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Maximizing the impact of HIV prevention efforts: Interventions for couples

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Abstract

Despite efforts to increase access to HIV testing and counseling services, population coverage remains low. As a result, many people in sub-Saharan Africa do not know their own HIV status or the status of their sex partner(s). Recent evidence, however, indicates that as many as half of HIV-positive individuals in ongoing sexual relationships have an HIV-negative partner and that a significant proportion of new HIV infections in generalized epidemics occur within serodiscordant couples. Integrating couples HIV testing and counseling (CHTC) into routine clinic- and community-based services can significantly increase the number of couples where the status of both partners is known. Offering couples a set of evidence-based interventions once their HIV status has been determined can significantly reduce HIV incidence within couples and if implemented with sufficient scale and coverage, potentially reduce population-level HIV incidence as well. This article describes these interventions and their potential benefits.

Keywords

HIV/AIDS; HIV serodiscordant couples; couples HIV testing and counseling; HIV prevention; sub-Saharan Africa

Introduction

Thirty years into the global fight to curb the HIV epidemic, important gains have been made. HIV incidence has declined in 33 countries, 6.6 million people (47% of those eligible) living with HIV (PLHIV) are now receiving treatment, and 15 low-resource countries have been able to reach at least 80% of pregnant women living with HIV (WLHIV) with antiretroviral drugs to prevent vertical transmission (World Health Organization [WHO], United Nations Children's Fund [UNICEF], & Joint United Nations Programme on HIV/AIDS [UNAIDS], 2011). Despite these advances, 2.5 million people were newly infected with HIV in 2011, highlighting the inadequacy of current prevention efforts (Joint United Nations Programme on HIV/AIDS [UNAIDS], 2012).

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Access to HIV testing and counseling (HTC) services continues to increase. In a subset of 87 countries, 72 million HIV tests were conducted in 2010, up from 64 million in 2009 (WHO, UNICEF, & UNAIDS, 2011). Multiple service delivery models have led to this increase including provider-initiated HTC as part of facility-based care, home-based HTC, and mobile services. Despite these efforts, population coverage of HTC remains at 40% (WHO, UNICEF, & UNAIDS, 2011). Testing individuals remains the norm in most programs and few couples test for HIV together (Desgrées-du-Loû & Orne-Gilemann, 2008). HIV serostatus disclosure to sex partners remains difficult (WHO, 2004), and between 20–50% of PLHIV attending clinical care do not know their partner's HIV status (Deribe, Woldemichael, Wondafrash, Haile, & Amberbir, 2008; Mlambo & Peltzer, 2011; Sarna et al., 2008).

Integrating partner and couples HIV testing and counseling (CHTC) into routine clinic-based services (e.g., antenatal, HIV, tuberculosis, and other outpatient services) and community-based services (e.g., home and mobile HTC) can significantly increase the number of couples, where the status of both partners is known. Encouraging couples to test together and to mutually disclose their HIV status allows couples to make joint, informed decisions about HIV prevention and reproductive issues, such as contraception and conception (Curran et al., 2012). Studies have consistently shown that couples who test together are more likely to adopt HIV prevention strategies than individuals who test alone (Allen et al., 2003; Burton, Darbes, & Operario, 2010; Rosenberg et al., 2013). CHTC has also been shown to increase uptake of interventions to prevent vertical transmission (Farquhar et al., 2004), to improve infant outcomes (Aluisio et al., 2010), and to improve uptake of and adherence to HIV treatment services (Stirratt et al., 2006; Ware et al., 2009). CHTC services are especially important for identifying HIV serodiscordant couples, where one member is HIV-infected and the other is not. In sub-Saharan Africa, as many as half the PLHIV are in a serodiscordant relationship with current sexual partners (Chemaitelly, Cremin, Shelton, Hallett, & Abu-Raddad, 2012). Providing ongoing services to serodiscordant couples can prevent HIV transmission to the negative partner. In addition, CHTC is an important gateway for linking all couples to appropriate prevention, care, and treatment services based on the couple's serostatus. Table 1 summarizes these services and their associated benefits.

Fear of intimate partner violence (IPV) has often been cited by women as a barrier to HIV serostatus disclosure and CHTC (Hardon et al., 2012; Medley, Garcia-Moreno, McGill, & Maman, 2004; Rujumba et al., 2012). Most studies, however, have not found an association between CHTC and an increased risk of IPV incidence even among HIV serodiscordant couples (Emusu et al., 2009; Shuaib et al., 2011; Semrau et al., 2005; Were et al., 2011). Women with a prior history of IPV may be at higher risk for experiencing adverse events following HIV serostatus disclosure or CHTC, than women without this history (WHO, 2004, 2006). As a result, CHTC counselors should be trained to screen for IPV during the pre-test counseling session and to counsel such women about the risks and benefits of CHTC. Women with a history of IPV should be provided with ongoing counseling and supported in making decisions regarding the safety and feasibility of involving their partners in voluntary testing or disclosure. Women currently in a violent relationship should also be referred to IPV support services, where available (WHO, 2004, 2012a).

Recently released guidelines by the World Health Organization (WHO) describe in detail the effectiveness and numerous benefits of CHTC (WHO, 2012a). This article complements these guidelines by describing interventions that should be offered to couples, once their HIV status has been determined (President's Emergency Plan for AIDS Relief [PEPFAR], 2011; WHO, 2008, 2012a). These interventions can substantially reduce the risk of transmission to HIV-negative sex partner(s) and children and ensure that HIV-positive partners receive the care and treatment they need. In generalized epidemics with large numbers of serodiscordant couples, these interventions, if implemented in sufficient scale and coverage, have the potential to significantly impact the population level HIV incidence (El-Sadr, Coburn, & Blower, 2011). While the number of couples living with HIV in concentrated epidemics is smaller (1–9% vs. 16–45% in generalized epidemics), the proportion of couples who are HIV discordant in these settings is higher (75% in concentrated epidemics vs. 50% in generalized epidemics) (Chemaitelly et al., 2012; Dong, 2011; Klumthanom, 2011). This highlights the need to ensure that couples in both generalized and concentrated epidemics have access to these interventions (PEPFAR, 2011; WHO, 2012a).

Antiretroviral treatment (ART) for the HIV-positive partner

The clinical trial, HIV Prevention Trials Network (HPTN) 052, showed that providing ART to the HIV-positive member in serodiscordant couples reduced the risk of heterosexual transmission by 96% (Cohen et al., 2011). These results support the association between reduced viral load and lower HIV transmission risk first identified in observational studies (Donnell et al., 2010; Quinn et al., 2000). HPTN 052 also confirmed the long debated assumption that ARVs can prevent horizontal HIV transmission, as well as vertical transmission (Anglemyer, Rutherford, Baggaley, Egger, & Siegfried, 2011; Cohen et al., 2011). Evidence in a recent ecological report from South Africa indicates substantial reduction in HIV incidence in communities with the greatest ART usage, further supporting the prevention benefits of ART (Tanser, Barnighausen, Grapsa, & Newell, 2012). These findings highlight the importance of ART as an HIV prevention strategy in addition to its importance in reducing the morbidity and mortality associated with HIV infection (Cain et al., 2011; Severe et al., 2010; Sterne et al., 2009).

Current WHO HIV treatment guidelines recommend initiation of lifelong ART at CD4 counts of 350/mm³ or lower, including prioritizing ART for eligible pregnant women (WHO, 2010a, 2010b). The newly released CHTC guidelines, the first WHO guideline to address treatment as prevention, expand this recommendation to include offering ART at CD4 counts above 350/mm³ to persons in serodiscordant relationships in order to reduce HIV transmission risk to the uninfected partner (WHO, 2012a).

Adherence counseling and support

The success of ART in achieving sustained reductions in viral load depends upon long-term retention in care and medication adherence. Effective behavioral interventions to increase patient adherence have been described in a number of studies, and include provider-delivered education or counseling (Kalichman, Cherry, & Cain, 2005; Levy et al., 2004;

Pradier et al., 2003; Tuldrà et al., 2000), couple-based counseling (Remien et al., 2005), telephone support (Collier et al., 2005), reminder devices (Andrade et al., 2005), home visits (Williams et al., 2006), pillbox organizers (Petersen et al., 2007), and directly observed therapy (Altice, Maru, Bruce, Springer, & Friedland, 2007; Lucas et al., 2006). Adherence counseling should emphasize the importance of medication adherence, both for maintaining proper health and for preventing HIV transmission to uninfected sex partner(s) and child(ren) (PEPFAR, 2011). In addition, qualitative studies have identified other barriers to ART initiation and medication adherence including fear of stigma, fear of the side effects of ARVs, fear of taking medications on an empty stomach, and concerns around the transport costs associated with treatment (Duff, Kipp, Wild, Rubaale, & Okech-Ojony, 2010; Kahn et al., 2013; Murray et al., 2009). In order to maximize ART adherence, providers should routinely assess their patients' concerns around adherence, and provide appropriate counseling and support to address these concerns (Simoni, Amico, Smith, & Nelson, 2010).

HPTN 052 participants maintained nearly perfect adherence (and viral load suppression) through frequent study visits and direct measurement of blood plasma viral load. While this approach is unlikely to be replicated in program settings, the exceptional adherence observed in this study suggests that "altruistic adherence" by an HIV-positive partner wanting to protect their uninfected partner from HIV may be an important factor to consider when designing adherence counseling messages for serodiscordant couples.

Ensuring that PLHIV remain in HIV clinical care after an HIV diagnosis has proven challenging with approximately half of PLHIV dropping out of care before initiating ART (Larson et al., 2010; Rosen & Fox, 2011). The effect of initiating ART at higher CD4 counts on retention in care is unknown. However, preliminary findings indicate that early ART initiation may be associated with improved retention in care (Mosssdorf et al., 2011; Franke et al., 2011). While the mechanism behind this association is unclear, HIV-positive individuals may be more likely to remain in care, if they perceive that ART has both health and prevention benefits. Further research on how to retain patients in care is needed.

Ongoing risk reduction counseling including condom distribution

Risk reduction counseling is an effective strategy for reducing HIV risk behavior (Allen et al., 2003; Crepez et al., 2006; Kennedy, Medley, Sweat, & O'Reilly, 2010). HPTN 052 and other recent studies of discordant couples (Cohen et al., 2011; Donnell et al., 2010; Dunkle et al., 2008) have demonstrated that counseling and condom use can reduce HIV transmission risk even before the benefits of ART are realized. The incidence of HIV transmission in control groups (where the HIV-positive partner was not receiving ART) was reduced to less than 2 events/ 100py (Cohen et al., 2011; Donnell et al., 2010). However, the risk of virologically unlinked HIV acquisition from an external relationship remained substantial (~20–27% of HIV transmission events) even in randomized controlled trials, where participants received intensive risk reduction counseling and condoms at every follow-up visit (Cohen et al., 2011; Donnell et al., 2010). The persistent risk of HIV acquisition from outside relationships demonstrates the failure of current HIV prevention interventions at creating sustained behavior change among some individuals. Developing more effective prevention strategies to reduce concurrent sexual risk behaviors and increase

condom use with all types of sex partners (Agha, 2012; Chemaitelly & Abu-Raddad, 2013; Reynolds, Luseno, & Speizer, 2013) is urgently needed.

Sexual risk reduction counseling (while clearly imperfect) remains an important intervention to equip couples with the knowledge and skills necessary to reduce the risk of HIV transmission, both within the couple and to outside partners. Sexual risk reduction should include messages on partner reduction, mutual monogamy to a partner of known HIV status, and consistent condom use at every sexual encounter; a condom demonstration, if needed; and condom distribution (PEPFAR, 2011; WHO, 2008). Alcohol reduction counseling should also be routinely offered to couples as alcohol use is associated with HIV risk behavior (Fisher, Bang, & Kapiga, 2007; Shuper, Joharchi, Irving, & Rehm, 2009), reduced adherence to ARVs (Palepu, Horton, Tibbetts, Meli, & Samet, 2004), and poorer health outcomes (Baum et al., 2010; Ghebremichael et al., 2009). All couples should be offered risk reduction counseling and condom distribution even if the HIV-positive partner(s) is receiving ART (PEPFAR, 2011; WHO, 2012a).

Prevention of mother-to-child HIV transmission (PMTCT)

Ensuring that all HIV-positive pregnant women and their male partners are linked to PMTCT interventions can significantly reduce or eliminate new pediatric infections and improve the health and care-giving ability of WLHIV and their families. WHO guidelines on PMTCT and infant feeding recommend: prioritizing eligible pregnant women for ART initiation; starting ART or ARV prophylaxis for those not yet eligible for treatment (i.e., CD4 counts >350 cells/mm³) during the 2nd trimester; and extending ARV prophylaxis to mothers or infants throughout the breastfeeding period (WHO, 2010c, 2010d). Full implementation of these guidelines can reduce the rate of vertical transmission to less than 5% even in breastfeeding populations (WHO, 2010c). This has led to the global goal of eliminating MTCT by 2015, defined as reducing new pediatric infections by 90% and reducing MTCT rates to $<5\%$ (Joint United Nations Programme on HIV/AIDS [UNAIDS], 2011). Reaching this goal has proved challenging, however, with only 48% of pregnant women receiving the most effective PMTCT regimens (WHO, UNICEF, & UNAIDS, 2011). A new WHO programmatic update on PMTCT options describes the advantages of moving toward either triple ARV prophylaxis, or the newly proposed “Option B + ” of initiating all WLHIV on lifelong ART upon diagnosis (WHO, 2012b). An important rationale for this updated guidance was the added benefit of preventing HIV transmission in serodiscordant couples and partnerships in addition to the reduced rates of vertical transmission associated with earlier ART initiation.

Integrating male partner testing and couples HIV testing and counseling (CHTC) into antenatal services is an effective strategy for increasing women’s uptake and adherence to PMTCT interventions and for improving infant outcomes (Aluisio et al., 2010; Becker, Mlay, Schwandt, & Lyamuya, 2010; Farquhar et al., 2004). Simply put, women are more able to adhere to PMTCT regimens when their male partners are aware of their HIV status and supportive of their attendance in HIV care (Medley et al., 2004). HTC in antenatal settings is already at a high level, and programs are now beginning to implement CHTC services. While some PMTCT programs have experienced challenges in scaling up male

partner testing, uptake of CHTC has been high in programs that have prioritized scale-up of CHTC services in a comprehensive manner. In Rwanda, for example, the percent of pregnant women testing with their male partner increased from 13% in 2003 to 84% by 2010 following implementation of a multi-component approach that included community education, performance contracts between the President of the Republic and local officials, performance-based financing for clinic staff, and weekend CHTC services (Republic of Rwanda Ministry of Health, 2011).

Family planning and safer conception/pregnancy counseling

Safer conception and pregnancy counseling should be offered to couples who desire a pregnancy, as evidence indicates that both pregnant women (Moodley, Esterhuizen, Pather, Chetty, & Ngaleka, 2009) and their male partners are at increased risk for acquiring HIV during pregnancy (Mugo et al., 2011). Safer conception counseling should not end with the pregnancy itself and should include consideration of the couple's HIV status. HIV-negative pregnant women should understand the increased risk of MTCT associated with acquiring HIV during pregnancy (Gay et al., 2010; Pilcher et al., 2001; Tuomala et al., 2003). HIV-positive women should be assessed for whether they are healthy enough for pregnancy, and whether their ART regimens, if applicable, are safe and effective during pregnancy.

For couples who do not desire children, prevention of unintended pregnancy among WLHIV is an important, yet under-utilized PMTCT strategy. Many women in sub-Saharan Africa, both HIV positive and negative, report an unmet need for contraception (Homsy et al., 2009). Providing family planning counseling and services for couples can reduce the number of unintended pregnancies, and ultimately, the number of pediatric infections (Wilcher & Cates, 2009). While some observational studies have found that women using progestin-only injectable contraception may be at increased risk of HIV acquisition (Baeten et al., 2007; Heffron et al., 2012; Morrison et al., 2010), other studies have not found this association (Kiddugavu et al., 2003; Kleinschmidt et al., 2007; Myer, Denny, Wright, & Kuhn, 2007; Reid et al., 2010). In contrast, the morbidity and mortality risks associated with unwanted pregnancy and child-bearing among women, regardless of their HIV status, are substantial and have been clearly demonstrated (Rodriguez, Reeves, & Caughey, 2012). These findings emphasize the importance of ensuring that women continue to have reliable access to contraception. As a result, the WHO recommends that HIV-negative women at high risk for HIV acquisition, including those in serodiscordant couples, be strongly advised to consistently use condoms and other HIV preventive measures to reduce their risk of acquiring HIV, in addition to using a progestin-only injectable to prevent pregnancy (WHO, 2012c).

Anti-retroviral treatment for pre-exposure prophylaxis (PrEP)

Pre-exposure prophylaxis (PrEP), ART given to the HIV-negative partner prior to HIV exposure, may reduce HIV acquisition risk (Baeten et al., 2012; Celum and Baeten, 2012). However, concerns have been raised around the feasibility of PrEP as an HIV prevention strategy including poor adherence among some uninfected individuals to drugs (Dimitrov, Masse, Holte, & Brown, 2012; Van Damme, et al., 2012), a possible increase in sexual risk

behaviors (especially with casual partners) if individuals no longer feel at risk for HIV acquisition, and the potential spread of antiretroviral drug resistance due to incomplete adherence (Van Damme et al., 2012). PrEP, both using topical and oral agents, remains the subject of several ongoing clinical trials that should help clarify the efficacy of the intervention and offer more clues about utility (Cohen, Muessig, Smith, Powers, & Kashuba, 2012). In addition, the WHO has released guidance on the use of PrEP among serodiscordant couples and other groups at high risk of acquiring HIV (WHO, 2012d). This guidance is meant to encourage countries to undertake demonstration projects to determine the safety, effectiveness, and sustainability of daily oral PrEP in non-research settings (WHO, 2012d).

Voluntary medical male circumcision (VMMC) for HIV-negative male partners in serodiscordant relationships

VMMC has been shown to reduce HIV acquisition risk by 60% (Siegfried, Muller, Deeks, & Volmink, 2009), and has been recommended by a number of international organizations as a key HIV prevention strategy in generalized epidemics (PEPFAR, 2011; WHO, 2012a). Population-based data from South Africa have confirmed lower HIV prevalence and incidence (55% and 65% lower, respectively) among circumcised men compared to uncircumcised men (Auvert et al., 2011). VMMC is an exceptional HIV prevention method, in that it offers lifelong partial protection against female-to-male sexual transmission of HIV and other STIs. VMMC also provides an opportunity to reach men and boys with HTC services including CHTC. Fourteen countries in sub-Saharan Africa have now been prioritized for scaling up of VMMC services due to high HIV prevalence and low prevalence of male circumcision (World Health Organization [WHO] & Joint United Nations Programme on HIV/AIDS [UNAIDS], 2011). To date, more than two million males have received VMMC in these priority countries (PEPFAR, 2012). To help increase coverage of VMMC, WHO recommends that all HIV-negative men in serodiscordant or concordant negative couples be routinely counseled about and linked to VMMC services (WHO, 2012a; World Health Organization [WHO] & Joint United Nations Programme on HIV/ AIDS [UNAIDS], 2008).

Screening and treatment for other sexually transmitted infections (STIs), as indicated

Assessment and treatment of other STIs is important for both patient care and prevention. Some STIs may be more complicated and difficult to treat in PLHIV and STI symptoms are often more severe in immune-compromised individuals (WHO, 2003). An STI infection can also serve as a marker for unprotected sex. Couples who present with an incident STI should be targeted for intensive risk reduction counseling. Both members of the couple should be assessed and treated for the STI to prevent further transmission and re-infection between the couple members (WHO, 2003).

Repeat HTC for HIV-negative individuals annually

HIV-negative partners in serodiscordant couples should be offered HTC annually to assess whether HIV transmission has been successfully prevented (WHO, 2012a, 2010e). Concordant negative couples in high prevalence settings, or who are at high risk for HIV infection (i.e., couples with outside partners) should also be offered HIV testing annually. Individuals or couples who seroconvert should be linked to appropriate prevention, care, and treatment services.

Conclusion

HIV prevention, care and treatment services have traditionally been focused on individuals. To maximize the benefits of these services, a paradigm shift away from individually-focused services and toward couples-focused services is now critically needed. Expanding partner/couples HTC services in both facility and community settings can significantly increase the number of couples, where the status of both partners is known. Couples can then be linked to appropriate prevention, care, and treatment services based on the knowledge of their serostatus as described in Table 1.

The HPTN 052 data provide important evidence to inform the ongoing debate of whether to initiate ART earlier to maximize the prevention benefits associated with treatment. In generalized epidemics with a high frequency of serodiscordant couples in stable relationships, prioritization for early ART should be given to PLHIV in serodiscordant relationships. In addition to early treatment, other interventions for couples described in this commentary should be implemented as part of routine practice and incorporated into national guidelines. These include adherence counseling and support, risk reduction counseling, and condom distribution, family planning counseling and services, STI assessment and treatment, and linkage to other HIV prevention services as appropriate (i.e., PMTCT, VMMC, and repeat testing for HIV-negative partners).

Engagement and enrollment of male partners remains a challenge in scaling up couples-based services as men are less likely than women to test for HIV (Peltzer, Matseke, Mzolo, & Majaja, 2009; Venkatesh et al., 2011; Ziraba et al., 2011), to enroll in HIV clinical care (Cornell, Myer, Kaplan, Bekker, & Wood, 2009; Parrott et al., 2011), to initiate ART (Braitstein et al., 2008; Keiser et al., 2008), and to be retained in HIV clinical care (Zachariah et al., 2011). In order to bring interventions targeting couples to scale, efforts to increase the number of men who know their HIV status and are linked to and retained in HIV services are clearly needed. Reluctance to encourage couples interventions has in part been due to fears about IPV. While high levels of IPV are reported in many communities, the association with HIV testing and disclosure is unclear (WHO, 2004). Health workers should be aware of IPV and should be trained how to screen for, address, and make appropriate referrals to community-based IPV support services as needed (WHO, 2004, 2012a).

In summary, current HIV prevention efforts have largely been unsuccessful at curbing the HIV epidemic. Highly effective interventions have now been identified that can significantly

reduce HIV incidence within couples, and if implemented in sufficient scale and coverage, potentially reduce population-level HIV incidence. For the first time since the onset of the global HIV epidemic, we now have the tools to meaningfully impact HIV incidence. The time has come to implement and scale up what we know works for HIV prevention including the interventions described in this article.

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Table 1

List of interventions and their associated benefits according to couple's HIV serostatus.

Couple's HIV status	Possible services/interventions	Potential benefits
M + /F +	<ul style="list-style-type: none"> • Efficient "case finding" through partner/ couple testing • Anti-retroviral treatment provision and adherence counseling • Risk reduction counseling • PMTCT services • Family planning services • STI screening and treatment 	<ul style="list-style-type: none"> ➤ Earlier ART initiation ➤ Increased HIV prevention with other sexual partners ➤ Increased uptake and adherence to FP, PMTCT, ART ➤ Increased psychosocial support ➤ Decreased rate of unplanned pregnancy ➤ Decreased risk of mother-to-child HIV transmission
M/F	<ul style="list-style-type: none"> • Risk reduction counseling and condom distribution • Voluntary medical male circumcision • STI screening and treatment • Family planning services • Repeat HIV-testing for couples at high risk 	<ul style="list-style-type: none"> ➤ Decreased risk of acquiring HIV from other sexual partners ➤ Decreased rate of unplanned pregnancy ➤ Increased emotional support
M + /F	<ul style="list-style-type: none"> • Efficient "case finding" through partner/couple testing • Earlier ART (ART for prevention) • Adherence counseling and support • Pre-conception counseling with ART/PreP for prevention • Risk reduction counseling and condom distribution • STI screening and treatment • Family planning services • Repeat HIV-testing for HIV-negative member 	<ul style="list-style-type: none"> ➤ Decreased transmission within current relationship and with other sexual partners ➤ Safer conception ➤ Increased psychosocial support ➤ Increased uptake and adherence to FP, ART ➤ Decreased rate of unplanned pregnancy
M/F +	<ul style="list-style-type: none"> • Efficient "case finding" through partner/ couple testing • Earlier ART (ART for prevention) • Pre-conception counseling with ART/PreP for prevention • Risk reduction counseling and condom distribution • STI screening and treatment • PMTCT services • Family planning services • Repeat HIV-testing for HIV-negative member • Voluntary medical male circumcision 	<ul style="list-style-type: none"> ➤ Decreased transmission within current relationship and with other sexual partners ➤ Safer conception ➤ Increased psychosocial support ➤ Increased uptake and adherence to FP, ART, PMTCT ➤ Decreased rate of unplanned pregnancy ➤ Decreased risk of mother-to-child HIV transmission