Abstracts of the XIX International AIDS Conference
*Journal of the International AIDS Society* 2012, **15 (Suppl 3)**
http://www.jiasociety.org/index.php/jias/article/view/18443 | http://dx.doi.org/10.7448/IAS.15.5.18443



# E1 - Integrating HIV inpatient and outpatient services, HIV-TB, HIV-STI, non-communicable disorders and other relevant diseases

## MOAE0102

### Family health days: an innovative approach to providing integrated health services for HIV and non-communicable diseases among adults and children in hard-to-reach areas of Lesotho

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**Background:** Due to Lesotho's high adult HIV prevalence (23%), considerable resources have been allocated to the HIV/AIDS response, while resources for non-communicable diseases have lagged. Since November 2011, the Elizabeth Glaser Pediatric AIDS Foundation (EGPAF) has supported Lesotho Ministry of Health to roll out Family Health Days (FHDs), an innovative strategy to increase community access to integrated health services, with a focus on hard-to-reach areas where immunization coverage, HIV service uptake, and screening and treatment for chronic diseases are low.
**Methods:** Services were provided at mobile service delivery points from 17th October to 25th November 2011. Delivery points located in rural setting were staffed by multi-disciplinary teams of doctors, nurses, community workers, nutritionists, AIDS officers, and pharmacists (30-40 health professionals present).
**Results:** During this campaign, 8,396 adults were tested for HIV (67.3% female; 32.6% male). In all, 588 (7%) tested HIV-positive (6.7% female; 7.1% male). Among those testing HIV-positive, 68.5% (403) received CD4 testing and 36.6% were enrolled into HIV care at their nearest clinics. A total of 324 ART defaulters were identified and linked back to care. Follow-up with referral facilities showed 100% of patients (defaulters and newly enrolled) linked to care were enrolled at a facility. Standard immunizations were administered to 990 children. 4,454 adults (24.7% male; 75.3% female) were screened for hypertension, and of those screened, 24.2% had elevated blood pressure and were linked to care centers. Addtitionally, 3,045 adults had blood sugar tests (27.0% males; 73.0% females); 3.1% had elevated blood sugar and were linked to care facilities.
**Conclusion:** Offering integrated services within hard-to-reach communities can increase access to a variety of critical health services, including those for non-communicable diseases, and can link ART clients lost to follow-up back to facilities. This approach will be scaled up throughout Lesotho as a strategy to reach all populations in the country.

## MOAE0103

### Integrated community HIV testing campaigns: leveraging HIV infrastructure for non-communicable diseases

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**Background:** The high burden of undiagnosed HIV in sub-Saharan Africa limits treatment and prevention efforts. Community-based HIV testing campaigns can address this challenge and provide an untapped opportunity to identify non-communicable diseases (NCDs). We tested the feasibility and diagnostic yield of integrating NCD and communicable diseases into a rapid HIV testing and referral campaign for all residents of a rural Ugandan parish.
**Methods:** A five-day, multi-disease campaign, offering diagnostic, preventive, treatment and referral services, was performed in May 2011. Services included point-of-care screening for HIV, malaria, TB, hypertension and diabetes. Finger-prick diagnostics eliminated the need for phlebotomy. HIV-infected adults met clinic staff and peer counselors on-site; those with CD4 $\leq$100/$\mu$L underwent intensive counseling and rapid referral for antiretroviral therapy (ART). Community participation, case-finding yield, and linkage to care three months post-campaign were analyzed.
**Results:** Of 6,300 residents, 2,323/3,150 (74%) adults and 2,020/3,150 (69%) children participated. An estimated 95% and 52% of adult female and male residents participated respectively. Adult HIV prevalence was 7.8%, with 46% of HIV-infected adults newly diagnosed. Thirty-nine percent of new HIV diagnoses linked to care. In a pilot subgroup with CD4 $\leq$100, 83% linked and started ART within 10 days. Malaria was identified in 10% of children, and hypertension and diabetes in 28% and 3.5% of adults screened, respectively. Sixty-five percent of hypertensives and 23% of diabetics were new diagnoses, of which 43% and 61% linked to care, respectively. Screening identified suspected TB in 87% of HIV-infected and 19% of HIV-uninfected adults; 52% percent of HIV-uninfected TB suspects linked to care.
**Conclusion:** In an integrated campaign engaging 74% of adult residents, we identified a high burden of undiagnosed HIV, hypertension and diabetes. Improving male attendance and optimizing linkage to care require new approaches. The campaign demonstrates the feasibility of integrating hypertension, diabetes and communicable diseases into HIV initiatives.

# E3 - Effect of HIV funding/programming on sexual and reproductive health (SRH) services

## WEPDE0101

### Managing change in performance-based project funding: a case study of PPFN Rapid Emergency Scale Up Plan to increase HCT/FP/STIs integrated services

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**Background:** Planned Parenthood Federation of Nigeria (PPFN) is implementing the Global Fund Round 9 project as Principal Recipient. In 2011, PPFN was challenged with lack of HCT RTK, FP and STI commodities resulting in poor performance.
In creating change to optimise PPFN performance, the Rapid Emergency Scale Up Plan was developed to meet the backlog of unmet targets in three weeks; the *Kotter's 8 step change mode* as theoretical model. The plan addresses HCT and provision of integrated SRH/HIV services through FP/STI services to capture HCT missed opportunities.
This abstract therefore seeks to document lesson learnt through the plan surpassing PPFN HCT services.
**Methods:** PPFN designed a plan showing targets linked to each clinic. A cumulative target for all clinics within a cluster was assigned to PPFN staff in each of the 35 states. This was replicated by region. To determine if each staff would meet its targets, Kotter's 8 step models was applied.
PPFN had the following targets for 2011: provide service in 486 health facilities and ensure that and 225,800 HCT clients were provided with FP and STI services.
**Results:** By using FP/STIs services as entry point, PPFN met its target by 110% for HCT services, 213% for FP/STIs services with 88% of facilities providing services
**Conclusion:** The paper indicates integration of services as a way to meet client's needs in a challenging environment and therefore increases performance while optimizing resources.

# E4 - Integration of SRH and HIV services: Delivery models and costs

## WEPDE0102

### Reaching key populations in SRH/HIV integration: recommendations from a global intervention review to identify strategies to increase the responsiveness and relevance of integrated programming to the sexual and reproductive health and rights (SRHR) needs of high-risk groups, including sex workers, MSM, transgenders, IDUs and PLHIV

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**Background:** While policy and implementation support for SRHR/HIV integration is increasing, significant questions and uncertainties remain about what such programming means in practice. This is particularly the case in concentrated HIV epidemics, where little is still known about what integration should look like for key populations, including sex workers, men who have sex with men (MSM), transgenders, injection drug users (IDUs) and people living with HIV (PLHIV). While integration is a desirable goal in the long-run particularly for clinical services, joining programs and systems that are not ready could compromise quality and access for these groups that already face difficulty in obtaining appropriate services for both HIV and SRH needs.
**Methods:** India HIV/AIDS Alliance undertook a global review of over 160 resources available on the websites of selected national and international organisations, including NGOs, technical support agencies and UN agencies. The resources included case studies, mappings, toolkits, policy briefings and program reports.
**Results:** The review identified the most common challenges in designing and implementing SRH/HIV integrated programs for key populations. These included stigma and discrimination, low levels of demand, lack of rights-based approaches, low attention to gender inequality, low understanding of key populations' specific SRH needs, lack of capacity and sensitivity among service providers, lack of strong referral systems and inadequate resources for additional interventions. The review highlighted key steps that organisations can take to successfully integrate SRHR and HIV in their responses for key populations.
**Conclusion:** While SRH/HIV integrated programs present an important opportunity to respond to the unmet needs of key populations, integration that is premature, overly rapid or too large-scale risks compromising rather than enhancing key populations' access to high quality HIV and SRH services. Good practice principles, including gender equality, human rights-based approaches, meaningful involvement of communities, for work with key populations are particularly critical in effective HIV/SRHR integration.

# E8 - Task-shifting

## MOPDE0103

### Implementation of VMMC efficiency elements in four sub-Saharan countries: service delivery methods and provider attitudes

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**Background:** The Systematic Monitoring of the Male Circumcision Scale-up (SYMMACS) is designed to track voluntary male circumcision (VMMC) service delivery in Kenya, South Africa, Tanzania, and Zimbabwe. The study measured adoption of six elements to increase efficiency in the delivery of clinical VMMC services, including:
**Methods:** Data collection took place at 14-30 VMMC sites per country (73 sites total) from April-December 2011. It included observation of the clinical facilities, observation of VMMC procedures, interviews

| If given the choice, providers reported that they would apply the following efficiency measures at their MC clinic: | Kenya (n = 85) | | South Africa (n = 95) | | Tanzania (n = 93) | | Zimbabwe (n = 74) | |
|---|---|---|---|---|---|---|---|---|
| | Already do (%) | Yes (%) | Already do (%) | Yes (%) | Already do (%) | Yes (%) | Already do (%) | Yes (%) |
| 1. Multiple beds per provider | 36.7 | 27.1 | 82.9 | 14.3 | 73.1 | 25.8 | 100.0 | 0.0 |
| 2. Bundled surgical supplies (purchased as a kit) | 0.0 | 40.0 | 88.6 | 9.5 | 24.7 | 32.3 | 100.0 | 0.0 |
| Bundling of surgical instruments and supplies by clinic staff | 97.6 | 0.0 | 7.6 | 19.0 | 73.1 | 20.4 | 0.0 | 9.5 |
| 3. Task shifting: allowing adequately trained nurses and or clinical officers to perform the entire MC procedure | 98.8 | 1.2 | 13.3 | 57.1 | 73.1 | 24.7 | 0.0 | 86.5 |
| 4. Task sharing: allowing secondary providers to administer local anesthesia | 38.8 | 21.2 | 85.7 | 13.3 | 73.1 | 23.7 | 68.9 | 27.0 |
| Task sharing: allowing secondary providers to complete interrupted sutures | 41.2 | 17.6 | 81.9 | 16.2 | 73.1 | 23.7 | 59.5 | 32.4 |
| 5. Use of forceps guided surgical method | 100.0 | 0.0 | 91.4 | 8.6 | 74.2 | 24.7 | 98.6 | 1.4 |
| 6. Electrocautery/diathermy | 14.1 | 41.2 | 88.6 | 11.4 | 5.4 | 15.1 | 78.4 | 16.2 |

Implementation of efficiency measures in VMMC: act.

with VMMC providers and the in-charge officer, and compilation of service statistics.

- Surgical method
- Task shifting (allowing non-physicians to perform VMMC)
- Task-sharing (allowing non-physicians to conduct aspects of VMMC)
- Rotation among multiple bays in the operating theater
- Bundling of supplies and tools
- Use of electrocautery instead of ligating sutures

**Results:** The results are useful for monitoring service delivery in each country and conducting cross country comparisons. The data shows considerable variation by country on 5 of the 6 elements, the exception being nearly universal use of the forceps-guided method (see Table 1). The study revealed stark differences on task-shifting, both in terms of actual practice and provider attitudes toward it. For example, in Zimbabwe, while no providers report using task-shifting, 86.5% say they would implement the practice given the choice. Countries also differed in the use of multiple beds per provider (rotation) during VMMC, with100% of providers in Zimbabwe reported using multiple beds, compared to 38% percent in Kenya, reflecting a different service delivery model. Provider reported use of electrocautery ranged from 5.4% in Tanzania to 88.6% in South Africa.
**Conclusion:** The decision to adopt these elements is generally based on national policies. However, the review of these practices across four countries demonstrates alternative methods of service delivery, and is intended to incite potential changes to these policies in the name of increasing efficiency.

## E9 - Models of delivery, including promotion of acceptance, uptake and costs

## MOPDE0102

### Determinants of VMMC provider burnout in four sub-Saharan countries

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**Background:** The Systematic Monitoring of the Male Circumcision Scale-up (SYMMACS) is designed to track voluntary male circumcision (VMMC) service delivery in Kenya, South Africa, Tanzania, and Zimbabwe. The study measured adoption of six elements to increase efficiency in the delivery of clinical VMMC services, including:

- Surgical method (e.g., forceps-guided)
- Task shifting (allowing non-physicians to perform VMMC)
- Task-sharing (allowing non-physicians to conduct aspects of VMMC)
- Rotation among multiple bays in the operating theater
- Bundling of supplies and tools
- Use of electrocautery instead of ligating sutures

**Methods:** Data collection took place at 14–30 VMMC sites per country (73 sites total) from April-December 2011. It included observation of the clinical facilities, observation of VMMC procedures, interviews with VMMC providers and the in-charge officer, and compilation of service statistics. A total of 357 providers reported on their attitudes towards their jobs and on the pervasiveness of burnout in the field of VMMC.
**Results:** The results are useful for monitoring service delivery in each country and conducting cross country comparisons. The data shows varied levels of burnout and job satisfaction among providers across countries (see Table 1 and Table 2).
The various survey instruments allow for an analysis of which program, site and provider level factors may contribute to increased

**Table 1. Occurrence of VMMC provider reported burn**

| Among all providers | Kenya (n = 85) | South Africa (n = 105) | Tanzania (n = 93) | Zimbabwe (n = 74) |
|---|---|---|---|---|
| % reporting to have noticed any provider fatigue/burnout among colleagues when they perform MC full-time as a primary work activity | | | | |
| Yes, frequently | 8.2 | 14.3 | 0.0 | 9.5 |
| Yes, occasionally | 80.0 | 26.7 | 8.6 | 24.3 |
| Yes, but very rarely | 7.1 | 15.2 | 16.1 | 32.4 |
| No, not at all | 4.7 | 41.0 | 74.2 | 29.7 |
| Don´t know | 0.0 | 2.9 | 1.1 | 4.1 |

**Table 2. VMMC provider personal job satisfaction a**

| % of providers who report to strongly agree or agree with the following statements on job satisfaction: | Kenya (n = 85) | South Africa (n = 105) | Tanzania (n = 93) | Zimbabwe (n = 74) |
|---|---|---|---|---|
| ● Performing (or assisting in performing) male circumcision is a personally fulfilling job. | 87.1 | 82.8 | 100.0 | 81.1 |
| ● I personally have begun to experience work fatigue or burnout from performing (or assisting in performing) male circumcision repeatedly. | 70.6 | 36.2 | 53.8 | 27.0 |

burnout. This paper presents results on: type of site (mobile/ static/ outreach), site volume, provider cadre, education and additional training, time in field, full/part-time status, and variety of tasks performed. For example, preliminary analyses from Zimbabwe indicated that physicians experience higher levels of burnout than their nurse colleagues.

**Conclusion:** The review of these practices across the four countries will shed light on alternative methods of staffing and service delivery that contribute to lower levels of burnout among VMMC providers. The results could inform policies and program planning for VMMC as well as other clinical HIV services.

## MOPDE0106

### A comparative analysis of two high-volume male medical circumcision (MMC) operational models with similar service delivery outcomes in different settings within Gauteng and KwaZulu-Natal provinces in South Africa: urban Centre for HIV/AIDS Prevention Studies (CHAPS) versus rural-SACTWU Worker Health Program (SWHP)

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**Background:** In 2010 South Africa initiated rapid scale up of MMC services nationally. In support of the service delivery, CHAPS operates a ''specialized fixed'' VMMC programme in a large urban setting in Johannesburg, Gauteng. SWHP operates a ''roving'' VMMC programme in the rural district of Uthukela, KwaZulu-Natal. Both programmes have achieved similar uptake of MMC services using different operational models, with each achieving the highest number of MMCs nationally within their applicable settings.

**Methods:** A comparative analysis was conducted of CHAPS' ''fixed site'' and SWHP's ''roving team'' over a one year period to analyse unique attributes of each, namely: social mobilisation; staff and capital resources; extent of partnerships with district Departments of Health (DOH), service quality, and cost comparisons between models.

**Results:** Social mobilisation activities were similar but customised to address local customs and preferences. There was variation in staffing and capital expenditure due to CHAPS' initial capital outlay for a fixed site and its permanent team of 27 versus SWHP's skeleton team of 12 with no investment in facilities. Both programmes have strong partnerships with their district DOHs, although SWHP benefited from more support in terms of interim staffing and provision of surgical consumables. This contributed to variances in expenditure and cost per MMC by programme. Adverse events and service quality were comparable, but roving services required greater time and resources in tracking client follow up than fixed services. Table 1.

**Conclusion:** This comparative analysis shows models need to be customised to address the requirements of each target population group and their geographic settings. In urban settings, fixed sites, drawing on large dense surrounding populations, maintain good daily numbers and follow up rates. In rural settings, the roving model, with significant government support, is economical and effective in reaching targets and covering communities spanning large areas.

| Description | CHAPS | SWHP |
|---|---|---|
| Capital Expenditure | 550 000 | 153 000 |
| Salaries & Wages | 5 135 222 | 3 256 688 |
| Awareness Campaigns | 163 680 | 26 400 |
| Surgical Kits & Supplies | 2 774 000 | 1 778 000 |
| Training | 6 000 | 93 300 |
| Transport & Travel | 37 084 | 123 646 |
| Operating Overheads | 1 254 416 | 544 631 |
| **Cost per 12 000 MMC procedures per annum** | **9 920 402** | **5 975 665** |
| **Cost per MMC Procedure (SA Rands)** | **R 827** | **R 498** |

## MOPDE0107

### We too are shareholders: why women must be meaningfully involved in the rollout of medical male circumcision in Africa

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**Background:** Evidence is mixed on the benefit of medical male circumcision (MMC) for women. Questions remain whether there is direct benefit in reducing HIV acquisition among women; whether men put women at risk due to early resumption of sex; whether mass rollout of MMC leads to risk compensation in ways that compromise women's ability to negotiate condom use; and whether MMC increases patriarchal behaviors such as gender-based violence. We present data from various studies to address these questions and make the case for women's shareholding position in MMC.
**Methods:** We reviewed over 30 published and ongoing studies on MMC for evidence on early resumption of sex, risk compensation, benefits of MMC to women, and women's views of and reactions to MMC rollout in different African countries.
**Results:** About 10 studies have returned the verdict of no risk compensation among circumcised men. In addition, there are few but scientifically solid evidence emerging showing up to 47% direct benefit of MMC in reducing HIV transmission to women, particularly when sex is not resumed early. However, four studies show consistent evidence of early resumption of sex before wound healing, ranging from 24-42% overall, 63-76% among married/cohabiting men, and 12-48% among HIV-positive men. About 15 studies indicate that women support MMC though misconceptions are still common, with up to 77% unaware of the need for sexual abstinence. Some believe that scale-up of MMC translates into reduced risk hence less need for safe sex.
**Conclusion:** With the current scale up of MMC for HIV prevention in 14 African countries, there is no evidence of risk compensation; however, early resumption of sex and women's low risk perception because their partners are circumcised may undermine the benefits of MMC to women. MMC programs should target women with correct and complete information and advocate for their involvement in partners' decisions on circumcision.

# E15 - Managing HIV supply chain challenges with limited resources

## THPDE0101

### Lessons from the rapid response of Namibia's supply chain when antiretroviral treatment guidelines changed to tenofovir-based first-line regimen

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**Background:** Namibia's antiretroviral treatment (ART) programme has expanded rapidly, enrolling 68,000 adult patients on treatment by December 2009, with 35% taking stavudine-based regimens. In 2010 the Ministry of Health & Social Services (MoHSS) adapted WHO recommendations and began implementing new ART guidelines that changed ART eligibility criteria and preferred first line regimens. Thus, MoHSS enlisted the support of the Supply Chain Management System (SCMS) to analyse the supply chain implications of the changes and provide support for a smooth transition.
**Methods:** Using MS Excel(r) spreadsheets, SCMS modelled implications of increasing the CD4 threshold for ART initiation and changing to tenofovir-based first line regimens. Backed by Namibian Government funding commitment, CMS accelerated internal procurement processes to avail tenofovir-based formulations, reviewed stock control parameters to manage reduced demand for stavudine and expanded ARV storage capacity to cope with the increased volumes of ARVs. Monitoring systems were intensified including quarterly tracking of trends in consumption and treatment regimens.
**Results:** Within 8 months, CMS had managed to accumulate adequate quantities of tenofovir formulations, clearing the way for the national roll-out of the new ART guidelines starting September 2010. As a result, over 34% of the approximately 90,000 adults on ART were taking tenofovir-based regimens one year later. In addition, a potential wastage of about US$ 950,000 worth of stavudine formulations was prevented and stock outs of tenofovir formulations avoided.
Interventions to optimise existing storage space at CMS created an additional 328 pallet locations, a 74% increase in racked storage capacity in five rooms for ARVs and general pharmaceuticals.
**Conclusion:** A rapid response was achievable due to the Namibian government's commitment and the agility of the supply chain. Timely availability of information through robust monitoring systems established to capture changing consumption patterns informed procurement planning and minimised the risks associated with change in ART guidelines.

## THPDE0102

### Cote d'Ivoire in crisis: supply chain strategies averted treatment interruption

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**Background:** Crisis followed the October 2010 Presidential elections in Cote d'Ivoire. International sanctions were applied, the banking system collapsed, security deteriorated and internal displacement prevented access to healthcare. SCMS, a PEPFAR program administered by USAID, adapted the national HIV/AIDS supply chain strategies to respond to changing conditions and to avoid treatment interruption
**Methods:** From the outset, SCMS established a crisis-committee whose daily calls between the field and Washington focused on information sharing with the Ministry of Health (MOH), Mission, USG team, Implementing Partners (IPs) and international donors.
SCMS jointly reviewed supply plans and stock-status reports with international donors and IPs and adjusted planned orders to meet urgent national demands. Under threat of air, land and sea border closings, SCMS re-routed all deliveries though its' Regional Distribution Center (RDC) in Accra, Ghana. The RDCs, in turn, pulsed commodities into the country as demand required and security permitted. Meanwhile, in country, the MOH provided patients with two months treatment instead of the usual one. The distribution mechanisms, however, were disrupted and SCMS together with IPs created an interim distribution plan in which IPs picked up their products and distributed them to sites.
**Results:** Deliveries continued throughout the crisis; no health facility experienced a stockout of critical products and treatment interrup-

tion was averted. Donor collaboration ensured planned deliveries met patient needs. The RDC in neighboring Ghana provided flexibility to maximize in-country stock levels, arrange last-minute flights and make urgent deliveries. On-the-ground collaboration with the MOH and IPs ensured medicines were not only available at service delivery points, but in the patients' hand.
**Conclusion:** By creatively leveraging in-country knowledge, regional resources and procurement volumes of supplies, ARVs and other critical products reached patients throughout the crisis.

## THPDE0103

### Use of simple, low cost innovations to improve availability of HIV-related commodities at public hospitals in Uganda

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**Background:** Currently, HIV/AIDS care support from donors is shifting from direct service delivery to systems strengthening of country-owned programs. However, frequent stock-outs of HIV supplies occur, as, in many cases, the systems for supply of HIV- and non-HIV-related commodities remain separate, and health facilities do not order for HIV commodities when required. The Strengthening Uganda's Systems for Treating AIDS Nationally (SUSTAIN) Project worked closely with and supported 17 public hospitals in Uganda to harmonize ordering for commodities from the governments' National Medical Stores to improve availability and service delivery.
**Methods:** SUSTAIN utilized four low-cost interventions to strengthen supply chain management systems: identification of focal persons responsible for submission of commodity orders to the national stores; training of the order focal persons in ART logistics management followed by onsite coaching and mentoring; telephone text message reminders to the focal persons one week prior to order deadlines; and development of an order checklist to harmonize submission of HIV- and non-HIV-related commodities.
**Results:** From January to October 2011, average ordering rates for all commodities improved from 46% to 71%. Improvements were noted in order submission rates for HIV-related commodities: from 29% to 81% for ARVs, 24% to 69% for PMTCT commodities, and 22% to 63% for HIV test kits. 54% of facilities harmonized submission of orders for all commodities, an improvement from 12% in January 2011. Improved submission of orders resulted in increased availability of HIV-related commodities and quality of care.
**Conclusion:** Improving availability of commodities and supplies available through the national system can be achieved by supporting hospitals to utilize low cost, simple innovations to improve ordering rates.

## THPDE0105

### Overcoming challenges in supply chain management amidst rapid scale-up of antiretroviral services

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**Background:** Fragile health commodity supply chain systems have long been a factor inhibiting universal access to care and treatment in ART programs. Weaknesses in the various components of the logistics cycle contribute to non-dependable and irregular supply of quality products at service delivery points which causes poor health-seeking behaviour, treatment interruption and poor adherence and therefore treatment failure and resistance.
**Methods:** In June 2010, STAR-EC, a five year USAID-funded project implemented by JSI, initiated training and mentorship of health workers in pediatric ART, logistics management of opportunistic infection medicines and stores management to build capacity for quantification. District focal persons were facilitated to support the sites to submit orders to the national suppliers. Storage was improved through the provision of medicine cabinets and pallets. Destruction of expired commodities was done in high priority health centres to generate space for increasing quantities of products. STAR-EC later supported the collection of these supplies from the facilities to the district stores for destruction by MoH. Data management was improved through the printing and distribution of logistics management information tools that encouraged the use of more optimal formulations. During periods of stock outs, buffer commodities were provided and collaboration with other partners mitigated non-availability at facilities. Consistent communication with national stores to determine availability of supplies and support to facilities to make and retrieve emergency orders was provided.
**Results:** The ordering rate for ARVs increased from 46% to 96% and was maintained as shown in Figure 1. Consequently, the availability of products improved which led to increase in number of clients enrolled onto ART as shown in the Figure 2.

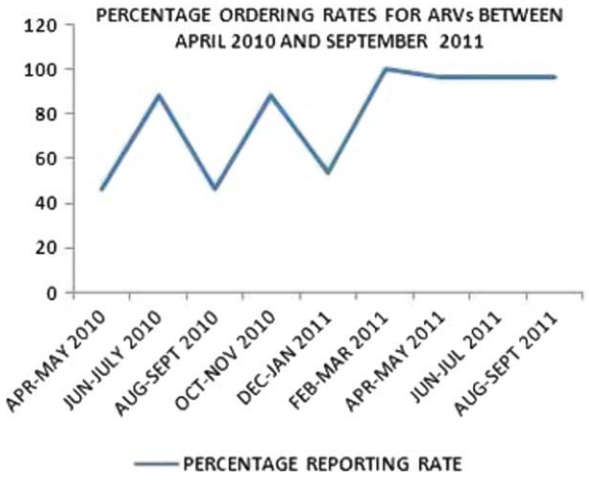


**Figure 1. Ordering Rate for ARVs.**

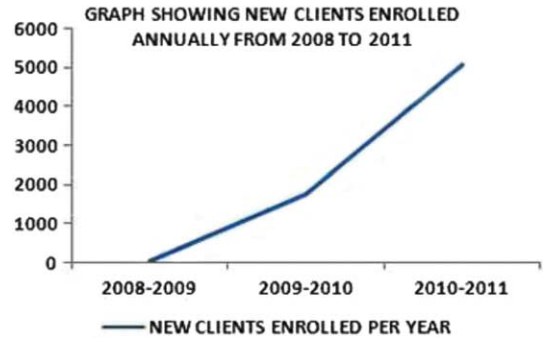


**Figure 2. Annual Enrolment of Clients on ART.**

**Conclusion:** Improved availability of commodities at health facilities and consequently, sustained expansion of ART programs can be achieved by with a holistic approach towards all the elements of the logistics cycle.

## THPDE0106

### Mind the gap: evaluating internal controls in HIV supply chains across sub-Saharan Africa

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**Background:** With USAID and Global Fund support, Deloitte Consulting LLP assessed existence and effectiveness of internal controls for government and non-governmental pharmaceutical supply chains in selected African countries. Within these countries, Deloitte traced inventory movements and volumes of selected ARVs, RTKs, and other commodities from the point of entry along the supply chain to end-user consumption.
**Methods:** The Deloitte team assessed a variety of sites, including central, provincial, and district warehouses; rural health posts; government, mission, and private hospitals; points of entry; and transportation companies. Site sampling methodology weighted provinces and districts by expected risk areas for diversion, population size, number of sites, and volume of medicine dispensed.
ARVs, RTKs and other commodities (e.g., anti-malarials, essential medicines, ITNs) were traced. Assessments incorporated a structured questionnaire, documentation sampling and review, and end-to-end reconciliation of inventory movements across each level of the supply chain. The evaluation focused on eight areas to determine control strength: Control Environment, Monitoring and Evaluation, Port Arrival and Customs Clearing, Transportation, Receiving, Storage, Distribution, and People. Scores were rolled up to province and country level in these eight areas to yield a final risk score for each country's supply chain.
**Results:** Assessed supply chains were generally found to be in the second quartile of maturity (with a score between 25 and 50 of 100 points), indicating overall weakness in internal controls. Amongst assessed countries, trends were inconsistent at the central, provincial or district levels. Common to all countries, sub-district facilities had very weak controls, leading to greater losses compared to upstream facilities.
**Conclusion:** Country governments and donors must improve documentation practices, particularly at the lowest level of the supply chain for ARV and RTK consumption. Strengthening sub-district facility controls will decrease stock-outs, diversion, and loss due to expiry, increasing available resources for health programming and improving patient outcomes.

# E17 - Developing/implementing chronic disease programmes in resource-limited settings

## MOAE0104

### Cardiovascular disease risk factor profiles of HIV-positive clients: findings from a pilot program to integrate CVD screening into HIV services at a secondary health facility in Kano, North-Western Nigeria

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**Background:** There is a clear and growing body of evidence for increased prevalence of cardiovascular disease (CVD) in HIV patients as a result of viral effects or of antiretroviral medications (ART). This pilot was implemented to assess the feasibility of integrating routine screening of cardiovascular risk factors in an HIV clinic setting in order to inform programmatic approaches.
**Methods:** HIV-positive clients enrolled in the facility between May 2010 and August 2011 (12,177 clients) were targeted for clinical CVD screening. Those found with specified CVD risk factors were referred for laboratory evaluation of their fasting blood sugar and lipid profile. In addition, behavioral and biomedical interventions were provided, including referrals to an on-site cardiac clinic for clients with a ten-year CVD risk of developing a fatal or non-fatal cardiovascular event of $\geq$20% (WHO/ISH AFR-D CVD risk assessment charts). Follow-up annual and biannual CVD risk assessments were also scheduled for clients with $<$20% and $\geq$20% ten-year CVD risks respectively.
**Results:** From May 2010 to August 2011 a total of 1,033 HIV positive clients aged between 17 and 70 years were randomly selected for screening; 82.7% were receiving ART. Of those screened, 205 (19.8%) were identified with one or more CVD risk factors and sent for laboratory evaluation; 42% of whom had a CVD risk of $<$20%, and 2.4% a CVD risk of $\geq$20%. The most common risk factors identified were age (25.7%), male sex (25.9%), high BMI (21.8%), and hypertension (15.2%). Although all risk factors were more prevalent in those receiving ART, there was no statistically significant difference with the ART-naive. Mean serum total cholesterol levels were found to increase as duration on ART increased.
**Conclusion:** We conclude that integration of screening for cardiovascular diseases in ART clinic settings is feasible and essential in order to improve the life expectancy of HIV-positive individuals.

## MOAE0105

### Integrating cervical cancer prevention services into mobile HIV counseling and testing services to reach more women with life-saving cancer interventions

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**Background:** Zambia has the world's second highest annual cervical cancer incidence and mortality rates[1] coupled with one of the world's highest HIV prevalence rates at 14.3%.[2] Research has shown an association between HIV infection and a high incidence of invasive cervical cancer with rapid progression. In the Zambia military population where the seroprevalence rate is estimated to be two times higher than the national rate, women are at greater risk of cervical cancer and HIV co-infection.
**Methods:** PCI and the Zambia Defence Force (ZDF) adopted the ''screen-and-treat'' model of the Cervical Cancer Prevention Program in Zambia (CCPPZ) and integrated it into an existing ZDF mobile HIV counseling and testing (CT) unit. The pilot was implemented in 14 ZDF units using existing health facilities and equipment. ZDF nurses were trained on the CCPPZ protocols and used an opt-out approach to enroll women accessing mobile CT services. Nurses screened consenting women using visual inspection with acetic acid (VIA) and

provided same-visit treatment using cryotherapy (''screen-and-treat'').
**Results:** A total of 839 women accessed mobile CT services; 560 women (67%), median age 35, consented to being screened. Of the 560 screened, 16% (88/560) were found with abnormal cervical lesions of which 11% (62/560) were eligible for on-site cryotherapy and were treated immediately while 5% (26/560) were referred to the Gynecologic Cancer Prevention Unit at University Teaching Hospital and of these 92% (24/26) completed the referral. The prevalence of HIV among women screened was 20% (113/560).
**Conclusion:** The high proportion of women (67%) that accepted screening for cervical cancer and the high proportion of women completing the referral, show that existing HIV prevention interventions provide a springboard for rapidly reaching women with timely, life-saving and easily adaptable cervical cancer prevention and treatment programs such as ''screen and treat''.
[1] GLOBOCAN 2008
[2] Zambia Demographic and Health Survey (2007)

## MOAE0305

### Sustainable financing for national responses through use of locally mobilised resources: a case of the AIDS levy in Zimbabwe

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**Background:** Zimbabwe is one of the countries with the highest HIV prevalence (13.75%) in the world. It has a strong policy and strategic framework and a National AIDS Trust Fund (NATF) created through an Act of Parliament. All employed individuals and companies in Zimbabwe pay 3% of their taxable income on monthly and quarterly for former and later respectively. The money support the national response to HIV and AIDS and the fund has emerged as an innovative and potentially sustainable internal response resourcing approach.
**Methods:** The study was conducted in Zimbabwe and used a combination of secondary literature, key informant interviews (Ministry of Health, NAC, Private Sector and Public Service authorities), focus group discussions (beneficiaries) and observations (Health facilities).
**Results:** The NATF is an innovative approach for a self financed/sustained HIV and AIDS response in Zimbabwe. Currently 25% of all people on ART are supported by the fund apart from financing some interventions under prevention, advocacy and monitoring and evaluation. Assisted the country achieve Global Fund grant targets though funding the acceleration of implementation. Strengthened and improved effectiveness of NAC's coordinating capacity. Fund's full potential yet to be realised as the informal sector (with estimated 80% of the employable population) is not contributing and the economy operating 40% of its capacity. NATF is a regional best practice and four countries Tanzania, Botswana, Kenya and Zambia have visited Zimbabwe to learn about the levy.
**Conclusion:** The NATF demonstrates potential countries have to generate internal resources to sustain their responses. In the context of diminishing the external global financial support, countries need innovative approaches to avoid reversing response gains. Countries with large informal sectors need to ensure contribution by these as they also benefit from services and commodities. The success of this approach rests on genuine political commitment and private sector collaboration.

# E21 - Using mobile phones/other methods to track patient and for programme data

## WEAE0302

### Monthly monitoring at a small NGO: mobile phones versus paper

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**Background:** For a small NGO supporting a community health worker program in rural villages, ensuring accurate timely data collection is difficult. Paper based systems are time-consuming to collect and often provide incomplete data. A simple, cost-effective monitoring system using mobile phones can speed up data collection and provide better data. This project aimed to use electronic reporting to better capture the quality of support (social, family, personal) provided by community health workers.
**Methods:** The project adapted paper-based monthly reporting tools already in use for implementation on the mobile phone platform using open access Frontline software. 38 CHWs (21% of the total number) were selected from a diverse set of locations. Staff built buy in from participating CHWs for the new technology and trained them on the system. Data was collected through SMS to a central database. CHWs received an initial sum of phone credit and were reimbursed based on the number of messages received, regardless of accuracy. To assess the comparative benefit of the system, SIC measured the collection and accuracy of CHWs using paper surveys.
**Results:** One month after initiation, participating CHWs had sent monthly patient information by text for 37.2% of their clients with 9.8% of messages having data errors. For paper, at one month, the percentage of monthly patient reports collected was 6%. At three months, a higher percentage of paper reports (78.7%) had been collected than electronic (45.0%). Paper surveys were two and a half times as likely to have missing information.
**Conclusion:** The mobile phone system has a clear advantage in timeliness of data. Over time, however, consistency with mobile phone reporting declined because of difficulties with reimbursements and challenges with system maintenance Next steps are adjusting the reimbursement system and evaluating whether the system is better suited for use in ongoing reporting, annual evaluation or not at all.

## WEAE0304

### Mobile telemedicine for improved community-level clinical decision making, referrals and medical information transmission and storage: a pilot study in Nairobi, Kenya

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Presenting author email: jecohn6@gmail.com

**Background:** Shortages of health professionals in low-income countries make task shifting to community health workers (CHWs) crucial to AIDS care and treatment. Multiple studies of CHW utilization reveal poor linkages to the formal health sector, lack of clinical decision making support in the field and weak integration of information gathered at the community level with the national health information system.
**Methods:** A pilot study was performed at a public HIV clinic in Nairobi that provided CHWs with a mobile telephone system (ClinipakMobile) loaded with surveys that support appropriate clinical decision making and link to an electronic patient information database. Each CHW underwent a one-day training on use of ClinipakMobile and used ClinipakMobile at home visits with clients living with HIV. Variables assessed were: ability of the CHW to use ClinipakMobile based on standardized role-play assessments, CHW satisfaction surveys, ability of the server to store clinical data, and patient-based outcomes assessed by an end-of-study chart review of CHW referrals.
**Results:** Seventeen CHWs participated. The CHWs quickly learned and retained skills in using ClinipakMobile across three time points (week 0, 3 and 6) and expressed great satisfaction. The database maintained function and integrity with only one down-time period of 24 hours. CHW patient interviews using ClinipakMobile recorded multiple ''red flag'' answers for antiretroviral non-adherence (21%), side effects (30%) and opportunistic infection symptoms (33%) resulting in 30% of patients receiving ClinipakMobile-recommended referrals to the health facility. The chart review revealed these problems were infrequently noted by clinicians at follow-up visits.
**Conclusion:** ClinipakMobile is an easy-to-use mhealth tool to improve CHW functioning to care for PLWHA. Busy clinicians may not note important clinical ''red flag'' that CHWs record at home visits. In the future, patient information gathered on ClinipakMobile should be downloaded from the server daily and given directly to clinicians to improve care during clinic visits.

## FRAE0104

### An automated platform for delivery of CD4 results to SMS-enabled antenatal clinic printers, Botswana

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**Figure 1. Display from two of the monitoring platform screens, displaying specimen details, validation/transmission status, and clinic status.**

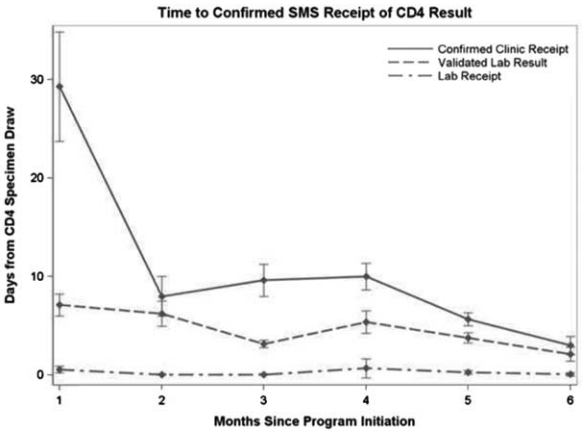


**Figure 2. Turn-around time for CD4 result delivery to antenatal clinics.**

**Background:** CD4 determination and is a key step in the prevention of mother-to-child transmission cascade. However, timely access to centrally-processed CD4 results remains a challenge for antenatal clinics in resource-limited settings.
**Methods:** As part of an interventional study to improve antenatal access to HAART, we developed an automated platform to wirelessly communicate CD4 results to portable SMS-enabled thermal printers (iBacsTel) in referral antenatal clinics. The system, authored in Python over a MySQL database using Django, directly collects results from flow cytometer (FACSCalibur) output files and integrates demographics and validation status from electronic records. The system then sends validated results via a SMS gateway (Kannel) to printers in referring antenatal clinics. Clinic receipt is confirmed centrally via SMS. A monitoring platform (see Figure 1) permits quick central assessment of clinic printer status, laboratory delays, deviations from expected testing patterns (e.g. due to supply outages, staffing shortages), and identification of women with low CD4 counts. We deployed the system in 16 clinics around Gaborone, Botswana (2 clinics added per month) between August 2011 and February 2012.
**Results:** Antenatal CD4 results for 367 women have been transmitted and confirmed, including 92 women qualifying for HAART (CD4 $<$250 cells/$\mu$L). Pre-intervention delivery, largely via hand delivery of printed results, was estimated at 21 days. After an initial adaptation phase, the mean number of days from phlebotomy to confirmed clinic result receipt improved to 3.0 days (95% CI 2.1–3.9 days, Figure 2). Improvements in both laboratory and results transmission times have resulted from real-time identification of laboratory delays, software modifications, and preemptive management of printer airtime periods. Clinicians report satisfaction, noting substantial improvements in reliability and timeliness.
**Conclusion:** Direct transmission of CD4 results to antenatal practitioners is feasible and reduces time to result receipt. The system permits central monitoring of clinic and lab performance and prioritization of pregnant women with low CD4.

## TULBE02

### Implementation of a wireless GPRS-based monitoring system for point-of-care CD4 testing at rural primary health facilities in Mozambique

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Presenting author email: jquevedo@clintonhealthaccess.org

**Background:** Point-of-care CD4 testing (POC CD4) is being implemented in many countries to improve access to CD4 and HIV services, especially in decentralized rural and remote areas. However, the implementation of POC CD4 faces challenges due to the difficulties of monitoring testing quality, operator performance, instrument breakdowns and supply stock-outs in remote sites.
**Methods:** At 10 health centers in Sofala Province, Mozambique we implemented twelve POC CD4 devices enabled with GPRS modems capable of transmitting test data to a central database via local mobile phone network. A web-based software interface was customized to allow provincial and national-level supervisors to access the following data from each device: (i) device functionality; (ii) daily test volume; (iii) error type and frequency; and (iv) frequency and performance of daily quality control runs (Figures 1 and 2).
**Results:** Data from the twelve POC CD4 devices representing a total of 336 testing days and 3,109 CD4 tests (with 620 quality control runs) were aggregated and reported by the interface. The system identified 376 error events, including 19 quality control failures (Levey-Jennings $>2$ standard deviations), 4 failures to run daily controls before testing, 45 operator test errors, 6 possible device malfunction events, and 21 instances of attempted use of expired reagents. These events prompted follow-up corrective action by supervisors more quickly than with previous paper-based reporting methods.
**Conclusion:** This is the first description of a remote wireless monitoring system to track performance of POC diagnostic tests for HIV in resource-limited settings. This GPRS-based system can improve the management of POC diagnostics by capturing real-time events that might otherwise go unnoticed. This enables detailed management of the quality and performance of POC CD4 testing in remote areas and rapid response to resolve problems and provide


**Figure 1.**


**Figure 2.**

additional training or support. This system also has applications in monitoring patient- and population-level epidemiological trends.

# E25 - Strategies to increase HIV testing, and to promote linkage and retention in care

## WEAE0202

### A laboratory-based approach to reduce loss to follow-up of HIV-positive clients

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**Background:** In Nigeria, the progressive loss of patients at every stage in antiretroviral therapy (ART) programs especially at the point of uptake of CD4 monitoring poses a threat to the achievement of treatment targets. Long waiting time coupled with the burden of traveling long distances for blood draw and receipt of CD4 results has led to attrition in the number of clients who test positive to HIV versus the number who eventually commence ART.
**Methods:** In order to increase uptake of CD4 monitoring and reduce loss to follow up (LTFU) at three USAID/MSH supported HIV care and treatment clinics, the following interventions were instituted.
1. Task shifting to data clerks to fill laboratory request forms for CD4 monitoring instead of clinicians who complain of heavy workload.
2. Strengthened escort services from the point of enrollment to the laboratory to ensure that clients access laboratory investigations on the same day.
3. Task shifting to laboratory technicians on the use of automated CD4 equipments after consistent onsite training and supervision.
4. Established point of care sample collection for CD4 estimation.
5. We commenced daily CD4 investigations (Monday to Friday) ensuring that clients attending clinics from long distances access CD4 monitoring on any day of the week.
6. Commenced 24 hours turnaround time for release of CD4 result to ensure rapid initiation of eligible clients on ART.
**Results:** After 12 months, number of clients accessing CD4 investigations increased from 53.8% to 93.3% while number of clients LTFU reduced from 58.7% to 10.7%. Turnaround time for CD4 results decreased from 7 days to 24 hours. Average client waiting time reduced from 4 hours to 1hour 30mins.
**Conclusion:** Strengthening laboratory systems helps increase uptake of CD4 investigations, shorten client waiting time and ultimately reduces LTFU especially among clients attending clinics from hard to reach communities with difficult terrains.

## WEAE0301

### The distribution and use of cell phones to mothers of HIV-positive infants identified by the Haiti National Early Infant Diagnosis of HIV program (EID): a model for increasing adherence?

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**Background:** The Caris Foundation in partnership with the Voila Foundation provides cell phones to mothers of HIV-positive infants identified via the Haiti National EID program. Mothers without access to cell phones are difficult to communicate with; Caris EID teams contact families to increase clinic attendance, improve treatment adherence and monitor children's health.
**Methods:** New phones were distributed to mothers of HIV-positive infants identified by the EID program. The program started in May 2010 and is ongoing. The cell phones were donated by Voila, a national cell service provider in Haiti. It was explained that the purpose of the phone was for monitoring the child and the mother would be contacted regularly by members of the Caris team/site providers. Each mother gave signed consent. Caris coordinators call mothers who have phones (donated or pre-existing) approximately weekly to discuss appointments, drugs and their children's health status.
**Results:** Over 70% of the phones used to monitor families were still active in Feb 2012. Of the 76 families with functional cell phones, all 76 children were adherent to treatment as defined as attending 6 out of the last 6 hospital appointments given (monthly). All the women felt positive about being called by the Caris teams and 99% felt it was helpful.

| # of Sites | # of Women Given Phones | # of Women followed up with their own phones | # of Phones Active | # of Phones Inactive | # of Phones Stolen | # of Children of families with phones in active follow up, regular adherence and on treatment |
|---|---|---|---|---|---|---|
| 20 | 70 | 38 | 76/108 (70.4%) | 21/108 (19.4%) | 11/108 (10.2%) | 76/76 (100%) |

Cell phone distribution figures.

| Questions | Responses |
|---|---|
| Why were you given a phone? (50 of the 70 women who were given a phone were contactable by the donated phone) | To check my child is healthy/ok 45/50 (90%) To remind me of my appointments 37/50 (74%) To contact someone if I my child is sick/ needs help 30/50 (60%) |
| What do you feel when you are called by the team? (108 respondents) | Positive Feelings 108(100%) Neutral Feelings 0 (0%) Negative Feelings 0 (0%) |
| Does being contacted by the team help you? (108 respondents) | Yes 107 (99.1%) No 1 (0.9%) |
| If being called is helpful-why? (108 respondants) | Appointment Reminder 86 (80%) Medication Reminder 68 (63%) To help me when my child is ill 55 (51%) |
| What are the problems you have with your phone? (108 respondants) | Lack of money to buy minutes 81 (75%) Difficulty in finding a place to charge the phone 43 (40%) Poor phone reception 27 (25%) Fear of phone being stolen 23 (21%) |

Cell phone questionnaire, Haiti.

**Conclusion:** The distribution of cell phones to families of HIV-positive children identified with the EID program in Haiti has helped our teams monitor the progress of children. Approximately 20% of PCR positive children identified are lost to follow up within the first year and contact by phone can help. Phones are available for approximately 20USD in Haiti; the program is not prohibitively expensive. 30% of the phones were non-functional/stolen within 21 months of the project. The use of mobile phones, combined with an active community tracing program has benefitted the Haiti EID program.

## MOPDE0203

### Risk factors for late-stage HIV disease presentation at initial HIV diagnosis in Durban, South Africa

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**Background:** Despite expanded access to HIV testing, most newly-diagnosed South Africans present with severe immunosuppression. We sought to determine the risk factors for presentation with late-stage HIV disease and the perceived barriers to presenting earlier for care.
**Methods:** We enrolled and surveyed adults prior to HIV testing at four outpatient clinics in urban and peri-urban areas of Durban from August 2010 to November 2011. Late-stage HIV disease was defined as a CD4 count $<100$ cells/mm$^3$. We used multivariate logistic regression models to determine the effects of sex, emotional health, social support, distance from the clinic, employment, perceived barriers to receiving healthcare, and foregoing healthcare to use money for food, clothing, or housing (''competing needs to healthcare'') on presentation for care with late-stage HIV disease.
**Results:** Among 3,669 adults screened, 830 (22.6%) were enrolled, newly-diagnosed HIV-infected, and obtained a CD4 result. Among those, 279 (33.6%) presented with late-stage HIV disease. In multivariate analyses, participants who lived $=5$ kilometers away (OR 2.8, 95% CI 1.7–4.7), had reported competing needs to healthcare (OR 1.7, 95% CI 1.2–2.4), were male (OR 1.7, 95% CI 1.2–2.3), worked outside the home (OR 1.5, 95% CI 1.1–2.1), perceived health service delivery barriers (OR 1.5, 95% CI 1.1–2.1), and had poor emotional health (OR 1.4, 95% CI 1.0–1.9) had higher odds of late-stage HIV disease presentation.
**Conclusion:** In Durban, South Africa, the strongest independent risk factors for presentation with late-stage HIV disease were living further from the clinic, being male, and having competing needs to healthcare. Self-reported barriers related to personal illness, costs of care, and poor perceived service delivery were also significantly associated with late-stage disease presentation. Future studies should examine whether use of mobile units and financial assistance may reduce presentation with late-stage HIV disease in resource-poor settings.

## THPDE0301

### Towards universal awareness of HIV status: a systematic review on uptake of home-based HIV testing in sub-Saharan Africa

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**Background:** Improving access to HIV testing is recognized as a key priority in scaling up HIV treatment and prevention services. Home-based testing (HBT) as an approach to delivering wide-scale HIV testing is explored in this study.
**Methods:** A systematic review and random effects meta-analysis of published studies reporting on uptake of HBT in sub-Saharan Africa since 2000 were conducted to assess the proportion of individuals accepting HBT and receiving their test result. Three electronic databases were searched.
**Results:** Our initial search yielded 1199 articles, 114 were reviewed as full-text articles and 19 publications involving 21 studies ($N=524,787$ offered HBT) were included for final review. The studies came from 5 countries: Uganda, Malawi, Kenya, South Africa, Zambia.

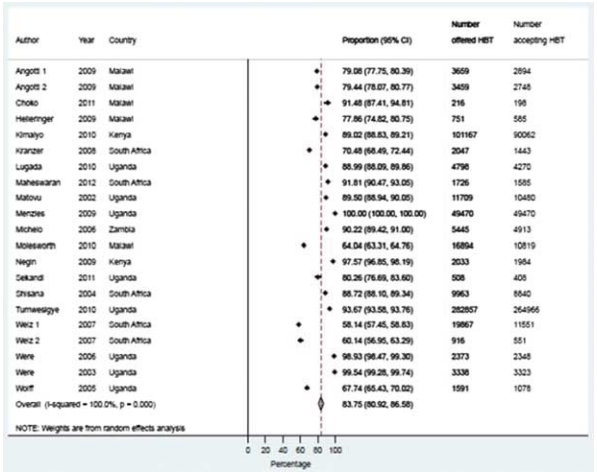


**Figure 1. Proportion accepting HBT.**

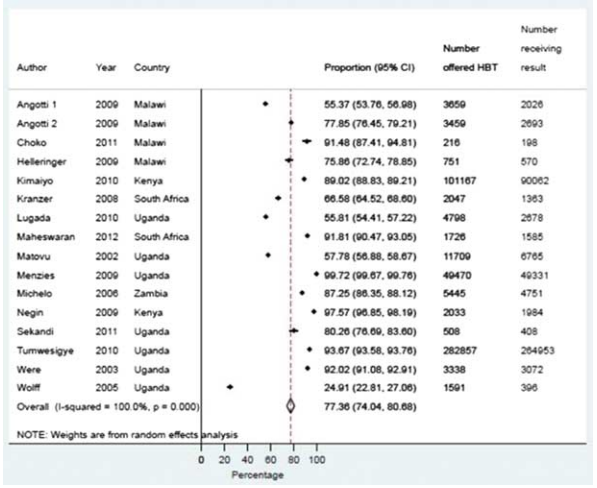


**Figure 2. Prop receiving HBT of all those offered.**

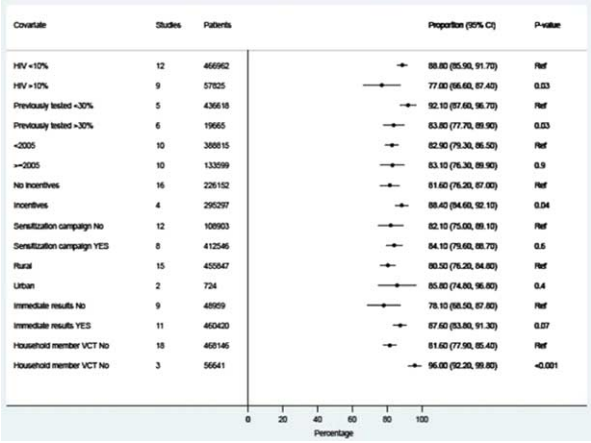


**Figure 3. Sub-group analyses of proportions accept.**

The proportion of people who accepted HBT (N = 474,516) ranged from 58.1% to 100%, with a pooled proportion of 83.8% (95% CI: 80.9–86.6%) (Figure 1). Heterogeneity was high ($t^2$0.13). Sixteen studies reported on the number of people who received the result of HBT (N = 432,835). The proportion of individuals receiving their results out of all those offered testing ranged from 24.9% to 99.7% with a pooled proportion of 77.4% (95% CI: 74.0–80.7%), ($t^2$ 0.12) (Figure 2). HIV prevalence ranged from 2.9%–36.5%. New diagnosis of HIV following HBT ranged from 40–79% of those testing positive. Forty-eight percent of those offered testing were men and they were just as likely to accept HBT as women (pooled odds ratio 0.84 (95% CI: 0.56–1.26)($t^2$0.33). The proportion of individuals previously tested for HIV among those offered a test ranged from 5–66%. No evidence was reported of negative consequences of HBT.

**Conclusion:** Home based voluntary counselling and testing has the potential to dramatically increase awareness of HIV status in previously undiagnosed men and women in sub-Saharan Africa. HBT is a gateway to accessing care early and the benefits for individual and public health, both for treatment and prevention, make it an invaluable tool in the fight against HIV.

## THPDE0302

### Thinking outside the docs: expanding access to HIV testing services through the delivery of HIV testing at the Department of Motor Vehicles in Washington, D.C.

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**Background:** Washington DC has an estimated HIV prevalence rate of 3.2% and only 50% may be aware of their infection. Using large volume public service venues may promote HIV testing and directly increase access to HIV testing, thereby increasing the number of residents who know their HIV status. Family and Medical Counseling Service, Inc. (FMCS) implemented a novel program to provide HIV testing at the Department of Motor Vehicles (DMV) which provides driver's license and automobile tag services to over 150,000 residents annually.

**Methods:** Dedicated project staff discuss the importance of routine HIV testing and offer the test to everyone awaiting DMV services. Rapid HIV testing is conducted in a private office inside the DMV, and all who test positive are immediately referred to care and support services. We present data describing the HIV testing outcomes from the program. We also asked a sample of 406 persons who didn't test about their reason for refusal.

**Results:** From October 2010 to February 2012, 108,188 individuals were offered an HIV test, 8,152 (8%) accepted, 6,788 (83%) were tested, and 34 (0.5%) were positive. The most common reasons for refusal were ''already had a test in the past six months'' (138/406, 30%) and ''do not feel I'm at risk'' (76/406, 17%). Twenty-three percent (n = 1,566) of those tested had never been tested before; the majority of whom were aged 13–24.

**Conclusion:** Conducting HIV testing in high volume non-clinical settings, such as the DMV, is a feasible strategy to engage individuals in HIV counseling and testing services, including those who have never tested before. Expansion of this program model to similar public service sites may be necessary to increase access to HIV testing services, encourage routine screening and increase the percentage of individuals in the general population who know their HIV status.

| | Total | African American | Female | 13–24 Year Olds | 25–44 Year Olds | 45+ Year Olds |
|---|---|---|---|---|---|---|
| Tested | 6,788 | 6,652 (98%) | 3,869 (67%) | 1,493 (22%) | 3,190 (47%) | 2,105 (31%) |
| First Ever Tested | 1,566 | 1,542 (98%) | 829 (53%) | 564 (135%) | 547 (35%) | 456 (28%} |

Demographic Data Table.

## THPDE0304

### The national HIV counselling and testing campaign and treatment expansion in South Africa: a return on investments in combination prevention

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[1]National Department of Health, HIV Cluster, Pretoria, South Africa. [2]South Africa National AIDS Council, Pretoria, South Africa. [3]UNAIDS, Pretoria Country Office, Pretoria, South Africa

**Background:** South Africa has an estimated 5.6 million people living with HIV, representing a quarter of the disease burden in sub-Sahara Africa and one fifth of the global disease burden. The National HCT Campaign was launched in April 2010 and ended in June 2011, coordinated by the National Nerve Centre.

**Methods:** The Campaign was launched at national, provincial and district levels and targeted everyone between the ages of 12–60 years, not exclusive of younger or older persons. Confidentiality and informed consent was required to test and every site was linked to a referral facility providing ART, care and support. HCT was done at health facilities, work places and community outreach sites.

**Results:** South Africa committed a significant budget of US$3.5 billion to support the HCT Campaign and Treatment Expansion. By June 2011 a record 13,269,746 HIV tests were conducted and 2,155,312 (16%) people tested positive of whom 48% had CD4 counts above 350. Over 400,000 patients were initiated on ART, of whom 57,000 were pregnant women. National Laboratory DNA PCR results indicated that mother to child transmission rates at 8 weeks reduced to 5% compared to 11% in 2009. Over 8 million

people were screened for TB and 185 million male condoms and 524,000 female condoms were distributed. 237 males were medically circumcised, exceeding the Campaign target of 100,000. The procurement system achieved a 53% ARV price reduction through competitive tenders and 3,686 (80%) health facilities were capacitated to deliver ART through task shifting and training of 10,542 nurses.

**Conclusion:** South Africa has succeeded in implementing a massive HCT campaign linked to a comprehensive HIV prevention model that optimizes treatment for prevention and reduction of new HIV infections. The Campaign created a shift from testing for treatment to testing for prevention and promoted combination prevention to turn the AIDS epidemic tide for South Africa.

## THPDE0306

### Announcing a new method of HIV testing: the planning of robust home testing for HIV combined with internet counseling

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Presenting author email: jvdhelm@ggd.amsterdam.nl

**Background:** Recent estimates indicate that 40% of the HIV infections in the Netherlands are undiagnosed. Earlier diagnosis of HIV will improve individual health outcomes and reduce further spread. Self tests for HIV have become available, which allow individuals to test at home without involvement of health care professionals. Although self tests may help to increase HIV test uptake, there are concerns about test quality, counseling and medical follow up. The Amsterdam Public Health Service has initiated the HivTest@Home project to develop and evaluate a service that provides reliable HIV self tests using oral fluid in combination with an Internet counseling strategy for individuals at high risk for HIV, especially MSM and migrants from HIV endemic countries.

**Methods:** A website and logistic infrastructure will be developed that provides an intake with personal advice about HIV self testing, and enable individuals to purchase the HIV self test we provide online. With the test, they will receive a code to access a pre-test trajectory including step-by-step instructions, counseling, and low-threshold contact options with health care professionals. For those who test positive, a follow-up procedure will be developed to motivate them to access regular health care for confirmation testing and referral to an HIV clinic.

**Results:** The service will be launched in 2013, accompanied by a media campaign targeting high risk groups. We aim to distribute 2,000 tests within a 12-month period, assuming an HIV prevalence of newly diagnosed individuals of 2.5-5.0%. Using data collected online from participants, web statistics, interviews with participants, and clinical follow-up data, we will evaluate the feasibility and acceptability of the service and its effectiveness in identifying undiagnosed HIV infections.

**Conclusion:** If feasible and effective this new method can create another reliable low-threshold testing option for different risk populations -an option hardly needed to break the cycle of low-testing numbers.

# E26 - Co-designing and implementing programmes at national and regional scale

## TULBE03

### HIV treatment as prevention: driving health system development and improved health outcomes in British Columbia

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[1]British Columbia Ministry of Health, Population and Public Health, Vancouver, Canada. [2]British Columbia Ministry of Health, Population and Public Health, Victoria, Canada. [3]BC Centre for Excellence in HIV/AIDS, Vancouver, Canada. [4]Office of the Provincial Health Officer,

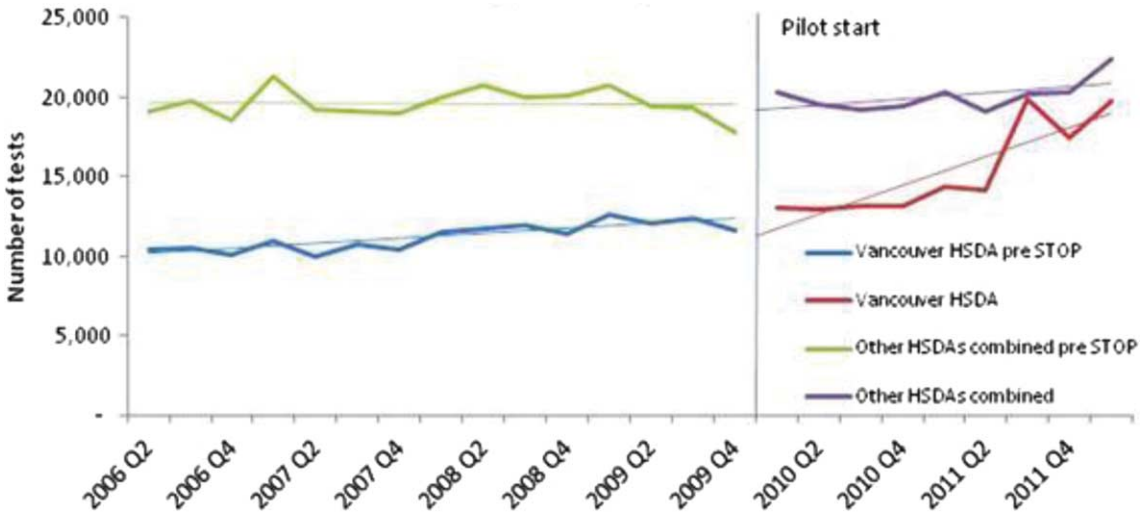


**Figure 1. Dramatic Increase in HIV testing in Vancouver—one of the two STOP HIV pilot areas—compared non-pilot areas. [Increases in HIV Testing].**

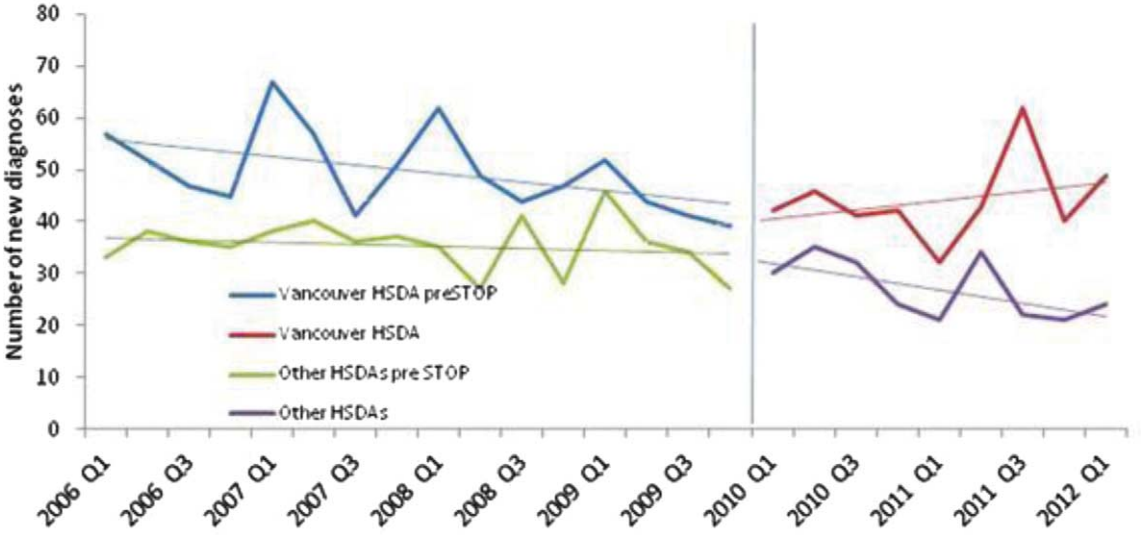


**Figure 2. Reversal in new diagnosis trends in Vancouver—one of the two STOP HIV pilot areas—compared to non-pilot areas [Increases in HIV Diagnoses].**

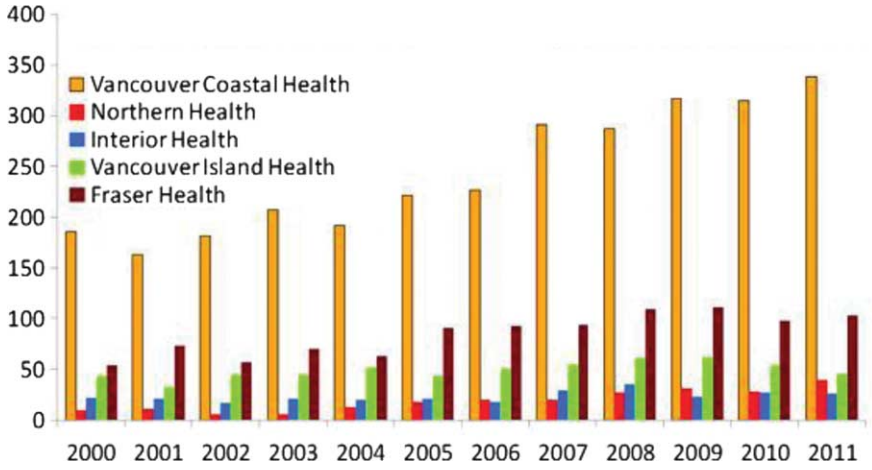


**Figure 3. Increasing trend in treatment starts in the two STOP HIV pilot areas (Vancouver Coastel Health and Northern Health) compared to the rest of the province [Increases in Treatment].**

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**Background:** Jurisdictions use a mix of horizontal and vertical approaches to achieve health system reform. Horizontal approaches like British Columbia's Innovation and Change Agenda aim to strengthen the overall health system, while vertical strategies, supported by specialized provincial structures, address specific health issues. Both approaches have drawbacks, so public health leaders such as Jaime Sepúlveda and Julio Frenk have described a third way, ''the diagonal approach'': explicit intervention priorities, with cost effectiveness and improved reach and engagement embedded as foundational principles, can generate positive disease-specific outcomes for individuals and populations, while dealing with generic health system issues such as human resource development and quality assurance.

**Methods:** BC is using an explicit HIV Treatment as Prevention (TasP) pilot, Seek and Treat to Optimally Prevent HIV (STOP HIV), as a diagonal approach to drive innovation and strategic change in BC's health system. Emphasis has been placed on several outcomes: improved screening; increased diagnoses due to improved screening; and increased linkage to care/treatment. Several discrete initiatives have been deployed to enhance health system capacity to reach (''Seek'') and sustainably engage (''Treat'') vulnerable groups in an overall program of care.

**Results:** STOP HIV is driving health system change. Latest data is confirming that British Columbians' in the pilot areas are being better engaged leading to increased HIV testing, diagnoses, treatment and reduced AIDS mortality—see Figures [1–3].

**Conclusion:** STOP HIV is a real-world implementation of HIV TasP, aimed at reducing HIV/AIDS-related morbidity and mortality, as well as new HIV diagnoses, and as a result containing associated health system costs. The initiative has become a driver of diagonal health care reform—and by engaging the most vulnerable and hard to reach, contributes to reducing health inequalities.

## WEPDE0105

### 'Less is more': assessing the effectiveness of a HIV prevention program for long distance trucker drivers in India after a re-designing in implementation structure

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**Background:** A large scale HIV prevention programs among long distance trucker drivers was started in 2003 across 36 Transhipment locations (TSLs) alongside the national highways. Program was re-designed in the year 2006 by reducing number intervention locations to 17 high performing TSLs. The current research assesses the effectiveness of program after the re-design process.
**Methods:** Program monitoring data over seven years and two rounds of cross-sectional behavioral survey conducted in January 2008 (N = 1402) and July 2009 (N = 1407) were used. Indicators on program outreach and service utilization were examined. Multivariate logistic regression models were used to assess if the increase from first survey to next was significant.
**Results:** Coverage of program increased from 43535 in 2004 to 311667 in 2010, though there was a decline in number of TSLs. Along with this, there was a significant increase in number of truckers utilizing clinical services. Analysis from survey data showed that there was a seven-fold increase in clinic visit in last 12 months from 2008 to 2009 (21% vs. 63%, $P < 0.001$). Significant level of increase was also observed in percent of truckers who watched street plays, participation in health exhibitions. Furthermore, increase from round-1 to round-4 was significant in the following indicators: received condom (13% to 22%, $P < 0.001$), one-one counseling (15% to 21%, $P < 0.01$). Treatment seeking for sexually transmitted infection (STI)-related symptoms from STI clinics also increased six times during this time (16% vs. 50%, $P < 0.001$).
**Conclusion:** The re-designing of the intervention has increased the program coverage and service utilization. Implementing truckers program in limited number of high-impact locations after proper planning can help in saturating the coverage and optimum utilization of the available resources.

# E27 - Capacitating public health systems to deliver HIV care at scale

## TULBE04

### Changes in population-level HIV RNA distribution one year after implementation of key components of an HIV 'test and treat' strategy in rural Uganda

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[1]University of California San Francisco, HIV/AIDS Division, San Francisco General Hospital, San Francisco, United States. [2]Makerere University-UCSF Research Collaboration, Kampala, Uganda. [3]Mulago-Mbarara Joint AIDS Program, Mbarara, Uganda. [4]Gillings School of Global Public Health, University of North Carolina, Chapel Hill, United States. [5]School of Public Health, University of California, Berkeley, Division of Biostatistics, Berkeley, United States. [6]Center for AIDS Prevention Studies (CAPS), University of California San Francisco San Francisco, United States. [7]Makerere University School of Medicine, Kampala, Uganda
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**Background:** 'Test-and-treat' programs combining expanded HIV diagnosis, linkage to care, and ART delivery are under consideration, but real-world experience is lacking. During 2011, in rural southwestern Uganda, implementation of ART eligibility to CD4 < 350/uL began. Concomitantly, we (A) conducted a community-wide HIV testing/linkage-to-care campaign, and (B) offered ART to adults with CD4 ≥ 350 via a research study (EARLI: NCT01479634). One year later, we conducted a second health campaign and examined the population distribution of HIV RNA levels.
**Methods:** During weeklong campaigns in May 2011 and 2012, all Kakyerere Parish residents were offered HIV testing (Determine, Inverness) in multi-disease diagnosis and linkage ''health fairs''. In HIV+ individuals, HIV RNA levels were measured by a validated fingerprick blood collection method and RT-PCR (Abbott). We assessed population HIV RNA levels by computing (1) the proportion of persons with an undetectable VL, (2) the median VL, and (3) the mean log(VL) among HIV+ persons.
**Results:** After community mobilization, 4,343 and 4,872 persons attended the 2011 and 2012 campaigns, respectively. We estimated 69% and 71% community participation based on census data from 2011 and 2012, respectively. Adult HIV prevalence (≥18yrs.) was 7.8% in 2011 (179/2,282 adults) and 9.4% in 2012 (210/2271 adults). Prevalence was 18.6% on the final day of the health fair located at the parish trading center, and 8.2% across prior days ($p < 0.001$). A substantially higher proportion of HIV+ individuals had an undetectable HIV RNA level in 2012 vs. 2011 (55% vs. 37%), and both median VL and mean log(VL) were lower in 2012 (see table).

| | May 2011 Health Campaign (n = 165 HIV+ adults[a]) | May 2012 Health Campaign (n = 210 HIV+ adults) |
|---|---|---|
| **Undetectable VL, n (%)** | 62 (37%) | 115 (55%) |
| VL 486–10,000 copies/mL, n (%) | 40 (24%) | 48 (23%) |
| VL 10,000–100,000 copies/mL, n (%) | 42 (25%) | 40 (19%) |
| VL > 100,000 copies/mL, n (%) | 21 (13%) | 7 (3%) |
| **Median VL (IQR), copies/mL** | 2185 (<486–33,045) | <486 (<486–7,903) |
| **Mean log(VL) (95% CI), copies/mL** | 3.62 log (3.46–3.78 log) | 3.20 log (3.09–3.31 log) |

[a]165/179 adults tested had a VL completed.
2011 and 2012 HIV Testing Campaigns.

**Conclusion:** In this ongoing study, we demonstrate that key components of a test-and-treat strategy are feasible in a resource-limited setting. One year after implementing intensified community-based HIV testing and linkage, with ART eligibility regardless of CD4 count, over half of HIV+ persons attending a health campaign had undetectable HIV RNA.

# E29 - International funding for HIV scale-up: following the money

## MOAE0306

### Funding universal access to antiretroviral treatment through a 'Global Health Charge' on alcohol and tobacco consumption: feasibility in the 20 countries with the largest HIV epidemics

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Presenting author email: microhaart@aol.com

**Background:** Current funding levels from PEPFAR/Global Fund may be too low to ensure Universal Access to antiretrovirals (ARVs) in the long-term. Additional, sustainable sources of funding are required.
**Methods:** For the 20 countries with the largest HIV epidemics, the additional costs required to achieve Universal Access were calculated, using WHO 2011 estimates of patient numbers requiring ARV treatment, combined with Clinton Foundation prices of ARVs, and PEPFAR estimates of cost of care/diagnostics. WHO estimates of adult population size, annual alcohol and tobacco consumption (commercially supplied) were used to estimate annual revenues from a ''Global Health Charge'' of 1 US cent per 10mL unit of alcohol, and 10c per 20 cigarettes.
**Results:** In the 20 countries with largest HIV epidemics, 5.2/11.3 million eligible patients were receiving antiretrovirals (coverage 46%). The minimum cost of care was $861 per patient-year (antiretrovirals, $406, medical $300, diagnostics $155). Ten of the 20 countries (Botswana, Brazil, China, India, Nigeria, Thailand, Russia, Uganda, Ukraine and Vietnam), could fund 100% of Universal Access costs from National revenue using the ''Global Health Charge'': $2.57 of the total $17.97 billion of revenue collected per year would cover treatment of 3.0 million eligible patients in these countries. In the other 10 countries (Cameroun, Cote d'Ivoire, DR Congo, Kenya, Malawi, Mozambique, Tanzania, South Africa, Zambia, Zimbabwe) $937 million could be collected annually with the Global Health Charge: sufficient to treat 1.1 million eligible patients (35% of the additional $2.67 billion budget required for Universal Access).
**Conclusion:** A ''Global Health Charge'' of 1 US cent per unit of alcohol, and 10 cents per 20 cigarettes, collected and spent at a National level, would be sufficient to fund an additional 4.1 million patients per year with antiretroviral treatment and care; Universal Access could be acheived in 10 of the 20 countries with this system.

# E31 - Impact of health insurance schemes, co-payments and out-of-pocket payments on access, adherence and outcomes

## MOPDE0201

### Time and money: the costs of utilizing HIV and TB treatment and care in rural KwaZulu-Natal

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**Background:** HIV and TB treatment is provided free of charge in the public sector in South Africa. However, patients may lose time and incur expenses due to utilizing these services. We measure time and financial costs of utilizing HIV and TB services, and examine in how far they lead to financial distress (patients' self-report of either borrowing money or selling assets to finance healthcare).
**Methods:** We randomly selected patients in a two-stage-sampling scheme and collected data in patient exit interviews: 300 patients on antiretroviral treatment (ART), 200 enrolled in a pre-ART programme, and 300 receiving TB treatment in rural KwaZulu-Natal, South Africa. We assess factors associated with financial distress in multiple regressions, controlling for sex, age and employment.
**Results:** Most patients utilizing healthcare were women: 79% (in pre-ART), 62% (ART), 53% (TB). The average times patients spent utilizing care at the last clinic visit was: 3.5 (pre-ART), 2.8 (ART), and 1.1 hours (TB). The average total costs of utilizing healthcare during the last visit were: 15 (pre-ART), 25 (ART), and 20 South African Rand (ZAR) (TB). Transport was the single largest cost component in all three patient categories. 39% (ART), 31% (pre-ART), and 41% (TB) of patients reported financial distress due to healthcare utilization. For each additional hour spent utilizing healthcare, the odds of financial distress increased by 3% (pre-ART), 21% (ART) and 64% (TB). For every additional 10 ZAR spent on utilizing healthcare, the odds of financial distress increased by 25% (pre-ART), 9% (ART), and 6% (TB).
**Conclusion:** In this poor, rural community, very high proportions of patients utilizing HIV or TB services report financial distress due to healthcare utilization. Frequent, free transport to HIV and TB clinics would likely substantially reduce the time and financial burdens of healthcare, as well as the prevalence of financial distress.

# E33 - Social protection

## MOPDE0205

### Economic spillover effects of ART on rural South African households

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**Background:** ART rollout may have important indirect effects on households and communities. We assess household spillover effects of ART on economic outcomes, in a region of rural South Africa with high HIV prevalence.
**Methods:** Longitudinal socioeconomic data from a large population surveillance system ($n > 100,000$) were linked with clinical records from the government ART program serving the area ($n = 6964$). We first describe the extent of household-level exposure to ART among residents in the community. We then employ panel data techniques to evaluate the impact of ART on household assets, food insecurity, and perceived financial status; household composition; and the labor market participation and school enrollment of other household

members. We assess trends in these economic outcomes, relative to the dates when household members accessed the ART program and/or initiated ART. As a point of contrast, we examine similar trends relative to dates of death due to HIV in the era before the public sector ART rollout.
**Results:** By 2010, two-fifths of area residents lived with someone who had sought care in the government ART program. Prior to widespread availability of ART, households in the region experiencing an HIV-related death faced large economic costs. In contrast, we find little evidence that households of ART initiators experience significant economic hardship due to HIV illness.
**Conclusion:** South Africa´s public sector ART rollout has provided substantial social protection for households against the economic costs formerly associated with HIV illness and death. Through indirect exposure to ART via household living arrangements, large populations now enjoy the economic benefits of ART.

## E34 - Cost-effectiveness of optimizing diagnostics and monitoring tools

### TUAE0101

**Cost-effectiveness of lateral-flow urine LAM for TB diagnosis in HIV-positive South African adults**

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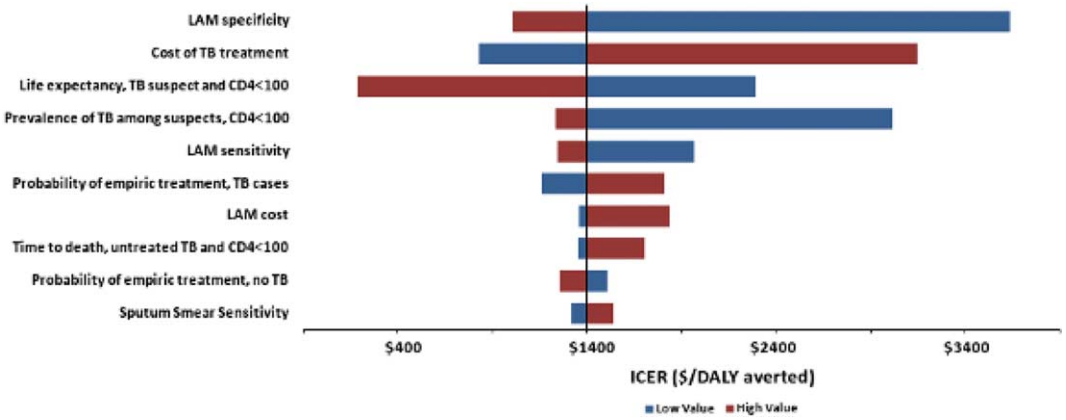
**Background:** Improved diagnosis of tuberculosis (TB) is a high priority in people living with HIV/AIDS. A lateral flow assay is now available for point-of-care detection of lipoarabinomannan (LAM, a cell wall component of *Mycobacterium tuberculosis*) in urine. This assay improves sensitivity of TB diagnosis in highly immunocompromised individuals, but its cost-effectiveness is uncertain.
**Methods:** We incorporated data from a clinical evaluation of lateral-flow urine LAM into a decision-analytic cost-effectiveness model. Our study cohort consisted of hospitalized, HIV-infected South African adults with $CD4^+$ T-cell counts $<100$ cells/μL, clinical consideration of TB diagnosis, and access to sputum smear microscopy. Our primary outcome was the incremental cost-effectiveness ratio (ICER), expressed in 2011 US dollars per disability-adjusted life year (DALY) averted from the perspective of a public-sector TB control program. Key assumptions are shown in Table 1. We adopted a lifetime time horizon with 3% discounting and performed both sensitivity analysis and probabilistic uncertainty analysis.
**Results:** For every 1000 patients tested, adding lateral-flow urine LAM to microscopy generated 80 incremental appropriate TB treatments and averted 58 DALYs, at a cost of $1400 (95% uncertainty range: $716–$5773) per DALY averted (Table 2). The majority of incremental costs reflected TB treatment. Incremental cost-effectiveness was most sensitive to assay specificity, cost of TB treatment, life expectancy after TB cure, and cohort TB prevalence (Figure 1 and Figure 2). The probability of acceptability was 99.1% at a per-DALY willingness-to-pay threshold equal to per-capita gross domestic product ($11,000) and 85.3% at a threshold of $2000 (Figure 3).
**Conclusion:** Lateral-flow detection of urinary LAM is potentially cost-effective for TB diagnosis in severely immunocompromised South African adults. Cost-effectiveness can be maximized by deploying this assay in populations with high TB prevalence, adopting treatment thresholds that optimize specificity, and

| Name | Value | Sensitivity Range | Reference |
|---|---|---|---|
| TB prevalence | 0.38 | 0.12–0.5 | Study data |
| LAM sensitivity | 0.66 | 0.3–1 | Study data |
| LAM specificity | 0.95 | 0.7–1 | Study data |
| Sputum smear sensitivity | 0.345 | 0.2–0.5 | IJTLD 2011; 15:287–295 |
| LAM cost | $3.50 | $1–$30 | IJTLD 2011; 15:287–295 |
| Treatment cost, per person | $870 | $500–$2000 | WHO 2011 |
| Probability of empiric therapy: TB cases who test negative | 0.53 | 0–0.75 | BMC Public Health 2011; 11:127 |
| Probability of empiric therapy: people without TB who test negative | 0.21 | 0–0.5 | AIDS 2007; 21:2043–2050 |
| Life expectancy following TB cure (CD4 T-cell count $<100$ cells/μL) | 1.45 | 1–10 | Actuarial Society of South Africa 2008 |

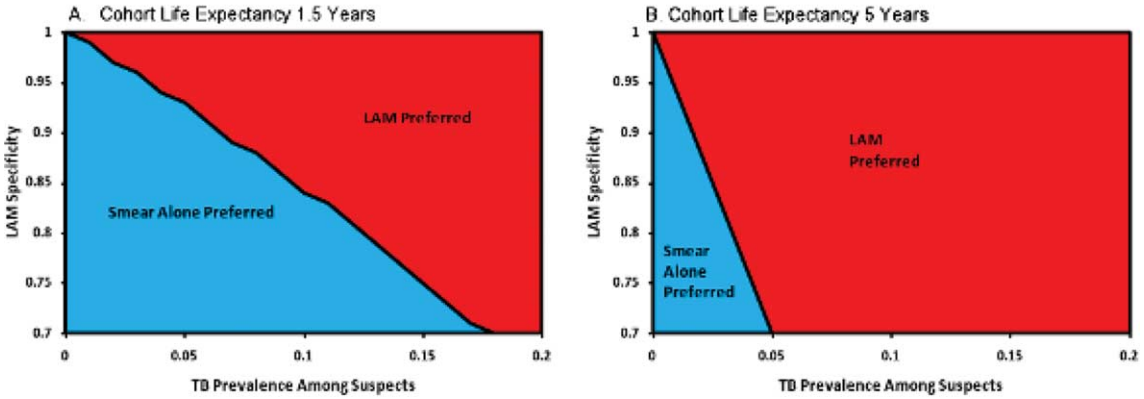
Key Parameter Values.

| Scenario | Cohort Size | TB Cases | TB Cases Treated | Non-TB Cases Inappropriately Treated | Deaths | DALYs | Total Cost | Incremental Cost Effectiveness Ratio ($/DALY) |
|---|---|---|---|---|---|---|---|---|
| Sputum Smear Alone | 1000 | 380 | 262 | 130 | 170 | 495 | $306,000 | |
| Smear Plus Urine LAM | 1000 | 380 | 342 | 155 | 110 | 437 | $387,000 | $1400 |

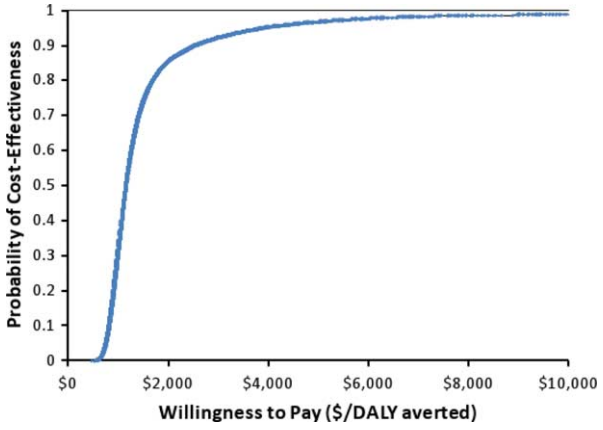
Cost Effectiveness of Lateral-Flow Urine LAM.




**Tornado Diagram: One-Way Sensitivity Analyses.**




**Preferred Strategy, Willingness to Pay = $11,000.**




**Cost-Effectiveness Acceptability Curve.**

promptly delivering antiretroviral therapy to extend patients' life expectancy following cure.

## TUAE0105

### Routine HIV screening in Portugal: clinical impact and cost-effectiveness

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**Background:** We sought to forecast the clinical impact and cost-effectiveness of routine HIV screening in Portugal, where the burden of disease remains high.

**Methods:** We used a computer model of HIV detection and treatment, coupled with Portuguese national clinical and economic data, to estimate life expectancy (LE), cost, and the incremental cost-effectiveness ratios (ICERs) of alternative HIV screening strategies. We compared current HIV detection practices in Portugal to routine HIV screening in adults aged 18–69. We considered a variety of target populations with differing levels of HIV risk and several testing strategies including the current strategy, one-time screening, screening every five years, screening every three years, and annual screening (Table 1). Baseline input values included: undiagnosed HIV prevalence (0.16%), annual incidence (0.020%), mean age (42 years), mean CD4 at care initiation (292 cells/μL), test acceptance (63%), linkage to care (78%), HIV test cost (_5.40), and an annual discount rate (5%). We conducted extensive sensitivity analyses on these values.

**Table 1. National base case results**

| | HIV-INFECTED POPULATION | | | | GENERAL POPULATION | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Undiscounted | Discounted | | | Undiscounted | Discounted | | | |
| Screening strategy | LYs | LYs | QALYs | Costs (Euros) | LYs | LYs | QALYs | Costs (Euros) | ICER (Euros/QALY) |
| Current screening practice | 36.117 | 15.426 | 14.549 | 76,930 | 38.216 | 16.097 | 16.089 | 720 | — |
| One-time screening | 36.597 | 15.652 | 14.752 | 83,500 | 38.221 | 16.099 | 16.091 | 780 | 36,500 |
| Screening every 5 yrs | 37.128 | 15.778 | 14.871 | 88,530 | 38.226 | 16.101 | 16.092 | 840 | dom* |
| Screening every 3 yrs | 37.381 | 15.850 | 14.940 | 91,320 | 38.227 | 16.101 | 16.093 | 870 | 57,200 |
| Annual screening | 37.896 | 16.011 | 15.090 | 97,980 | 38.233 | 16.103 | 16.094 | 980 | 91,700 |

*dom = ''weakly dominated.'' Costs more and confers fewer QALYs than an alternative strategy.
**DOM = ''strongly dominated.'' Costs more and is less effective than an alternative strategy.

**Table 2. Lisbon region base case results**

| | HIV-INFECTED POPULATION | | | | GENERAL POPULATION | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Undiscounted | Discounted | | | Undiscounted | Discounted | | | |
| Screening strategy | LYs | LYs | QALYs | Costs (Euros) | LYs | LYs | QALYs | Costs (Euros) | ICER (Euros/QALY) |
| Current screening practice | 36.077 | 15.416 | 14.538 | 77,020 | 38.152 | 16.083 | 16.068 | 1,300 | — |
| One-time screening | 36.560 | 15.646 | 14.744 | 83,710 | 38.161 | 16.086 | 16.071 | 1,410 | 34,900 |
| Screening every 5 yrs | 37.092 | 15.772 | 14.863 | 88,740 | 38.170 | 16.089 | 16.073 | 1,510 | 47,900 |
| Screening every 3 yrs | 37.350 | 15.843 | 14.931 | 91,550 | 38.174 | 16.090 | 16.074 | 1,560 | 48,200 |
| Annual screening | 37.871 | 16.002 | 15.079 | 98,190 | 38.184 | 16.092 | 16.076 | 1,720 | 76,300 |

**Table 3. Guarda region base case results**

| | HIV-INFECTED POPULATION | | | | GENERAL POPULATION | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Undiscounted | Discounted | | | Undiscounted | Discounted | | | |
| Screening strategy | LYs | LYs | QALYs | Costs (Euros) | LYs | LYs | QALYs | Costs (Euros) | ICER (Euros/QALY) |
| Current screening practice | 36.176 | 15.435 | 14.559 | 76,750 | 38.280 | 16.112 | 16.111 | 140 | — |
| One-time screening | 36.622 | 15.662 | 14.764 | 83,320 | 38.280 | 16.113 | 16.111 | 150 | 62,800 |
| Screening every 5 yrs | 37.158 | 15.786 | 14.881 | 88,380 | 38.282 | 16.113 | 16.111 | 170 | dom* |
| Screening every 3 yrs | 37.416 | 15.860 | 14.953 | 91,090 | 38.282 | 16.113 | 16.111 | 180 | 97,800 |
| Annual screening | 37.934 | 16.010 | 15.091 | 97,860 | 38.282 | 16.113 | 16.111 | 240 | DOM** |

**Results:** One-time testing increased discounted HIV-infected LE from 15.426 to 15.652 LYs and undiscounted HIV-infected LE from 36.117 to 36.597 LYs, as compared to current detection practice (Table 1). One-time testing yielded greater increases in HIV-infected LE and was more cost-effective in regions with greater HIV risk (Table 2, Lisbon, Undiagnosed HIV Prevalence = 0.29%, Annual Incidence = 0.037%), compared to regions with lower HIV risk (Table 3, Guarda, Undiagnosed HIV Prevalence = 0.03%, Annual Incidence = 0.004%). In Lisbon, the cost-effectiveness ratio of screening every three years was 48,200 _/QALY and the cost-effectiveness ratio of annual screening was 76,300 _/QALY.
**Conclusion:** One-time, routine, voluntary HIV screening in the Portuguese general population meets accepted international standards of cost-effectiveness. One-time screening is more attractive in regions with higher undiagnosed HIV prevalence and even more frequent screening may be justified in these regions given their higher incidence rates.

## TUPDE0201

### Cost effectiveness evaluation of alternative monitoring strategies for antiretroviral therapy in low-resource settings: monitoring of HIV viral loads, CD4 cell counts and clinical assessments versus clinical monitoring alone (STRATALL ANRS 12110/ESTHER trial in Cameroon)

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**Background:** Since the introduction of antiretroviral therapy (ART) in low-resource settings the use of laboratory monitoring for HIV infection has been the subject of great debate. This study aimed to assess the cost and cost-effectiveness of clinical plus laboratory monitoring (LAB) compared with clinical monitoring alone (CLIN).
**Methods:** A randomized non-inferiority trial was performed in nine rural district hospitals in Cameroon. HIV-infected, ART-naive adults with WHO stage 3-4 disease were enrolled and followed-up for 2 years. Participants were randomly assigned to CLIN (quarterly clinical monitoring) or LAB (six-monthly HIV viral loads and CD4 cell counts plus quarterly clinical monitoring) by a computer-generated list. Clinical outcomes and related-costs were calculated among patients followed-up for at least six months excluding the period unrelated to ART monitoring. Incremental cost-effectiveness ratios (ICER; US$ per life-years saved) were computed based on two HIV-RNA test costs (Abbot molecular technology, $67 and in house ANRS test, $35). One-way and multivariate sensitivity analyses were performed.
**Results:** Analyses were conducted among 188 and 197 patients in the LAB and CLIN groups respectively. With the Abbott test, results per 100 individuals showed that LAB compared with CLIN increased costs by $49,800 and saved 10.6 life-years (ICER = $4678 per life-year saved). With the ANRS test, the incremental cost is $34,900 per 100 individuals, i.e. an ICER of $3276 per life-year saved. 50 000 trial Monte Carlo simulation showed ICERs (IQR) from $3536-$5136 and $2553-$3642 per life-year saved with the first and second tests respectively. Considering a cost-effectiveness threshold of $3800 (i.e. three times the Cameroonian capita gross domestic product), LAB is cost-effective when the cost of HIV-RNA plus CD4 cell count are lower than $75.
**Conclusion:** Monitoring of HIV viral load and CD4 cell count to guide switching to second-line ART is cost-effective in resource-limited settings when using less costly generic tests.

# E36 - Cost-effectiveness of management of health care systems

## TUAE0102

### Cost-effectiveness of strategies to promote identification of HIV cases: economic analysis of a controlled trial in China

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**Background:** Expanding HIV testing in healthcare settings needs more economic evidence in China with concentrated HIV epidemic. This study was aimed to examine the costs and benefits of strategies to improve HIV testing and promote case finding.
**Methods:** Cost-effectiveness analysis based on a Markov model was applied to compare three HIV testing strategies for patients in outpatient departments: Strategy A = targeted testing based on risk behavior and symptoms, Strategy B = non-targeted testing all male adult patients with blood withdrawn for any clinical reasons, Strategy C = non-targeted testing all adult patients with blood withdrawn. Unidentified HIV prevalence, number of testing, number of newly identified cases, and related costs were derived from a controlled trial, which compared the effectiveness of strategies above in areas with concentrated epidemic in China. Long-term costs and health outcomes were derived from the literature. Incremental cost utility was evaluated from a societal perspective using a lifetime horizon. The benefit from reduced HIV transmission was not considered.
**Results:** With 0.3% of the undiagnosed outpatient HIV prevalence in study areas, the cost per new HIV infection identified was $146.1, $258.4 and $350.9 under strategy A, B, C, respectively. Strategy A resulted in per-patient lifetime discounted costs of $11,349 and benefits of 6.21 quality-adjusted life-year (QALY) gained. Strategy B increased mean QALY by 0.018, with an incremental cost-effectiveness of ?5,710/QALY, and Strategy C increased mean QALY by 0.017 than strategy B, with an incremental cost-effectiveness of $6,592/QALY. Sensitivity analysis showed that even if the undiagnosed HIV prevalence was as low as 0.113%, annual implementation of strategy C would still be cost-effective, with a cost of $14,059 to save a QALY, which was just 3 times of GDP per capital in China.
**Conclusion:** In concentrated epidemic area, non-targeted HIV testing in healthcare setting is cost-effectiveness and justified for sustainable investment.

# E37 - Cost-effectiveness of programmes building individual, community and institutional capacity

## TUAE0103

### Cost-effectiveness of test and treat prevention in a high HIV prevalence U.S. city

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**Background:** Progress in reducing HIV incidence in the US epidemic has stalled in recent years. Modeling studies suggest that test-and-treat interventions could powerfully control some HIV epidemics. Using mathematical modeling, we assess cost-effectiveness of test-and-treat strategies in the HIV epidemic in Newark, NJ, one of the most severe in the U.S.
**Methods:** A compartmental model was developed representing populations at HIV-risk in Newark with transmission through sex and intravenous drug use. The model was calibrated to NJ data on annual prevalent cases by acquisition mode, 2002–2009. Three interventions (In) were considered: In1 increased HIV testing coverage; In2 provided In1 and case management; In3 provided In2 and universal antiretroviral therapy. In current practice, at-risk subjects were assumed tested once every four years. Expanded testing resulted in the testing frequency doubling. Health resource use and unit costs were estimated, testing and HIV-related outpatient costs calculated, and inpatient and emergency department costs abstracted from the literature. A health care system perspective, 3% discount rate, and ten-year program time horizon were used. Costs are in U.S. dollars (USD) 2011.

**Table 1. Costs and cases/deaths averted, Newark NJ**

| Intervention | Outpatient costs (USD)* | Inpatient + emergency costs (USD)* | Total costs (USD)* | Net costs (USD)* | HIV cases averted* | HIV deaths averted* |
|---|---|---|---|---|---|---|
| Current practice | $758,618,000 | $276,685,000 | $1,035,302,000 | – | – | – |
| In1 | $934,916,000 | $368,002,000 | $1,302,918,000 | $267,616,000 | 1,097 | 1,823 |
| In2 | $1,058,479,000 | $367,446,000 | $1,425,926,000 | $123,008,000 | 3,036 | 4,395 |
| In3 | $1,128,486,000 | $394,732,000 | $1,523,218,000 | $97,292,000 | 485 | 680 |

* = 10-year aggregated totals, discounted, increments relative to next strategy.

**Results:** At the start, 220,500 individuals were HIV-uninfected but at-risk and 16,550 were HIV-infected. Annually, In1, In2, and In3 averted a median of 142, 581, 658 incident cases and 162, 826, and 901 HIV-related deaths respectively. Ten-year costs, cases/ deaths averted are presented (Table 1). ICERs per death averted for In1, In2, and In3 were $146,800, $28,000 and $143,100 respectively. In1 is less efficient than a blend of current practice and In2. If such a blend were implementable, then In1 would be eliminated and ICERs for In2 and In3 would be $62,800 and $143,100 respectively.
**Conclusion:** Test-and-treat strategies, particularly testing combined with case management +/− universal ART, may substantially decrease HIV transmission in this high prevalence area, prevent HIV-related deaths, and do so in a cost-effective fashion.

## TUPDE0103

### Value for money of structural interventions: going beyond HIV-only cost-effectiveness analysis

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**Background:** The UNAIDS Investment Framework highlights ''critical enablers'' that influence the success of HIV programmes; and synergies with other development sectors. Although the need to address the structural drivers of HIV vulnerability is well recognised, there is a danger that these interventions are not prioritised in HIV budgets, given the limited body of evidence on their cost-effectiveness. A key challenge to economists evaluating such interventions is how to assess the wide range of costs and consequences of these comprehensive structural interventions. We use two methods to estimate the cost-effectiveness of a conditional cash transfer in Malawi to keep girls in school.
**Methods:** We model national costs based on full coverage of girls of secondary school age (15–19 years) living on less than US$1.25 a day. Based on trial evidence, we model a 64% reduction in HIV incidence among the target group to estimate economic benefits. We use two economic evaluation approaches, one that apportions the total costs of the intervention according to the HIV-related proportion of total economic benefit and another based on the WHO cost-effectiveness threshold.
**Results:** We find that about 30% of estimated economic benefits in Malawi are related to HIV. The trial estimated a cost per infection averted (IA) of US$12,500, which we translate into a cost per DALY of US$711. Allocating total costs according to the proportion of HIV-related economic benefit reduces the cost per IA to US$3,750 and the cost per DALY to US$213. Alternatively, if the HIV programme wishes to achieve cost-effectiveness at the WHO threshold of GDP per capita (US$310) then it would achieve value for money by funding 44% of total costs.
**Conclusion:** HIV programmes are recommended to allocate funds to structural interventions based on proven effectiveness and according to the threshold at which the intervention becomes cost-effective from an HIV perspective, rather than estimating conventional cost-effectiveness ratios.

# E38 - Effects of adult and paediatric HIV treatment on earned and family income

## MOPDE0204

### Impact of antiretroviral therapy (ART) on socio-economic status and productivity of HIV-positive individuals/ households in a private setting in India

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**Background:** PLHA have decreased economic productivity both due to direct and indirect causes. Data from developed countries have shown that at the societal level, high costs ART are offset by increased productivity. However, these data have to be substantiated in developing countries where the expenditure for ART largely borne by individuals. We ***hypothesized*** that post-ART the SES would improve regardless of the baseline SES and will be sustained over time.
**Methods:** We performed a comprehensive SES evaluation pre/post ART initiation using an ambispective cohort study design. Indian household-specific SES validated tool'' (Aggarwal OP 2005), with score of $<15$ being indigent to $>76$ being affluent was used prospectively, along with clinical, ART adherence data at 6 &18 months post ART, compared using paired t-tests.
**Results:** Among 140 started on ART, 118 had pre ART SES data, median f/u was 22 months, of these: 57% were women; median age 38 years; 67% married; 89 (78%) heterosexual sex as HIV risk; 40 (34%) had major OI and/or TB at presentation. Reported self-occupation was: skilled laborers 35%; 10% unskilled laborers; 23% housewives; 22% were professionals/ blue collar job;1 CSW, 1 student, 10 unemployed. The median pre-post ART CD4 cell counts were: 187& 454 ($p<0.01$); median body weight pre-post ART was 54 & 57 kg ($p<0.01$); 97% were 100% adherent. The mean Pre-ART total SES score was 37.06 (+/− 10.2); and Post-ART SES score 40.62 ($\pm$10.1 $P<0.001$) and these results were sustained over time, remained significant when only monthly income included on exclusion of fixed assets. Delta change in SES was directly correlated

to increase in CD4 and weight, indirectly to being housewife/unemployed and having a dead spouse.
**Conclusion:** Our data show a significant impact of ART on SES in a sustained manner in a developing world setting, which has policy level implications.

# E41 - Pharmacoeconomics and cost effectiveness

## FRAE0102

### The cost-effectiveness of maternal and infant antiretroviral regimens to prevent vertical HIV transmission in Malawi

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**Background:** This study assessed the cost-effectiveness of maternal triple-drug ART or infant nevirapine to reduce HIV transmission during breastfeeding from HIV-infected Malawian mothers, not meeting treatment guidelines for their own health. Strategies were evaluated at two entry points into the health system: (1) time of delivery, for mothers who have not accessed ART antenatally, and (2) antenatally.
**Methods:** Cost-effectiveness was estimated from the healthcare perspective, using nationally representative unit costs, and was evaluated in terms of HIV transmissions averted, life-years gained, quality adjusted life-years (QALYs), and disability adjusted life-years (DALYs). The risk of HIV transmission associated with the antenatal and postnatal strategies were taken from the Kesho Bora and BAN studies, respectively. Antenatal regimens were (1) AZT and (2) AZT, 3TC, lopinavir/ritonavir. The postnatal interventions were (1) maternal ART (AZT, 3TC, lopinavir/ritonavir); (2) infant NVP; and (3) no extended post-natal prophylaxis. Scenario analyses evaluated alternative drug combinations and prices, 2nd trimester initiation, and varying paediatric ART coverage.
**Results:** For entry into the health system at delivery, infant nevirapine throughout breastfeeding was cost effective. With antenatal entry to the health system, antenatal AZT plus infant nevirapine during breastfeeding was cost effective. The incremental cost-effectiveness ratios for these strategies were $616.28 and $1,031 per HIV transmission averted, $31.84 and $53.33 per life-year saved, $34.25 and $57.20 per QALY and $32.47and $54.42 per DALY averted, respectively. The recommended strategies did not change in the alternative scenario analyses.
**Conclusion:** For pregnant, HIV-1 infected women presenting to the health system at delivery and not requiring ART for their own health, infant nevirapine throughout breastfeeding is a highly cost-effective method for postpartum PMTCT. For those presenting antenatally, antenatal AZT followed by infant nevirapine throughout breastfeeding (World Health Organization Option A) is the most cost-effective PMTCT strategy.

## FRLBX06

### The clinical and economic impact of a generic first-line antiretroviral regimen in the U.S.

R.P. Walensky[1], P.E. Sax[2], Y.M. Nakamura[3], M.C. Weinstein[4], P.P. Pei[3], K.A. Freedberg[1], A.D. Paltiel[5] and B.R. Schackman[6]
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**Background:** US guidelines recommend once-daily, one-pill efavirenz/emtricitabine/tenofovir as a preferred first-line ART regimen. With the anticipated availability of generic efavirenz in the US, the cost of a once-daily, three-pill alternative (generic efavirenz, generic lamivudine, tenofovir) will decrease, but adherence and virologic suppression may be lower. We project the clinical impact, cost, and cost-effectiveness of the generic-based vs. brand-name options.
**Methods:** Using an HIV simulation model (CEPAC-US), we examine 3 strategies: 1) No ART (for comparison); 2) three-pill generic-based ART; and 3) one-pill brand-name ART. Inputs are from peer-reviewed data: ART efficacies (24-week suppression: 78% generic-based vs. 85% brand-name); drug costs are 25% of average wholesale price (AWP) for generics and 77% of AWP for others ($8,600/year vs.

| | Per person life expectancy (QALYs)* | Per person lifetime cost* (USD 2010) | ICER ($/QALY) |
|---|---|---|---|
| No ART | 4.05 | 131,300 | – |
| Three-pill generic-based ART | 12.09 | 305,200 | 21,600 |
| One-pill brand-name ART | 12.45 | 349,100 | 121,300 |

QALY: Quality-adjusted life year; ICER: Incremental cost-effectiveness ratio. *QALYs and costs discounted at 3% annually; undiscounted life expectancy for one-pill brand-name = 19.33 QALYs.

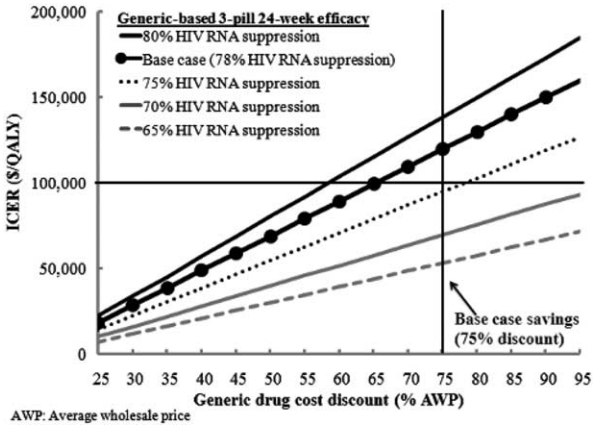


**Figure. Incremental cost-effectiveness or brand-name compared to generic based first-line ART regimen.**

$15,370/year for the regimen); the cohort is 84% male, mean CD4 317/μl. From the US health system perspective (2010 USD), we report incremental cost-effectiveness ratios (ICERs, $/QALY) compared against a $100,000/QALY threshold. We also project the potential annual savings for those initiating ART (incident diagnoses, ~2,500) and those eligible to switch to the generic-based regimen (prevalent cases, ~147,000)

**Results:** Compared to No ART, generic-based ART has an ICER of $21,600/QALY. Compared to generic-based ART, brand-name ART increases lifetime costs by $43,900, and per-person survival gains by 0.36 quality-adjusted life years (due to increased efficacy and reduced resistance from emtricitabine compared to lamivudine), for an ICER of $121,300/QALY (Table). ICERs are sensitive to decreases in generic-based ART efficacy and to generic drug costs; most plausible combinations lead to ICERs >$100,000/QALY (Figure). Estimated annual savings if all eligible US incident/prevalent patients switched to the generic-based regimen are $1.01B.

**Conclusion:** Compared to a slightly-less effective generic-based regimen, the cost-effectiveness of the guideline-recommended brand-name regimen exceeds the $100,000/QALY threshold. Switching to generic-based regimens would yield substantial savings for programs that fund HIV treatment.

## E42 - Effects of public-private partnerships, and working with faith-based groups and traditional healers on HIV outcomes

### TULBE01

**Quantifying the role of private health providers in HIV testing: analysis of data from 18 countries**

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**Background:** In many developing countries, reliance on private providers for healthcare, even among the poor, is high. However, less is known about health seeking behavior specific to HIV/AIDS care. As countries increasingly view the private health sector as an integral part of the overall health system, it is critical to understand the current and potential role of private providers in addressing HIV/AIDS needs.

**Methods:** We analyze 20 Demographic and Health Surveys from 18 countries conducted between 2005 and 2011 in which information on source of HIV test is available.

**Results:** Use of private providers for HIV testing varies greatly across countries (see Figure 1). Overall use of the private sector for HIV testing is strongly correlated with use of the private sector for other health services but not strongly correlated with per capita GDP, uptake of HIV testing, or overall HIV prevalence. At the household level, use of the private sector is highly correlated with household wealth in nearly all countries (see Figure 2) but not strongly associated with level of education, marital status or location (urban vs. rural) in most countries.

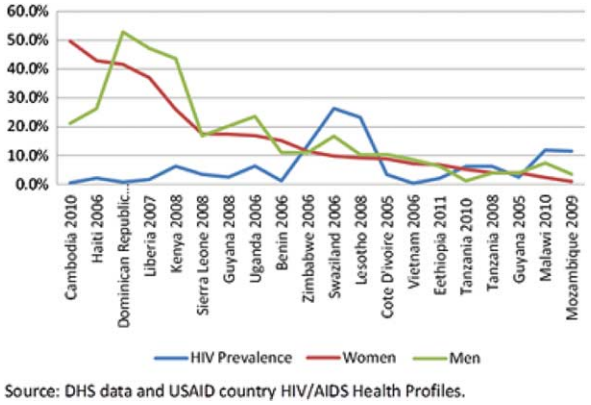


**Figure 1. Among Those Who Received an HIV Test, Share Who Received Test from Private Provider [Use of Private Sector for HIV Testing].**

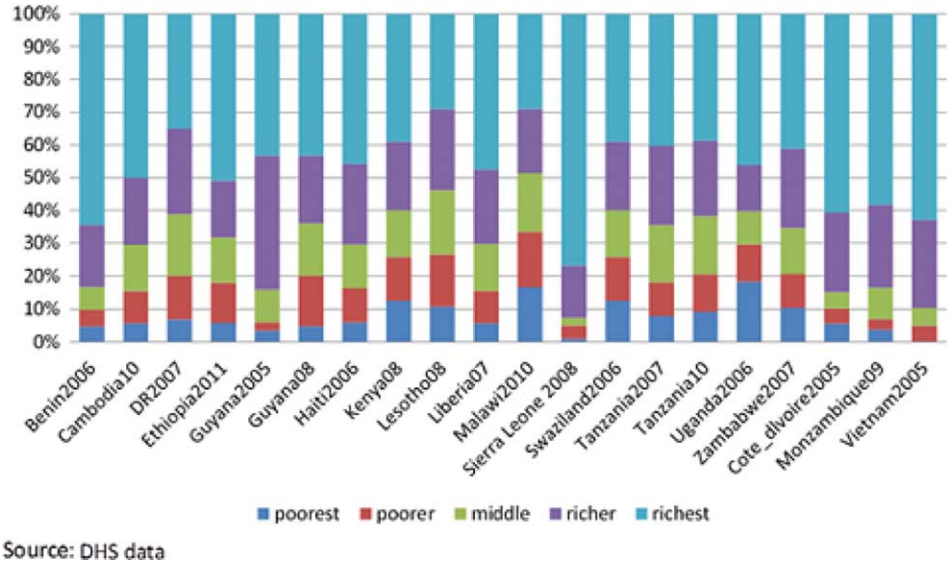


**Figure 2. Among Women Reporting Having Received an HIV Test from the Private Sector, Share from Each Wealth Quintile [Breakup of Users of Private Sector for HIV Testing].**

In addition to information on source of most recent HIV test, DHS data also contains information on whether women who received ANC were offered an HIV test allowing us to compare public and private providers on this simple measure of performance. In all countries but two (Malawi and Uganda) private providers were more likely to offer an HIV test during ANC than their public and non-profit counterparts.
**Conclusion:** The private sector plays a significant role in HIV testing in many countries. More research is needed to understand how private providers could be further leveraged to increase levels and quality of HIV testing and counseling and strengthen national HIV responses.

## E47 - Human resources development for prevention, treatment, care and multi-sectoral responses

### THPDE0104

**Helping people deliver: how introducing pre-service training in supply chain management has strengthened local capacity, produced cost-savings and improved patients' lives**

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**Background:** Supply chains are essential to securing availability of life-saving commodities for patients. Unfortunately, logistics training is often absent from the professional education of staff operating the supply chain. In-service training, while traditionally used to teach supply chain skills, takes personnel away from their work, is expensive to implement and often relies heavily on external technical assistance. USAID is investing in pre-service training (PST) as a cost-effective and sustainable alternative to build a competent health workforce in supply chain management (SCM).
**Methods:** The Supply Chain Management System (SCMS), a project under PEPFAR administered by USAID, works with local universities to incorporate SCM courses into pharmacy and nursing programs and build the capacity of university staff to plan, teach and manage those courses. Course content is based on local context and existing supply chain systems and prepares health workers for day-to-day supply chain tasks they will encounter post-graduation.
**Results:** As a result of SCMS PST initiatives, the Namibian School of Pharmacy now includes pharmaceutical management and procurement courses in its curriculum. In Zimbabwe, with support from the USAID | DELIVER PROJECT, three pharmacy programs offer SCM courses, with nursing programs to follow suit. Two national universities in Rwanda and Zambia require laboratory logistics courses for laboratory science degree programs. Since the Zambia course's introduction, SCMS in-service training costs have been reduced by 62%; 80% of the 272 students trained currently work in MOH facilities.
**Conclusion:** SCMS PST activities build local capacity in health supply chain and develop a sense of ownership for local training institutions in creating a skilled SCM workforce. Future health workers graduate with a fundamental understanding of SCM, enabling them to make an immediate contribution to the health system. Savings from reduced reliance on in-service training can be reinvested into national HIV programs, allowing for expanded services and potentially improved health outcomes.

## E48 - Community coordinating mechanisms

### WEPDE0205

**Reducing harassment amongst sex workers: Aastha experiences of community committees in addressing crises in Mumbai, India**

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**Background:** Sex Workers (SWs) in Mumbai, India are highly vulnerable and face numerous incidents of harassment from police, stakeholders, clients, family members.
Since 2004, FHI 360 has implemented a BMGF supported HIV/STI prevention project with over 80,000 male, female and transgender SWs in Mumbai. A community led, crisis response system (CRS) was devised to address the crises incidents.
**Methods:** In January 2007, SWs were collectivized by peer educators (PEs) into site-level Task Force Committees (TFCs), members of which are community leaders. The focus of the TFCs was to provide instant support in times of harassment from key stakeholders including police, criminal elements and regular partners. Core TFC members were capacitated through training programs on legal literacy, skill building on addressing incidents of stigma, discrimination and harassment and improving negotiation and communication skills.
**Results:** From January 2007–December 2011, over 84,000 crisis incidents were supported. Analysis of program data, showed that the

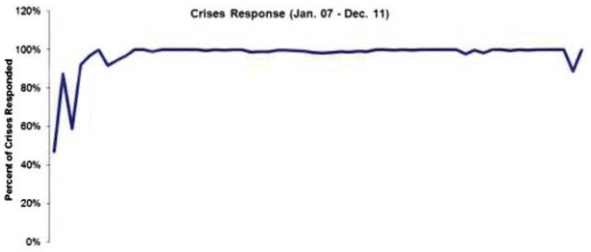


**Figure 1. Crisis incidents supported.**

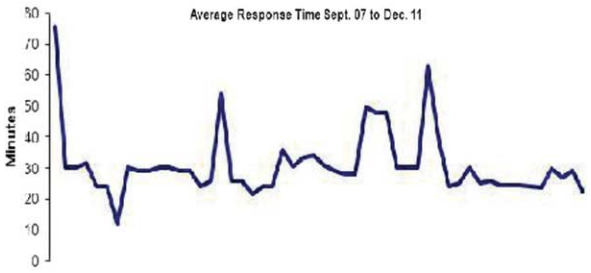


**Figure 2. Average Crises Response Time.**

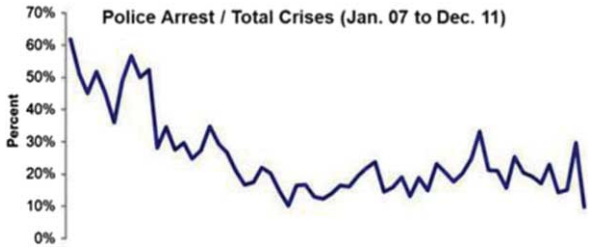


**Figure 3. Police Arrest and Total Crisis.**

percent of crises support increased from 47% (January 2007) to 100% (December 2011) [Graph 1]. The average response time to the crises incidents reduced from 75 minutes (September 2007) to 21 minutes (December 2011) [Graph 2]. Also the percent of police arrests, out of the total crises occurred, reduced from 62% (January 2007) to 10% (December 2011) [Graph 3].

Data from Behavioural Tracking Survey, a cross-sectional behavioural study with 2,106 FSWs conducted in 2010 also showed that 90.7% FSWs who were aware of CRS had accessed crisis services at least once in the last six months, as compared to those who were not aware of the CRS (66.8%) ($p < 0.001$ [OR] = 4.84: 3.83–6.12).

**Conclusion:** Site-level TFCs are integral to a CRS that responds effectively and instantly to incidents of harassment faced by SWs. Programmatically, this could lead to reducing barriers of access to services.

## E49 - Peer programmes and organizations

### THPDE0305

**Inmate peer educators are essential to prison-based HIV testing and TB screening in Zambia**

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**Background:** High HIV and TB rates, poor health services, overcrowding and lack of human and financial resources are common in prisons of sub-Saharan African countries, including Zambia. Severe staff shortages and the need for inmate buy-in led to recruitment and training of inmates to assist in the implementation of prison-based HIV testing and TB screening. We describe the inmate peer educator program implemented during a TB REACH-funded collaboration between the Zambia Prisons Service (ZPS) and the Centre for Infectious Disease Research in Zambia.

**Methods:** Eligible peers were chosen by prison officers, and received 5 days of training to complete symptom assessments, refer inmates for TB/HIV screening, collect sputum, assist with enrollment into National HIV and TB treatment programs, and provide educational outreach and counseling. Inmate drama members were also mentored to convey health messages through acting, music, and dance.

**Results:** We trained 74 peer educators and 57 drama members and found that they were enthusiastic and committed to the screening program. Between November 2010 and September 2011, peers led 6,436 inmates (average of 32 inmates screened per day), through HIV testing and TB screening. Challenges included: requests for incentives, concerns over TB exposure, and difficulty maintaining adequate numbers of peers because of inmate release and transfer. Solutions included: promotions within inmate hierarchies, provision of N95 respirators, and additional training to maintain peer numbers and establish peer-to-peer mentorship.

**Conclusion:** Scale-up of prison health services in sub-Saharan Africa is an urgent priority. This inmate peer educator program was a low-cost, effective intervention that was critical to the successful implementation of this prison-based HIV and TB program. Ongoing support and ownership by ZPS and prisoners is needed to ensure long-term program sustainability.

## E53 - Decentralization of services

### WEAE0205

**Outcomes of antiretroviral treatment programs in rural Lesotho: health centers and hospitals compared**

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**Background:** In order to improve access to antiretroviral therapy (ART), Lesotho was one of the first countries in southern Africa to adopt task-shifting from hospitals to nurse-led health centers (HC). We compared outcomes in patients who initiated ART at HC with those who started at hospitals in two catchment areas in rural Lesotho.

**Methods:** Patients aged ≥16 years who started ART in one of two hospitals or one of their 12 affiliated HCs between 2008 and 2011 were included. Baseline characteristics were compared using Mann-Whitney and Pearson's chi-square tests. No follow-up was defined as no recorded follow-up after starting ART, lost to follow-up (LTFU) as not returning to the facility for ≥180 days after the last visit. Crude retention in care was estimated using Kaplan-Meier methods. Mortality, no follow-up and LTFU in patients who started ART in hospitals and HCs were compared using logistic and cause-specific Cox regression models. Odds ratios and hazard ratios, adjusted for gender, age, CD4 count, WHO stage at start of ART and type of first-line ART regimen are reported.

**Results:** A total of 3,733 patients, including 2,036 (54.5%) who started ART at HC and 1′697 (45.5%) at hospital level, were analyzed. Patients who started ART at hospitals had more advanced disease than those in the HC-group (Table 1). Overall, 46 patients (2.3%) in the HC and 58 (3.4%) in the hospital group had no follow-up visit. Over 5,504 person-years, 414 patients died (11.1%) and 577 (15.5%) were lost to follow-up. Crude, three-year retention was higher at HC (67.8% (95% CI: 64.6–70.7) versus 61.9% (58.8–64.9)). However, in

**Table 1. Baseline characteristics of patients**

| | ART start at Hospital | ART start at Health Center | p-value | Total |
|---|---|---|---|---|
| **Number of patients** | 1′697 | 2′036 | | 3′733 |
| **Number of women (%)** | 1′081 (63.7) | 1′307 (64.2) | 0.75 | 2′388 (63.9) |
| **Median age in years (IQR)** | 37 (31–47) | 39 (32–49) | <0.001 | 38 (31–48) |
| **Baseline median absolute CD4 count/µl (IQR)** | 163 (78–270) | 212 (127–289) | <0.001 | 194 (102–281) |
| **WHO stage III/IV (%)** | 850 (50.1) | 654 (32.2) | <0.001 | 1′504 (40.3) |
| **Median weight in kg in (IQR)** | 55 (48–63) | 56 (50–63) | 0.08 | 55 (49–63) |
| **Baseline hemoglobin (g/dl)** | 11.6 (10.2–13) | 12.3 (11.2–13.6) | <0.001 | 11.9 (10.6–13.2) |
| **EFV-based first-line regimen (%)** | 1′140 (67.6) | 1′259 (62.1) | <0.001 | 2′399 (64.6) |

**Table 2. ART outcomes by type of facility**

| | No follow-up | | Mortality | | Loss to follow-up | |
|---|---|---|---|---|---|---|
| | Odds Ratio (95% CI) | p-value | Hazard Ratio (95% CI) | p-value | Hazard Ratio (95% CI) | p-value |
| **Unadjusted** | | 0.03 | | 0.01 | | 0.08 |
| Hospital | 1 | | 1 | | 1 | |
| Health Center | 0.65 (0.44–0.97) | | 0.77 (0.63–0.93) | | 0.86 (0.73–1.02) | |
| **Adjusted** | | 0.21 | | 0.54 | | 0.21 |
| Hospital | 1 | | 1 | | 1 | |
| Health Center | 0.75 (0.49–1.17) | | 1.07 (0.86–1.32) | | 0.89 (0.75–1.06) | |

adjusted analyses, mortality and LTFU were similar in both groups (Table 2).

**Conclusion:** In rural Lesotho, patients who initiated ART in HCs had less advanced HIV disease than those in hospitals. Retention in care was similar in both settings.

## WEAE0206

### High rates of loss to follow-up during first year of pre-antiretroviral therapy for HIV at primary health care level in rural Uganda

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**Background:** Pre-antiretroviral therapy for HIV (pre-ART) is increasingly recognized as an entry point to the continuum of care for HIV to facilitate timely initiation of antiretroviral therapy (ART). In this study we assess a public pre-ART program at primary health care level in rural Uganda.

**Methods:** This retrospective analysis used a file and register audit at all four governmental health centres (HC) providing ART and pre-ART care in Iganga district, Uganda. All HIV patients registered from February 2005 to August 2009 were included. We report rates of retention and attrition for patients in pre-ART care and facility performance indicators.

**Results:** Out of 2357 registered HIV-patients, 2024 (85.9%) were still not initiated on ART by the time of our study. The overall retention in care of these patients was 19.3% after 4.6 years since introduction of the program with 1634 patients lost to follow up (LTFU) and 390 retained in care. At one HC, the retention rate was 3.6% (22 patients retained out of 603). The probability of retention in care was 0.75 [CI 0.72-0.78] at the first month, 0.46 [CI 0.42-0.49] at 6 months, 0.36 [CI 0.32-0.39] at 12 months and 0.26 [CI 0.23-0.30] at 24 months after enrollment and significantly lower than among patients who initiated ART. Of the patients alive and attending the pre-ART program, 20.8% were eligible to ART according to national guidelines but not yet initiated. Stock-outs of Cotrimoxazole occurred at all HCs. At two HCs, more than one third of the individual patient files of pre-ART patients were not available.

**Conclusion:** The pre-ART program at HC-level in the district under investigation faces challenges in high rates of LTFU early after enrollment of the patients. To assure timely initiation of ART, better quality and new strategies to retain patients in pre-ART care programs are needed.

## THAE0103

### PMTCT decentralization does not assure optimal service delivery: revelations from successful individual-level tracking of HIV-positive mothers and their infants

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**Background:** As essential services for PMTCT are increasingly decentralized to antenatal care (ANC) sites, the consequences of shifting services from dedicated HIV care and treatment (C&T) clinics remain incompletely explored. We compared service delivery at ANC and C&T clinics in Kinshasa, DRC, a low HIV prevalence, resource-deprived setting.
**Methods:** In 10/2010, an enhanced standard of care was introduced at 44 ANC sites: personnel were retrained to implement the 2010 WHO PMTCT guidelines including Option A and co-located post-delivery care, and were provided with new individual-level tracking tools and supportive supervision. Women were encouraged to enroll at either of two affiliated C&T sites for continued PMTCT and HIV care but could opt to receive AZT-based prophylaxis at ANC sites when it became available alongside CD4 testing in 2011. Antiretroviral therapy was available only at C&T sites.
**Results:** Of 1,233 HIV-infected women tracked between 10/2010 and 12/2011, 926 (75.1%) were newly diagnosed; 306/926 (33.0%) enrolled in C&T. Newly diagnosed women were more likely to receive CD4 testing (RR = 2.2; 95% CI 1.9-2.6) and a WHO-recommended regimen (RR = 1.6; 95% CI 1.4-1.8) if they enrolled in C&T than if they remained at an ANC site. Infants were more likely to receive a package of extended NVP, cotrimoxazole and DNA PCR testing at C&T than at an ANC site (RR = 1.9; 95% CI 1.6–2.3). At ANC sites, 116 women received AZT-based prophylaxis and 91 received CD4 testing; 95 infants received the postnatal package.
**Conclusion:** Individual-level tracking of mothers and infants was feasible in Kinshasa and revealed that PMTCT services were delivered less effectively at sites historically focused on ANC rather than HIV C&T. While decentralization increased care access, its potential to further reduce vertical transmission cannot be fully realized without sustained training and supervisory support to ensure optimal quality of service delivery throughout the entire PMTCT cascade.

## THAE0104

### Preventing mother-to-child HIV transmission through community-based approach in Nepal

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**Background:** Since 1988, Nepal has evolved from a ''low HIV prevalence'' to a ''concentrated epidemic''. In 2005, the Government initiated PMTCT services in hospitals, but they were found to be least accessible by most disadvantaged pregnant women living in remote areas. In 2009, UNICEF and Government in collaboration with CBOs introduced a community based PMTCT service integrated with MNCH, in one of the highest HIV burden districts of Nepal
**Methods:** The CB-PMTCT model uses the government's existing MNCH structures. Trained Volunteers provide HIV information to pregnant women and refer them for ANC services. During ANC visits pregnant women are encouraged to take HTC services. If positive, the pregnant woman is referred for further treatment and support. During the pregnancy she is provided with counselling on delivery preparedness and treatment adherence. HIV-positive women are encouraged for institutional delivery
**Results:** The CB-PMTCT intervention increased the ANC coverage from 78.7% in 2009 to 82.2% in 2011. HTC uptake increased from nationally 9% in 2008 to 40% in 2011 in the intervention areas. In 2011, 82% positive pregnant women received ARV prophylaxis compared to 50% in 2008, and infant ARV coverage reached 85% from 57% in 2009. Institutional delivery increased from 7.5% to 16.1%.
**Conclusion:** Utilization of PMTCT by pregnant women dramatically increased by taking services at the community level. The volunteers and WLHIV created demand for PMTCT services and care practices. The integration of PMTCT in MNCH services is an efficient, cost effective and sustainable approach. Because of the proven efficacy of the intervention Government is keen to scale up the model in 7 districts with Global Fund funding. In order to improve the service utilization, HTC services should be decentralized up to the community level. It is also imperative to address stigma and discrimination and change social norms to ensure equitable access to services by KAP.

# E54 - Decentralization of services for ART, community care and continuity of care health services

## WEPDE0106

### Scaling-up access to antiretroviral treatment: a comparison of outcomes among HIV-positive children receiving treatment at mobile and hospital-based HIV clinics in rural Zambia

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**Background:** Travel time and distance are barriers to care for HIV-infected children in resource-poor settings. Decentralization is one of the strategies to scaling-up access to antiretroviral treatment (ART), but few such programs have been evaluated. We compared outcomes for children receiving care in mobile and hospital-based HIV clinics in rural Zambia.
**Methods:** Outcomes were measured within an ongoing cohort study of HIV-infected children seeking care at Macha Hospital, Zambia since September 2007. Children in the outreach group received ART from the Macha HIV clinic and transferred to one of three mobile outreach clinics administered by Macha Hospital. Children in the hospital group received ART at the Macha HIV clinic, and reported Macha Hospital as their nearest healthcare facility.
**Results:** 46 children in the outreach group and 41 children in the hospital group were included. The median time between enrolment and transfer to the outreach clinic was 10.2 months (IQR:5.7,14.9). After transfer to the outreach clinic, travel time was significantly shorter and fewer caretakers used public transportation (before: 47.8%; after:2.8%; $p < 0.0001$). Consequently, 44.4% of caretakers reported lower transportation costs and 69.4% had fewer faced obstacles with transportation. Caretakers reported receiving the same quality of care. At ART initiation, median age, weight-for-age z-scores (WAZ) and CD4% were similar for children in the hospital and outreach groups. Children in both groups experienced similar increases in WAZ and CD4%. Five children, all in the outreach group (12.8% vs. 0.0%; $p = 0.07$), experienced virologic failure after their transfer. The median percentage of visits with full adherence ($>95\%$) was significantly lower in the outreach compared to the hospital group (65% vs. 84%; $p = 0.02$).

**Conclusion:** Despite similar clinical and immunologic outcomes, children in the outreach group were less likely to achieve virologic suppression, potentially due to lower adherence. Continued adherence counseling is critical for the success of decentralized care.

## E56 - Scaling-up methods and experiences for HIV programmes

### WEAE0401

**Sustaining quality while scaling-up adolescent ART: findings from Zimbabwe´s largest adolescent cohort**

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**Background:** As Anti Retroviral Treatment (ART) programmes improve survival in early life the number of adolescents in need of ART will continue to increase. Programmes will need to scale up services which address the particular needs of adolescents. Here we assess the experience of such scale up in a large urban adolescent cohort.
**Methods:** Between 2004 and 2010 9,360 adults and 1,776 adolescents commenced antiretroviral therapy (ART) at Mpilo OI ART clinic, Bulawayo. A package of specific activities for adolescents was implemented, to provide comprehensive care including active defaulter tracing, a comprehensive, dedicated counselling programme and psycho-social activities operating both inside and outside the clinic, such as a youth club. Adolescents were engaged in decisions regarding their care.
In this retrospective cohort analysis adolescents were defined as those $\geq$ 10 and $<$19 years old at ART initiation date. Cox's proportional hazards model was used to calculate hazards and the log rank test to assess significance.
**Results:** Between 2004 and 2010 a six-fold increase in adolescent ART initiations occurred (Figure 1). 12 month adolescent loss to follow increased in the first 3 years of the programme, peaking at 7%, subsequently falling to below 5% by the end of the study period. There was no significant difference between adult and adolescent hazard of death. (HR = 0.92, p = 0.3793) Loss to follow up was significantly higher in adults than adolescents. (HR = 1.92, p < 0.0005) (Figure 2).
**Conclusion:** These results contrast other research, which generally show adolescent outcomes to be worse than those in adults. Outcomes in expanding programmes have also been shown to suffer elsewhere.
As more HIV positive children survive into adolescence, ART programmes must scale up comprehensive services for this group; we show that good results are feasible with dedicated clinical and psychosocial resources in resource poor settings.

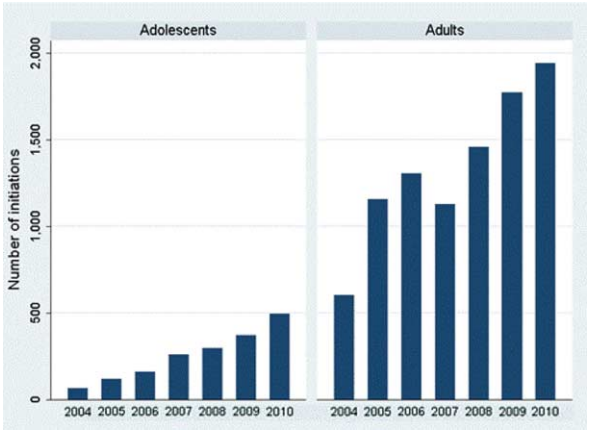


**Figure 1. ART Initiations in Mpilo Bulawayo: 2004–2010.**

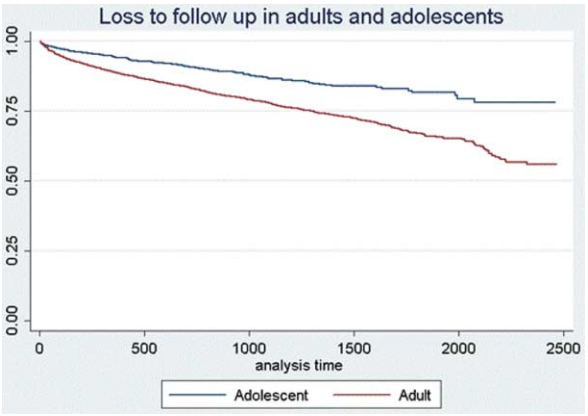


**Figure 2. ART Loss to follow up Mpilo Bulawayo: 2004–2010.**

### THAE0105

**Nothing for us without us: community led approaches towards successful implementation of HIV prevention programs: experiences from southern India**

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**Background:** Community based organizations (CBOs) and non-governmental organizations (NGOs) have generally proven to be effective instruments for sustainable implementation of HIV prevention programs among female sex Workers (FSW). Affinity and integrity with FSWs have enabled them to expand coverage and medical service delivery by transferring responsibility to FSWs and fostering demand driven approach.
To identify and understand factors that enhance performance of programs with FSWs, Technical Support Unit (TSU) of the Karnataka State AIDS Prevention Society (KSAPS) Government of Karnataka, conducted case studies of two programs implemented by FSWs collective (CBO) and an NGO. Both programs have achieved high standards of service delivery.
**Methods:** Focused group discussions (FGD) were conducted with the following: board members of CBO and NGO 2 FGDs (11 participants), outreach team 2 FGDs (18 participants), FSW peer educators 2 FGDs (27 participants), Female Sex Workers 2 FGDs: (17 participants). FGDs were conducted with the KSAPS and TSU whose

mandate is to provide technical assistance to the prevention programs.
**Results:** Factors that contributed significantly to improved performance were that these projects are components of broader, holistic agenda that puts women at its centre, addressing women's needs, including, but not limited to, HIV prevention.
Programs generate evidence-based plans from program data. Site-based peer plans are used, which plan for individual FSW and tailor services according to individual profiles, have improved TI performance. This has helped Peer Educators to spend quality time in the field, while also improving their productivity. Supportive hand holding by Technical Support Unit has helped in diagnosing problems and its resolution.
**Conclusion:** Embedding HIV prevention within broader programs that respond to women's needs, and in which FSWs play a deciding role, increases likelihood of success of the programs. As NACP-III nears its end and the nation prepares for NACP-IV, these findings indicate promising direction for future.

## E57 - Integration of HIV services rather than stand-alone services, and services which bond the community care with the health facility services

### WEPDE0206

**HIV prevention through pharmacies network in Ukraine: improving access to services for injecting drug users and commercial sex workers**

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**Background:** The prevalence of HIV infection in Ukraine is 1.33% (adult). In Europe it is one of the highest rates. The highest concentration of-among IDUs.
Pharmacy interventions started in Ukraine in 2007. The clients of pharmacy interventions are mainly belong to IDUs, including female IDUs, and commercial sex workers (CSWs).
Currently 143 pharmacies are implementing pharmacy-based prevention projects in cooperation with 25 NGOs in 13 out of 27 regions of Ukraine.
**Methods:** Organization of the project activities: an NGO and a pharmacy sign a cooperation agreement.
NGO: transfers consumables to the pharmacy, trains pharmacy workers, informs the target group about the project, pays for the pharmacy services within the project and reports to the donor agency funding the project (ICF ''International HIV/AIDS Alliance in Ukraine'', funded by the Global Fund).
Pharmacy: provides free of charge services to the program clients, provides the program client cards to the new clients (IDUs and FSWs), and keeps record of the clients and distributed products.
The basic package at the pharmacies includes: syringe distribution/exchange (3–5), alcohol swabs, condoms, information products, delivery of the harm reduction program client cards to the new clients. Counseling on safe behavior, referral of the clients to NGOs to receive other services (testing for HIV, STIs, counseling by specialists) are also provided.
**Results:** Achievements for 2011: General year coverage: 27 435 clients, who made more than 387 000 visits to the pharmacies.11 714 new clients (IDUs, CSWs) became the participants and were issued à Participant card of the pharmacy programme. Syringes exchange organized in 32 pharmacies (out of 143)-permission for such exchange obtained from the local controlling institutions.
**Conclusion:** Approximately 20.5 % of the over-all number of new clients (57 143) was involved into the HIV prevention programs of Alliance in Ukraine through the pharmacies in 2011.

## E58 - Role of community organizations in linking people to HIV services and strengthening the health system

### WEAE0204

**Community-based adherence support associated with improved virological suppression in adults receiving antiretroviral treatment: five-year outcomes from a multicentre cohort study in South Africa**

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**Background:** Sub-Saharan African antiretroviral treatment (ART) programmes have a severe professional staff shortage resulting in inadequate support for patients which contributes to increasing virologic failure. However, community-based adherence-support (CBAS) workers now form a significant work-force. This study evaluated the effect of CBAS on virological outcomes at 57 non-governmental organization-supported public ART facilities in four South African provinces.
**Methods:** CBAS workers provide education and psychosocial support for ART patients through home visits to assess and address adherence challenges. A multicentre cohort study was performed, including adults starting ART between January 2004–September 2010 at clinics where patients were eligible to receive CBAS. Prospectively collected routine electronic data were analysed. Outcome measures were virological suppression (VS) (viral load $<$ 400 copies/ml) at six-monthly intervals until 5 years of ART. Multivariable generalised estimating equations were used to compare VS between patients who received and not receiving CBAS, using an intention-to-treat approach. Extreme-case sensitivity analyses were performed to estimate bias due to missing viral load results.
**Results:** 66,953 patients were included: 19,668 (29.4%) received CBAS and 47,285 (70.6%) did not. At baseline, median age was 34.8 years; 45,844 (68.5%) were female; median CD4 cell count was 125 cells/μl (IQR: 65–175). After six months of ART, VS was 76.6% (95% CI: 75.8%-77.5%) and 72.0% (CI: 71.3%-72.5%) in CBAS patients and non-CBAS patients, respectively ($P < 0.0001$). In multivariable analyses after one and five years of ART, CBAS was associated with improved VS, adjusted odds ratio (aOR) 1.33 (CI: 1.24–1.43) and aOR 2.66 (CI: 1.61–4.40), respectively. Improved virological suppression in CBAS patients remained evident in sensitivity analyses considering missing test results as either suppressed (aOR 1.44 [CI: 1.37–1.52]) or unsuppressed (aOR 1.15 [CI: 1.11–1.19]).
**Conclusion:** CBAS was associated with improved virological suppression, the magnitude of which increased for longer therapy duration. Expanded implementation of this intervention should be considered in resource-poor settings.

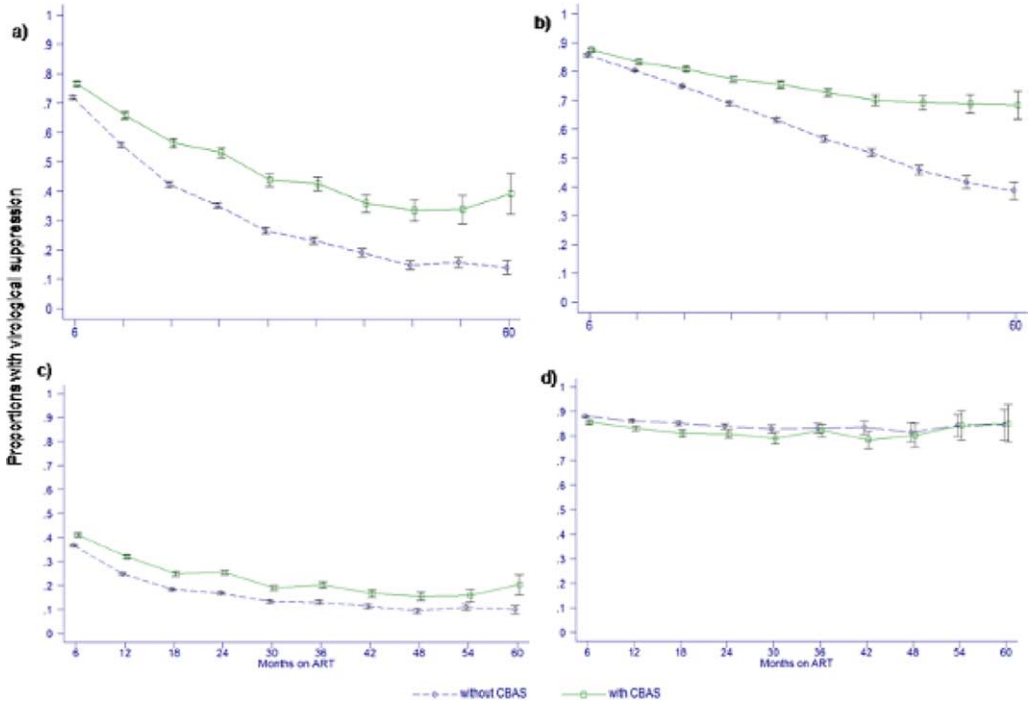


**Figure 1. Proportions of patients achieving virological suppression in (a) intention-to-treat (ITT) analyses censoring missing values, (b) ITT analyses regarding missing values as suppressed, (c) ITT analyses regarding missing values as unsuppressed and (d) on-treatment analyses.**

## THPDE0303

### Effectiveness of rapid night-time HIV testing for men who have sex with men (MSM) in Kinshasa, Democratic Republic of Congo

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**Background:** In the DRC, traditionally stigmatized groups such as MSM are also those most at risk of HIV infection. In the first activity of its kind in Kinshasa, *Projet Integré de VIH/SIDA au Congo* (ProVIC), a USAID/PEPFAR-funded HIV/AIDS project, partnered with local nongovernmental organization Progrès Santé Sans Prix (PSSP) to assess the receptiveness to and feasibility of providing voluntary nighttime mobile HIV counseling and testing (HCT), or ''moonlight'' testing, to MSM using rapid finger-prick technology. Providing quality services to MSM and addressing their specific needs, including combating stigma, are important to reversing the HIV/AIDS epidemic in the DRC.
**Methods:** MSM were identified through risk mapping conducted at 15 sites in Kinshasa in 2010. Teams worked with groups of MSM peer educators from both the community and PSSP to provide HCT services using the rapid finger-prick method. Four mobile HCT teams, each including two laboratory technicians and a supervisor, conducted two moonlight HCT clinics per week. Attendance at the mobile HCT was carefully monitored, and observations on the strategy's successes were solicited from program staff.
**Results:** MSM attendance was initially low, with only 20 MSM accessing HCT services per night; over the course of the pilot, however, this number grew to an average of 80 clients per night. A seroprevalence of 30 percent was found among MSM ages 20 to 30. Involving MSM peer counselors in this intervention played an important role in the feasibility and effectiveness of this pilot.
**Conclusion:** Rapid moonlight HIV testing for MSM led to increased service utilization because services were more easily accessible; clients were pleased to receive prompt, quality services without the perception of negative judgment. Staff reported that involving MSM peer counselors in this intervention plays an important role in these outcomes. Nighttime testing for MSM under ProVIC has since been expanded to two additional provinces in 2012.

# E59 - Models for HIV service delivery in conflict and post-conflict settings

## THPDE0202

### Ensuring continuity of antiretroviral therapy among displaced populations during Ivorian post-election violence, 2011

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**Background:** Post-electoral unrest in Ivory Coast led to major population displacement. Looting, lack of personnel, shortage of drugs, difficult physical accessibility and insecurity challenged access to HIV services. Given the individual and public health impact of antiretroviral therapy (ART) interruption, addressing continuity of treatment was defined as a priority since up to 14,500 Ivorians under treatment could be affected.
**Methods:** As such, UNHCR ensured that all partners integrate HIV and AIDS related Identification, Communication and Case Management in the overall relief response. Out reach and registration of refugees and internally displaced persons were used as opportunities to link up those in need of ART. Messages delivered during gatherings encouraged PLWH to contact focal points for care and treatment.
HIV Joint assessment missions highlighted lack of ART-related inputs conflict affected areas.
**Results:** In Ghana and Liberia, among 258 refugees living with HIV registered, 142 were receiving ART. 60% of PLWH receiving ART in western Ivory Coast and 83% in Abidjan had interrupted their treatment for more than 3 weeks at time of identification. Language barriers (refugees), fear for stigmatisation and lack of ART services in refugees and IDP hosting areas were main reasons for treatment interruption.
People in need of ART were referred to closest treatment centres. Cross-border arrangements were made between Liberia and Ivory Coast to overcome a difference in second line therapy. UNHCR procured portable CD4 machines in conflict-affected areas to improve treatment quality.
**Conclusion:** Early identification of cases and communication through different strategies was essential to limit treatment disruption. Cross-border coordination and contingency planning for drug procurement and distribution enables continuity of treatment. The importance of continuity of HIV-related business continuity including treatment need to be further emphasised to patients, as well as planners and relief assistance managers.
Media should be cautious when talking about HIV status of a displaced population.

## THPDE0203

### The challenge of maintaining continuum of care and support to PLHIV in health facilities located in military conflict zones in Ivory Coast

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**Background:** Post-election crisis in 2010 in Ivory Coast caused militaries conflicts in several cities, disturbing health centres activities. NGO Aconda tried to support provision of care to PLWHA. To describe strategies implemented by Aconda to ensure continuum of care and support to PLWHA in health centers located in conflict zones.
**Methods:** It is a prospective study which describes activities of Aconda in health centres located at conflict area during war in Ivory Coast. Data has been collected from monthly reports.
Strategies were based on reduction of HIV activities package to an absolute minimum: supplying ARV to health centres; providing ART to patients in follow; continuing PMTCT and providing ARV prophylaxis to pregnant women. Communities based Organizations made active research of patients lost to follow and referred them to health facilities for care. Pharmacists gave systematically at least 3 monthly ARV provision to patients coming to visits. Counselling and testing Activities, biology and ART initiation were stopped.
**Results:** From January to June 2011, 05 health regions: Abidjan, Duékoué, Guiglo, Bloléquin and Toulépleu were located conflict zones. We noted 45/68 centres were functional: 40 in Abidjan, 3 in Guiglo and 2 in Duékoué. We note that 11 centres have been looted; 7 completely and 4 partially. Because of non accessibility for drug's vehicle, 32 sites had failures in delivering ART. In 28 sites, less than 50% of medical staff was present. In 12 centres where caregivers were absent, the provision of ART to patients has been ensured by counsellors and data managers. In the 3 months, 17,471 PLWHA (8.7% of children) received ART and 475 pregnant women, the ART prophylaxis.
**Conclusion:** Militaries conflicts cause a dislocation of health systems. Aconda managed to maintain care and support to PLWHA in health centres in war area, by reducing to absolute minimum services.

# E60 - Micro-finance programmes

## FRAE0105

### Small scale income generating initiatives mitigate the socio-economic vulnerability of HIV households in Bangladesh

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**Background:** HIV/AIDS has a devastating impact on the livelihood of peoples living with HIV/AIDS (PLHA) in a developing country like Bangladesh. Stigma and discrimination in the local conservative society makes their socio-economic condition more miserable.
**Methods:** Notun Jibon Shomaj Kollan Shongstha, a PLHA self help organization has started a peer-led programme, known as Income Generating Initiatives for the PLHA in Bangladesh (IGIPB) since March, 2010 to address the socioeconomic vulnerability of PLHA in Bangladesh.
**Results:** To date, the programme has covered total 46 PLHA families having average 4 members per family living at rural areas. A total of 143 PLHA has been supported, out of which, 43% were male ($n = 61$), 33% ($n = 47$) were female and the rest were children. After affected by HIV, the house hold income dropped, on average, by 33%, whereas household expenditure increased by 110%, which was mainly for medical purposes. Through the programme, the following services were provided: vocational training to all covered adult male and female (76%, $n = 108$); job assistance ($n = 17$), 42% ($n = 7$) of them were female; microcredit loans to start small scale business ($n = 7$, all were widowed female; health loans ($n = 22$), 68% ($n = 12$) of them were female and 13% were children ($n = 3$). Lump sum educational assistance grant (45 US Dollar per year per children) was provided to 35 HIV affected children (24% of the total covered PLHA). Moreover, job place advocacy and sensitization on HIV/AIDS were also done in different organizations ($n = 12$), Compared to the baseline, the average monthly income in each house hold increased 5.7 times higher after 1 year of coverage (mean $\pm$ SD in US Dollar, $35 \pm 11$ vs $201 \pm 21$, $p < 0.005$).

**Conclusion:** The success of this small scale programme demonstrates the importance of economic coverage for restoration of PLHA livelihood. Long term, large scale comprehensive programme is therefore needed further.

# E63 - Economic evaluation of prevention, treatment, care and mitigation programmes, adherence schemes, sustainability of programmes and financial strengthening initiatives

## MOAE0201

### Cost and efficiency analysis of the Avahan HIV prevention programme for high risk groups in India

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**Background:** The India AIDS Initiative (Avahan) is involved in scale up of HIV prevention interventions among high-risk groups (HRGs). The few existing studies limit their cost analysis to the implementing non-governmental organisations (NGOs). This is the first study to analyse the costs of HIV prevention at scale, over four years, including systems costs. These systems costs are particularly important for those replicating scale-up of HIV prevention in different settings. We present here the final results of a four year costing effort.

**Methods:** Financial and economic costs were collected from 64 districts, 137 NGOs and supporting costs at the state and costs of programme management by the Bill and Melinda Gates Foundation over four years, presented in US$ 2008 (3% discount rate). The intervention package included outreach, STI services, condoms, capacity building, community mobilisation, advocacy and enabling environment.

**Results:** Unit costs per person reached, per contact, per estimated population ranged US$ 232 (44–840), US$ 68 (13–242) and US$ 175 (95–443) respectively. Key factors driving cost variation include scale. Although costs fell with scale, they also increased over time with inclusion of new districts and activities as the programme developed (including high risk men who have sex with men, advocacy, and community mobilisation). The total economic costs (2004–2008) were US$ 97,966,216 of which approximately 35% was spent at NGO level, 30% at the State level and 35% at the national level which were mainly incurred for capacity building and programme management.

**Conclusion:** The rapid scaling up HIV prevention requires significant investment in expertise enhancement and programme administration. These are not captured in routine cost analysis, which may misinform resource planning. At scale the unit cost of services provision falls, however actual cost reduction may take longer as programmes evolve, and activities are added. Policy makers should take into account these additional costs while planning public health interventions.

## MOAE0204

### Increasing investment in syringe exchange is cost-saving HIV prevention: modeling hypothetical syringe coverage levels in the United States

T.Q. Nguyen[1], B.W. Weir[1], S.D. Pinkerton[2], D.C. Des Jarlais[3] and D. Holtgrave[1]

**Table 1. Parameters in Modeling**

| n | number of injecting drug users | |
|---|---|---|
| N | total number of drug injections per year | |
| $S_{SEP}$ | total number of syringes supplied by SEPs-base case | |
| $\Delta S$ | hypothetical increase in number of SEP syringes | |
| $S_{SEP\text{-}H}$ | total number of syringes supplied by SEPs-hypothetical case | $=S_{SEP\text{-}H}\Delta S$ |
| $SC_{SEP}$ | SEP syringe coverage-base case | $=S_{SEP/N}$ |
| $S_{SEP\text{-}H}$ | SEP syringe coverage-hypothetical case | $=S_{SEP\text{-}H/}N$ |
| $S_{non\text{-}SEP}$ | number of syringes a user gets from non-SEP sources per year | |
| $S_{non\text{-}SEP}$ | Total nuber of syrings from other sources-base case | |
| r | replacemant rate (rate at which increased SEP syrings supply lower use of non-SEP syrings) | $=S_{non\text{-}SEP}*n$ |
| $S_{non\text{-}SEP\text{-}H}$ | Total number of syrings from other sources hypothetical case | $=S_{non\text{-}SEP*r}\Delta S$ |
| B | Number of injection with from other sources hypothetical case | |
| $C_H$ | Proportion of syrings contaminated with HIV-hypothetical case | $\leq c(B+SSEP+S_{nonSEP})/(B+S_{SEP\text{-}H}+S_{nonSEP\text{-}H})$ |
| I | Number of new HIV infections due to IDU per year-base case | |
| $I_H$ | Number of new HIV infection due to IDU per year-hypothetical case | =I(CH/C) |
| $I_{avert}$ | Number of infections averted as a result of increased SEP | $I-I_H$ |
| \|u | Cost of syringe exchange programming, per syringe | |
| F | Additional founding requried | $=\Delta S*U$ |
| t | Life time treatment cost per infected person | |
| $T_{saved}$ | Savings in life time treatment cost | $=I_{averted}*t$ |

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**Background:** Syringe exchange for injecting drug users (IDU) is controversial and has limited funding in the US. To inform policy, we examine whether increasing investment in syringe exchange programs (SEPs) would be cost-effective for HIV prevention.
**Methods:** We model HIV incidence in hypothetical cases with higher *SEP syringe coverage* (i.e., percent injections with a new syringe from SEP) than current level—base case, and estimate *additional funding required*, *number of injections averted*, and *HIV treatment costs saved*.
The ratio of HIV incidence (hypothetical to base case) is established based on the transmission equation and simplified to the ratio of proportions of HIV-contaminated syringes (hypothetical to base case), which is a function of number of injections with a receptively shared (''borrowed'') syringe and numbers of syringes from SEPs and other sources. A maximal bound for hypothetical case incidence is calculated.
SEP syringe coverage and costs data are from the Beth Israel/NASEN survey. HIV incidence and lifetime treatment costs are from the CDC. We assume 1/2 of IDU-category and 1/4 of MSM/IDU-category infections are due to injection risk.
We conduct sensitivity analyses on ''borrowing'' probability, number of non-SEP syringes, extent to which SEP syringes replace non-SEP syringes, and proportions of IDU-category and MSM/IDU-category infections that are due to injection risk.
**Results:** Increasing SEP syringe coverage (now 2.9%) to 5% would avert 169 infections, requiring 19 million USD additional investment but saving 66 million USD in treatment costs. A larger increase to 10% would avert 497 infections, requiring 64 million USD investment but saving 193 million USD in treatment costs. Results should be updated when new data on parameter values become available.
**Conclusion:** SEPs are effective and cost-saving, and thus should be priority in the US. The ban on federal funding for SEPs should be lifted, and federal funding allocated to expanding SEPs.

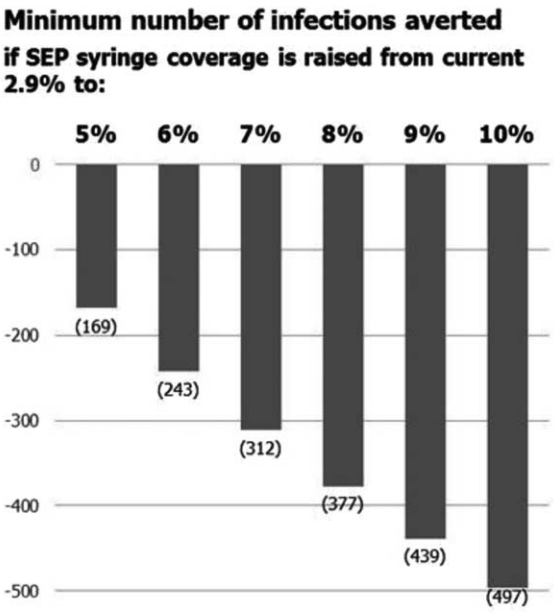


**Figure 1.**

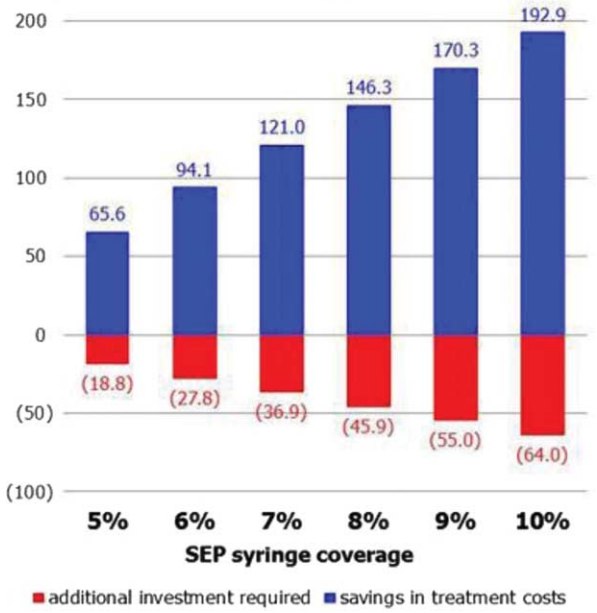


**Figure 2. Additional investment required & savings in HIV treatment costs (million 2011 USD) for each SEP syringe coverage level.**

## FRAE0101

### What does it cost to raise an orphan? A comparison of OVC costs in Ethiopia and Botswana

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**Background:** Estimating costs associated with OVC services is crucial in resource allocation, budgeting and sustainability planning. The estimated OVC population is 5.4 million in Ethiopia but only 130,000 in Botswana. In Ethiopia, it is estimated that only about 5% of orphans are receiving support from the government and NGOs, whereas in Botswana, approximately 49% are receiving support.
**Methods:** A costing exercise was conducted for 20 OVC programs in Ethiopia and 19 in Botswana. The data collection process involved conducting interviews with program managers and finance officers. This study followed an economic approach, where the value of all resources deemed necessary to deliver services to OVC were taken into account.
**Results:** Most of the organizations in both countries offered between 4 and 8 services to OVC. The most common services offered to OVC were education, psychosocial support and food/nutrition. The cost of reaching an OVC differed significantly across countries, with a unit cost of $80 in Ethiopia and $946 in Botswana. Even for specific

services, the cost differed significantly both within and across countries.

**Conclusion:** This analysis provides important comparative information about the range of costs by service area and the overall cost per child reached. The analysis shows that unit costs decline significantly as programs are scaled-up (diminishing marginal returns), but then increase as OVC programs grow bigger (diseconomies of scale). Differences in unit costs appear to be largely attributable to the type and intensity of services provided, as well as the overall difference in the cost of living between the two countries. The analysis could not, however, make any conclusions about the effectiveness of the interventions provided. It is recommended that future OVC research focus on measuring both costs and effectiveness.

## FRAE0103

### Economic evaluation of the national program to prevent mother-to-child transmission of HIV in Ghana

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**Background:** Based on 2009 WHO clinical guidelines for the prevention of mother to child transmission of HIV (PMTCT), the Government of Ghana updated its National PMTCT Guidelines in 2010, indicating new antiretroviral (ARV) drug regimens for treatment and prophylaxis, and introducing new services. Few international studies have examined costs of PMTCT services under new WHO guidelines and until now, no studies in Ghana had examined the cost of delivering these services.

**Methods:** We analyzed the cost of PMTCT services in the National PMTCT Guidelines: HIV testing and counseling (HTC), antiretroviral prophylaxis and/or therapy for seropositive pregnant women and postpartum care for seropositive mothers and their HIV-exposed infants. We used a normative approach with elements of top-down and bottom-up costing, first developing a representative care schedule according to national guidelines, and refining it based on expert interviews. Data were collected at the central level and from a purposive sample of 14 facilities reflecting characteristics

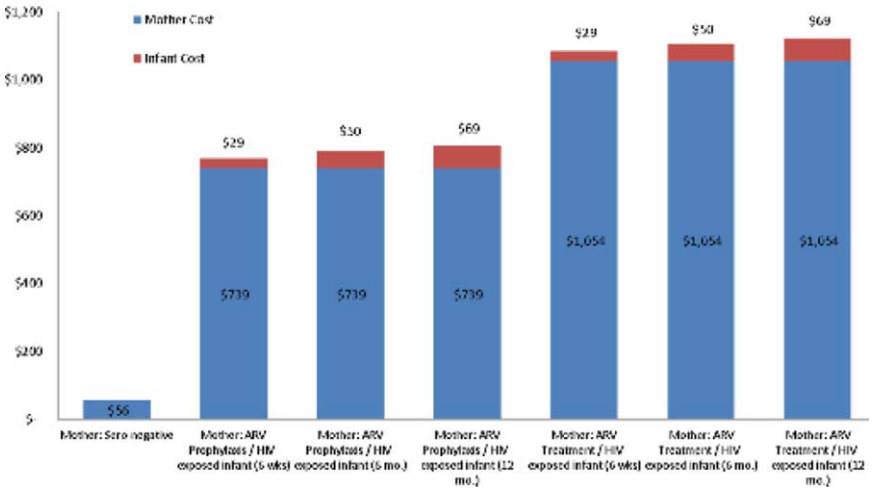


**Figure 1. PMTCT Unit cost for Mother/child pairs, in US$.**

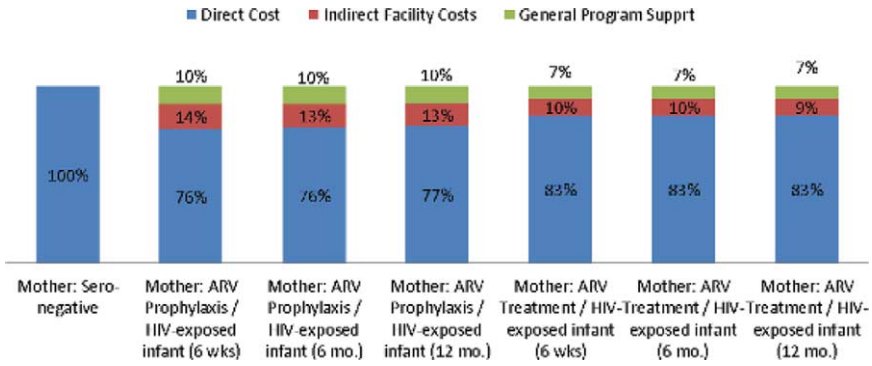


**Figure 2. Distribution of direct and indirect costs, by mother/child pairs.**

thought to influence unit cost, including facility level and facility ownership.
**Results:** We found an average cost of US$56 for providing HTC services, US$739 for seropositive pregnant women on ARV prophylaxis, and US$1,054 for sero-positive pregnant women on ARV treatment. The cost for providing PMTCT services to an HIV-exposed infant ranged from US$29 to US$69 (Figure 1).
Direct costs accounted for the majority of total cost, comprised primarily of costs for antiretroviral drugs, laboratory testing, and staff time; suggesting that the unit cost of delivering PMTCT services will not vary significantly in terms of changes in client load (Figure 2).
**Conclusion:** We found higher staff costs for delivering the same services at higher-level facilities, where more specialized staff deliver services, suggesting task shifting could achieve cost efficiencies. These data can be used to better inform resource allocation decisions as PMTCT programs are scaled up in Ghana and other countries.

## E64 - Sustainability of ART programmes and adherence in developing countries

### MOAE0205

**Transition from stavudine to tenofovir and zidovudine for first-line treatment of HIV/AIDS in low- and middle-income countries**

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**Background:** In 2009, the WHO recommended the transition from stavudine (d4t) containing regimens due to side effects in favor of regimens containing zidovudine (ZDV) and tenofovir (TDF). We describe the transitions from stavudine to preferred regimens and the current purchasing trends.
**Methods:** We analyzed 17,819 adult antiretroviral purchases between 2009 and 2011, as reported to the World Health Organization *Global Price Reporting Mechanism*, the Global Fund *Price Quality Report* and by UNITAID.
**Results:** Stavudine's total market value declined from 99.85 million USD in 2009 to 29.7 million USD in 2011. Purchases of 3-in-1 fixed dose combinations (FDC) containing d4t represented 1.2 million people who could be treated in a year (person-years) in 2009, increasing to 1.3 million person-years, before dropping to 472,000 person-years in 2011. Purchases of TDF 3-in-1 FDCs increased from 41,000 to 145,000 person-years from 2009 to 2011. Zidovudine 3-in-1 FDC purchases increased from 1.18 to 1.74 million person-years between 2009 and 2010, but then dropped in 2011. Of the 74 countries purchasing stavudine in 2009, 24% did not purchase stavudine in 2010 or 2011, while an additional 24% did not purchase stavudine in 2011. In all, 52% of countries continue to purchase stavudine products.
The median annual price of the 3-in-1 FDC containing d4t dropped from 77 to 62 USD per year from 2009 to 2011. ZDV median prices were 137 and 113 USD in 2009 and 2011, respectively. TDF 3-in-1 with emtricitabine exhibited the smallest change, from 250 USD/year in 2009 to 242 USD in 2011. The 3-in-1 with TDF and lamivudine held the lowest median price, at 174 USD in 2011.
**Conclusion:** Transition from stavudine has been slow, though some countries have exhibited rapid transition. Price remains a critical concern in transition from stavudine to ZDV or TDF regimens.

## E65 - Economic strengthening initiatives (including micro-finance, health insurance, etc.)

### WEAE0402

**Self-esteem, self-efficacy and hope among vulnerable adolescents affected by HIV participating in community-based savings and lending groups in rural Nyanga district, Zimbabwe**

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**Background:** Approximately 25% of Zimbabwe's children are estimated to be orphaned, with the majority orphaned due to AIDS-related illnesses. HIV-affected households often face severe financial constraints making them unable to meet their basic needs. Financial stress can negatively impact overall mental health, life satisfaction, and wellbeing in numerous ways. Perceived control over one's economic situation and sense of self can mediate financial distress.
**Methods:** Over a one year period, 2000 adolescents participated in community-based savings and lending groups (SLG), and 50% also received life skills education (LSE). A quantitative survey was administered to a randomly selected sub-sample of the project population matched with a sample of adolescents from a non-intervention control ward. Surveys were administered in Shona and back translated into English. Data were entered into SPSS and analyzed using univariate and bivariate measures.
**Results:** 160 adolescents participated in the survey. Average age was 15-years-old with an average household size of seven members. Adolescent SLG group members ($n = 139$) reported statistically significant higher scores on self-efficacy ($p < .001$), self-esteem ($p < .01$), and hope ($p < .01$) than adolescents from the control group ($n = 21$). There were no statistically significant differences between adolescents who received SLG only compared to those who received SLG plus LSE, although most of the random sample received both interventions. While 75% of adolescents reported that caregivers decided how general household income was spent, 45% of adolescents reported caregivers decided how their SLG funds would be spent; 33%made independent decisions regarding their funds. Hope scale scores positively correlated with increased decision making power over funds.
**Conclusion:** Adolescents affected by HIV face many challenges including poverty and unknown futures. Economic empowerment may provide an option for responding to both immediate financial concerns and also building mental health resilience and outcomes for the future.

## E66 - Consequences of test-and-treat programmes on investments in human capital and on household finances/ wealth

### THAE0102

**Improved employment and children's education outcomes in households of HIV-positive adults with high CD4 counts: evidence from a community-wide health campaign in Uganda**

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**Background:** Despite growing evidence that socio-economic outcomes among HIV-infected adults show improvement after antiretroviral therapy (ART) initiation, little is known about the variation in these outcomes among a population that also includes individuals with high CD4 counts and those not enrolled in care. We examined associations between CD4 count and socio-economic outcomes among adults participating in a community-wide health campaign in a rural Ugandan parish.
**Methods:** A one-week community health campaign offering diagnostic and treatment services for HIV and other infectious and non-communicable diseases was conducted in May 2011. Data on campaign participants′ employment were collected, and a detailed household socio-economic survey was conducted among a random subset of participants. Multivariable regression was used to assess relationships between CD4 count and employment and educational outcomes.
**Results:** 2,323 adults (74% of the community) participated in the campaign. 179 adults (7.8%) tested HIV-positive and 46% were newly diagnosed. HIV-positive adult participants with CD4 $>550$ and 350–550 worked 4.8 and 5.3 more days during the past month than those with CD4 $<200$ ($p<0.05$). No differences in work patterns were found between participants with CD4 200-350 and $<200$. The association was similar among those on ART and not on ART. Children's school enrollment was also associated with adults' CD4 counts. Children in households of adults with CD4 $>350$ had 20% higher school enrollment rates than children in households of adults with CD4 $<200$ ($p<0.05$). Finally, socio-economic outcomes of HIV-participants with high CD4 counts resembled those of HIV-negative participants.
**Conclusion:** Outcomes of HIV-positive adults with high CD4 counts are not only better than those of adults with low CD4 counts, they also resemble those of HIV-negative adults. Early initiation of ART could generate economic benefits by preventing a decline in employment and education outcomes and maintaining them at levels seen among HIV-negative peers.

## TULBE05

### Dramatic increases in population life expectancy and the economic value of ART in rural South Africa

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**Background:** Large increases in adult life expectancy are anticipated in HIV endemic regions, due to antiretroviral treatment (ART). Such changes may have important implications for economic decision-making on the part of individuals and governments.
**Methods:** We estimate adult life expectancy (15 + e15) annually for 2000–2011 using data from a large population cohort in rural South Africa ($n = 149{,}640$), a population where 28% of adults were infected with HIV in 2011. We assess the distribution of life spans in 2003, prior to the public sector roll out of ART in South Africa, and in 2011. We use observed changes in adult life expectancy to compute a cost-benefit ratio for government provision of ART in this setting.
**Results:** After declining in the early 2000s, adult life expectancy in the population cohort increased from 52 years in 2003 to 61 years in 2011 (Figure 1); gains were larger for women (9.5 years) than for men (6.6 years). Changes in the distribution of lifespans reveal a substantial shift towards older ages (Figure 2). Applying standard estimates of the value of a statistical life-year (1-3 times per capita GDP), ART roll-out in this community has led to lifetime gains of $26,000 to $77,000 per capita. This is 2-6 times larger than the per capita cost of providing lifelong ART to every person who contracts HIV in this community, which we estimate at $13,400, based on 2012 cost figures from the President′s Emergency Plan for AIDS Relief.
**Conclusion:** ART roll-out has resulted in large increases in adult life expectancy in rural South Africa. The economic value of these health gains far outweighs the costs of treatment. Future research is needed to understand how people perceive these changes in longevity, and how these changes affect attitudes, such as fatalism,

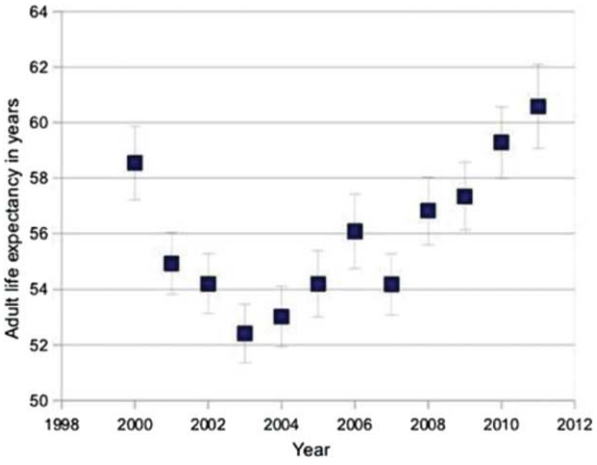


**Figure 1. Adult life expectancy, 2000–2011.**

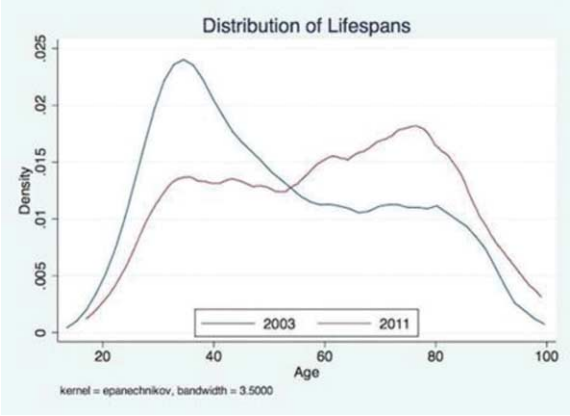


**Figure 2. Distribution of Lifespans, 2003 and 2011.**

and behaviors, such as healthcare-seeking, risk-taking, and educational choices.

## MOPDE0206

### The impact of antiretroviral therapy on the social, economic and working conditions of patients with HIV in Malawi

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**Background:** Antiretroviral therapy (ART) for treatment of HIV/AIDS patients in less developed countries (LDCs) produces an impact on individual health and indirectly impacts socio-economic status. We investigated the impact of an ART program on work productivity and household income as these are key parameters for cost-benefit analyses of HIV public programs and policies.
**Methods:** Health status of HIV-infected patients on ART was determined at baseline and subsequent visits through assessment of Body Mass Index (BMI), hemoglobin, viral load and CD4 cell subsets. Socio-economic status was assessed exploring productivity (hours worked), income, and other economic variables through patient interviews. Using a prospective design we followed a cohort of patients from the DREAM program Malawi with the following inclusion criteria: HIV positivity, age $\geq$15, ART initiation within 2 months of enrollment. All subjects had at least 8 months of follow-up post-ART initiation. Health, income and productivity parameters were evaluated through paired t-test.
**Results:** 165 subjects were followed from 1/2008 to 3/2009. The overall health status of subjects improved significantly based on clinical and virologic parameters (Table). A positive overall impact on productivity and income was noted with hours worked in the last week increasing by 25%, hours worked in the last month increasing by 31%, income generated in the last week increasing by 85%, income in the last month increased by 80% (Table). For patients who were unemployed at baseline (n = 37) mean income was too low ($<$4$ per month) to be relevant for the analysis. With the exclusion of unemployed patients at baseline, the increase in last week/last month hours worked was +35% and +43% respectively, and last week/last month income +93% and +89% respectively (+400$ per year).
**Conclusion:** ART therapy has a strong impact on patients productivity and income, and provides an economic incentive towards sustainability of ART delivery programs in LDC.

## WEPDE0201

### Does condom use affect the earnings of commercial sex workers? New evidence from a survey of female sex workers in India

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**Background:** Unsafe sex is the major cause of transmission of HIV in developing countries like India. Condom use is, therefore, seen as the most effective instrument against the transmission of HIV. However, use of condoms in commercial sex is still nowhere universal. Part of the reason could lie in the evidence that sex workers lose income when they enforce the use of condoms among their clients. This paper re-examines how condom use affect the price for commercial sex.
**Methods:** A survey of 5498 female sex workers from four high HIV prevalence states of India was analyzed using a simultaneous equations model using three-stage least squares method, to identify the causality between condom use and price for commercial sex.
**Results:** The data indicated that 77 percent of the sex workers are consistent condom user. The analysis shows that there both price of sex and condom use influences each other. Also, results indicate that all types of sex workers (Road, Brothel, Hotel and Bar) except brothel-based workers received 35 percent higher earnings when they have protected sex than unprotected sex. Brothel based sex workers earned 24 percent less when they enforced the use of condom. The other exogenous factors that affect the price are negotiating power, level of education, type of sex workers (other sources of income, number of client visit per day, contract under pimp etc.). Hotel and bar based sex worker getting comparatively higher price.
**Conclusion:** The market for sex work has changed in favour of sex workers and condom use generally no longer has a negative premium for most of the sex workers. It is, therefore, possible to step up the intensity of behavioral intervention for enhancing

| Variables | Mean Value (status class) | | Mean increase in status class and % change | 95% confidence interval of difference | | P |
|---|---|---|---|---|---|---|
| | Baseline (t0) | Follow-up (t1) | | Min | Max | |
| **Malnutrition (BMI)** | 21.38 (0.82) | 21.79 (0.92) | 0.10 (12%) | 0.03 | 0.18 | 0.009 |
| **Hemoglobin** | 11.61 (1.76) | 12.99 (1.96) | 0.20 (11%) | 0.10 | 0.29 | $<$0.001 |
| **CD4 cell count (cells/mm3)** | 276 (0.76) | 379 (1.23) | 0.47 (62%) | 0.35 | 0.59 | $<$0.001 |
| **HIV-1 RNA Log10** | 3.93 (0.48) | 0.71 (1.85) | 1.37 (285%) | 1.20 | 1.53 | $<$0.001 |
| **Hours worked last 7 days** | 24 | 30 | 6 (25%) | 1 | 11 | $<$0.05 |
| **Hours worked last 30 days** | 96 | 126 | 30 (31%) | 13 | 48 | $<$0.01 |
| **Income over last 7 days (USD)** | 10.93 | 20.25 | 9.31 (85%) | 1.45 | 17.17 | $<$0.05 |
| **Income over last 30 days (USD)** | 43.97 | 79.29 | 35.32 (80%) | 11.88 | 58.76 | $<$0.01 |

Change in health and economic parameters.

condom use among the sex workers without worrying about its impact on their earnings.

## E68 - Investment frameworks and models in a period and in settings of decreasing financial resources.

### MOAE0203

**Company-level ART provision to employees is cost saving: a modelled cost-benefit analysis of the impact of HIV and antiretroviral treatment in a mining workforce in South Africa**

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**Background:** HIV impacts heavily on rates of absenteeism, labour force turnover and, ultimately, cost of operations of companies in sub-Saharan Africa. Employers increasingly supply HIV testing and antiretroviral treatment (ART) programmes at the workplace. The full economic impact of ART provision on a mining workforce has not yet been analysed.
**Methods:** We developed a dynamic health-state transition model to analyse the economic impact of HIV and the cost benefit of ART provision in a mining company in South Africa between 2003 and 2022. The model was fitted to the workplace using information on the size, composition, turnover, HIV prevalence and CD4+ counts of the workforce from company records. Bottom-up analyses of economic costs at the company supplied data on inpatient and outpatient resource utilisation and the costs of absenteeism and replacing a sick worker. Costs are analysed from the company perspective and presented undiscounted and discounted at 5%.
**Results:** As a result of lower mortality and morbidity in the employees covered by ART, survival in employment of HIV-positive employees grows by 7% as ART coverage increases from 21% to 80% of eligible HIV-positive employees by 2022. The associated reduction in absenteeism and benefit payments more than offsets the additional cost of the ART programme, leading to a 9% decrease in the total and annual cost of HIV to the company and a 15% decrease in the mean cost per HIV-positive employee by 2012 (Table 1). 48% and 37% of cost savings are due to reductions in benefits and absenteeism, respectively (Table 2). Savings to the company average USD 1.1 million per year. Total HIV-related costs equal 1.5 to 3.5% of payroll.
**Conclusion:** ART provision at the workplace level is cost-saving for the company. Our results point to private-sector ART provision as a viable alternative to overburdened public sector ART programmes.

**Table 1. Cost of HIV to company 2003–2022**

| Cost (2010 USD) | No ART | With ART | Difference to No ART |
|---|---|---|---|
| undiscounted | | | |
| Total cost (millions) | 363 | 331 | −9% |
| Mean annual cost (millions) | 18 | 17 | −9% |
| Mean annual cost per HIV-positive employee | 15,137 | 12,881 | −15% |
| discounted | | | |
| Total cost (millions) | 282 | 257 | −9% |
| Total annual cost (millions) | 14 | 13 | −9% |
| Mean annual cost per HIV-positive employee | 11,792 | 10,003 | −15% |

**Table 2. Mean annual cost per item 2003–2022**

| Cost item | Annual cost per item in 2006 USD (% of annual cost) | | Difference to No ART (% of total savings) |
|---|---|---|---|
| | No ART | With ART | |
| ART programme cost | – | 0.6 (5%) | +0.6 (−) |
| Medical care (inpatient and outpatient) | 1.4 (12%) | 1.3 (12%) | −0.1 (6%) |
| - of which inpatient care | 0.4 (9%) | 0.3 (9%) | −0.1 (0.2%) |
| - of which outpatient care | 1.1 (3%) | 0.9 (3%) | −0.2 (6%) |
| Absenteeism | 5.2 (42%) | 4.6 (41%) | −0.6 (37%) |
| Benefits | 5.0 (40%) | 4.2 (37%) | −0.8 (48%) |
| Training and recruitment | 0.7 (6%) | 0.6 (5%) | −0.1 (9%) |

## E70 - Cross-national comparisons

### WEAE0403

**The state of the national response to prevent HIV among young people: a review of national reporting in 20 high-prevalence countries**

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**Background:** Given recent international commitments to the prevention of HIV among young people, we sought to assess the national response to prevent new infections among 10-24 year olds in countries with high HIV prevalence.

**Methods:** For 20 countries with generalized HIV epidemics, current national strategic plans and progress reports were reviewed to assess the national response in terms of: planning, measured by the inclusion of youth-specific strategies within national AIDS plans; and implementation, or the extent to which prevention activities reach the intended audience.
**Results:** All 20 countries include youth-specific strategies in their current national AIDS plan, and school-based HIV prevention was the youth prevention strategy most often included. Governments of all 20 countries report that school-based HIV education is reaching the majority of people in need, and included in primary, secondary, and teacher training curricula. The proportion of schools providing life-skills based HIV education varies from 2% to 100%. Programmes for out-of-school youth, behaviour change communication, and condom promotion were commonly included in national strategies, however, their content, quality and coverage were generally not reported. In UNGASS country progress reports, few countries disaggregate by age and sex the UNGASS indicators relevant to young people, or report comparable statistics over time.
**Conclusion:** In 20 high-prevalence countries, HIV prevention among young people is considered a priority in national plans, and the most widely implemented intervention for youth is school-based prevention. Monitoring youth-focused programmes should be improved to assess coverage, quality and delivery through comparable data over time. At a minimum, reporting UNGASS indicators by age and sex will improve the usefulness of national progress reports in tracking prevention efforts for youth. As a priority, systems are needed to report planning and programmes to promote condoms and HIV testing among young people, given the scarcity of data at the national level.

## E72 - Sustainability of financing and programmes

### MOAE0302

**Sustainability of HIV programs: lessons learned from sustainability analyses in four countries**

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**Background:** The political will to achieve universal access of HIV services by 2015 versus the decline in HIV donor funding requires HIV programs to rethink the current model of scaling up towards universal access, particularly when it relies heavily on donor funding.
**Methods:** The study reviews the results of the HIV/AIDS Program Sustainability Analysis Tool (HAPSAT) studies in four countries: Guyana, Kenya, Sierra Leone, and South Sudan. It focuses on sustainability challenges in the areas of financing, programming and human resources, and selected proposed solutions to these challenges.
**Results:** The sustainability issues encountered in the four countries were largely associated with these countries' heavy dependence on donor funding. In the initial years of the respective HIV/AIDS programs, this led to the expansion of HIV services beyond the levels that can be sustained without donor support. This expansion, for example, included stand-alone HIV clinics catering to a small number of patients. Solutions to the sustainability challenges can be categorized into one of the following: 1) Prioritization, both between

| Country | Income level | HIV prevalence (2008–9) | ART coverage (2009) | Funding issues |
|---|---|---|---|---|
| Guyana | Lower middle | 1.1% among pregnant women | 83.5% | Decrease in HIV funding from World Bank and PEPFAR |
| Kenya | Low | 6.3% among 15–49 year olds | 61% | Need to sustain the funding for the high level of coverage despite being low-income |
| Sierra Leone | Low | 1.5% among 15–49 year olds | 50% | Need to sustain the funding for the high level of coverage despite being low-income |
| South Sudan | Low | 3% among pregnant women | 8.3% | Global Fund grant (a key source of HIV funding in the country) ending, with no other funding source in place |

Background characteristics

| | |
|---|---|
| Prioritization | 1) Tailored IEC/BCC for MARPs and mass media for general populations (Sierra Leone, South Sudan); 2) Prioritization of use of various mass media based on unit cost per message exposure (South Sudan); 3) Target setting based on past performance to factor proxy for capacity (Sierra Leone, South Sudan) |
| Efficiency | 1) Limiting the number of financing agents (South Sudan); 2) Identification of existing datasets that can be assembled into a central strategic database to facilitate coordination of donors (Guyana); 3) Integration of HIV-related social services into other general social services (Guyana) |
| Resource mobilization | 1) Providing a plan to close a US$1.67 billion gap, through a combination of air freight levy, increasing the insurance premium, increasing government budget allocation, and decentralizing ART service delivery (Kenya); 2) Illustrating to donors the added value of their funding by unit cost analysis (South Sudan) |

Examples of Sustainability Recommendations

different interventions, and between target populations to be reached by a given intervention. Prioritization is more challenging where no cost-effective information exists, e.g., when dealing with non-clinical interventions. In such cases, the relevance of the intervention to the specific country context and the capacity to scale-up and sustain were assessed; 2) Efficiency, which includes, among others, partial or full integration of HIV services with the wider health and social services; and 3) Resource mobilization, from traditional sources such as governments, as well as innovative resources such as a levy tax on airlines.

**Conclusion:** With the decline in donor HIV funding, national HIV Programs will have to reassess the components of their respective programs in the context of sustainability. Countries will benefit from integrating sustainability plans into their strategies, operational plans and funding proposals.

## WEAE0105

### Affordability of HIV/AIDS treatment in developing countries: an analysis of ARV drug price determinants

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**Background:** Although prices for first-line drugs fell during the last years, affordability remains a critical issue in developing countries. Failure to first-line drug treatment increases the number of people living with HIV/AIDS (PLWHA) that require second-line treatment. The aim of this study is to analyze the global antiretroviral prices between 2003 and 2011 and associated factors, particularly differences between innovator/generic drugs, and the innovator prices evolution as the patents get closer to expiration.

**Methods:** Retrospective transactional data for antiretroviral procurements between 2003 and 2011 from the Global Price Reporting Mechanism (GPRM/WHO) was used. For every transaction, price, quantity, supplier and drug characteristics were recorded. Descriptive analyses were based on daily dose prices and quantities (PDD, QDD). Logarithm of PDD was regressed on transaction year, log(QDD), therapeutic class, years before patent expiration, formulation, and innovator/generic indicator.

**Results:** Mean PDD decreased from US$1.1 in 2003 to US$0.48 in 2011. In this period, mean PDD of generic drugs fell about 40.8%, while mean PDD of innovator drugs increased about 22%. Innovator firms sold 7% of purchased quantity (20% of total expenditure in antiretrovirals). Econometric analysis demonstrates price sensitivity to therapeutic classes, formulation, and quantities. Innovator prices are 35% ($p < 0.001$) higher than generics. In addition, the estimation suggests that innovator prices increase when initial patents arrive to expiration: 6.3% ($p < 0.001$) per year. Although first-line prices are in average 131% ($p < 0.001$) lower than second-line, innovator prices for first-line drugs are 33% ($p < 0.001$) higher than generic drugs.

**Conclusion:** Procurement policies should pay attention not only to higher prices practiced by innovator firms for drugs recommended in first-line regimens, but also to drugs with patents arriving to expiration whose prices are higher than drugs with patents expiring later. Where patent protection is concerned, high prices may impair the delivery of higher quality treatment in developing countries.

## TULBE06

### Scenario-based cost projections for PEPFAR resource requirements for the ART program in Ethiopia from FY2011-FY2015

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**Background:** Providing HIV treatment consumes substantial program resources. Forecasting future resource requirements can help ensure uninterrupted service delivery as treatment programs grow. We undertook cost analyses and projections for PEPFAR resources required to continue supporting the national ART program in Ethiopia under various scenarios from FY2011 through FY2015.

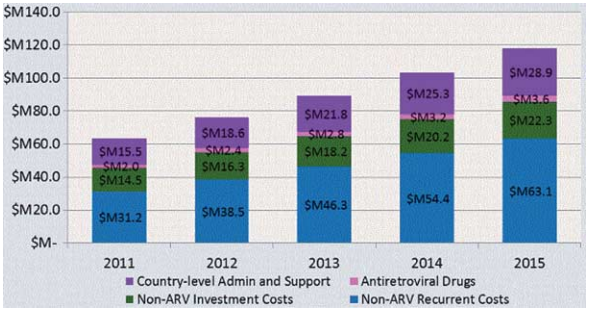


**Figure 1. Base Case projections FY 2011–2015.**

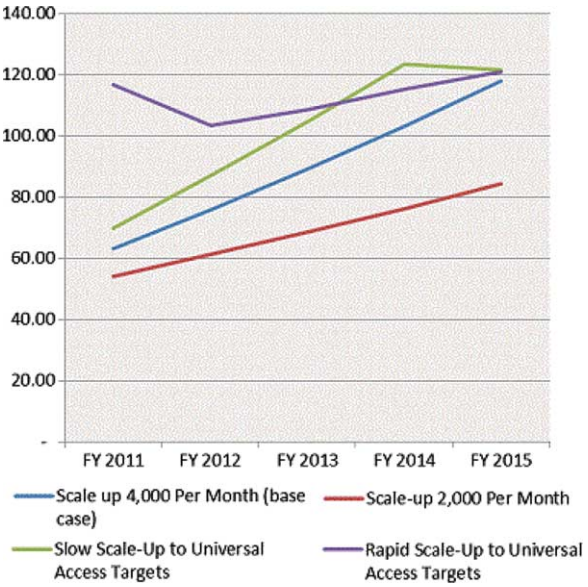


**Figure 2. Trends in projected costs (in millions USD).**

**Methods:** We collected data on actual expenditures devoted to supporting treatment programs in FY 2010, and used these data to calculate unit costs for various services. Data about patient and program characteristics were collected from performance reports, indicator targets, results of cohort analyses, and known program mark-ups and prices. We used the PEPFAR ART Costing Model 2010 to calculate resource requirments under scenarios describing different rates of new patient enrollment.
The base case scenario assumed continued program growth at its current pace, adding 4,000 new ART patient slots every month from an initial patient volume of 207,458 ART patients. We assumed that Pre-ART patient volume continues to grow proportional to ART patient volume. This base case scenario was compared to 1) a slower (50% reduction) in patient uptake from base case scenario, 2) linear scale-up to universal access targets, 3) rapid scale-up to universal access targets.
**Results:** Faster rate of scale-up requires markedly increased resources for expanding capacity to accommodate a large number of patients at the initial phase, but in subsequent years, annual costs drop sharply and drop below the slower rate of scale-up for universal access. However, the total 5 year cost was higher than in all other scenarios. ARV costs represent a small fraction of total PEPFAR costs, as these costs are largely covered by the national government through Global Fund and other donors.
**Conclusion:** Programs need to weigh the higher costs of rapid scale-up, and the improved health outcomes and economic gains of universal access in making planning decisions.

## E73 - Measuring efficiency and effectiveness of national AIDS programmes

### MOAE0303

**Spending on ART by provinces in South Africa: trends, cost drivers, (in)efficiencies and sustainability**

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**Background:** In 2003, the South African government committed to providing ART free to HIV-positive patients attending public health care facilities. National Treasury increased the budget allocations to cope with the rapid rate of ART roll-out, and has committed to increasing its allocations by 22% on average over the Medium Term Expenditure Framework (MTEF) period (2010/11 to 2012/13). Initially, provinces struggled with lack of capacity, stock-outs and even underspending. In recent years, some of these challenges have been reduced as procurement and supply systems have been improved and human resource capacity has been expanded. However, examining the different provincial ART expenditure in relation to respective numbers of ART patients and HIV prevalence shows interesting variations, highlighting possible areas for improved efficiency in some provinces.
**Methods:** The total public spending that was labelled as"ART" by the South African provinces was identified for the years 2007/08, 2008/09 and 2009/10, and broken down into cost components. This was limited by the level of disaggregation available in the public expenditure records. Simple unit costs were calculated using the total provincial ART spending per annum, divided by the number of public ART patients in that province in each year.
**Results:** The rough estimates of unit costs over the three years show increasing efficiencies in delivery, with variations in the key cost drivers per province. Comparing the provincial spending with estimated numbers of patients in need of treatment indicates that allocations and spending appear to be along lines of capacity to deliver, rather than of need. As spending on ART in SA dramatically increased, spending on prevention interventions decreased nominally and proportionally, raising concerns of sustainability. The attached figures present some key findings.
**Conclusion:** The study concludes with recommendations for improved efficiency of ART spending and delivery, and sug-

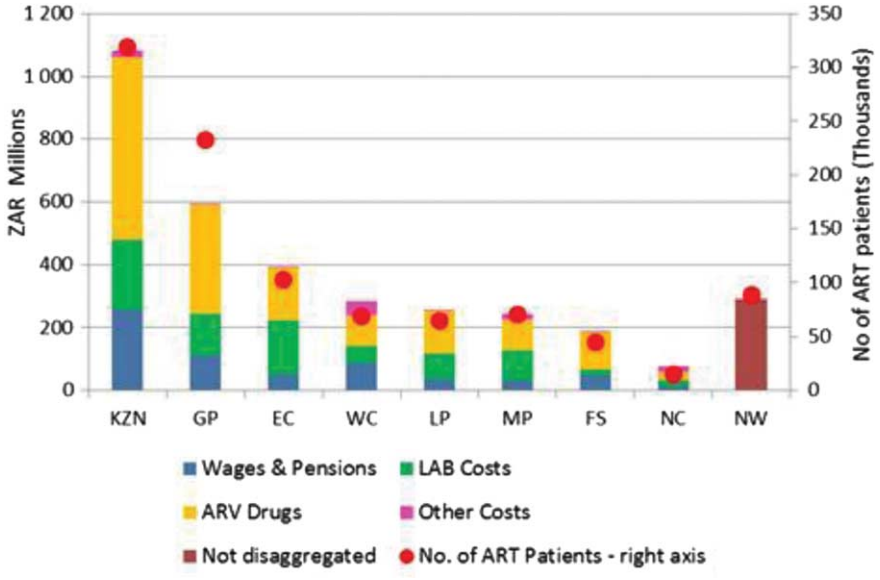


**Figure 1. South African Provincial DOH Spending on ART and Numbers of ART Patients (ZAR Mill, '000s patients, 2009/10).**

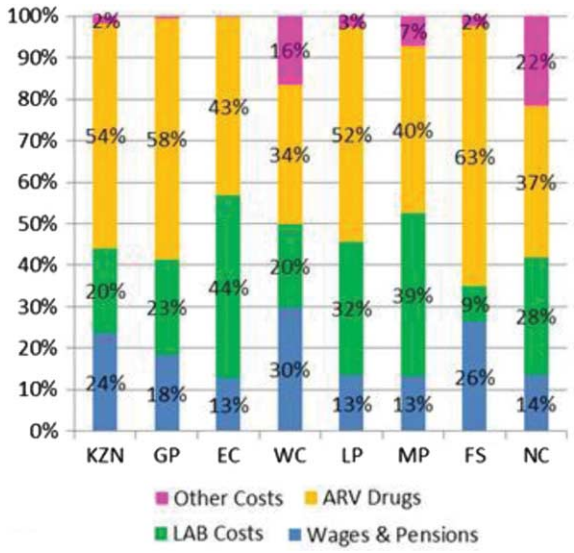


**Figure 2. South African Proportional ART Spending per Production Factor, By Province (2009/10).**

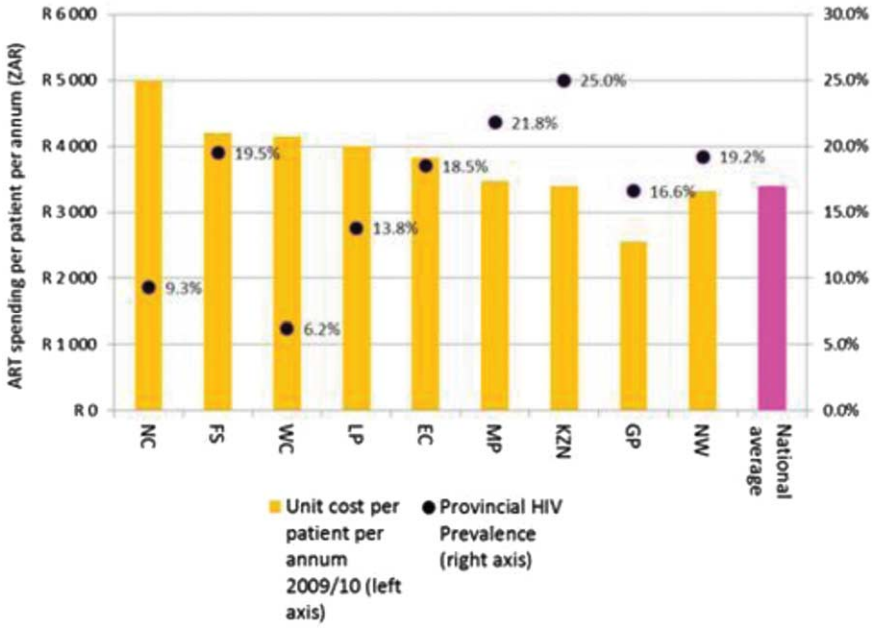


**Figure 3. South African Provincial DOH Public ART cost per patient per annum (ZAR) and HIV Prevalence (%, 2009/10).**

gestions for more equitable allocations across provinces in South Africa.

## E74 - Ethics of operations research, HIV programme implementation and economic evaluation

### WEAE0303

**Mobile phone adherence support for antiretroviral therapy: what would it cost the National AIDS Control Program in India?**

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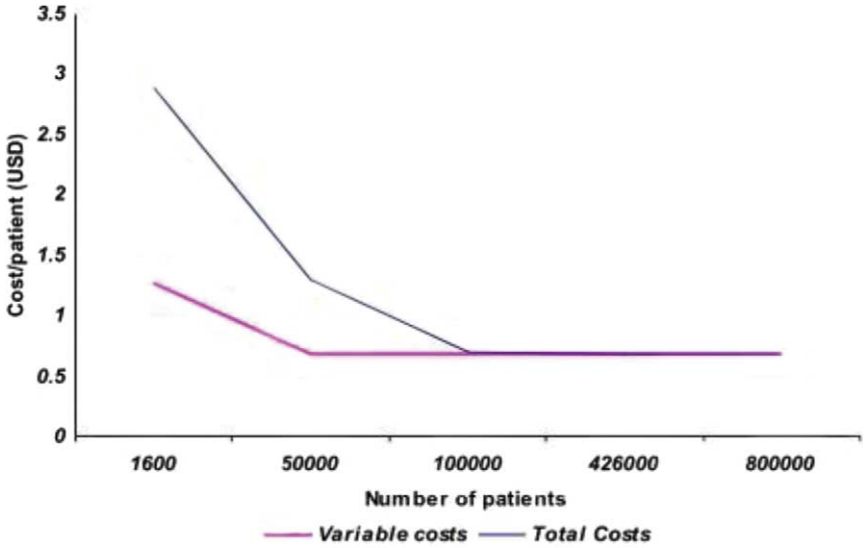
**Background:** Mobile phone reminders for adherence support in HIV have gained popularity in recent years. While many studies have proven the effectiveness of such reminders, few have assessed the costs on a large scale. This study aims to assess their costs of such

**Table 1. Healthcare program costs for mobile phone adherence support for patients attending an HIV clinic in South India**

| **At healthcare provider level** | | |
|---|---|---|
| **One-time costs*** | **Costs (USD)** | **Annualised cost (USD)** |
| Development of the intervention | 402.66/5yrs | 80.53 |
| Development of the web interface | 201.33/5yrs | 40.27 |
| Equipment costs (llaptop and 1 mobile phone) | 664.38/5yrs | 132.88 |
| **Fixed costs*** | **Cost (USD)** | **Annualised cost (USD)** |
| Service maintenance | 603.99/year | 603.99 |
| Equipment maintenance | 28.19/3years | 9.40 |
| Program manager | | |
| (10% of annual time, 503.32USD/mth salary) | | 603.99 |
| Overheads | 201.33/year | 114.40 |
| Data manager (15min/week, 140.93USD/mth salary) | | 10.63 |
| Tota cost | | 1596.07 |
| **Variable Costs*** | **Costs (USD)** | **Annual Cost/patient (USD)** |
| IVR cost | 0.03Q/IVR | 1.57 |
| SMS cost | 0.004/SMS | 0.21 |
| Counselor | | |
| (20min/patientyyear, 24.16USD/mth salary) | | 0.11 |
| Total variable cost | | 1.89 |
| **Total costs** | | **Annual Cost (USD)** |
| Total cost = | | |
| One-time cost + Fixed costs + n(vanable costs) | | 4627.60 |
| Total cost/patient (number of patients 1600)[@] | | 2.89 |

*One time costs: one time investments made either by healthcare providers.[#]Fixed costs: Costs that do not change with the units of consumption. [$]Variable costs: Costs that change with the units of consumption. [@]Number of patients receiving ART at St. Johns Medical College Hospital. Bangalore. India. 1USD = 49.67INR as of 15$^{th}$ February 2012
Cost of mobile phone reminders




*42600 patients are currently on ART under the NACP III. 800,000 patients are expected to receive ART by 2017under the National AIDS control program. Cost of IVR/30sec call: 0.03USD for upto 50,000 patients, 0.02USD for 50,000-100,000 patients, 0.01USD≥100,000patients.
Cost/ SMS: 0.004USD for upto 50,000 patients, 0.002USD for 50,000-100,000 patients, 0.0008INR≥100,000 patients. 1USD=49.67INR as of 15th February 2012.

**Figure 1. Total and variable costs for scale up of mobile phone adherence reminders (IVR+SMS) for Antiretroviral Therepy in the Indian context [Total and Variable costs for scale up].**

**Table 2. Sensitivity analysis of costs for mobile phone adherence support for antiretroviral therapy based on the number of patients and type of mobile support**

| Patient Numbers | 100000 | | 426000[$] | | 800000[#] | |
|---|---|---|---|---|---|---|
| **Mobile support** | **IVR** | **SMS** | **IVR** | **SMS** | **IVR** | **SMS** |
| **Onetime + fixed costs (USD)** | 1596.07 | 1596.07 | 1596.07 | 1596.07 | 1596.07 | 1596.07 |
| **Annual variable cost/patient* (USD)** | | | | | | |
| IVR cost/30 sec call | 0.52 | NA | 0.52 | NA | 0.52 | NA |
| Cost/SMS | NA | 0.04 | NA | 0.04 | NA | 0.04 |
| Counselor cost | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| Total variable cost* | 0.64 | 0.16 | 0.64 | 0.16 | 0.64 | 0.16 |
| **Total costs (USD)** | | | | | | |
| One time cost* | | | | | | |
| Fixed costs* | | | | | | |
| n (variable costs) | 65437.42 | 17279.58 | 273560.23 | 68407.83 | 512326.89 | 127064.16 |
| Total Cost/patient* | 0.65 | 0.17 | 0.64 | 0.16 | 0.64 | 0.16 |

*IVR cost/30 sec call=0.01USD, and cost/SMS=0.0008USD if number of patients $\geq$100000 patients.
[$]Number of patients on ART under the National AIDS Control Program in 2011 (NACP). [#]Number of patients expected to receive ART under the NACP Phase IV (2012–2017) *(Reference: Working group on AIDS control for the 12th five year plan, Planning commission, GOI)*. @Total costs approach variable costs as number of patients increase. 1USD=49.67INR as of 15th February 2012.
Sensitivity analysis of costs.

reminders to support adherence in patients on antiretroviral therapy (ART) within the context of the National AIDS control Program of India. *The mobile phone reminder* in this study consists of a combination of an interactive voice response (IVR) and picture message (SMS); both forms of adherence reminders are received by patients once a week. This intervention was developed for the HIVIND trial in India.

**Methods:** The study was done from a program perspective at St. John's Medical College Hospital, Bangalore, India. Total costs of establishing and maintaining the mobile phone reminders were studied. Sequential procedure for costing was used. This involved identifying, measuring and pricing resource use in natural units (eg: minutes). Sensitivity analysis for scale up involved: (1) varying the number of patients and (2) varying the constituents of intervention ie; (i) IVR and SMS (ii) SMS alone (iii) IVR alone.

**Results:** Total cost for mobile phone adherence reminders is 2.89USD/patient/year for 1600 patients on ART at the study site (Table 1). Estimated cost to the national program is 0.68USD / patient/year for scale up from 0.42million currently on ART to 0.8million patients expected to receive ART by 2017 (Figure 1). Cost estimates for individual components ie; IVR alone and SMS alone for 0.8million patients are 0.64USD/patient/year and 0.16USD/patient/year respectively (Table 2).

**Conclusion:** From our study, the Indian program would incur an overall cost of 0.086% of its current 5year budget to provide such adherence support. The costing results of this study are relevant for policy makers when considering interventions to enhance adherence support within the national program.

# E75 - Use of operations research to support the response to HIV prevention and treatment

## MOPDE0202

### Factors associated with non-utilisation of antenatal care services by women delivering with an unknown HIV status at four poly-clinics in Chitungwiza, Zimbabwe

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**Background:** Increasing numbers of women are presenting in labour without prior antental care (ANC) with unknown HIV status in the town of Chitungwiza, Zimbabwe (from 918 in 2009 to 4768 2010) depite efforts to raise community awareness and national maternal and child health campaigns. A study was conducted to identify factors associated with utilisation and non-utilisation of ANC services among women delivering in four Chitungwiza clinics.

**Methods:** A one to one unmatched case control study was conducted at four PMTCT sites from February–April 2011. A case was any woman who presented in labour without prior ANC or had attended only one ANC visit. A control was any woman who presented in labour having attended two or more ANC visits. Systematic sampling was done using delivery registers as sampling frames. First case was randomly selected then every second woman until the required sample size was reached. An administered questionnaire was used to collect data. EpiInfo v3.5.3 was used for analysis.

**Results:** There were 232 cases and 232 controls with a median age of 25 in both groups. Unaffordable of ANC fees (OR = 3.8; 95% CI: 1.39–10.46), seeking Tradtional Birth Attendant (TBA) servises (OR = 3.2; 95% CI: 1.16–8.85), and religious beliefs (OR = 1.7; 95% CI: 1.09–2.68) increased the likelihood of not booking for ANC. Independent determinats of non-utilisation of ANC included belonging to the apostolic faith (AOR = 3.1[1.05–9.18],seeking TBA services with previous pregnancy (AOR = 3.2 [1.16–8.86], unaffordable user fees (AOR = 3.0 [1.15–7.69]). Having received information on ANC with previous pregnancy (AOR = 0.16 [0.10–0.26], death of a child (AOR = 0.41 [0.19–0.93] and being HIV-positive (AOR = 0.39 [0.23–0.64)] were independent determinants of ANC utilisation.

**Conclusion:** Revision and enforcement of national polices on ANC user fees is necesary to improve ANC utilisation, access to HIV testing and counselling, treatment care and support during pregnancy and ensure that ANCservices are accessible to pregnant women at an affordable fee.

## E77 - Operations research making a difference in programme performance

### WEAE0203

**Risk factors and true outcomes of children lost to follow-up from antiretroviral therapy in Lilongwe, Malawi**

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**Background:** Loss to follow-up (LTFU) negatively affects antiretroviral therapy (ART) programmes by leading to viral resistance as well as immunological and clinical failure among patients and by biasing mortality estimates. Among children, risk factors for LTFU and true outcomes of these patients are not well known. The objectives of the study were to analyze LTFU risk factors of children on ART and to determine their true outcomes through active tracing.
**Methods:** Descriptive retrospective cohort study of 1182 children that were on ART at an urban HIV clinic in Malawi between April 2006 and December 2010. Since 2006, the clinic implements an innovative programme, Back-to-Care (B2C), to increase ART patient retention through phone and field tracking. Baseline characteristics routinely collected at ART initiation were gathered together with the information obtained from the B2C field tracing team to determine ART initiation factors that influenced subsequent LTFU.
**Results:** Of 985 children (1999 children-years) on ART included in the analysis, 251 (25%) were LTFU, a LTFU rate of 12.6/100 children-years. No available CD4 count at initiation [Adjusted Hazard Ratio (AHR): 2.01, 95% CI: 1.31–3.07]; nutritional wasting (AHR: 1.6, 95% CI: 1.17–2.18) and age under 2 years (AHR: 1.55, 95% CI: 1.02–2.37) all independently increased the risk of LTFU. Of 201 LTFU children traced, 158 (79%) were found: 11% died, 26% transferred out (TO) to another treatment centre and 63% were alive. LTFU rate was reduced by 62% after tracing. Mortality estimates were corrected, increasing from 2.6% to 4.8%.
**Conclusion:** Increased patient retention efforts, coupled with more active tracing of LTFU children on ART, could reduce LTFU, increase patient adherence, and improve mortality rate estimates.

## E80 - Strategies for phasing-in viral load in resource-limited settings

### TUPDE0206

**Use of viral load testing in resource-limited settings to confirm treatment failure in children: experience from Nyanza Province, western Kenya**

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**Background:** In Kenya, about 47,000 (9%) of the 520,000 people on antiretroviral therapy (ART) are children. Use of virologic measurement to monitor response to ART is not routinely provided due to cost and accessibility; however, viral load (VL) testing is being offered in limited settings to confirm treatment failure.
**Methods:** We analysed demographic and clinical data from pediatric patients ( $<15$ years) meeting national criteria for treatment failure who submitted samples for VL testing from 68 clinical sites in Nyanza Province. Immunologic criteria included CD4 count or percent non-response (rise $<50$ cells/mm$^3$ or persistent CD4 $<100$ cells/mm$^3$) or CD4 fall $>50\%$ of peak, to baseline, or below threshold value for age. Clinical criteria included new/recurrent WHO stage 3/4 conditions, poor growth, or recurrent infections. We evaluated the positive predictive value (PPV) of using immunologic and clinical criteria to diagnose virologic failure (VL $>1{,}000$ copies/ml, after $>6$ months of ART).
**Results:** Between Sept 2008-June 2011 336 pediatric samples were tested; patient median age 10 years (range 1–14) and 143 (43%) were female. 94% were on a first-line nevirapine/efavirenez-based regimen, median duration on ART was 2.6 years, 213 (63%) patients met $>1$ immunologic criteria, 51 (15%) $>1$ clinical criteria, and 71 (22%) met both. Despite 99% of clinicians reporting satisfactory patient ART adherence, 287 (85%) samples indicated virologic failure. The PPV of immunologic criteria was 87% (95% Confidence Intervals [CI] 84%–90%) compared to 62% PPV (95% CI 50%–73%) for clinical criteria. The PPV of both criteria present was 96% (95% CI 88%–98%).
**Conclusion:** Virologic failure was confirmed in 85% of pediatric ART patients with suspected treatment failure. Immunologic criteria in combination with clinical criteria were more useful in correctly identifying patients requiring regimen changes and reduced the number of false positives compared to using clinical criteria or immunologic alone.

## E81 - Use of viral load in prevention of mother-to-child transmission (PMTCT) programmes

### TUPDE0205

**Routine viral load testing among pregnant HIV-positive women on antiretroviral therapy: implications for prevention, Nyanza province, Kenya, 2011**

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**Background:** Highly active antiretroviral therapy (HAART) among HIV-infected women during pregnancy and breastfeeding reduces the risk of HIV transmission. Maternal HIV viral load (VL) is an important predictor of transmission risk, and VL monitoring during pregnancy could be useful to optimize clinical management. However, routine

VL monitoring is not widely available in Kenya. We assessed routine VL monitoring for pregnant HIV-infected women on HAART to determine the proportion of women who were not reaching treatment and prophylaxis goals

**Methods:** We initiated a pilot in September 2008 in Nyanza at 66 clinical sites offering VL testing for patients identified as meeting clinical and immunologic criteria for treatment failure or who were pregnant. Frequencies, proportions, and interquartile ranges (IQR) for demographic and clinical data were calculated. Bivariate analysis examined potential correlates of detectable VL ( >400 copies)

**Results:** Between 2008 and June 2011, pregnant women, without evidence of clinical or immunological failure, constituted 683 (8%) of 8073 patient samples submitted for VL testing. Median age was 29 years (IQR 26–33) and median baseline CD4 count was 190cells/mm$^3$ (IQR 102–279). The median duration of HAART was 2 years (IQR 1–3) and 99% were on a first-line regimen (zidovudine/stavudine + lamivudine + nevirapine/efavirenz). 161 (24%) of samples yielded a detectable VL. Women with a baseline CD4 < 200 were more likely to have a detectable VL (OR = 1.79, 95% CI 1.24–2.57) compared to those with a CD4 > 200. Age and duration of HAART were not associated with a detectable VL

**Conclusion:** One in four pregnant women on HAART, without current indications of treatment failure, had a detectable VL. Pregnant women, especially those with low baseline CD4 counts, should receive enhanced ART adherence counseling and close clinical monitoring. Routine use of VL testing during pregnancy can identify women requiring additional intervention to maximize care and prevention outcomes.

**Disclaimer:** The content and views in this abstract are solely the responsibility of the authors and do not necessarily represent the official views of the affiliated organizations, United States Government, or Government of Kenya.

# E82 - Operations research in the use of laboratory monitoring, other than viral load

## TUPDE0202

### Assessment of laboratory test utilization for HIV/AIDS care in ART clinics of Malawi

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**Background:** Transition to CD4 monitoring for pre-ART assessment and viral load (VL) monitoring for ART response assessment is planned in Malawi. We assessed how often clinicians ordered these tests as compared to current guidelines, and whether the samples were successfully and promptly processed.

**Methods:** We conducted a retrospective review from electronic medical records of all patients seen from August 2010 through July 2011, in two urban HIV-care clinics that utilize 6-monthly CD4 monitoring regardless of ART status. We calculated the percentage of patients on whom clinicians ordered CD4 or VL analysis for routine care, using blood-draw as a proxy for ordering. For all CD4 and VL samples sent to the adjacent Ministry of Health central laboratory, we determined rates of successful lab-processing, and mean time to returned results.

**Results:** Of 22,488 patients seen, 8147 (35%) had at least one blood draw for CD4 count. Of all CD4 samples sent, 8061/8754 (92%) samples were returned as successfully processed. Of those, mean time to processing was 1.6 days (s.d 1.5) but mean time to results being available to clinician was 9.7 days (s.d. 3.5). Regarding VL, 189 patients (1% of the 18,330 on ART) had a blood draw and only 118/213 (55%) samples were returned as successfully processed. Mean processing time was 39.9 days (s.d. 24.6); mean time to results being available to clinician was 43.9 days (s.d. 28.8). During the one-year evaluated, there were multiple lapses in processing VL samples for up to 2 months; no samples were processed after May 2011.

**Conclusion:** Clinicians grossly underutilize CD4 and VL as diagnostic and monitoring tools. Laboratory processing failures and turnaround times are unacceptably high, especially for viral load analysis. Alternative processing techniques or results reporting strategies, such as point-of-care devices or SMS result reporting, may offer considerable improvement before successfully adopting these tests as standard-of-care.

## TUPDE0204

### Evaluating the effect of the use of point-of-care CD4 machines on access to antiretroviral therapy (ART) eligibility screening and ART initiation for HIV-positive pregnant women in Zimbabwe: towards elimination of new paediatric HIV infection by 2015

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**Background:** Treatment-eligible HIV-positive pregnant women have the highest risk ( >75%) of transmitting HIV to their infants, but only a small proportion of women are being initiated on antiretroviral therapy (ART) during pregnancy in Zimbabwe, partially due to limited access to CD4 testing to determine treatment eligibility. We assessed whether introducing point-of-care (POC) CD4 machines at 43 high-volume, Elizabeth Glaser Pediatric AIDS Foundation supported, PMTCT sites in Zimbabwe increased the proportion of HIV-positive pregnant women assessed for ART eligibility and subsequently initiated on ART.

**Methods:** A quasi-experimental before and after study design was conducted, with 43 high-volume PMTCT sites selected based on number of HIV-positive pregnant women seen. POC CD4 machines were deployed to all 43 sites in June 2011 following health worker trainings on usage of machines and tools (registers, summary sheets). Data were collected before (April–June 2011) and after (July–September 2011) deployment of POC CD4 machines (intervention). Data were analyzed using SPSS v15.0. Differences between proportions were tested using Wilcoxon signed rank test.

**Results:** Before introduction of the POC machines, 617 (51%) of 1,210 HIV-positive pregnant women received a CD4 test at the 43 sites. After the machines were introduced, 890 (81%) of 1,100 women received a CD4 test. There was a significance difference between the proportion of women tested for CD4 count before and after the intervention (P = 0.023) and between the proportion initiated on ART before and after the introduction of the CD4 machines (9% [104] before versus 25% [276] after; (P = 0.001).

**Conclusion:** Deployment of POC CD4 machines was associated with increased CD4 testing and ART initiation for HIV-positive pregnant women at the 43 intervention sites. Based on these early results, expansion of POC CD4 machines to all high volume PMTCT sites in Zimbabwe is recommended to increase access to ART eligibility towards elimination of new HIV infections in children by 2015.

# E83 - International trade law and intellectual property

## WEAD0405

### Methodology to determine the patent status of key ARVs and other essential medicines: a strategy to reduce cost of treatment

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**Background:** Evidence has emerged linking the lack of readily available accurate information of the patent status of key ARVs with high prices in some countries. Despite their similar socio-economic circumstances, it shows that countries often pay significantly different prices for the same ARVs. Greater cost savings can be achieved if organizations and officials involved in the national procurement have more transparent information regarding the patent status of key ARVs.
**Methods:** UNDP has co-sponsored the development of a methodology written by Barbara Milani and Cecilia Oh that can be used by officials involved in procuring ARVs and other essential medicines in low and middle income countries to determine their patent status and ascertain whether and when generics can be freely imported into their country.
**Results:** The methodology was preliminarily tested in Canada, China, India, and South Africa in 2006 and proved to be effective in determining the patent status of ARVs. An updated and expanded version of the methodology is being finalized and will be launched before the AIDS Conference in July 2012.
**Conclusion:** In light of the decrease in AIDS funding and growing need for countries to lower treatment cost, the methodology can be used by officials and organizations involved in procurement to ensure that generic ARVs are imported legally, and by low and middle income countries to facilitate the use of other flexibilities, where necessary, if valid patents for key ARVs are hampering the procurement of more affordable equivalents of comparable quality.

## WEAE0103

### Understanding voluntary licensing: an analysis of current practices and key provisions in antiretroviral voluntary licenses

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**Background:** Voluntary licensing has gained increased attention as a potential policy measure to improve access to generic versions of widely-patented antiretroviral (ARV) medicines in developing countries, particularly in relation to the Medicines Patent Pool, an international voluntary licensing mechanism. This study offers a description of ''baseline'' voluntary licensing practices before UNITAID's decision to establish the Pool in 2009, analyzes the evolution of licensing practices since then, and highlights the types of license provisions with the most important implications for public health.
**Methods:** We compiled data on all publicly-announced voluntary licenses between major ARV patent-holders and generic firms, and analyzed various provisions covering: geographic scope for production and sales; degree of competition enabled for end products and active pharmaceutical ingredients; royalty rates; freedom to co-formulate into fixed-dose-combinations and pediatric formulations; technology transfer; regulatory data; and various other provisions with public health relevance.
**Results:** There is wide variation in voluntary licensing practices, with geographic scope ranging from one to 112 countries; number of licensees ranging from one to unlimited; royalty rates ranging from 0% to 5% of the generic price; freedom to co-formulate ranging from none to unlimited; and access to technology transfer and regulatory data ranging from minimal to extensive. Other terms and conditions may have important public health impact, but the lack of transparency on the text of licenses limits the scope of the analysis.
**Conclusion:** Voluntary licenses offer one potential route to improving access to low-cost, generic ARVs in a predictable, sustainable manner. However, attention must be paid to license provisions that can limit access to generic medicines, restrict competition, create onerous burdens, or otherwise reduce the public health benefits of licensing. Increased transparency in licensing practices, critical analyses of license provisions, and improved license terms are necessary to maximize the potential public health benefit of this policy tool.

## WEAE0104

### Panorama of the pharmaceutical patenting and sanitary registration of ARVs drugs in Brazil: implications to access and to health industrial complex

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**Background:** In Brazil the number of patents and patent applications has increased, making it difficult to place generic drugs in the market. At the same time, it is fundamental that the pharmaceutical companies-either innovators or generic-register their drugs, formulations or combinations in the National Agency Sanitary Surveillance-ANVISA (acronym in Portuguese) so that the general population to access is their sanitary registration.
**Methods:** This study was conducted between April 2010 and April 2011 and it was funded by the Brazilian Ministry of Health. The research resulted in two methodological outcomes: 1) an ARV patent and sanitary registration database; 2) research methodology aimed at overcoming one key difficulty faced in Brazil in this area of investigation, which is that patents are not automatically linked to their corresponding final products. The methodology was designed for Brazil, but it may be adapted to other countries. Regarding to sanitary registration of ARVs, ANVISA provides an online database of granted and not granted sanitary registrations.
**Results:** Patents and registration for 23 single-drug medicines and 8 combinations were reviewed. The study identified 96 patents or patent applications related to these drugs and combinations, which account for more than 3 patents/drug. One study result is that the granting of a secondary patent delays the entry of generic medication in the market. In the case of darunavir, the first patent will expire in 2016, but if the last patent application is granted (for Tibotec), the patent applicant, will benefit from a monopoly until 2025.
**Conclusion:** The results of the research led to the following policy recommendations: 1: Wide application of the Bolar Exception and rigid standards for patent examinations; 2: Incentives for pre and post-grant oppositions; 3: A possible solution for the non-transparent

nature of the patent system in Brazil is the compulsory publication of granted patents.

## E85 - Role of multilateral agencies and donors

### THPDD0105

**Conflict-affected displaced persons need to benefit more from HIV Global Fund grants and national strategic plans**

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**Background:** Access to HIV programmes for refugees and internally displaced persons (IDPs) is a human rights issue and a public health priority for affected and host populations. Primary source of funding for HIV programmes for many countries is the Global Fund. This article analyses the current HIV National Strategic Plans (NSPs) and Global Fund approved proposals from rounds 1–8 for countries in Africa hosting populations with refugees and/or IDPs to document their inclusion.
**Methods:** The review was limited to countries in Africa as they constitute the highest caseload of refugees and IDPs affected by HIV. Only countries with refugee and/or IDP populations of ≥10,000 persons were included. NSPs were retrieved from primary and secondary sources while approved Global Fund proposals were obtained from the organisation's website.
**Results:** Majority of countries did not mention IDPs (57%) compared with 48% for refugees in their HIV NSPs. A minority (21–29%) of HIV NSPs referenced and included activities for refugees and IDPs. The majority of countries with ≥10,000 refugees and IDPs did not include these groups in their approved HIV proposals (61%–83%).
**Conclusion:** Besides legal obligations, Governments have a public health imperative to include these groups in NSPs and funding proposals. Governments may wish to add a component for refugees that is additional to the needs for their own citizens. The inclusion of forcibly displaced persons in funding proposals may have positive direct effects for host populations as international and UN agencies often have strong logistical capabilities that could benefit both populations. Given recent developments in the Global Fund and HIV funding in general, the HIV funding situation for forcibly displaced persons may worsen. It is essential for their inclusion to occur if we are to reach the stated goal of universal access and the Millennium Development Goals.

## E87 - International assistance and funding mechanisms

### WEPDE0203

**Its 'dark ripple' effect: competing narratives of PEPFAR and sex work in southern Africa**

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**Background:** The President's Emergency fund for AIDS Relief (PEPFAR) is the largest donor in Southern Africa, spending over US $6 billion since 2004 and supporting ARV treatment for 1.5 million people. However, since the introduction of PEPFAR conflicting narratives have appeared regularly. These conflicting narratives often tend to differently describe and interpret the content, intent, impact and outcome of PEPFAR policies, particularly with regards to prostitution.
**Methods:** This analysis utilized a competing narrative approach to identify recurrent and conflicting narratives relating to PEPFAR and its implementation among organizations and populations in southern Africa. A competing narrative methodology allows the identification and comparison of differing interpretations of phenomena. Here narratives found in published, ethnographic and interview sources from sex work and public policy communities in Southern Africa and elsewhere were analyzed and similarities and differences in these communities' interpretations of the PEPFAR policy compared.
**Results:** The presentation and discussion of PEPFAR's anti-prostitution clause vary widely, and have varied over time. Sex worker communities and organizations have spoken of PEPFAR's "dark ripple effect"-the incremental phase-out of sex worker-accessed services, the increasing isolation of sex workers, and fears about disseminating and sharing information about sex work programs and funding. In contrast, public policy communities have been slow to acknowledge, publicly, the policy's suggested failures, or to provide clarifying guidance or response to proposed shortcomings.
**Conclusion:** Among the two often-opposing communities, conflicting narratives about PEPFAR and its implementation were found. Evident were narratives of PEPFAR's suggested harms and the lack of response to it. This analysis builds on earlier work to suggest that fostering improved dialogue between sex work and US funding communities would help to better broad understandings of PEPFAR's impacts, while potentially translating to improved HIV service access for sex workers.

## E89 - Financial sustainability of the response to HIV and AIDS

### MOAE0304

**Ensuring the financial sustainability of the national AIDS response in a low-middle income country with the growing HIV epidemic: is it feasible in the next few years in Ukraine?**

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**Background:** Ukraine is a lower-middle income country with the most severe and growing HIV-epidemic in Europe (1.1% estimated adult prevalence), concentrated among people who inject drugs (PWID), sex workers (SWs) and men who have sex with men (MSM). Ukraine's financial needs for the adequate HIV response are dramatically increasing while it continues to highly depend upon external funding. The major challenge is to sustain financing of the HIV response while the global financial crisis prompts uncertainty of the level and scope of future donor support, especially for middle-income countries. We aimed to examine the financial sustainability of Ukraine's HIV response, and make recommendations for its mid- and long-term financing strategies.

**Table 1. Annual expenditures on HIV (in USD) by programme areas and sources of financing – 2009–2010**

| | 2009 | | 2010 | |
|---|---|---|---|---|
| **HIV expenditures** | **Domestic governmental** | **External and NGO** | **Demestic governmental** | **External and NGO** |
| Prevention tor PWID | 169 373 | 3 292 357 | 146 772 | 3 625 771 |
| Prevention, for other MARPs | 191 793 | 1 278 826 | 56 743 | 1 540 867 |
| PMTC | 4 951 137 | 420 194 | 5 410 734 | 437 383 |
| Other prevention | 4 857 170 | 3 875 473 | 4 015 743 | 4 717 556 |
| Treatment | 23 196 773 | 3 911 843 | 22 537 044 | 7 884 386 |
| Care and support | 564 399 | 2 179 320 | 962 890 | 2 701 316 |
| Organizational and administrative support | 4 121 960 | 12 386 875 | 4 924 272 | 13 877341 |
| Total | 38 052 604 | 27 344 888 | 38 054 198 | 34 784619 |
| GRAND TOTAL | 65 397 492 | | 72 838 817 | |

**Table 2. Annual estimated financing needs by HIV programme areas, future financing allocations for HIV by sources and financing gap (in USD) – 2012–2015**

| **HIV financing needs** | **2012** | **2013** | **2014** | **2015** |
|---|---|---|---|---|
| Prevention | 51 319 632 | 56 318 716 | | |
| Treatment | 100 366 043 | 117 037 132 | | |
| Care and support | 17 789 487 | 22 175 823 | | |
| Organizational and administrative support | 13 460 978 | 16 703 643 | | |
| TOTAL | 182 936 140 | 212 235 315 | 250 437 671 | 295 516 452 |
| **Sources of future financial allocation** | **2012** | **2013** | **2014** | **2015** |
| Governmental | 47 330 859 | 63 627 783 | 63 627 783 | 63 627 783 |
| Other domestic | 2 000 000 | 2 000 000 | 2 000 000 | 2 000 000 |
| External (Global Fund) | 71 420 140 | 44 052 919 | 64 668 346 | 69 911 446 |
| External (other) | 23 686 808 | 23 750 000 | 21 750 000 | 21 750 000 |
| TOTAL | 144 437 807 | 133 430 702 | 152 036 129 | 157 289 229 |
| **Financial gap** | **2012** | **2013** | **2014** | **2015** |
| TOTAL | 38 498 333 | 78 804 613 | 98 401 542 | 138 227 223 |

**Table 3. Unit costs of HIV prevention and treatment interventions per client per year (in USD)**

| **Intervantion** | **Prevention for PWID** | **Prevention for SWs** | **Prevention for MSM** | **Prevention for prisoners** | **ART with 1st line ARVs** | **ART with 2st line ARVs** |
|---|---|---|---|---|---|---|
| Unit cost | 55 | 62 | 51 | 23 | 928 (incl. USD 843 for ARVs) | 1716 (incl. USD 1631 for ARVs) |

**Methods:** We analyzed trends in the annual expenditures using the National AIDS Spending Assessments; financing needs for 2011–2015 using the 2011–2013 National Operational Plan and the gap analysis for 2014–2015; future domestic and external funding allocations; policy environment, and implications of all those on future financial sustainability.

**Results:** The HIV expenditures dramatically increased since 2004 (USD3.3M) with external and non-governmental resources comprising 42–48% of the USD 65.4–72.8M in 2009–2010. Despite the increasing future funding allocations from all sources, the financial gap remains substantial estimated at USD 138M in 2015. All HIV care and prevention services remain free through public and community-level settings regardless of the funding source.

**Conclusion:** While domestic investments for treatment increase, HIV prevention especially for key populations is almost fully funded externally. Allocation of a larger proportion of governmental resources is critical, along with policy initiatives aimed at reduction of costs per client through efficient service delivery modalities, including HIV service integration into primary and other care. While donor-funding commitments will be still required for the next few years, establishment of alternative modalities like financing HIV from a national health insurance, introducing cost-sharing arrangements, and facilitating private-public partnerships will be needed.

# E91 - AIDS: taking a long-term view and developing more positive and sustainable outcomes

## WEPDE0104

### Evaluating the costs of implementing a more sustainable response: a study of PEPFAR support to Kenya's PMTCT program, 2005–2010

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**Background:** The President´s Emergency Plan for AIDS Relief (PEPFAR) in its second phase (2009–14) has an increased emphasis on promoting the sustainability of the HIV/AIDS response. Such sustainability is related to greater country ownership, local capacity, and strengthened health systems. Investments promoting sustainability can compete for resources with the rapid delivery of services. There is need to measure the costs associated with an increased emphasis on sustainability.
**Methods:** The USAID HPI Costing Task Order evaluated the cost of PEPFAR support to service delivery and sustainability for the PMTCT program in Kenya. Data were analyzed from two implementing partners: FHI360 and the Elizabeth Glaser Pediatric AIDS Foundation. Data sources included implementation and financial records as well as interviews with partner staff. From this data, unit costs of PEPFAR support per mother receiving ARV-based prophylaxis and per infection averted were calculated for the study period, 2005–2010.
**Results:** The average unit cost across EGPAF and FHI360 of PEPFAR support (excluding commodity costs) per HIV-positive mother provided antiretroviral-based prophylaxis declined by 52% from $567 to $271. PEPFAR support for commodities and supply chain added $48 to the latter cost in 2010. The unit cost of PEPFAR support per averted mother-to-child infection declined by 66% from $7,117 to $2,440, excluding commodity costs. The sustainability-related proportion of the unit cost of support to PMTCT increased from 12 to 33% over the study period. Investment into sustainability has grown in proportion and complexity while overall unit costs of support have declined.
**Conclusion:** Investing in sustainability did not inhibit the expansion of PMTCT services. Such investments build long-term viability and enhance the prospect of a transition from reliance on donor support. We do not see a trade-off between scaling-up services and investing in sustainability. Rather, investment in sustainability is critical to service delivery scale-up and an effective, affordable use of PEPFAR resources.

# E92 - Global recession and funding cutbacks: unleashing new challenges for sustainability

## WEAE0106

### The 'middle-income' curse: should global aid and treatment access decisions be based on national economic criteria?

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**Background:** Of late, donors adjusting their funding policies and companies and agencies working on treatment access initiatives have included World Bank set economic criteria in their decision making. What has been the impact of these new parameters in HIV funding and treatment access in so-called "middle income" countries?
**Methods:** The analysis looks at 1) Changes in Global Fund funding criteria; 2) Changes in price discounts by MNCs on ARVs and 3) The coverage of the Medicines Patent Pool licence announced in 2011. The situations of India, China, Argentina, Botswana and Namibia are examined in particular.
**Results:** The study finds that in all three cases, economic criteria are now playing a key role in determining the level and extent of assistance in relation to funding and treatment access. While the Global Fund funding criteria attempts to balance the economic status of a developing country with its disease burden, in the other two situations, the use of economic criteria appears motivated only by private interests in profits.
**Conclusion:** The use of GDP to determine access to HIV funding and treatment has gained acceptance in part because of the impression that the "middle income" status of a country indicates the ability of the country or its people to fund HIV programmes or HIV treatment. The GDP does not however reflect actual situations in country or the fact that several HIV programmes with marginalized communities are only in existence because of neutral, evidence based funding from the Global Fund. Such an approach undermines the very basis of Universal Access and is likely to be counterproductive both in the short term (with countries hesitating from adopting evidence of treatment as prevention into policies) and in the long term (as HIV programmes in these countries shrink or are shaped by national priorities and prejudices including in relation to marginalized groups).

## THPDE0204

### Patient outcomes in Lubumbashi, Democratic Republic of Congo after disruption in HIV care and treatment due to decreased Global Fund appropriations

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**Background:** The worldwide financial crisis has forced The Global Fund to scale-down funding for HIV programming, particularly in Sub-Saharan Africa. There are few documented reports of patient outcomes when decreased Global Fund appropriations lead to disruption of HIV care and treatment.
**Methods:** We conducted a cross-sectional survey to assess transfer behavior, care satisfaction, ART treatment and adherence, and disease progression among patients experiencing unexpected disruption of HIV services in Lubumbashi, Democratic Republic of Congo. A systematic random sample (n = 1,000) was selected from

HIV+ patients enrolled in the Central Africa International Epidemiologic Databases to Evaluate AIDS (IeDEA).

**Results:** Of 1,000 patients, 363 were lost-to-follow-up, 36 deceased, 540 found and 61 have unknown status. Of the 540 patients who were found, data are currently available from 299. Of these, 259 (87%) were formally transferred to another facility, predominately government-run (95%). 91% (n = 231) of transferred patients presented at least once for continued care. Of those who continued care, 20% received adherence counseling and 45% had CD4 testing. 87% of the 299 patients with available data were on ARVs at the time of clinic closure. Among these, 78% continued taking ARVs after transfer, 1% started second line therapy, 7% started a new ART regimen, and 2% stopped taking ARVs. 24% of patients on ARVs reported non-adherence to one or more drug. Prior to transfer, 25% of the patients were WHO stage I/II and 75% were stage III/ IV, compared to 28% in WHO stage I/ II and 72% in stage III/ IV one year after the disruption.

**Conclusion:** When faced with disruption of care, patient retention is jeopardized. Many countries with grave HIV epidemics have experienced reductions in Global Fund appropriations. A better understanding of the consequences of these reductions is needed.

**Abstract Coding Guide**
Example: **MOAA01** = (Weekday) **MO** – (Session type) **AA** – (Session order) **01**
Weekdays: SU (Sunday), MO (Monday), TU (Tuesday), WE (Wednesday), TH (Thursday), FR (Friday)
Session types: oral abstract sessions – AA (Track A), AB (Track B), AC (Track C), AD (Track D), AE (Track E), AX (Cross-Track), LBA (Late Breaker Track A), LBB (Late Breaker Track B), LBC (Late Breaker Track C), LBD (Late Breaker Track D), LBE (Late Breaker Track E), LBX (Late Breaker Cross-Track); oral poster discussions sessions – PDA (Track A), PDB (Track B), PDC (Track C), PDD (Track D), PDE (Track E) PDX (Cross-Track)
Session order: 01, 02, 03, 04, etc.