once diagnosed, assessment for stage of HIV disease, ideally including a CD4 count, requires clinical skills and laboratory services that are often only available at district hospitals. Increasingly, CD4 counts can be made available through investment in laboratory specimen collection systems from peripheral health facilities to more central laboratory facilities. Different point-of-care CD4 testing technologies are being developed and validated that are suitable for use in peripheral health facilities and this will greatly simplify laboratory monitoring of HAART, both from the perspective of the health system and that of the patient. After initial assessment, peripheral health facilities (health centers and dispensaries) should also be able to cater for the needs of patients diagnosed with HIV infection who are not yet in need of HAART, such as counselling on how to prevent onward HIV transmission; prevention and prophylaxis of opportunistic infections; and monitoring for disease progression.
For the most part, patients eligible for HAART are initially managed by a hospital clinician, although this can also be done by appropriately trained clinicians at a health center or a specialized HIV-care clinic [32]. In general, once initiated and stable on treatment, patients may be referred to peripheral services closer to their homes (which then becomes the routine care provider) for continued care and monitoring. Where this has worked, the prerequisites for success have been staff training, appropriate supportive supervision, reliable supply chain management, and, most importantly, the setting up of referral pathways for those situations that arise during HAART which staff at peripheral health facilities are unable to handle. However that they can be adequately cared for at a health center or dispensary can be problematic, and some patients, especially those with adequate resources, may prefer not to attend health facilities within their communities for the sake of maintaining confidentiality of the HIV diagnosis.

Community health workers can be an important additional resource. In addition to providing general psychosocial or physical support, operational research has demonstrated that supervised lay health workers are able to deliver HAART safely and effectively away from a health facility, following training in the monitoring of patients and using checklists to detect drug side effects and signs of treatment failure [33–35]. NGOs can, and usually do, play a major role in the provision of HIV care, especially through lay workers and volunteers [36].

Specialized HIV clinics and larger health facilities still serve as the routine providers for populations located near them though in an integrated model they should have a greatly diminished number of such patients. In addition, they should provide supportive supervision for peripheral units, laboratory referral services, and care for referred patients with severe infectious complications of HIV that require inpatient management, treatment failures, ARV-related toxicities, and noninfectious complications of long-term HIV infection.

**Essential managerial components**

**Treatment guidelines**

Most LMICs have elaborated their own national treatment guidelines adapted from a comprehensive set of WHO guidelines for a public health approach to antiretroviral treatment of HIV in resource-limited settings [37]. Available guidelines cover all essential elements of HIV care, including HIV testing and counselling; antiretroviral therapy of children, adults and special subgroups, such as those with TB/HIV coinfection and pregnant women; as well as the prevention and treatment of opportunistic infections and essential clinical and laboratory monitoring [38]. The WHO guidelines aim to draw from the best available evidence and to be updated regularly as experience evolves. They simplify treatment choice and practices to selected standard regimens and practices, around which training and procurement can be focused to enable widespread HAART provision, despite limited resources [37].

**Implementation guides**

In addition to their national guidelines, many national ART programmes have also developed country-specific ‘implementation guides’ to cover such requirements for scale-up of ART provision as essential staff training, task shifting within health service delivery, procurement and supply chain management and monitoring and evaluation. These guidelines are very important for ensuring that the programmes do not remain purely aspirational, but are translated into standardized provision of care and treatment services.

**Essential training**

This must include providing health workers with information on the nature of HIV infection and its natural course, the occurrence of OIs and HIV-related cancers, the need for early diagnosis and strict adherence to treatment, the negative effects of HIV stigma and how to overcome it, and the key principles of HIV prevention. Awareness that HIV serodiscordance occurs frequently amongst couples is important for both prevention and care.

**Management of HIV care services**

Health services are frequently overwhelmed by the number of outpatients seeking care for HIV. In many areas with high HIV prevalence, hospital inpatient care services have long been overburdened with an ever-growing number of AIDS-related hospitalizations. With availability of HAART, the workload at outpatient departments (OPDs) has also grown enormously. Given HIV-related stigma, it is debatable whether to hold specialized HIV clinics or to integrate HIV care into routine OPD work. However, health facilities may be forced to hold specialized clinics to make the most effective use of human resources. Enabling more peripheral health facilities to become able to initiate HAART is inevitable and is the only way to cope with large patient numbers. If done well, it does not imply a lower quality of services. However, this comes with an obligation of training and retraining of health workers, provision or up-to-date clear and simple guidelines, and effective supportive supervision.

**Supplies and commodities**

Essential medical and diagnostic equipment and commodities should be available as appropriate to the level of health facility and skills of staff, in addition to a reliable supply of all HIV-related medicines. Avoiding drug stock-outs is probably the single most important health system contribution to prevent treatment failure and ARV drug resistance.
Record keeping

All facilities delivering long-term HIV care must also be equipped to document and maintain patient clinical data. Because recording of service data collection is a laborious additional task, it is important that training of health workers incorporates these skills and that health workers are also facilitated to participate in the use of collected data to monitor and to improve their own service provision.

Integration of HIV care and prevention

HIV prevention and care services have usually developed independently. For example, behaviour change education and condom promotion were traditionally organized by means of campaigns delivered through public health and education services. However, effective counselling and treatment of people living with HIV/AIDS can also make a major contribution to HIV prevention as has become obvious in the context of prevention of mother-to-child transmission of HIV. It is important that the messages provided by the two approaches are coordinated. Finally, people living with HIV have an important role to play as partners in all programs on prevention and treatment of HIV and the healthcare services should be conscious of this contribution [39]. In addition, HIV-care services should use every patient interaction opportunity to promote the protection of the sexual partner.

Populations at increased risk of HIV

In each country, there are be population subgroups with a higher risk of being HIV-infected, such as injecting drug users, men-who-have-sex-with men, youth, sex workers and other specific occupational groups, such as long-distance truck drivers or members of the uniformed services. Concerted efforts to extend integrated HIV care and prevention to such communities is certain to produce the most profound gains per person reached, and especially in populations with a concentrated epidemic.

Conclusion

There is increasing clarity on what the essential ‘package’ of HIV care must include and on the potential contribution of the different levels of health services and different cadres of health workers. HIV care services will, of necessity, move from vertical programmes towards greater integration based on the provision of HIV care alongside care for other chronic conditions, such as TB, diabetes, and hypertension. Experience has also clarified the essential managerial components for successful large-scale HIV care programmes. On the contrary, the future holds enormous challenges, mainly because the numbers of people requiring HAART and prophylactic ARVs to prevent vertical transmission will continue to increase. As such, every opportunity to enhance prevention of HIV transmission even within treatment programmes must be utilized.

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Conflicts of interest

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