THE UTAP-2 ATLANTA PROJECT:

TARGETED TECHNICAL ASSISTANCE, FLEXIBLE IMPLEMENTATION SUPPORT, AND PRACTICAL TRAINING TO STRENGTHEN THE GLOBAL HIV RESPONSE

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The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) launched its first phase in 2003, channeling funds to mount an emergency response to the growing, global HIV crisis. ICAP at Columbia University became a key implementing partner in this historic effort, which succeeded in bringing HIV prevention, care, and treatment to millions of people around the world. One of the Cooperative Agreements funding ICAP's work during this period was the 2002 - 2011 University Technical Assistance Project (UTAP), through which ICAP provided short- and long-term technical assistance to support the national HIV response in four African countries (Mozambique, Rwanda, South Africa, and Tanzania).

As the original UTAP project drew to a close and PEPFAR moved into its second phase—focused on sustainability—ICAP entered into several, follow-on Cooperative Agreements, called UTAP-2. Four were country-focused (in Côte d'Ivoire, Democratic Republic of Congo, Swaziland, and Tanzania) and the fifth—UTAP-2 Atlanta—became a flexible mechanism for providing a wide range of technical assistance and other support to PEPFAR countries. After beginning in 2009 as a means to help CDC conduct surveillance training more efficiently through distance education, UTAP-2 Atlanta grew over the next six and a half years to comprise 11 distinct projects addressing needs and gaps in the HIV response and answering important research questions to inform the response going forward

The following set of briefs provides an overview of ICAP's UTAP-2 Atlanta projects, which can be grouped into four general categories: program implementation; evaluation and research; training and education; and strategic information. The briefs are intended to share the methods, achievements, and key findings of these important projects with ICAP partners, fellow implementers, civil society, and the international community.

ICAP was founded in 2003 at Columbia University's Mailman School of Public Health. Now a global leader in HIV and health systems strengthening, ICAP provides technical assistance and implementation support to governments and non-governmental organizations in more than 21 countries. ICAP has supported work at more than 5,250 health facilities around the world. More than 2.5 million people have received HIV care through ICAP-supported programs and over 1.7 million have begun antiretroviral therapy. Online at ICAP.columbia.edu

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1 The in-person workshops associated with this project were held in South Africa and Tanzania, but professionals from 14 countries across sub-Saharan Africa participated.

Program Implementation

OPTIMIZING HIV SERVICE DELIVERY DURING AND AFTER CONFLICT: THE CASE OF SOUTH SUDAN

SOUTH SUDAN

Background

The Republic of South Sudan gained independence in 2011, making it the newest country in Africa. The two protracted civil wars that preceded independence and, together, spanned over four decades, left South Sudan's health system and infrastructure in an extremely weak state. With an estimated 190,000 people living with HIV in the country—20,000 of whom are children under 15—mounting an effective national HIV response represents one of many critical public health challenges facing South Sudan.

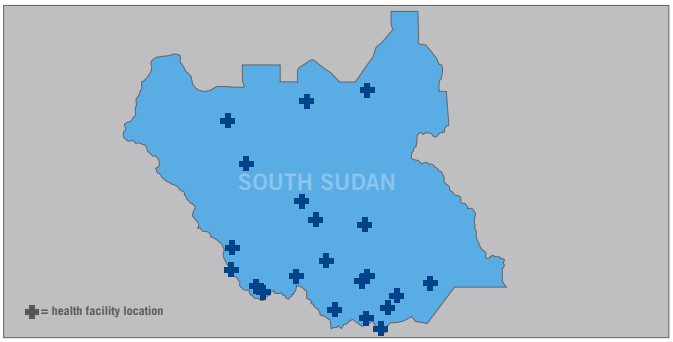
In 2011, South Sudan had 22 HIV care and treatment sites providing services to people living with HIV, up from only two in 2006 (see Figure 1). Progress strengthening HIV services was halted, however, when the national HIV program failed to secure resources to continue HIV activities funded through the Global Fund to Fight AIDS, Tuberculosis, and Malaria. This critical funding expired in November 2011, leaving the future of South Sudan's HIV program uncertain.

Core Project Approaches

In December 2012, ICAP collaborated with CDC to respond to this urgent need by launching a program to provide technical assistance to the Government of South Sudan. ICAP used a multi-pronged approach to support the Ministry of Health (MOH) to develop a robust, evidence-based response to the HIV epidemic and improve the quality of HIV care and treatment services in South Sudan. This approach comprised:

Building the Ministry of Health's Capacity at the National and State Level

Figure 1: South Sudan Health Facilities Providing HIV Care and Treatment (national HIV prevalence: 2.7%)



Recognizing that the numerous implementing partners supporting South Sudan's HIV program lacked coordination, ICAP worked to increase the MOH's ownership of the HIV response; to standardize the way HIV services were being delivered; and to increase communication among partners by:

- Supporting the revitalization of HIV-related technical working groups and providing technical assistance to revise national HIV care and treatment guidelines, training materials, and monitoring and evaluation (M&E) tools; to standardize the national package of HIV care and support; and to develop plans for the scale-up of HIV care and treatment and Option B+ throughout South Sudan.

- Seconding an HIV specialist to the MOH's HIV/AIDS Department to strengthen coordination and oversight of the national HIV program.

- Identifying bottlenecks affecting the quality of HIV services in South Sudan by working hand-in-hand with the MOH to conduct a **joint assessment** of 21 of the country's 22 HIV care and treatment facilities. Meetings

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were subsequently conducted at each facility to share the findings with health managers and staff, and to collaboratively develop action plans addressing identified gaps.

- Advocating for the establishment of a supply chain technical working group, in order to address recurrent supply chain interruptions that were inhibiting HIV service delivery, and supporting the group to conduct national-level HIV commodity quantification using facility-level consumption data.

- Developing a supervisory framework and beginning to build the capacity of national- and state-level MOH staff to provide effective supervision to HIV care and treatment facilities. This included institutionalizing regular, on-site supportive supervision and clinical mentorship visits using a standardized HIV program quality assessment tool.

Providing Technical Assistance to Health Facilities to Improve HIV Service Quality

The joint assessment revealed that health providers working at HIV care and treatment sites generally lacked sufficient knowledge and skills to provide high-quality services. To address this gap, ICAP:

- Trained 33 health facility ART managers in ART site management, covering topics such as how to coordinate HIV services at the facility level and how to manage the supply of drugs and commodities.

- Adapted useful job aids and disseminated them to health workers. ICAP also provided them with ongoing on-the-job mentorship and supportive supervision to continuously build their knowledge and skills.

- Developed a data-driven, systematic continuous quality improvement framework to build health worker capacity to monitor service quality indicators.

In addition, ICAP worked to improve health facility-level systems across South Sudan's 22 care and treatment facilities by:

- Conducting workflow analyses to maximize the efficiency of limited available human resources.

- Providing basic medical equipment, such as scales, stethoscopes, and blood pressure cuffs, as well as essential office supplies, to 14 health facilities.

- Working to institutionalize intra- and inter-facility referral systems to increase patient uptake of HIV services.

- Supporting health facilities to standardize requisition and reporting processes to lessen the frequency of drug and commodity stock-outs.

- Strengthening facility-level laboratories by distributing CD4 point of care machines and related reagents to ten priority health facilities, training 22 laboratory personnel on their use, and providing clinical mentorship on laboratory quality management.

Supporting the Use of Strategic Information for Evidence-Based Decision-Making

The joint site assessment also revealed considerable gaps in routine service data collection, compilation, and review. To begin to address these gaps, ICAP:

- Participated actively in the national strategic information technical working group, supporting national stakeholders to assess gaps in M&E and update national M&E tools.

- Worked hand-in-hand with health facilities to collect routine service data, providing mentorship on the use of updated national M&E tools and supportive supervision to improve the quality of data being collected.

- Helped introduce appointment log books at HIV clinics as a way to standardize patient appointment systems and allow health workers to better monitor patient retention.

- Supported the MOH to conduct the country's first **National Annual Review and Planning Workshop**, where representatives from the MOH, 19 ART facilities, and implementing partners gathered for five days to review results of the joint clinic assessment and performance during 2014. During the workshop, each health facility developed an annual plan encompassing all aspects of HIV care, with specific targets to be monitored at the facility, state, and national level. This represented the first evidence-based, facility-level decision-making and planning event of its kind in South Sudan.

Providing Technical Assistance to Minimize Service Interruption During and After Conflict

When political conflict re-erupted in South Sudan in December 2013, many HIV care and treatment facilities in Juba, Jonglei, Upper Nile, and Unity states were forced to close, and facilities throughout the country experienced complete or partial

stock-outs of ARVs and other essential commodities. To help minimize service interruptions, ICAP:

- Provided technical support through weekly calls to each health facility, using a checklist to address all aspects of HIV service provision, and liaised with stakeholders and facilities to address supply shortages and stock-outs.
- Developed guidelines on ARV substitution to facilitate health workers' decision making in cases where a patient's current ARV regimen was out of stock. This document was vetted by the MOH and distributed nationally.
- Provided technical assistance to introduce client-held cards enabling ART and PMTCT patients to carry their treatment information to any facility to access services.

What Was Achieved

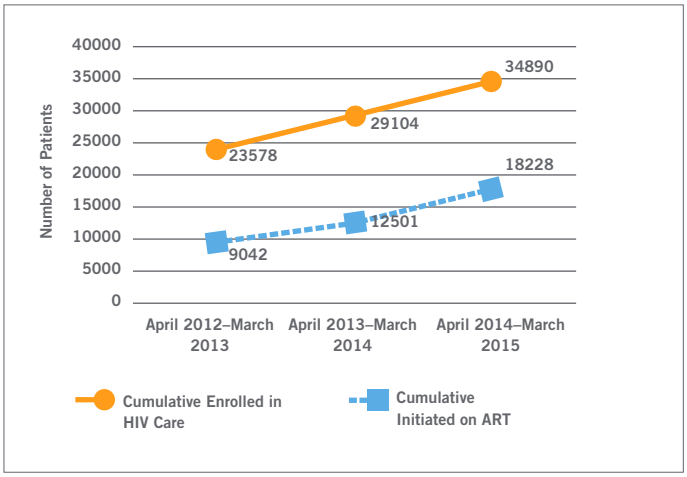
As a result of the support ICAP provided to local partners in South Sudan between December 2012 and March 2015,

- A total of **12,704** people were newly enrolled in HIV care and **10,440** people were initiated on ART.
- The cumulative number of patients accessing ART increased from **9,042** in March 2013 to **18,228** in March 2015 (see Figure 2).
- The cumulative number of patients enrolled in HIV care increased from **23,578** in March 2013 to **34,890** in March 2015 (see Figure 2).
- The number of people receiving ART at a given point in time more than doubled, from 5,159 in March 2013 to 10,852 in March 2015.
- The percentage of people living with HIV known to be alive and on treatment 12 months after ART initiation increased from **66 percent** in March 2014 (when this data started being collected) to **72 percent** in March 2015.

Lessons Learned and the Way Forward

- In complex settings where there are problems with service quality, engaging a new, "third-party" partner (in this case, ICAP) to conduct a comprehensive assessment of service quality can help identify key bottlenecks and foster communication and collaboration among implementing partners and local stakeholders in order to address them.

Figure 2: Increase in Cumulative Number of Patients Enrolled in HIV Care and Initiated on ART in South Sudan, 2013-2015



- It is very difficult to implement an effective HIV program in the context of severe human resource shortages; efforts to improve HIV service delivery should be accompanied by initiatives to expand existing cadres of health workers.
- To optimize resources and ensure that all health facilities are implementing the same model of HIV care, it is important that countries have nationally standardized HIV guidelines, a national training curriculum, and mechanisms that support a holistic approach to mentorship and supportive supervision.
- By early 2014, approximately 740,000 people had been internally displaced by renewed political conflict in South Sudan. To ensure that people living with HIV can remain on treatment during and after crisis situations, it is critical that humanitarian assistance programs provide a minimum set of HIV care and treatment services to internally displaced populations.

Going forward, ICAP will continue its work providing technical assistance to South Sudan's MOH to further strengthen its HIV program. ICAP will also expand its scope in 2016, initiating intensive work with nearly half of the HIV care and treatment facilities in South Sudan—prioritizing high-patient load facilities in high-burden regions of the country—to improve the quality of HIV care and treatment service delivery.

Program Implementation

STRENGTHENING CAMEROON'S SYSTEM FOR MONITORING AND EVALUATING HEALTH SERVICES THAT PREVENT MOTHER-TO-CHILD TRANSMISSION OF HIV

CAMEROON

Background

In 2011, global leaders committed to working toward eliminating new HIV infections among children. That year, Cameroon was named one of 22 priority countries with the highest burden of pregnant women living with HIV. At the time, it was estimated that only 53 percent of pregnant women living with HIV in Cameroon were receiving antiretrovirals to prevent mother-to-child transmission of HIV (PMTCT). As the Government of Cameroon set new, ambitious PMTCT targets, it became a critical priority to strengthen Cameroon's monitoring and evaluation (M&E) system to enable health managers at every level to access high-quality data and use this information to assess gaps in the health care delivery system, guide decision-making, and measure progress toward the ultimate goal of eliminating new pediatric infections in Cameroon.

Core Project Approaches

From 2012–2015, ICAP—with support from the Centers for Disease Control and Prevention (CDC)—collaborated with the Government of Cameroon to develop a robust system to monitor and evaluate national PMTCT and maternal and child health (MCH) services. ICAP's multi-pronged approach comprised:

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Supporting a Collaborative Process to Design a New, Comprehensive Set of M&E Tools for PMTCT and MCH

ICAP conducted a situational analysis of existing national PMTCT and MCH tools in 2012. This assessment revealed that: 1) PMTCT and MCH tools were not sufficiently integrated; 2) registers and reporting tools were not available in many health facilities; and 3) the M&E tools in use varied across health facilities and many health workers had not been trained on how to use them. To address these gaps, ICAP:

- Convened representatives of the national MCH and HIV programs, the national PMTCT technical working group, and fellow implementing partners in a series of meetings to develop a single, standardized set of user-friendly M&E tools for PMTCT and MCH (see Box 1)
- Piloted the tools in 26 health facilities in Cameroon and used health worker feedback to refine the tools' content and design. The process of soliciting feedback from end-users increased the tools' user-friendliness and encouraged local ownership of the data collection process.
- Finalized, printed, and rolled out the tools across all 3,563 PMTCT sites in Cameroon

Box 1: The New Package of M&E Tools for PMTCT and MCH

- Integrated PMTCT/MCH registers for:
  - Antenatal care
  - Labor and delivery
  - Postnatal care (mother)
  - Postnatal care (infant)
  - Laboratory
- Patient-held pregnancy follow-up card
- Monthly health facility-level reporting form (with 44 key PMTCT indicators)
- Electronic, Integrated Data Aggregation Tool (IDAT) for aggregating, analyzing, and reporting on PMTCT/MCH data at the district, regional, and national level
- Data Quality Assessment (DQA) tool
- Standard operating procedures for each tool

Supporting M&E Training at the National, Regional, District, and Health Facility Level

To introduce the new M&E tools to health workers and managers throughout Cameroon, and build their capacity to use them effectively:

- ICAP developed a training-of-trainers curriculum and trained a cadre of 42 national master trainers. Subsequently, these trainers collaborated with ICAP and other implementing partners to train a cadre of 193 regional trainers—including district-level managers, data managers, and implementing partner staff—who cascaded the training further to relevant facility-level health workers, such as nurses, midwives, and laboratory technicians.
- To complement the training-of-trainers approach, ICAP collaborated with master trainers to provide on-site training, mentorship, and supportive supervision to health workers in Northwest and Southwest regions, ensuring correct implementation of the M&E tools and sensitizing them to the importance of integrated PMTCT and MCH services

Working to Increase Data Quality and Data Use for Decision Making

To increase the quality of routinely collected data in Cameroon and to cultivate a culture of using data to guide decision-making, ICAP:

- Created tools for simple analysis and routine data feedback, using automated Electronic, Integrated Data Aggregation Tool (IDAT) key indicator and site feedback reports
- Trained and mentored 86 national and district-level staff on how to analyze IDAT reports and use the information to improve health services
- Advocated for the inclusion of a standard report in DHIS2, which was rolled out in Cameroon in July 2015. The standard report serves as a source of routine, quarterly data feedback to health facilities.
- Collaborated with the Ministry of Health and other stakeholders to develop a Data Quality Assessment (DQA) strategy, tool, and accompanying training materials, with the aim of improving the quality of data being collected in Cameroon. ICAP piloted the tool in six health facilities and will support the roll-out of DQA activities going forward.

Increasing the Knowledge Base Guiding PMTCT Scale-up in Cameroon

- In 2012, Cameroon's Ministry of Health announced plans to transition to Option B+, a model where all HIV-infected pregnant women are initiated on lifelong antiretroviral therapy (ART). To support the country in assessing feasibility and cost implications of adopting Option B+, ICAP collaborated with the Ministry of Health, the National AIDS Control Committee, UNICEF, CDC, and other international stakeholders to collect key inputs and support a modeling exercise. In April 2013, ICAP helped convene national and international stakeholders at a dissemination meeting to review the findings, which projected that while the cost of implementing Option B+ would be substantially higher than the cost of the current PMTCT strategy (Option A), it would have tremendous programmatic benefits in Cameroon and could avert up to 10,000 infant infections per year.

- ICAP provided technical inputs on a study conducted in 2013 that sought to understand the barriers preventing pregnant women from accessing MCH and PMTCT services in Cameroon. Key barriers identified by the study included insufficient communication to women about available PMTCT services, the relatively high cost of MCH services, and the long distance between women's homes and the nearest health facility. Following the study's completion, ICAP supported four meetings held in different regions of Cameroon, bringing together health workers, ministry of health representatives, and international stakeholders to review and discuss the study's findings.

What Was Achieved

As a result of the support ICAP provided to local partners in Cameroon between July 2012 and March 2015,

- The number of registers being used in MCH and PMTCT settings was reduced from 10 to five, streamlining data collection efforts and supporting integrated service delivery.

- Cumulatively, over 26,800 copies of the new registers, monthly reporting forms, and standard operating procedures were distributed to the 3,563 PMTCT sites in Cameroon.

- Over 1,200 health workers and managers were directly trained on how to use the new, streamlined set of PMTCT/MCH M&E tools.

- By 2015, over 89 percent of Cameroon's health facilities were successfully submitting PMTCT M&E indicator reports to the district level.

- By 2015, 68 district offices and all 10 regions and were using IDAT to report PMTCT/MNCH data to the National AIDS Control Committee.

Lessons Learned and the Way Forward

- The content of M&E tools must speak to the clinical services they are intended to track. Thus, it is important that efforts to integrate different types of M&E tools closely mirror efforts to integrate the way clinical services themselves are being delivered in health facilities.

- When revising a national M&E tool, a collaborative process that brings together key stakeholders and end-users is important to maximize local buy-in. Careful negotiation is often required to strike a balance between the real-world usability of a tool and the number of data elements it seeks to capture.

- Field testing and the use of case studies are critical to assessing the practicality and user-friendliness of M&E tools in real-world settings.

- Providing health workers with clear standard operating procedures for the M&E tools they are responsible for, combined with targeted training and mentorship, is an effective way to increase health workers' capacity and motivation to collect quality, routine data.

Going forward, ICAP will continue its work supporting Cameroon's Ministry of Health to strengthen its national M&E system, with a focus on: 1) further improving the PMTCT/MCH registers and expanding the number of health workers trained on their use; 2) implementing DHIS2 in all 184 districts of the country and building the capacity of district data managers to utilize the system effectively; and 3) implementing DQA activities in four regions of the country. ICAP will also expand on its M&E activities by directly supporting the delivery of comprehensive HIV care and treatment services in 34 districts of Center and Littoral regions, using the new national M&E tools to guide program implementation and continuing to foster data use for program improvement.

Evaluation and Research

IDENTIFYING OPTIMAL MODELS FOR HIV CARE IN AFRICA

ETHIOPIA, KENYA, MOZAMBIQUE, RWANDA, TANZANIA

Background and Rationale:

HIV care and treatment services have been rapidly scaled up across sub-Saharan Africa, the region hardest hit by the HIV epidemic. In order to evaluate and improve efforts to make high-quality HIV care and treatment accessible to all who need it, it is critical to measure patient outcomes and assess the impact of different models of HIV care.

Study Overview:

From 2009 to 2015, ICAP partnered with the Centers for Disease Control and Prevention (CDC) and the Ministries of Health in Ethiopia, Kenya, Mozambique, Rwanda, and Tanzania to examine routinely collected, patient-level data in order to measure outcomes from PEPFAR-supported HIV care and treatment facilities. The study includes data on close to 500,000 adults living with HIV and more than 45,000 children, gathered from 284 ICAP-supported health facilities across the five focus countries. The study, which utilized routinely collected (de-identified) data from on-site electronic databases, evaluated key HIV care and treatment outcomes across different health facilities within and across each country. To leverage the study as a means to strengthen in-country ownership and utilization of routinely collected data for program evaluation and research, targeted capacity building activities were implemented in each country. For example, training and analytic mentorship were provided to local collaborators to build their skills in designing and conducting analyses, and in presenting findings via abstracts, presentations, and manuscripts.

Key Findings:

The study has addressed critical questions related to patient care, treatment outcomes, and the impact of facility-level and national efforts to improve HIV care. Optimal Models analyses have examined characteristics of patients enrolling late in HIV care, assessed retention of older adults living with HIV, quantified outcomes among children, and examined treatment initiation after changes to national pediatric antiretroviral therapy (ART) guidelines. The study has also measured the impact of targeted care packages, including adolescent- and youth-friendly services.

Examples of study findings include:

- In an analysis of data from 274 public health facilities in Kenya, Lesotho, Mozambique, Rwanda, and Tanzania, the investigators demonstrated that the expansion of pediatric services to primary health facilities resulted in increased numbers of children on ART, and suggested that these facilities have lower rates of mortality and loss to follow-up.

- In an analysis of data from 160 HIV clinics in Kenya, Mozambique, Rwanda, and Tanzania, the investigators found that youth experienced substantially higher attrition before and after ART initiation compared with younger adolescents and older adults, and that adolescent-friendly services were associated with reduced attrition among youth (particularly after ART initiation).

- In an analysis of data from 217 health facilities in Kenya, Mozambique, Rwanda, and Tanzania, the investigators

Optimal Models study findings have been featured in:

- **21 peer-reviewed publications** in major public health and medical journals, including AIDS, JAIDS, PLoS, and the Clinical Infectious Disease Journal
- **11 oral presentations** and **17 posters** at major scientific meetings, including the Conference on the Retrovirus and Opportunistic Infections (CROI) and the International AIDS Society Meeting (IAS)

demonstrated the value of a comprehensive HIV care cascade as a tool for monitoring HIV program performance (versus the traditional HIV treatment cascade approach, which does not follow outcomes of pre-ART patients)

Data from the Optimal Models study have also been included in analyses conducted by the International Epidemiologic Databases to Evaluate AIDS (IeDEA) and the Collaborative Initiative for Paediatric HIV Education and Research (CIPHER)—international collaborations that aim to pool cohort data across countries in order to improve understanding of the HIV epidemic globally.

Implications:

The Optimal Models study is unique in its utilization of data collected during routine HIV care from a wide range of health facilities across sub-Saharan Africa. The data provide both a snapshot and longitudinal view of the implementation and outcomes of services at facilities representative of those where most HIV-infected people receive care. The study's findings have contributed to greater understanding of outcomes among HIV-infected adults and children receiving care in resource-limited settings, and have contributed to the improvement of clinical HIV care. Findings from the study, which are relevant to policymakers and decision-makers within countries, across the region, and around the world, have been disseminated globally via scientific publications and international conferences (see box).

Highlighted Publications:

Teasdale CA, Alwar T, Chege D, et al. Impact of youth and adolescent friendly services on retention of 10-24 year olds in HIV care and treatment programs in Nyanza, Kenya. J Acquir Immune Defic Syndr. 2016;71(2):e56-9.

McNairy ML, Lamb MR, Abrams EJ, et al. Use of a comprehensive HIV care cascade for evaluating HIV program performance: Findings from 4 sub-Saharan African countries. J Acquir Immune Defic Syndr. 2015;70(2):e44-51.

Melaku Z, Lamb MR, Wang C, et al. Characteristics and outcomes of adult Ethiopian patients enrolled in HIV care and treatment: a multi-clinic observational study. BMC Public Health. 2015;15:462.

Eduardo E, Lamb MR, Kandula S, et al. Characteristics and outcomes among older HIV-positive adults enrolled in HIV programs in four sub-Saharan African countries. PLoS One. 2014;9(7):e103864.

Teasdale CA, Wang C, Francois U, et al. Time to initiation of antiretroviral therapy among patients who are ART eligible in Rwanda: Improvement over time. J Acquir Immune Defic Syndr. 2014;68(3):314-21.

Koech E, Teasdale CA, Wang C, et al. Characteristics and outcomes of HIV-infected youth and young adolescents enrolled in HIV care in Kenya. AIDS. 2014;28(18):2729-38.

Mugisha V, Teasdale CA, Wang C, et al. Determinants of mortality and loss to follow-up among adults enrolled in HIV care services in Rwanda. Plos One. 2014;9(1):e85774.

Lamb ML, Fayorsey R, Nuwagaba-Bironwoha H, et al. High attrition before and after ART initiation among youth (15-24 years of age) enrolled in HIV care. AIDS. 2014;28(4):559-68.

Fayorsey RN, Saito S, Carter RJ, et al. Decentralization of pediatric HIV care and treatment in five sub-Saharan African countries. J Acquir Immune Defic Syndr. 2013;62(5):e124-30.

Tene G, LahuertaM, Teasdale C, et al. High retention among HIV-infected children in Rwanda during scale-up and decentralization of HIV care and treatment programs, 2004-2010. Pediatr Infect Dis J;32(8).

McNairy ML, Lamb MR, Carter RJ, et al. Retention of HIV-infected children on antiretroviral treatment in HIV care and treatment programs in Kenya, Mozambique, Rwanda, and Tanzania. J Acquir Immune Defic Syndr. 2012;62(3):e70-81.

Lahuerta M, Lima J, Nuwagaba-Biribonwoha H, et al. Factors associated with late antiretroviral therapy initiation among adults in Mozambique. PLoS One. 2012;7(5):e37125.

Evaluation and Research

IMPROVING PEDIATRIC OUTCOMES THROUGH RESEARCH: THE PESS STUDY

SOUTH AFRICA

Background and Rationale:

While great progress has been made scaling up HIV care and treatment services for adults, expanding children's access to HIV care continues to lag. It is estimated that, of the 2.6 million children living with HIV in 2014, only 32 percent were receiving antiretroviral therapy (ART). Infants and young children infected with HIV have a very high risk of mortality and, without treatment, approximately half will die before the age of two. Research is needed to better understand the care children are receiving in HIV programs—as well as the gaps in that care—and the effects late ART initiation has on pediatric patients.

Study Overview:

From 2012–2015, ICAP collaborated with the Centers for Disease Control and Prevention (CDC) and health providers at five health facilities in South Africa's Eastern Cape province to conduct the **Pediatric Enhanced Surveillance Study (PESS)**, a prospective cohort study examining outcomes of children enrolled in HIV care. The PESS study enrolled 397 HIV-infected infants and children eligible to start ART (see box) and followed them for 12–24 months as they received routine care at five health facilities and enhanced laboratory and developmental monitoring for the study. The study aimed to examine clinical, immunologic, virologic, metabolic, psychosocial, and behavioral outcomes of enrolled children.

Key Findings:

Preliminary analyses indicate that, among the first 272 children enrolled in the study:

- More than half of those between five and 12 years of age at enrollment had not been diagnosed with HIV until they were over five years old.

- High proportions of children were hospitalized at enrollment and/or had a history of hospitalization prior to ART initiation. Among children under 12 months of age at study enrollment, 41 percent were hospitalized at enrollment and 18 percent had a history of hospitalization.

- Among children between two and nine years of age, 60 percent of caregivers reported at least one developmental delay or difficulty, and 35 percent reported two or more.

Box: Characteristics of the children enrolled in PESS:

- Children ranged in age from one month to 12 years of age
- At enrollment, 60 percent were three years old or younger
- 48 percent were female
- The mothers of 51 percent of the children were on ART at the time of enrollment
- The child's primary caregiver was:
- The mother, in 72 percent of cases
- The grandmother, in 14 percent of cases
- Another family member, in 10 percent of cases

An examination of ART initiation among the 354 enrolled children who were alive and attending study visits after three months:

- 76 percent, 84 percent, and 89 percent had initiated ART at 30, 60, and 90 days, respectively, after being identified as eligible for ART.

- Only half of the 85 children under 12 months of age initiated ART within seven days, as recommended in South Africa's 2013 national ART guidelines.

- Of the 40 children (11.3%) who did not initiate ART within 90 days, 31 (78%) started ART at a median of 119 days (range: 91-519), while 9 (13%) never started at all. Among the 40 late starters, 13 children were under 12 months old, 11 of whom had high viral loads (≥100,000 copies/mL).

- Almost half of children were delayed in starting ART due to adherence concerns of the health provider, including lack of a treatment supporter or incomplete adherence counseling.

Implications:

The study's findings provide critical information about gaps in the care being provided to children living with HIV in resource-limited settings. Findings indicate that many HIV-infected children continue to go undiagnosed and that many are not started on ART until they have reached advanced stage of disease. Only half of the children under 12 months of age enrolled in the study started ART within seven days, as required by South Africa's national fast-track guidelines, indicating that urgent action is needed to ensure that health workers are adequately trained and supported to rapidly initiate HIV-positive infants on ART. The study's findings also provide new and previously undocumented information about the way perceived adherence challenges can cause delays in ART initiation among children, including those with high viral loads and at greatest risk for disease progression and mortality.

Evaluation and Research

HOW CAN THE HEALTH SYSTEM RETAIN WOMEN IN HIV TREATMENT FOR A LIFETIME? A DISCRETE CHOICE EXPERIMENT TO INFORM OPTION B+ IMPLEMENTATION IN ETHIOPIA AND MOZAMBIQUE

ETHIOPIA, MOZAMBIQUE

Background and Rationale

In 2013, the World Health Organization recommended that all HIV-positive pregnant and breastfeeding women be provided with lifelong antiretroviral therapy (ART) to prevent mother-to-child transmission of HIV, a strategy known as Option B+. While Option B+ has increased access to ART for HIV-infected pregnant women, one initial study found that Option B+ clients were five times more likely not to return to the health facility after an initial visit than women starting ART for their own health (i.e., because they had reached a defined CD4 treatment threshold). Emerging concerns about retaining women in lifelong treatment necessitate research to identify what HIV-infected women want and how services can best be organized to promote their retention in care.

Study Overview

From 2013 to 2014, ICAP partnered with the Centers for Disease Control and Prevention (CDC) and the Ministries of Health of Ethiopia and Mozambique to study women's preferences for the structure and content of lifelong ART in the con-

Box: Summary of Research Methods

- A literature review and discussions with local stakeholders in Ethiopia and Mozambique to develop a list of policy-amenable attributes of Option B+ service implementation
- Four focus group discussions per country with HIV-infected women of childbearing age to better understand women's needs and preferences
- A cross-sectional DCE survey of 1,013 women in Ethiopia and 1,020 women in Mozambique

text of Option B+ scale-up (see box). Dr. Margaret Kruk, the study's Principal Investigator, and the ICAP team used a novel research tool called a discrete choice experiment (DCE), which can be used to systematically assess the relative importance of different factors on patient choices. This study represents the first time a DCE has been used to explore preferences for lifelong HIV treatment.

Key Findings

Results showed that HIV-infected pregnant women and women desiring a future pregnancy in Ethiopia and Mozambique placed greatest value on having respectful providers and the ability to obtain non-HIV services in the same consultation as their HIV care visit. These two service attributes were approximately twice as important to Ethiopian women as the availability of mother support groups and counseling services. In Mozambique, women valued respectful providers more than twice as much as providers who involved the husband/family in care, and valued the availability of non-HIV services in the same visit twice as much as obtaining counseling services.

Implications

Efforts to enhance retention in HIV care and treatment for pregnant women should focus on promoting respectful care by providers, integrating access to non-HIV health services into HIV care visits, and strengthening counseling services. The study's findings highlight that:

- Outpatient care should be organized to permit access to more than one service. Situating Option B+ services within maternal and child health programs, which is the current model in Mozambique, may facilitate service integration and potentially promote retention in care.
- Facilities selected to provide Option B+ services should also provide a basic package of non-HIV services.
- Health systems need to make structural changes—such as improved staffing and service availability—in order to increase access to health services, improve the quality of interpersonal care being provided, and enhance lifetime retention in HIV care.
- It is essential that policymakers and providers in HIV care embrace the respectful care agenda now being promoted in other areas of health. In addition, research is urgently needed on the underlying causes of disrespectful treatment and interventions that can be implemented to address this issue.

Evaluation and Research

HOW THE RAPID SCALE-UP OF HIV TREATMENT HAS AFFECTED PATIENT ATTRITION RATES: SEVEN-YEAR TRENDS IN 12 RESOURCE-LIMITED COUNTRIES

CÔTE D'IVOIRE, ETHIOPIA, GUYANA, HAITI, KENYA, MOZAMBIQUE, NIGERIA, RWANDA, SOUTH AFRICA, TANZANIA, UGANDA, ZAMBIA

Background and Rationale

In 2004, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) launched its flagship Track 1.0 Program to rapidly scale up HIV care and treatment services in 13 countries. By 2011—its final year—the program had supported 1.4 million people living with HIV to initiate antiretroviral therapy (ART). A key question raised during this dramatic scale-up was whether the quality of such programs could be sustained as health systems worked to meet the tremendous demand for HIV treatment. Early evidence from South Africa indicated that attrition among patients on ART [those no longer on ART at the clinic where they started treatment] had increased in the early phase of HIV programmatic expansion; however, more comprehensive, cross-country studies were needed to examine broader temporal trends in attrition.

Box: Researchers examined data from the following 12 countries:

- Côte d'Ivoire
- Ethiopia
- Guyana
- Haiti
- Kenya
- Mozambique
- Nigeria
- Rwanda
- South Africa
- Tanzania
- Uganda
- Zambia

PEPFAR

ICAP GLOBAL. HEALTH. ACTION. Columbia University Mailman School of Public Health

Study Overview

ICAP, with support from the Centers for Disease Control and Prevention (CDC), used aggregate, clinic-level data to explore the association between rapid scale-up of ART services and trends in six- and 12-month cohort attrition between the years of 2005 and 2011.[1] Drawing on routinely collected data on 926,344 patients initiating ART in 12,428 successive cohorts at 962 clinics across 12 countries (see box), this study represents the most comprehensive assessment of attrition among ART patients to date. The nearly seven years of observation enabled the examination of trends in attrition over virtually the entire duration of the Track 1.0 Program—and across a wide variety of clinic types, sizes, and approaches to patient care—as national programs and patient populations changed considerably.

Key Findings

Results indicate that, from 2005 to 2011, the Track 1.0 Program experienced a 10-fold increase in the number of supported clinics, and a five-fold increase in the number of patients initiating ART. This was combined with an increase in the decentralization of services towards smaller, primary health facilities and away from urban centers; an increase in median CD4+ cell count at ART initiation; and a decrease in the documentation of CD4+ cell count at ART initiation.

In assessing attrition, the study found that:

- Overall attrition six months after ART initiation was **21 percent** (ranging from 10-29 percent across countries) and, 12 months after ART initiation, was **28 percent** (ranging from 13-38 percent across countries).

- Combining data from all 12 countries, there was a **two percent** increase in six- and 12-month attrition per quarter among cohorts of patients initiating ART after Track 1.0 was initiated in each country, and a **two percent** increase in six- and 12-month attrition per quarter as clinics aged.[2] In the majority of the 12 countries, however, six- and 12-month attrition **remained stable or decreased over time** after Track 1.0 was initiated in each country and as clinics aged.

- Several clinic-level factors were associated with an **increased risk of attrition** at six and 12 months after ART initiation, including:

    - Less complete documentation of CD4+ cell count at ART initiation (an indicator for poor quality care)

    - Lower median cohort CD4+ cell count at ART initiation (likely reflecting higher death rates in patients with advanced HIV disease)

    - Public secondary and tertiary clinics (versus public primary clinics)

    - Clinics with fewer ART patients

- The following types of clinics were associated with a **decreased risk of attrition**:

    - Faith-based and other privately owned clinics (versus public primary clinics)

    - Clinics where fewer patients were known to have transferred to another clinic

    - Clinics where pediatric patients accounted for a smaller fraction of patients initiating ART

Implications

The stable or decreasing trends in attrition found in the majority of the study countries are encouraging, suggesting that expanded access to HIV treatment need not translate into increased attrition. The study found that increasing patient load and expanding services to lower-level and rural health facilities were not necessarily associated with an increase in attrition, which is reassuring in the context of continued global efforts to increase ART access and coverage. Notably, the overall six- and 12-month attrition rates found are consistent with those found in resource-rich settings.[3]

It should be noted that, as attrition is a composite measure that includes patients who died, were lost to follow-up, and stopped ART for any reason, further analyses of large datasets that include both patient- and clinic-level characteristics are needed to further understand the reasons for patient attrition and identify strategies to overcome these challenges.

1 Cohort attrition was defined as the proportion of patients in each cohort who were no longer on ART at the clinic where they had initiated it. Patients considered no longer on ART included those who died, were lost to follow-up, or remained in care but stopped ART for any reason.

2 "Clinic age" was defined as the number of quarters that a given clinic had been providing ART services.

3 Gardner EM, McLees MP, Steiner JF, Del Rio C, Burman WJ. The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. Clin Infect Dis. 2011;52(6):793-800.

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Evaluation and Research

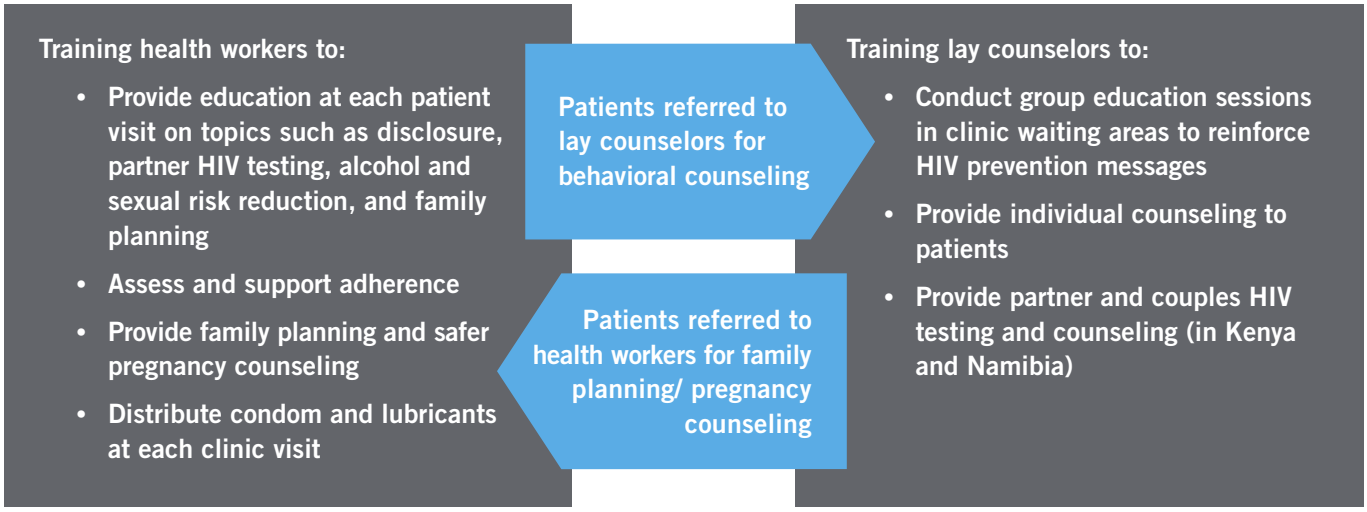
HOW CAN HEALTH WORKERS BEST SUPPORT HIV PREVENTION AMONG PEOPLE LIVING WITH HIV? EVALUATING AN INTERVENTION PACKAGE FOR USE IN HIV CARE AND TREATMENT SETTINGS

CÔTE D'IVOIRE, ETHIOPIA, GUYANA, HAITI, KENYA, MOZAMBIQUE, NIGERIA, RWANDA, SOUTH AFRICA, TANZANIA, UGANDA, ZAMBIA

Background and Rationale

Although HIV care and treatment services have largely been scaled up in countries around the world, HIV incidence remains high. The World Health Organization estimates that, in 2014 alone, two million people were newly infected with HIV. HIV prevention efforts have traditionally focused on reducing risk among people who are HIV-negative or unaware of their status. Recently, however, there has been increasing recognition of the centrality of people living with HIV in the effort to prevent HIV transmission. Research indicates that people living with HIV often have difficulty disclosing their status to sexual partners; low rates of condom use when in stable relationships; high rates of alcohol use (which is associated with increased risky sexual behavior and decreased adherence to antiretroviral therapy); and an unmet need for family planning. Although all of these factors can increase the risk of transmitting HIV to others, few studies have assessed how best

Figure: Intervention Package Components



to address HIV prevention needs among people living with HIV in clinical settings.

Study Overview

Between 2007 and 2011, ICAP collaborated with the Centers for Disease Control and Prevention (CDC) and the Ministries of Health in Kenya, Tanzania, and Namibia to conduct a group randomized trial to assess the effectiveness, acceptability, and feasibility of a multi-component, clinic-based HIV prevention intervention for people living with HIV (see figure). The assessment included 18 HIV care and treatments clinics located in district hospitals across Kenya, Tanzania, and Namibia. The clinics were paired based on clinic characteristics and then randomly assigned to either implement the intervention package or to continue providing the existing standard of care. The nearly 3,600 patients enrolled in the study—approximately 200 per clinic—were interviewed at baseline and six- and 12-months after the start of the intervention. Additional data sources included chart reviews, clinic records, questionnaires administered to health workers and lay counselors, and observation of patient visits.

Key Findings

Analysis of the study's baseline data indicated that:

- 82 percent of participants had disclosed their HIV status to recent sexual partners and 66 percent knew their partner's status. Of these, 28 percent reported that their partner was HIV-negative.
- 76 percent of participants reported using condoms consistently.
- Women were less likely than men to disclose, know their partner's status, and use condoms consistently with an HIV-negative partner.
- Five percent of participants were deemed to be harmful/likely dependent drinkers, and those reporting high-risk behaviors were more likely to be in a higher-risk drinking category.
- 79 percent of participants reported discussing alcohol use with a health provider in the past six months, and 90 percent reported reducing their alcohol use as a result of that discussion.

Results of the randomized trial indicate:

- Participants in intervention clinics were approximately 40 percent less likely to report unprotected sex in the last two weeks, at both 6 and 12 months, compared to participants in the comparison clinics.
- Participants in intervention clinics in Tanzania were over twice as likely to report using a highly effective method of contraception compared to participants in comparison clinics.
- Over 90 percent of health providers and lay counselors believed it to be feasible and important to offer patients HIV prevention messages and services; and over 85 percent reported feeling comfortable doing so.

- In the intervention clinics, the percentage of participants who reported meeting with a lay counselor in the past six months increased from 31 percent at the six-month interview to 52 percent at the 12-month interview.

- Participants in intervention clinics were more likely to report receiving key HIV prevention messages from providers than participants in comparison clinics; however, observation indicated that health providers and lay counselors were inconsistent in their implementation of the intervention package. For example, lay counselors distributed condoms in only 62 percent of encounters and providers offered family planning services in 18 percent of encounters.

Implications

To more fully address the HIV prevention needs of people living with HIV, health providers should be trained to integrate more comprehensive prevention-related assessments and counseling into routine clinical care. This includes:

- Integrating alcohol screening and counseling into adherence and risk reduction counseling.

- Integrating mental health screening and support services into routine HIV care.

- Integrating reproductive health services (including pregnancy counseling) into routine HIV care.

- Targeting additional risk reduction counseling to patients reporting non-disclosure, alcohol use, or a desire to become pregnant.

Additional research is needed to identify strategies for addressing common operational challenges in the clinic setting, including staff turnover and large patient volumes.

Highlighted Publications:

Bachanas P, Kidder D, Medley A, et al. Delivering Prevention Interventions to People Living with HIV in Clinical Care Settings: Results of a Cluster Randomized Trial in Kenya, Namibia, and Tanzania [published online ahead of print March 19 2016]. AIDS Behav. 2016. doi: 10.1007/s10461-016-1349-2.

Kidder DP, Bachanas P, Medley A, et al. HIV prevention in care and treatment settings: Baseline risk behaviors among HIV patients in Kenya, Namibia, and Tanzania. Plos One. 2013;8(2):e57215.

Bachanas P, Medley A, Pals S, et al. Disclosure, knowledge of partner status, and condom use among HIV-positive patients attending clinical care in Tanzania, Kenya, and Namibia. AIDS Patient Care STDs. 2013;27(7):425-35.

Medley A, Seth P, Pathak S, et al. Alcohol use and its association with HIV risk behaviors among a cohort of patients attending HIV clinical care in Tanzania, Kenya and Namibia. AIDS Care. 2014;26(10):1288-97.

Puja S, Kidder D, Pals S, et al. Psychosocial functioning and depressive symptoms among HIV-positive persons receiving care and treatment in Kenya, Namibia and Tanzania. Prev Sci. 2014;15(3):318-28.

Antelman G, Medley A, Mbatia R, et al. Pregnancy desire and dual method contraceptive use among people living with HIV attending clinical care in Kenya, Namibia and Tanzania. J Family Plann Reprod Health Care. 2015;41:e1.

Evaluation and Research

EVALUATING THE IMPACT OF ENHANCED TRAINING AND TOOLS TO STRENGTHEN HIV PREVENTION SERVICES IN TANZANIAN TB TREATMENT SETTINGS

TANZANIA

Background and Rationale

Although we now have effective treatments for HIV, nearly 60 percent of people living with HIV in sub-Saharan Africa are unaware of their status. One way to increase rates of HIV diagnosis is to leverage TB treatment settings as a place to offer routine HIV testing and counseling, as TB is often the most common presenting illness among people living with HIV. In fact, 39 percent of people with TB in the African Region who received an HIV test result in 2014 tested HIV-positive. The World Health Organization recommends that all TB patients, their partners, and family members be offered HIV testing and counseling, but more research is needed to assess how health workers can best be supported to achieve this.

Study Overview

Between 2013 and 2015, ICAP collaborated with the Centers for Disease Control and Prevention (CDC) and Tanzania's Ministry of Health and Social Welfare to conduct a quasi-experimental, multiple baseline study to assess the fea-

Box: The intervention package included:

A. Dissemination of and orientation on a set of five tools (two existing, two modified, and one new) to improve the documentation of partner testing and linkage to HIV clinical care

B. Providing health workers in TB clinics with enhanced training to:

- Deliver HIV testing and counseling to partners and couples
- Expand delivery and documentation of linkage to care for patients and partners newly diagnosed with HIV
- Conduct ART adherence counseling

C. Expanding the capacity of ex-TB patient volunteers to provide group education on HIV prevention and treatment

sibility, acceptability, and effectiveness of an enhanced HIV prevention service package implemented in TB clinic settings (see box). The interventions were implemented in 12 health facilities that included four referral hospitals, three health centers, and five directly observed treatment (DOTS) centers in Tanzania's Pwani Region. The health facilities were divided into three clusters, based on geography, with interventions started at different points in time depending on the cluster (see Figure). Researchers gathered data through interviews with health workers at each facility, retrospective abstraction of clinic records, and the analysis of quarterly summaries of ex-TB patient volunteer activity.

Key Findings

Preliminary findings indicate that:

- Almost all TB patients had a documented HIV status and the majority of TB/HIV co-infected patients were receiving ART.
- HIV testing at the 12 TB clinics resulted in the diagnosis of a substantial number of HIV-positive individuals, as well as the identification of a considerable number of discordant couples.
- The percent of HIV testing and counseling clients recorded as receiving couples counseling increased in all three clusters during the study period, but documented linkage to HIV care and treatment was relatively low.
- The number of group education sessions conducted by ex-TB patient volunteers at health facilities and in the community increased over time.
- Results from health provider interviews demonstrated that the majority found the tools easy to use for documenting HIV testing and linkage to care.

Implications

Based on the preliminary findings:

- Partner and couples testing in TB clinics is a high-yield strategy to identify HIV-positive individuals in need of HIV treatment, as well as discordant couples in need of HIV prevention services.
- Health workers are willing and able to document TB/HIV services and should be provided with further training and mentorship to ensure adequate documentation.

Figure: Quasi-Experimental, Multiple Baseline Study Design

	2014				2015
	Q1	Q2	Q3	Q4	Q1
Cluster 1	Begin Intervention A	Begin Intervention B & C			Retrospective data abstraction
Clusters 2 and 3	Begin Intervention A		Begin Intervention B & C		

Training and Education

USING DISTANCE EDUCATION TO BUILD CAPACITY IN HIV/AIDS EPIDEMIOLOGICAL SURVEILLANCE IN AFRICA

KENYA, NIGERIA, TANZANIA

Background

Surveillance plays a crucial role in our understanding of the HIV epidemic, enabling public health professionals to assess trends in HIV prevalence and risk behaviors across populations. Human resource challenges in sub-Saharan Africa and insufficient training of public health surveillance personnel have hindered the ability of many countries in the region to carry out effective HIV surveillance. To strengthen capacity in this area, a branch of the Centers for Disease Control and Prevention (CDC) has supported teams of trainers to travel to resource-limited settings to conduct brief, in-person training sessions on surveillance with local public health professionals. While effective, using mobile teams of educators to provide training to working professionals in a traditional classroom setting has several drawbacks: it generally requires participants to miss work, it is relatively costly, and it limits the feasibility of training participants from different geographic locations.

Project Overview

From 2009 to 2013, ICAP collaborated with the CDC to design, pilot, and evaluate a new approach—using distance education—to build surveillance capacity among public health professionals in sub-Saharan Africa. After adapting existing training materials for distance education, ICAP piloted the program in Tanzania, expanded it to Nigeria and Kenya, and then built the capacity of a local team in Kenya to independently implement the courses.

Course Adaptation Process

ICAP brought together a team of experts to redesign four existing CDC surveillance modules, creating two distance education courses based on adult learning principles and best practices in distance education and educational design (see Box 1). Leading up to the pilot in Tanzania, ICAP also collected information from registered course participants to further tailor the course content to meet participants' expectations and match their existing proficiency level.

Course Structure

The two new courses were 10-12 weeks in length and were de-

Box 1: Training Modules Redesigned to Form the New Distance Education Program

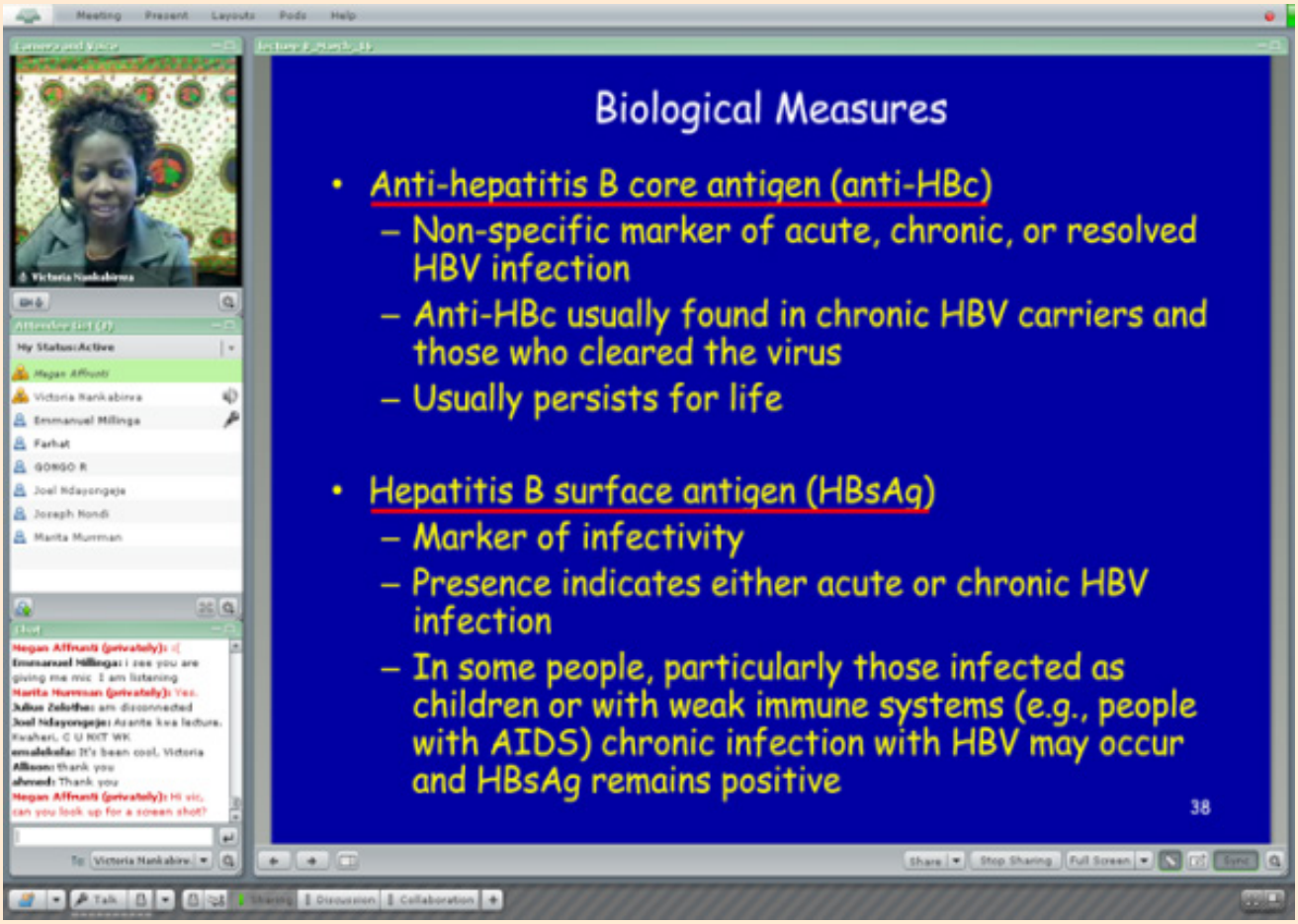
Existing CDC training modules	New distance education courses
• Overview of the HIV/AIDS Epidemic with an Introduction to Public Health Surveillance • HIV Serosurveillance	• 1: Introduction to HIV/AIDS and STI Surveillance
• Surveillance of HIV Risk Behaviors • Surveillance of Most-At-Risk Populations (MARPS)	• 2: Introduction to Behavioral Surveillance

livered in sequence via an interactive "virtual classroom." Each week, participants convened online for a 90-minute synchronous lecture, followed two days later by a 90-minute synchronous discussion session. Course participants viewed a streaming, live video of the instructor teaching the course via an Adobe Acrobat Connect Pro platform and concurrently viewed Powerpoint slides highlighting key points (see figure). Participants could hear each other ask and respond to questions, and could also communicate using the chat function. Each lecture included opportunities for participant interaction, including verbal questions and answers, as well as interactive polling exercises whereby participants answer a multiple-choice question and the frequency of each response is immediately displayed. To encourage participants to think critically about the content, they were also required to submit "warm-up" questions before each lecture and homework assignments before each discussion session. Each course culminated with participants completing a final report that provided an opportunity to apply the knowledge and skills gained.

Course Implementation, Evaluation, and Expansion

In 2009-10, ICAP piloted the new distance education courses with 24 public health professionals in Tanzania. Participants were recruited from local ministries of health, local CDC and ICAP offices, and other organizations involved in HIV surveillance in Tanzania. After both courses had been completed, ICAP conducted an evaluation of the program to document participants' experience and assess the courses' impact on participant knowledge and self-efficacy. The findings were positive (see Box 2) and lessons learned were used to further enhance the courses. Next, ICAP implemented the distance education program in Kenya and Nigeria (see table), with similarly positive outcomes. The following year, ICAP trained staff from Kenya's National AIDS and STIs Control Program (NASCOP), the University of Nairobi, and ICAP's local staff in Kenya to conduct and evaluate the distance education program, further building local capacity and increasing the program's future sustainability. After providing the local team in Kenya with two months of in-person

Figure: Snapshot of the Virtual Classroom



Box 2: Key Evaluation Findings

- Participants showed improvement in their **HIV surveillance knowledge**.[2]
- Participants self-reported that their **confidence with specific HIV surveillance tasks increased**.[3]
- The majority of participants (58% for the first course and 80% for the second course) reported that the courses **"completely met" or "exceeded their expectations."**
- Most participants (68% for the first course and 80% for the second course) indicated that the courses were **"very useful" in relation to their job responsibilities.**

and distance education training, both courses were taught for the first time by a local instructor, an epidemiologist from the University of Nairobi Health Services Center.

What Was Achieved

The program demonstrated the feasibility and effectiveness of using distance education as an alternative to face-to-face training to improve the surveillance skills and knowledge of public health professionals in resource-limited settings. It also demonstrated the feasibility of building the capacity of in-country teams, in a relatively short period of time, to implement and evaluate distance education courses that aim to strengthen HIV surveillance capacity. Despite some technological and attendance challenges, participants rated their overall experience of the online classroom positively and achieved positive learning outcomes. Trainees expressed particular appreciation for the convenience of the online classroom, which allowed them to balance their participation in the courses with busy work and travel schedules.

Table: Number of Health Professionals Trained

Country	Course 1	Course 2
Tanzania (pilot)	24	20
Nigeria	16	14
Kenya	Year 1: 16 Year 2: 23	Year 1: 15 Year 2: 20
TOTAL	79	69

Lessons Learned

Lessons learned during implementation of the distance education program include:

- Between 20 and 25 course participants is a reasonable number of students for one instructor and one teaching assistant to manage effectively.
- This type of course tends to function best when participants have similar surveillance-related knowledge and skill levels at the start of the first course.
- An in-person orientation session prior to the course is valuable for many reasons, including that it provides an opportunity to discuss goals and objectives for the program, facilitates the development of a social network among course participants, and provides an opportunity to review the course syllabus together and discuss minimum course requirements and incentives for course completion.
- A course website or Wiki that includes all course materials and that can be accessed by all participants is beneficial to the management of distance education courses (and decreases the number of course-related emails sent).
- Recording distance education sessions and making them available to course participants is extremely beneficial, as this enables students who missed sessions to watch them later. Recorded sessions also serve as an important study tool for participants who want to listen to specific sessions more than once.
- It is important to identify a method of supporting consistent internet access among participants so they can participate actively in the sessions. For this program, 3G devices were provided to each participant to help ensure steady internet access. While the cost was relatively high, three-quarters of pilot participants reported that the 3G device "very much enhanced" their ability to participate in the course.

Training and Education

BUILDING QUALITY IMPROVEMENT CAPACITY TO ACHIEVE THE GOALS OF HIV SCALE-UP

SOUTH AFRICA, TANZANIA

Background

The rapid scale-up of HIV care and treatment services in sub-Saharan Africa has enabled millions of people living with HIV to initiate antiretroviral therapy (ART). As a result, HIV-related deaths and new HIV infections have fallen dramatically. Much more remains to be accomplished, however, and ambitious goals continue to drive the global HIV response. The UNAIDS 90-90-90 initiative calls for 90% of people to be aware of their HIV status, 90% of those with HIV to be on ART, and 90% of those on ART to achieve viral suppression by the year 2020. The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) goal of an AIDS-free generation has been re-emphasized in PEPFAR 3.0, which aims for sustainable epidemic control. The plan to eliminate mother-to-child-transmission of HIV is another ambitious endeavor.

Achieving these goals will require more than addressing the major challenge of expanded coverage. While policymakers and program managers still face intense pressure to increase the number of adults and children accessing HIV services, the quality of HIV programs must also be enhanced both to achieve long-term impact and optimize the use of resources in an era of plateauing global funding for HIV. In response, PEPFAR has adopted a quality strategy that strives to insti-

tutionalize the ability of countries to continually improve HIV programs in order to sustain reductions in morbidity, mortality, and HIV transmission. This effort to accelerate quality improvement (QI) activities at the country level has highlighted the need to enhance the capacity of both ministry of health and U.S. Government (USG) field staff to design, oversee, and monitor QI initiatives.

Project Overview

From March 2013 to March 2015, ICAP collaborated with the Centers for Disease Control and Prevention (CDC) and its Center for Global Health Division of Global HIV/AIDS to design, deliver, and evaluate an innovative QI training course designed for staff of ministries of health in PEPFAR partner countries and their USG counterparts.

Baseline Needs Assessment

In early 2013, ICAP collaborated with CDC to design a rapid needs assessment, building on ICAP's past experience delivering training courses to USG field staff (including in-person and distance education courses on HIV surveillance and health systems strengthening). The assessment included two surveys and a series of key informant interviews, which revealed widespread interest in QI training among CDC staff. Respondents also reported quality challenges in all PEPFAR program areas in their respective countries, including HIV prevention, HIV testing and counseling, prevention of mother-to-child transmission of HIV, adult and pediatric care and treatment, and data quality.

Table 1: QI Course Structure

Phase	Modality	Description
1	4.5-day, face-to-face **foundational workshop**	The initial workshop provides participants with an introduction to quality and QI, QI principles, key QI tools (such as root cause analysis, fish bone diagrams, process maps, driver diagrams, prioritization matrices, family of indicators, and run charts). It also allows country teams to spend significant hands-on time applying QI tools to their quality challenge. Participants leave the workshop with a QI project proposal to share with key in-country stakeholders.
2	4-5 interactive, hour-long **webinars** conducted over the course of three months (and ongoing feedback on team projects)	In each webinar, presenters lecture for 30-40 minutes and then open the virtual "floor" to questions and comments. All webinars are recorded and links to the recordings are distributed to participants and posted on the course website.
3	Three-day, face-to-face **concluding workshop**	During the concluding workshop, participants present their country-specific QI project during a poster session and provide one another with peer feedback. They also participate in QI-related panel sessions and learn additional, advanced QI tools (including pareto charts and QI collaborative methodology).

Table 2: Overview of Course Participants

	Number of Participants	Participating Countries	Participating Organizations
Year 1	51	**11 countries:** Cameroon, DRC, Ethiopia, Malawi, Mozambique, Nigeria, Tanzania, Rwanda, South Africa, Swaziland, and Uganda	• 55 percent from CDC • 45 percent from ministries of health
Year 2	30	**6 countries**: Kenya, Lesotho, Malawi, South Africa, Uganda, Zambia	• 70 percent from USG organizations • 30 percent from ministries of health
TOTAL	82	**14 distinct countries**	

Box: Key Evaluation Findings, Course Year Two

- Over 90 percent of respondents indicated that the course achieved all of its objectives.
- 57 percent of respondents rated the overall course as excellent and the remaining 43 percent rated it as very good (36%) or good (7%).
- Learners' knowledge increased significantly following the Phase One workshop (average test scores rose from 60 to 90 percent).
- 100 percent of participants said they were likely (29%) or very likely (71%) to apply what they learned in their work setting.

Course Development and Structure

Drawing on the needs assessment results, ICAP collaborated with CDC to develop a five-month, three-phase training course to provide participants with a comprehensive introduction to QI concepts, methods, and tools (see Table 1). To enable participants to apply new knowledge and skills in a hands-on, practical way, the course design includes a QI project that country teams work on throughout the five-month course, addressing a contextually-relevant, HIV-related quality challenge of their choosing.

Course Implementation and Evaluation

ICAP conducted the three-phase Introduction to Quality and QI Course for the first time between November 2013 and March 2014, with phase one and three workshops convened in Tanzania. Fifty-one participants from 11 countries attended the course, most of whom were working at the central level in their respective countries at the time (see Table 2). In order to increase the faculty-to-participant ratio—and the opportunities for south-to-south exchange—country teams were divided into two cohorts, with both in-person trainings offered separately to each cohort.

To assess the course's strengths and weaknesses, ICAP conducted a robust evaluation after year one of the course. Results indicated that participant satisfaction with each phase was high and that most participants felt the phases had met all learning objectives. ICAP used participant feedback and its own experience implementing each of the course's three phases to improve the curriculum before moving into the course's second year.

The second iteration of the course was conducted from November 2014 to March 2015, with phases one and three convened in South Africa and thirty professionals from six countries participating (see Table 2). Evaluation of the course's second year demonstrated concrete evidence of increased knowledge and showed that participants both enjoyed the course and felt it achieved its learning objectives (see Box).

What Was Achieved

In the first two years of the course, 81 people from 14 countries received training and 17 distinct teams developed projects to address pressing quality challenges in their respective countries. The program demonstrated the feasibility and effectiveness of using a mixed approach (combining in-person workshops with distance learning components) to improve the capacity of working professionals in resource-limited settings to design, oversee, and monitor HIV-related QI initiatives.

Lessons Learned and Way Forward

Lessons learned from implementing the Introduction to Quality and QI Course include:

- The course should be scheduled to minimize conflicts for potential participants, such as the PEPFAR Country Operational Plan (COP) preparation process.
- Clear guidance should be provided to potential participants regarding ideal team size and participant qualifications in order to increase the likelihood of QI project implementation and facilitate the diffusion of QI initiatives.
- QI courses for working professionals should be designed to maximize time for hands-on work, exchange among participants, and interactive question and answer sessions.
- Creating a forum for current participants and course alumni to share their experiences and progress—and to provide one another with peer support—could be a way to further supplement learning.

As a result of its success, ICAP has received funding to conduct the QI course for a third and fourth year. To further improve the course, ICAP has moved the course to a summer-fall schedule, is integrating more PEPFAR-focused, up-to-date case studies into the content, and is featuring more alumni as both presenters and faculty.

Strategic Information

DEVELOPING AN OPEN-SOURCE DATA VISUALIZATION DASHBOARD TO FACILITATE THE ANALYSIS AND USE OF PATIENT-LEVEL DATA

KENYA

Background

When health managers and ministries of health have easy access to patient-level data collected across health facilities, they are better able to make informed decisions about how best to channel human and material resources to improve health services and patient outcomes. However, many countries in sub-Saharan Africa lack a centralized system into which all President's Emergency Plan for AIDS Relief (PEPFAR) implementing partners can input patient-level data from health facilities in their respective regions or provinces. This means that, in these countries, there is generally no way to make comprehensive analyses and comparisons using patient-level data, and that health managers must rely on aggregate data to inform their decisions.

Project Overview

From 2013 to 2015, ICAP collaborated with the Centers for Disease Control and Prevention (CDC) and Kenya's National AIDS and STI Control Program (NASCOP) to develop a pilot, web-based system to capture all electronic patient-level data collected

at PEPFAR-supported health facilities across the country. In addition, a user-friendly dashboard was developed to enable health managers to assess key HIV care and treatment indicators across individual patients and to compare them by region, age, sex, etc.

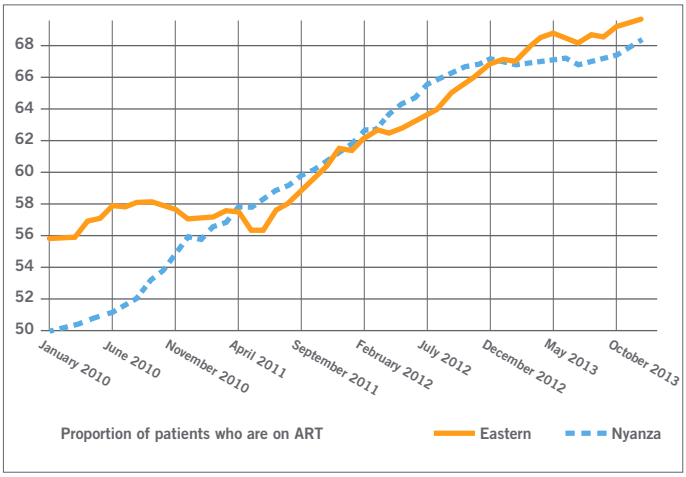
Developing a National Warehouse for Patient-level HIV Data

ICAP began by developing a common-format, patient-level data warehouse that includes a list of essential patient-level data elements. Next, customized tools were developed to de-identify these data elements and import them from each HIV implementing partner's existing patient-level database (including ICAP's) into the new common-format data warehouse. By 2014, ICAP had worked with NASCOP and five PEPFAR implementing partners working in Kenya to populate the new national warehouse with existing patient-level data.

Developing a User-friendly, Web-based Dashboard to Facilitate Data Visualization and Use

To enable local health managers and implementing partners to easily access and compare patient-level data from the national warehouse, ICAP developed a web-based HIV care and treatment dashboard using an open-source version of *Infoveave*. The new tool enables users to generate customizable charts and tables assessing characteristics and outcomes of patients enrolled in HIV care and treatment services at facilities with electronic patient-level data, and to assess patient outcomes over time. For example, the tool enables users to easily create graphs illustrating the difference between patient survival following antiretroviral therapy (ART) initiation among men and women; or to compare the proportion of patients on ART by region (see figure).

Figure: Example Output of New Patient-Level Dashboard



What Was Achieved

The web-based data visualization dashboard represents a robust, open-source interface for users to summarize large amounts of HIV-related programmatic data in a user-friendly way. The platform, which is both modifiable and non-country-specific, is freely available and could be adopted by any ministry of health that does not currently have a national-level electronic HIV database.[1] Countries with national electronic HIV databases may also find the front-end interface useful for data visualization, and only a small investment would be required to organize their databases to take advantage of the front-end displays. The tool has the potential to substantially enhance the use of routinely collected, electronic patient-level data for HIV program monitoring, evaluation, and operations research, allowing users to gain a more comprehensive understanding of HIV service delivery through the creation of customized data reports that meet their specific needs. The tool can also be implemented on a smaller scale by individual implementing partners; for example, ICAP is currently rolling out country-specific data visualization dashboards to all of its country-level offices.

Lessons Learned

- Strong, national-level buy-in is critical for developing a national, patient-level data warehouse and for encouraging the collaboration needed from all implementing partners throughout the development process.

- High-quality, user-friendly visualization of electronic patient-level data is feasible—without requiring users to have sophisticated statistical expertise—and has the potential to greatly enhance data usage.

1 To learn more about how to access the open-source dashboard, email ICAP-communications@columbia.edu.

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