Mobile clinics for antiretroviral therapy in rural Mozambique

Troy D Moon, a Tito Jequicene, b Meridith Blevins, a Eurico José, b Julie R Lankford, b C William Wester, a Martina C Fuchs c & Sten H Vermund a

a Vanderbilt Institute for Global Health, 2525 West End Avenue, Suite 750, Nashville, Tennessee 37203, United States of America (USA).

b Friends in Global Health, Limited Liability Corporation, Quelimane, Mozambique.

c Real Medicine Foundation, Los Angeles, California, USA.

Correspondence to Troy D Moon (email: troy.moon@vanderbilt.edu).

(Submitted: 27 August 2013 – Revised version received: 12 March 2014 – Accepted: 17 March 2014 – Published online: 19 June 2014)

Abstract

Problem Despite seven years of investment from the President’s Emergency Plan for AIDS Relief (PEPFAR), the expansion of human immunodeficiency virus (HIV)-related services continues to challenge Mozambique’s health-care infrastructure, especially in the country’s rural regions.

Approach In 2012, as part of a national acceleration plan for HIV care and treatment, Namacurra district employed a mobile clinic strategy to provide temporary manpower and physical space to expand services at four rural peripheral clinics. This paper describes the strategy deployed, the uptake of services and the key lessons learned in the first 18 months of implementation.

Local setting In 2012, Namacurra’s adult population was estimated to be 125,425, and of those 15,803 were estimated to be HIV infected. Although there is consistent government support of antiretroviral therapy (ART) programmes, national coverage remains low, with less than 15% of those eligible having received ART by December 2012.

Relevant changes Between April 2012 and September 2013, Namacurra district enrolled 4832 new patients into HIV care and treatment. By using the mobile clinic strategy for ART expansion, the district was able to expand provision of ART from two to six (of a desired seven) clinics by September 2013.

Lessons learnt Mobile clinic strategies could rapidly expand HIV care and treatment in under-funded settings in ways that both build local capacity and are sustainable for local health systems. The clinics best serve as a transition to improved capacity at fixed-site services.
Introduction
The high burden of human immunodeficiency virus (HIV) infections, acquired immunodeficiency syndrome, tuberculosis, malaria and under-five mortality in sub-Saharan Africa has driven the global community to explore both new and old ideas to alleviate these problems. The roll-out of mobile clinics to broaden health-service coverage received considerable attention in the 1960s and 70s, but were not adopted on a permanent basis due to logistic challenges.\textsuperscript{1,2} Today, in Mozambique, mobile clinic strategies are again being rolled-out to increase coverage with antiretroviral therapy (ART). Here, we report on 18 months of experience using one mobile clinic in Zambézia Province, Mozambique.

Local setting
In 2009, Mozambique had an HIV prevalence of 11.5\%, with 1.4 million people being HIV positive.\textsuperscript{3} Although there is consistent government support of ART programmes, national coverage remains low, with less than 15\% of those eligible having received ART by December 2012.\textsuperscript{4} ART scale-up has posed challenges for Mozambique’s under-capacitated health-care infrastructure.\textsuperscript{5-13} If Mozambique is to achieve a national target of 80\% ART coverage by 2015, then scale-up efforts must continue to be strengthened.

The magnitude of the HIV epidemic is especially evident in Zambézia Province, which is Mozambique’s second largest province and home to 4 million people.\textsuperscript{3,9,10} Zambézia has low literacy, poor maternal and child health indices, high rates of tuberculosis and malaria, high malnutrition, and comparatively low adult and paediatric ART coverage.\textsuperscript{9,10,12-14}

Friends in Global Health, which is affiliated with the Vanderbilt Institute for Global Health, has been providing technical assistance for HIV in Zambézia since 2007. In 2009, Friends in Global Health partnered with the Real Medicine Foundation to deploy a mobile clinic built on a four-wheel drive truck that was initially used for short-term HIV counselling and testing campaigns and for emergency response following natural disasters. The clinic is 6.3 m in length and able to operate in poor road conditions; it comprises two rooms inside the vehicle cage – one equipped for clinical consultations and the other as a pharmacy, with two side tents that provide space for HIV counselling and testing (Fig. 1).
In early 2012, Mozambique’s Ministry of Health, in conjunction with its partners from the President’s Emergency Plan for AIDS Relief (PEPFAR), initiated an acceleration plan for further scale-up of the country’s HIV programmes, to overcome the low ART coverage. Since April 2012, we have used funds from Real Medicine Foundation and PEPFAR to expand ART via the mobile clinic in the district of Namacurra, Zambézia Province. This district has approximately 125,425 adults, 15,803 of whom are infected with HIV, based on an estimated 2009 HIV prevalence of 12.6%.

**Approach**

The Ministry of Health acceleration plan included expansion of ART services in Namacurra from two clinics in January 2013 to seven by the end of 2013. Before expansion, many clinics required increased numbers and better trained staffing and building rehabilitation, presenting a bottleneck to scale-up of services. To achieve service initiation within the 2013 time frame, strategies were designed for using the mobile clinic to enable rapid expansion.

At first, the mobile clinic acts to reinforce the fixed clinic, providing temporary space for services while necessary changes at the facility are completed. Services offered by the mobile clinic include HIV care and treatment; point-of-care measurements of CD4+ T lymphocyte count and haemoglobin; activities to address retention in care before and after ART initiation; tuberculosis diagnosis and care; management of malaria, diarrhoea and malnutrition; and targeted maternal and child health care. The mobile clinic staff serve as direct health care providers and they also train and mentor staff of the fixed clinic through a learn by doing approach in which mobile clinic and fixed-site clinicians worked side by side in the care and treatment of HIV positive patients, including pregnant woman and exposed children. This mentored training also focused on aspects of HIV service functionality, such as patient chart documentation and laboratory and pharmacy logistical needs. Additionally, they actively collaborate with community organizations to ensure that patients have access to HIV-prevention services, including educational materials, condoms, referral for male circumcision, psychosocial support, nutrition counselling, support for orphans and vulnerable children, and home-based care if needed.

The mobile clinic is staffed by a non-physician health officer, a maternal child health nurse, a pharmacy technician, a lay counsellor, and a driver, all hired by Friends in Global
Health. It functions from Monday through to Thursday, and alternates weekly between two fixed clinics, thus spending 8 days per month at each site.

**Relevant changes**

As of 31 March 2012, Namacurra offered HIV services at only two of its 10 clinics (Namacurra Capital and Macuze), and reported 2146 patients actively enrolled in HIV care. In April 2012, two peripheral clinics – Mixixine and Malei – were chosen to receive initial mobile clinic support. When the clinics were considered to be self-sufficient, the mobile clinic moved from Mixixine to Furquia in February 2013 and from Malei to Mbaua in August 2013. Between April 2012 and September 2013, 4832 new HIV patients were enrolled in six clinics, of whom 1223 were enrolled at the four clinics that received active support from the mobile clinic (Table 1).

**Start-up process**

At each site, HIV services were launched with a health fair, to encourage community acceptance. During the fair, community leaders were invited to speak about the arrival of HIV services and the importance of being tested, initiation of treatment and adherence. Community theatre groups performed skits about HIV and other health issues; voluntary counselling and testing was offered; and nutrition education was shared.

**Laboratory testing**

Laboratory testing capacity in Zambézia Province continues to be a limitation for efficient patient care. For Namacurra Capital and Macuze (i.e. ART sites not supported by the mobile clinic), samples for CD4 counts, haematology and biochemistry are transported daily to the district capital laboratory. However, with the initiation of the ART expansion plan, this system for transport of samples was unable to meet the increased demand. In response, the mobile clinic was equipped with a point-of-care CD4 machine, a haemoglobinometer and rapid tests for HIV, malaria and syphilis, so that tests could be run on-site.

Training on phlebotomy and interpretation of laboratory results was provided through a learn-by-doing approach towards the collection of samples and the running of CD4, haemoglobin, and the various rapid tests. This mentored training was running throughout the time the mobile clinic remained at the fixed-site. Additionally, joint planning exercises were performed to incorporate the fixed-site clinic into the laboratory sample transport system, thus ensuring continuity of services after the mobile clinic moved on.
Logistic support for pharmaceuticals
The mobile clinic arrived at the site each day stocked with the necessary antiretroviral medications, tuberculosis medications and medications for common opportunistic infections. All other medications used at the fixed clinic were supplied through Ministry of Health’s routine channels for drug distribution. The mobile clinic pharmacist provided mentored training on the appropriate use of these medications, documentation and calculation of future stock needs. This ensured that, by the time the mobile clinic moved on to the next site, the fixed clinic had been incorporated into the provincial HIV drug supply network.

Counselling and support
The lay counsellor was responsible for performing voluntary counselling and testing, enrolling patients into the HIV services, and linking patients with community organizations to ensure delivery of additional services, as appropriate.

Lessons learnt
The provision of space and personnel through the mobile clinic allowed the district of Namacurra to instantly start expanding the programme to high-priority peripheral clinics. Overall, we feel that this strategy was successful in achieving the goal of rapid HIV service expansion in Namacurra; however, there were notable challenges. The key lesson learned about programme start-up was the importance of having an open collaborative partnership with district health authorities and with local leaders from the communities surrounding the clinics. Also fundamental from the beginning was engagement with health authorities to map out the resources needed for successfully transitioning activities from the mobile clinic staff to the district clinic staff.

The ART acceleration plan established for the province was quite ambitious and authorities were under significant pressure to expand as quickly as possible. This resulted in the mobile clinic leaving one of its first facilities too hastily. Plans to ensure continuity for pharmacy, laboratory transport, and monitoring and evaluation were not finalized before departure, resulting in a 1–2 month period of medication stock-outs and limited laboratory support. In response, a checklist was developed to determine whether a site had everything in place to be functioning alone. This checklist was used at each of the subsequent facilities supported by the mobile clinic and greatly improved the transition to local control of the programme (Box 1).
Conclusion
By using the mobile clinic strategy for ART expansion, Namacurra was able to expand provision of HIV care services from two to six (of a desired seven) clinics by September 2013. Following this pilot phase, in June 2013, Friends in Global Health started to deploy two additional mobile clinics in a further two districts of Zambézia Province, using the same strategy that had been employed in Namacurra. Scale-up is currently underway in provinces across the country. Long-term PEPFAR funding is not guaranteed; nevertheless, this strategy will assist Ministry of Health’s expansion plan for HIV services in the short-term, and should require support for only a few years.

Our experience reflects the realities of severe resource constraints in one of the world’s poorest nations. Manpower shortages and infrastructure limitations constrain more rapid expansion of chronic disease care for those infected with HIV. In the context of these challenges, deployment of a mobile clinic created a short-term solution, enabling services to be provided even as the fixed clinics were refurbished and staff were trained.

Funding
Funding was provided by the Real Medicine Foundation and PEPFAR through the Centers for Disease Control and Prevention, under the terms of Cooperative Agreement #U2GPS00631.

Competing interests:
None declared.
References


Box 1. Summary of main lessons learnt

- The mobile clinic strategy enabled the rapid start-up of HIV care and treatment at fixed-site clinics while the clinics were being renovated for HIV services and their staff were being trained.

- Early engagement of health authorities to map out the resources needed for fixed clinics to function independently, as well as engagement of community leaders to facilitate community acceptance of the mobile clinic strategy, were fundamental to program success.

- Use of mobile clinic staff as mentors to the local clinic staff enabled the transfer of skills and the rapid exit of the mobile clinic personnel, allowing the mobile clinic to quickly move to new sites.
Table 1. Human immunodeficiency virus care and treatment, Namacurra District, Mozambique, April 2012 to September 2013

<table>
<thead>
<tr>
<th>Site</th>
<th>Period for mobile clinic support</th>
<th>No. of patients active in care or treatment before mobile clinic implementation&lt;sup&gt;a&lt;/sup&gt;</th>
<th>No. of newly enrolled patients in care or treatment&lt;sup&gt;b&lt;/sup&gt;</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>With mobile clinic present</td>
<td>After departure of mobile clinic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed health-facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Namacurra Capital</td>
<td>No mobile clinic</td>
<td>1421</td>
<td>NA</td>
<td>NA</td>
<td>2209</td>
<td></td>
</tr>
<tr>
<td>Macuze</td>
<td>No mobile clinic</td>
<td>725</td>
<td>NA</td>
<td>NA</td>
<td>1155</td>
<td></td>
</tr>
<tr>
<td><strong>Mobile clinic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixixine</td>
<td>April 2012 to February 2013</td>
<td>0</td>
<td>360</td>
<td>235</td>
<td>595</td>
<td></td>
</tr>
<tr>
<td>Malei</td>
<td>April 2012 to August 2013</td>
<td>0</td>
<td>423</td>
<td>10</td>
<td>433</td>
<td></td>
</tr>
<tr>
<td>Furquia</td>
<td>February 2013 to present</td>
<td>0</td>
<td>360&lt;sup&gt;c&lt;/sup&gt;</td>
<td>NA</td>
<td>360</td>
<td></td>
</tr>
<tr>
<td>Mbaua</td>
<td>August 2013 to present</td>
<td>0</td>
<td>80&lt;sup&gt;d&lt;/sup&gt;</td>
<td>NA</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td><strong>Total No.</strong></td>
<td>2146</td>
<td>1223</td>
<td>245</td>
<td>4832</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HIV: human immunodeficiency virus; NA: not applicable.

<sup>a</sup> As of 01 April 2012.

<sup>b</sup> April 2012 to September 2013.

<sup>c</sup> Data was obtained between February to September 2013.

<sup>d</sup> Data was obtained between August to September 2013.
Fig. 1. A mobile clinic, Mozambique, 2013