

Evolution of Couples' Voluntary Counseling and Testing for HIV in Rwanda: From Research to Public Health Practice

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Background: Couples' voluntary HIV counseling and testing (CVCT) is a WHO-recommended intervention for prevention of heterosexual HIV transmission which very few African couples have received. We report the successful nationwide implementation of CVCT in Rwanda.

Methods: From 1988 to 1994 in Rwanda, pregnant and postpartum women were tested for HIV and requested testing for their husbands. Partner testing was associated with more condom use and lower HIV and sexually transmitted infection rates, particularly among HIV-discordant couples. After the 1994 genocide, the research team continued to refine CVCT procedures in Zambia. These were reintroduced to Rwanda in 2001 and continually tested and improved. In 2003, the Government of Rwanda (GoR) established targets for partner testing among pregnant women, with the proportion rising from 16% in 2003 to 84% in 2008 as the prevention of mother-to-child transmission program expanded to >400 clinics. In 2009, the GoR adopted joint posttest counseling procedures, and in 2010 a quarterly follow-up program for discordant couples was established in government clinics with training and technical assistance. An estimated 80%–90% of Rwandan couples have now been jointly counseled and tested resulting in prevention of >70% of new HIV infections.

Conclusions: Rwanda is the first African country to have established CVCT as standard of care in antenatal care. More than 20 countries have sent providers to Rwanda for CVCT training. To duplicate Rwanda's success, training and technical assistance must be part of a coordinated effort to set national targets, timelines, indicators, and budgets. Governments, bilateral, and multilateral funding agencies must jointly prioritize CVCT for prevention of new HIV infections.

Key Words: couples' HIV testing, Rwanda, implementing WHO guidelines

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INTRODUCTION

Worldwide, 35.3 million adults and children are living with HIV as of 2012.¹ Approximately, 70% of these individuals reside in sub-Saharan Africa where most new adult infections occur through heterosexual transmission.¹ In countries with HIV prevalence >10% among adults, 1 in 4 cohabiting couples and half of HIV-affected couples are HIV discordant with 1 HIV-infected (HIV+) and 1 HIV-uninfected (HIV–) partner.^{2–4} Consequently, cohabiting couples represent a large, high-risk population for HIV.⁵

Couples' voluntary HIV counseling and testing (CVCT) is an effective intervention for prevention of heterosexual HIV transmission in sub-Saharan Africa,^{3,6–11} particularly in Rwanda where ≥90% of new infections occur in cohabiting couples.^{5,12–15} CVCT provides both partners with the opportunity to share their HIV test results, jointly address issues related to HIV transmission and family planning, and support each other if one or both are infected.^{16–20} CVCT is also associated with an increased uptake of interventions to reduce mother-to-child transmission^{21,22} and with a lower risk of HIV infection in infants born to HIV+ mothers.^{7,23,24}

Despite increased recognition of the effectiveness of CVCT, very few couples in sub-Saharan Africa have the opportunity to be counseled and tested together or to mutually disclose their test results. In fact, most adults are either unaware of their own HIV status, that of their partner, or both,^{18,25–27} and in many cases adults do not know that it is possible to have a long-standing partner with a different HIV status.^{28,29} To our knowledge, Rwanda is the only country in Africa that has successfully implemented CVCT as a national

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standard, with approximately 88%–90% of married men and women aged 25–29 tested as a couple.³⁰ This article traces the evolution of CVCT in Rwanda from research findings to a nationwide evidence-based intervention and a social norm.

Coauthors and Organizations

Projet San Francisco (PSF) is a research organization established in Kigali in 1986 as a collaborative program with the Ministry of Health (MoH) (E.K., J.M., R.B., K.K., B.B.-H). Together with its sister organization, the Zambia Emory HIV Research Project (ZEHRP), it forms the Rwanda Zambia HIV Research Group (RZHRG), headquartered at Emory University (K.M.W, A.T., S.A.). The Rwanda Biomedical Center (RBC) of the MoH is an agency that incorporates what was previously the Treatment and Research AIDS Center (TRAC), the National Reference Laboratory (NRL), and the National TB and malaria control programs (S.N., P.M., E.R.). The US Centers for Disease Control and Prevention (CDC) office in Rwanda funded the training and technical assistance components of nationwide CVCT implementation (FN, PR).

First Evidence of CVCT As an Effective Intervention for HIV Prevention in Rwanda, 1986–1994

In 1986, HIV testing in Rwanda was performed for surveillance purposes at the National AIDS Control Program, and for blood screening at the National Blood Transfusion Center.

Between October 1986 and March 1987, HIV screening (enzyme-linked immunosorbent assay with Western blot confirmation) was provided to a consecutive sample of 3702 young women aged 18–35 years attending the antenatal care (ANC) and pediatric clinics at the Central Hospital of Kigali; the prevalence of HIV was 29%.³¹ In March–August 1988, with NIH funding to study the incidence, predictors, and natural history of HIV (NIH AI23980), PSF enrolled a subset of women (460 HIV+ and 998 HIV–) for a prospective cohort study³² and many requested HIV testing be provided to spouses. More than 25% of male partners sought testing when offered: 15% of couples had discordant HIV results, 20% were concordant positive, and the remaining 65% were concordant negative. After 1 year of follow-up, condom use in discordant couples increased from 4% to 57%,¹⁴ and the rate of HIV seroconversion among women with untested male partners was more than twice that for women whose partners were tested.¹³ Partner testing was also associated with a significant decrease in gonorrhea rates among HIV+ women. Pregnancy incidence decreased among all women when hormonal contraceptives were provided at the research clinic.^{33,34} When men and women were counseled separately, at times individuals did not disclose their results to their partners or disclosed inaccurate results.^{15,35} This posed a particular problem for discordant couples, and for concordant HIV+ couples in which each told the other partner they were HIV–. To optimize prevention, PSF developed procedures for joint pretest and posttest counseling.³⁶

After the evidence of the potential impact of the CVCT intervention on prevention of HIV, sexually transmitted

infections, and unplanned pregnancy, additional funding was sought to study behavioral, clinical, virologic, immunologic, and immunogenetic predictors of heterosexual transmission from man to woman and woman to man, in both donor and recipient in discordant couples (NIH AI40951). A testing center for couples was established, and outreach and promotion strategies publicized the services. By April 1994, the center received 10–15 couples/d and 241 discordant couples had enrolled in a cohort study. Unfortunately, during the genocide against the Tutsi in April–July 1994, all CVCT activities were interrupted, most PSF staff and participants were killed or fled, and the project relocated to Zambia.

Nine Rwandan PSF staff and their families came to Lusaka, Zambia's capital, to assist with the relocation of the NIH-funded studies of discordant couples. Between 1994 and 1997, these staff and their Zambian counterparts established a CVCT program and continued to refine procedures for recruiting couples for joint testing and following HIV-discordant couples.^{37,38} In 1997 when the situation in Rwanda had calmed, Rwandan staff wanting to return were assisted to do so.

Demonstration Projects and Refinement of CVCT Procedures in Postgenocide Rwanda, 1997–2002

In 1997, a grant was obtained from United Nations Population Fund (UNPF) to offer CVCT alongside family planning services to Kigali couples. Using procedures honed in Lusaka, when couples arrived at PSF, they were first received in a group discussion session led by a counselor. Each couple then participated together in a joint confidential pretest counseling session where they had an opportunity to speak freely and ask sensitive questions that could not be addressed in group discussion. Afterward, the couple went for phlebotomy, which included HIV rapid testing (available in 1995 and first implemented at ZEHRP^{37,38}) and rapid plasma reagin syphilis serology. Same-day test results were provided during joint posttest counseling. Both partners were together throughout the process, and services were provided free of charge with transport reimbursement, lunch, and child care. By 1999, the UNFPA-funded program had served >5000 couples.

In 2001, RZHRG was awarded a World AIDS Foundation (WAF) grant to explore the feasibility of establishing CVCT in government ANC clinics in Kigali and Lusaka. At that time, only 2 health centers in Kigali were offering HIV testing in prevention of mother-to-child transmission (PMTCT) programs.³⁹ Staff in these 2 centers were trained by PSF counselors and distributed written invitations to ANC clients to return with spouses for weekend CVCT programs. Between March and December 2001, 984 women received individual HIV testing and 956 women received CVCT. Corresponding numbers in Lusaka were 1022 and 663.⁴⁰

Demand Creation and Development of Best Practices for CVCT, 2003–2008

A US National Institutes of Mental Health grant (MH66767) allowed PSF to study CVCT obstacles at the

policy, provider, and client levels and to develop best practices in promotion and provision of CVCT. A household survey in 2003 confirmed that though most adults wanted to be tested with their partners, many thought CVCT was available at public facilities (which was not yet the case), and only 25% knew CVCT reduced HIV transmission within marriage.⁴¹

To coordinate demand and supply, a promotional strategy to invite couples for CVCT was developed and tested with a neighborhood randomized controlled trial in Kigali and Lusaka.^{42–44} Social Norms Theory highlights the role of community and peer influence in changing health behaviors, and studies have shown that normalizing behaviors like HIV testing through community promotions can decrease stigma and increase uptake.^{45,46} Influential network leaders (INLs) were selected from the health care, religious, nongovernmental/community-based, and private sectors. Each INL nominated influential network agents (INAs) and supported the INA's promotional efforts through public endorsements of CVCT. INAs received a 4-day training including observation of the CVCT process and demonstration of promotion among friends, family, workmates, church members, and the community. Performance-based pay was linked to the number of couples presenting an INA invitation at CVCT. This model was successful, particularly when invitations were distributed to the homes of individuals known personally to the INA, accompanied by an INL public endorsement, and with the availability of a mobile testing unit.^{42,43}

Between 2003 and 2008, 41,582 couples were tested together including 9099 boy/girlfriend or fiancée noncohabiting couples and 32,483 cohabiting couples. This corresponded to 15% of couples in Kigali⁴⁷ and set the stage for diffusion of CVCT as a norm in both cohabiting and premarital couples.^{48,49}

The prevalence of HIV infection from 2003 to 2008 was 10.2% among women and 5.9% among men in noncohabiting couples, and 14.3% among women and 13.4% among men in cohabiting couples. These prevalence rates were higher than those estimated by the Rwanda Demographic Health Survey in 2005, which showed the proportion of people infected by HIV in Kigali to be 8.0% of women and 5.2% of men.⁴⁷ This suggests that couples requesting CVCT services at PSF stand-alone centers may have been at higher risk than the general population.

During this time, counselors from PSF and the sister site in Zambia joined the US CDC and the Liverpool School of Tropical Medicine to develop training materials for couples' HIV counselors, promoters, and program managers. These were finalized and posted on the US CDC website in late 2007²¹ (<http://www.cdc.gov/globalaids/resources/prevention/chct.html>).

National Campaign for Partner Testing in ANC, 2003–2008

In November 2003, PSF and the MoH organized a consensus conference to endorse CVCT services. The conference was opened by the President of Rwanda, His Excellency Paul Kagame. Attendees included government ministers, representatives from US and Euro-

pean embassies, and key stakeholders involved in implementation of HIV prevention services including UN agencies, multilateral and bilateral organizations, nongovernmental organizations, district hospitals, and representatives of health centers. This conference culminated in the launching of a “10 by 10” campaign to test 10% of Rwandan couples by 2010. As the timing coincided with the expansion of HIV testing for pregnant women in PMTCT programs and feasibility of partner testing had been confirmed in Kigali, the MoH and the National AIDS Control Program gave priority to partner testing in ANC.

In 2003, when the national PMTCT campaign was launched, only 53 of the 442 government health centers nationwide offered voluntary testing and counseling services. That year nearly 35,000 pregnant women were tested for HIV and 16% of their male partners also came to the clinic for HIV testing. Promotional efforts were undertaken by the network of community health workers (CHWs) known in Rwanda as “Animateurs de Santé.” These are volunteers chosen by their communities to inform the population about disease prevention, and they work under the supervision of a health center. Nearly 45,000 CHWs were mobilized with support from local political leaders and staff from health centers. These CHWs received promotional training (adapted from the INA training developed during PSF research described above), thereafter visiting homes of pregnant women to encourage them and their husbands to seek testing. Monthly meetings were held at health centers to review progress and share best practices for promotion. Throughout the campaign, local and district political leaders were also actively involved in promoting ANC testing with male partner involvement at community gatherings, particularly on the community workday “Umuganda,” the last Saturday of every month. Radio announcements were also effective in spreading the message as only 1 language is spoken throughout Rwanda and radio stations broadcast nationwide.

These promotional efforts resulted in a steady increase of the uptake of HIV testing by pregnant women and their partners. The proportion of male partners tested in ANC increased to 33% after 2 years and 66% after 4 years (national program data, Fig. 1). By the end of 2008, 341 health centers were offering counseling and testing services to pregnant women. That year 300,000 pregnant women were tested of whom 78% had male partners who also tested.

During the first 5 years of the PMTCT program, ANC attendees and their partners were counseled and tested separately in government clinics. This practice arose in part from logistics: women were tested during their first ANC visit and given invitations to take home to their partners who came at a later date. In addition, data collection tools included sensitive sexual history questions that were challenging to ask when husband and wife were together. Lastly, there was confusion about the role of confidentiality and a widespread assumption that husband and wife would “work it out on their own.” Although couples were encouraged to mutually disclose their serostatus, the frequency of disclosure was not documented.

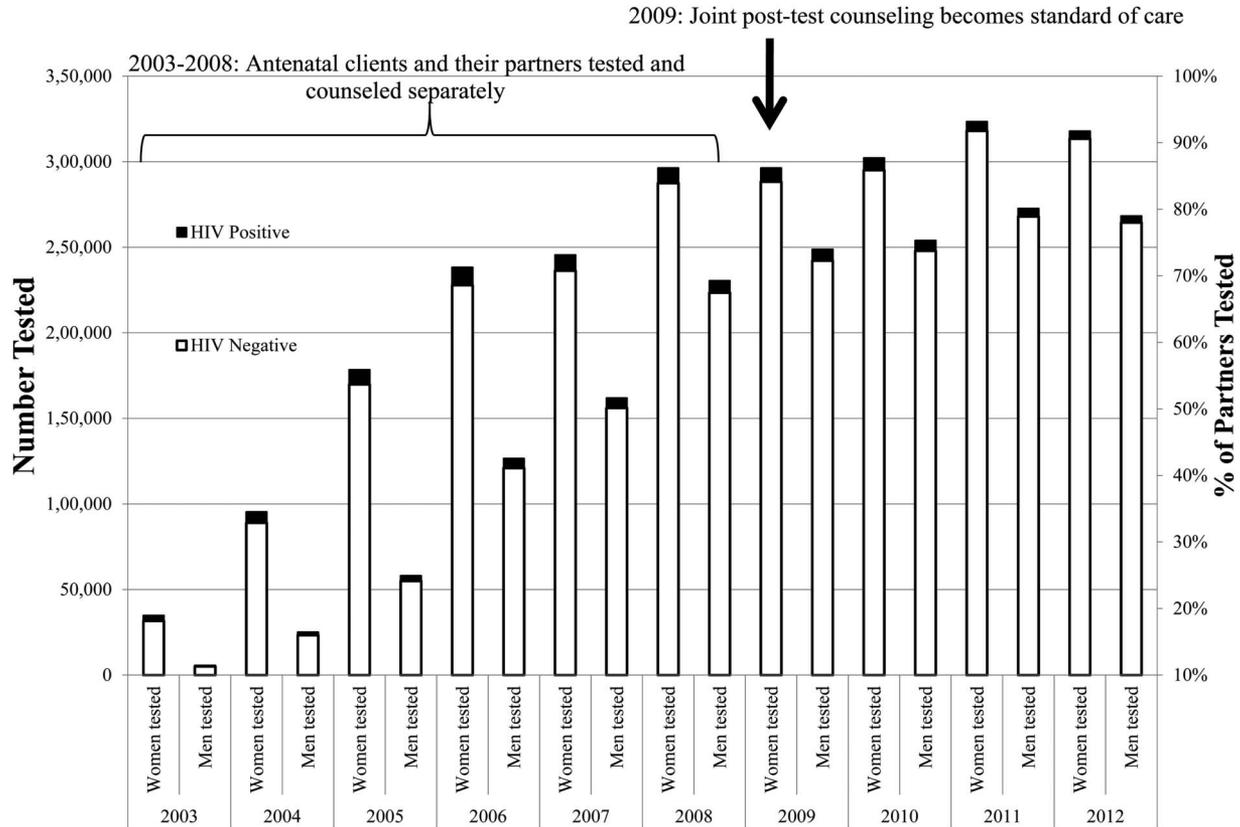


FIGURE 1. Ten years of nationwide HIV testing in antenatal clinics, 2003–2012.

Nationwide Transition to Joint Posttest Counseling and Enrollment of Discordant Couples in Quarterly Follow-Up, 2009–2014

Rwanda adopted new guidelines in 2009 which specified that pregnant women and their partners should be jointly posttest counseled with mutual disclosure of HIV results, as was specified in CDC counselor training guidelines⁵⁰ and later endorsed in WHO guidelines.⁵¹ To pilot this procedure, PSF counselors trained and supported government staff in several clinics in Kigali to provide weekend CVCT (as had been done in the WAF study in 2001 described above), with the goal of transitioning the procedures to weekday ANC services. According to the performance-based financing system,^{52,53} the MoH paid clinics for services rendered. It quickly became clear to clinic managers and staff that counseling 2 people jointly required far less time than counseling them as individuals, and that CVCT was thus time and cost saving. The additional benefit—much appreciated by counselors—was that difficulties with couples who did not disclose or disclosed inaccurately could be avoided. Figure 2 shows the rapid transition from weekend to weekday CVCT in these Kigali clinics during the last quarter of 2008.

It became apparent during the pilot that government counselors required new skills to comfortably counsel couples together effectively, particularly those in whom HIV results were discordant. The MoH requested that PSF provides technical assistance and training on the joint counseling and testing model for health care providers nationwide. With

funding from CDC (U2G-PS-1839), training modules were also developed for clinic managers, laboratory technicians, promotion managers, and data managers. The content of each training module was tailored to each health professional category involved in the program. Training for counselors focused on the skills required for the counseling of a couple; training of clinic managers encompassed the management of the CVCT program in the health care facility and advocacy of the program with community stakeholders; promotion managers were prepared to train CHWs and to coordinate outreach activities for CVCT promotions; laboratory technicians were trained specifically on HIV testing algorithm adapted for couples (specifically the addition of confirmatory testing for all those HIV+ on screening and their partners),¹⁸ whereas data managers were trained on CVCT reporting, monitoring, and evaluation. Indicators reported to RBC included number of couples tested by serostatus and indeterminate test results.

In 2010, quarterly follow-up of discordant couples in government clinics was added to the counselors' training manual. Follow-up procedures and longitudinal data collection tools adapted from research protocols were streamlined for program use to record HIV test result for the HIV- (or seroconverting) partner, pregnancy status and contraceptive use, and antiretroviral therapy (ART) use for the HIV+ partner. These have now been implemented in hundreds of government clinics following approximately 40,000 discordant couples.

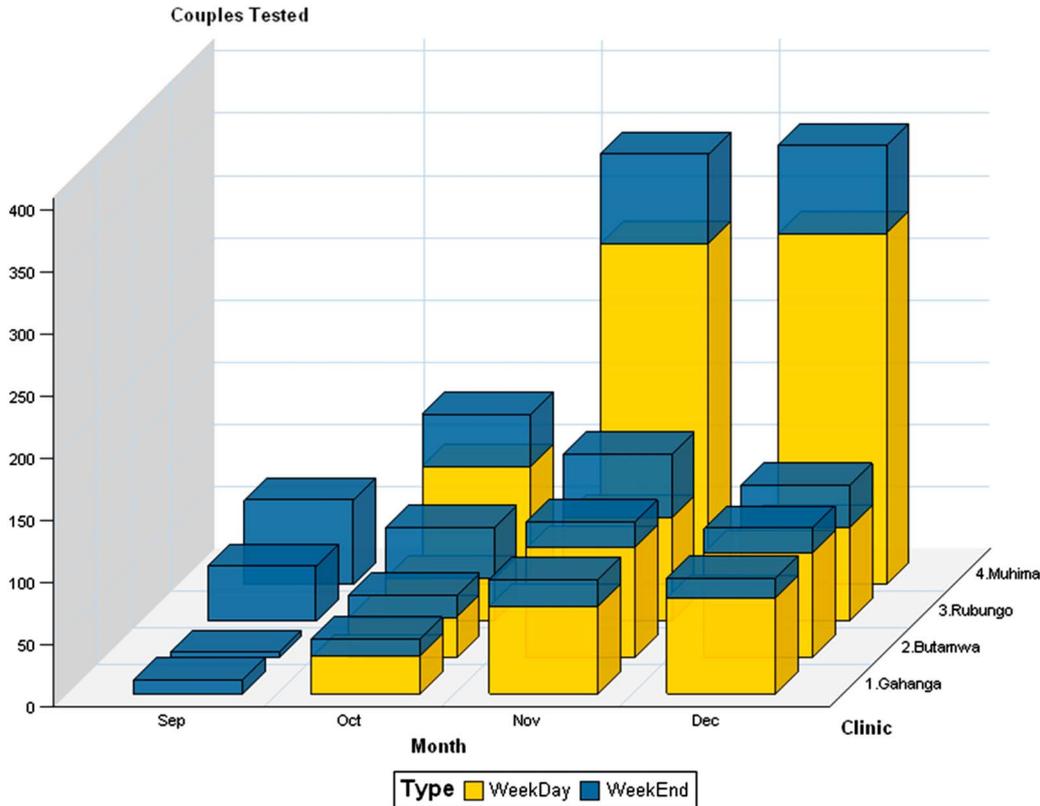


FIGURE 2. Transition from weekend to weekday CVCT integrated in selected Kigali ANC clinics, October–December 2008.

Between 2009 and 2013, PSF trained more than 2500 health providers, 77% of whom were counselors, 7% data managers, 6% laboratory technicians, 6% promotion managers, and 4% clinic managers (Table 1).

The number of health care facilities offering voluntary testing and counseling services in Rwanda increased to >400 in 2012. During this period, the proportion of pregnant women testing with husbands increased more than five-fold, from 16% to 84% (Fig. 1). This proportion plateaued in 2009, probably due to single mothers and men without time or inclination to accompany their spouses to ANC.

DISCUSSION

In this article, we describe the steps leading to the successful nationwide implementation of CVCT—an

evidence-based, feasible, affordable, and sustainable program that prevents an estimated >70% of incident HIV infections in Rwanda.^{5,12} To our knowledge, Rwanda is the first country to establish CVCT as a norm in ANC and reach an estimated 90% of couples. We discuss lessons learned and compare Rwanda with other African countries, notably Zambia where many of the same CVCT research and advocacy activities have taken place but successful demonstration projects have not led to a national program.

An important aspect of Rwanda’s success has been government support and collegial relationships between research, government, and implementation sectors. These were vital to coordinating policy, funding, promotion, and service provision. Rwanda’s small size, dense population, good transport and communication infrastructure, and homogeneous language have also facilitated rapid dissemination of CVCT.

TABLE 1. Nationwide Training of CVCT Teams in Government Clinics

	CVCT Counseling	Refresher CVCT	Discordant Couple Follow-Up	CVCT & Discordant Couple Follow-Up	Data Manager	Health Center Manager	Laboratory Technician	Promoter Manager	Total Trained Per Year
2009	106	0	0	0	0	0	0	0	106
2010	93	0	84	130	99	52	50	97	605
2011	24	182	0	199	41	45	74	33	598
2012	0	143	0	686	0	0	0	13	842
2013	0	134	5	189	28	17	18	0	391
Total	223	459	89	1204	168	114	142	143	2542

The support of local leaders and the active involvement of CHWs and health care providers were critical for demand creation and were leveraged by Performance-Based Financing and Community Health Insurance schemes in the health sector. The timing of the MoH's commitment to CVCT was fortuitous as it coincided with national PMTCT expansion.

Zambia and Rwanda have similar populations, but Zambia is 15 times larger and has five major language groups with 73 dialects. Knowledge of HIV discordancy is far lower in Zambia versus Rwanda,⁴¹ and also low in South Africa.²⁸ As a result, many do not disclose their HIV test results to partners and husbands often assume that their wife's test result from ANC must be the same as their own.^{15,35}

In Zambia, CVCT demonstration projects funded by the UK Department for International Development (DFID), the Canadian International Development Agency (CIDA), and the US CDC used the same procedures as Rwanda, including advocacy at national, provincial, district, and community levels; community- and clinic-based promotions incentivized with performance-based pay; transport reimbursement for couples (a necessary component in early stages, and one endorsed by both sides of a USAID-World Bank debate on the use of incentives for HIV prevention⁵⁴); and weekend services in government clinics. These demonstration projects provided CVCT services to over >250,000 of Zambia's 2.5–3.0 million couples in 7 cities and 26 underserved districts in 8 years. In some cities, CVCT uptake increased from <3% to 25% of ANC clients tested with partners. Unfortunately, this plateaued in 2014, and many HIV implementing partners continue to offer only individual testing.

Separate HIV testing of women and their partners is a missed prevention opportunity, and it illustrates how a critical procedural component can be overlooked when parties with different deliverables are involved. It is notable that to this day, international agencies tasked with HIV prevention programs in Africa still do not include CVCT among their indicators although prevention of HIV in women of childbearing age is the first of 4 prongs of PMTCT cited by WHO/UNAIDS.⁴² In Zambia, virus sequencing confirms that 9 of the 10 new infections in women come from their spouses.⁵⁵ Testing pregnant women with partners at the first ANC visit has the advantage of identifying discordant couples and thus likely preventing both heterosexual and perinatal transmission,⁵⁶ unlike repeat maternal testing during pregnancy and postpartum^{57,58} which, without CVCT, measures—but does not prevent—incident maternal HIV.

The recognition of discordant couples has led to investigations of behavioral, clinical, virologic, immunologic, and immunogenetic correlates of male-to-female and female-to-male transmission. Investigators have used CVCT to identify discordant couples for clinical trials of biomedical interventions such as ART, treatment-as-prevention (TasP), ART-containing vaginal microbicides, and pre-exposure prophylaxis. However, these studies did not report the prevention impact of the recruitment step—CVCT—which in observational studies reduced incidence from 10% to 11% in couples who did not know their results⁵⁹ to <3% in jointly counseled couples. CVCT thus prevented a large number of new infections before ART-based prevention was offered. The residual impact of

ART-based regimens reduced incidence from 2% to 3% to close to zero among adherent participants.^{60–62} Recent trials of “population TasP” have also not listed CVCT among the standard-of-care prevention services in study protocols,⁶³ even in home-based testing.⁶⁴ Demographic and Health Surveys-derived estimates show that most new infections occur in cohabiting couples,^{5,12} and the consensus is that joint testing leads to reduced risk. CVCT should be prioritized rather than remaining an unmeasured component of individual HIV counseling and testing, which is framed as a case detection exercise that receives <5% international funding.⁶⁵

Since 2013, the WHO recommended treating all HIV+ people in discordant partnerships with antiretroviral drugs to prevent transmission to their partners.⁶⁶ TasP among discordant couples cannot reach a meaningful number of couples until CVCT is effectively promoted and adopted as policy in HIV prevention programs, with adequate funding secured for its implementation. The prevention impact of CVCT is considerable without ART and given the low cost, CVCT can be implemented in areas without ART programs. Although TasP is available to many in Rwanda, it is much harder to access in southern African countries with similar per capita incomes and expenditures on health but much higher HIV prevalence rates, larger geographic areas, and multilingual populations.

Outside Rwanda, fewer than 10% of African couples are aware of their joint serostatus and this must be the first priority. International and national stakeholders must establish targets, timelines, and budgets for nationwide implementation of CVCT and look to Rwanda and to successful demonstration projects as models.

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