Abstract Access to reproductive health services for women with HIV is critical to ensuring their reproductive needs are addressed and their reproductive rights are protected. In addition, preventing unintended pregnancies in women with HIV is an essential component of a comprehensive prevention of mother-to-child transmission (PMTCT) programme. As a result, a call for stronger linkages between sexual and reproductive health and HIV policies, programmes and services has been issued by several international organizations. However, implementers of PMTCT and other HIV programmes have been constrained in translating these goals into practice. The obstacles include: (i) the narrow focus of current PMTCT programmes on treating HIV-positive women who are already pregnant; (ii) separate, parallel funding mechanisms for sexual and reproductive health and HIV programmes; (iii) political resistance from major HIV funders and policy-makers to include sexual and reproductive health as an important HIV programme component; and (iv) gaps in the evidence base regarding effective approaches for integrating sexual and reproductive health and HIV services.

However, we now have a new opportunity to address these essential linkages. More supportive political views in the United States of America and the emergence of health systems strengthening as a priority global health initiative provide important springboards for advancing the agenda on linkages between sexual and reproductive health and HIV. By tapping into these platforms for advocating and by continuing to invest in research to identify integrated service delivery best practices, we have an opportunity to strengthen ties between the two synergistic fields.

Introduction Effective linkages between the sexual and reproductive health and the HIV fields are essential to ensuring the reproductive rights of people living with HIV. All women, including those with HIV, have the right “to decide freely and responsibly on the number and spacing of their children and to have access to the information, education and means to enable them to exercise these rights”. The sexual and reproductive decisions faced by women with HIV involve their desire for pregnancy, their contraceptive practices, their choices about an unintended pregnancy, and their prenatal and postnatal options to reduce perinatal transmission of HIV (Fig. 1).

For women with HIV, linkages between the sexual and reproductive health and HIV fields can maximize the opportunities to address four distinct reproductive possibilities: (i) if a woman does not wish to become pregnant, she should be referred to or offered family planning services; (ii) if she wishes to become pregnant, she should be educated about the local infertility and prenatal services, the types of chemoprophylaxis available to reduce the risk of transmission to her child and, if in a sero-discordant relationship, HIV prevention approaches to minimize the risk of infection transmission to a partner when trying to conceive; (iii) if she is currently pregnant and wishes to continue her pregnancy, she should be offered the opportunity to obtain antiretroviral therapy to reduce HIV transmission risks; and (iv) if she is currently pregnant but does not wish to continue her pregnancy, she should be referred to safe abortion services. Postpartum contraception could be offered as an option for those who do not wish to become pregnant again.

Regardless of HIV status, increasing access to sexual and reproductive health services will not only offer women more control over their reproductive lives and help them safely achieve their desired fertility, but also will produce major public health benefits on maternal and infant morbidity and mortality. Voluntary contraceptive services, in particular, will benefit the health of women and infants in a variety of ways by delaying first births, lengthening birth intervals, reducing the total number of children born to one woman, preventing high-risk and unintended pregnancies, and reducing the need for unsafe abortion.

For those who are living with HIV, linking the sexual and reproductive health and HIV fields further enhances the public health impact by preventing pregnancies in women with HIV who do not wish to become pregnant. This in turn can reduce the number of infants born with HIV and the number of children orphaned due to AIDS. Indeed, prevention of unintended pregnancies in HIV-positive women is one of the four strategic elements recommended by WHO and its United Nations partners for PMTCT (Fig. 2).

Preventing unintended pregnancies

Four different analyses have confirmed the importance to PMTCT efforts of preventing unintended pregnancies in women with HIV. One study showed that moderate decreases in the number of pregnancies to HIV-infected women, ranging from 6% to 35% depending on the country, could result in numbers of averted HIV-positive births equivalent to those averted by antiretrovirals. Another study demonstrated that adding family planning to PMTCT services in high-HIV prevalence countries could avert 71 000 child HIV infections compared with the 39 000 HIV-positive births averted with PMTCT only. A third analysis suggested that current levels...
of contraceptive use in sub-Saharan Africa may already be preventing 22% (or 173,000) of HIV-positive births annually, despite contraception not being widely available in Sub-Saharan Africa. If all women in the region who did not wish to get pregnant accessed contraceptive services, as many as an additional 160,000 HIV-positive births could be averted every year. Finally, a similar analysis done for the focus countries of the President’s Emergency Plan for AIDS Relief (PEPFAR) found that the annual number of unintended HIV-positive births currently prevented through contraceptive use ranges from 178 in Guyana to 120,256 in South Africa.

Contraception is also a cost-effective PMTCT intervention. For the same level of expenditure, increasing contraceptive use through both traditional family planning services and outreach among non-users who do not want to get pregnant averts almost 30% more HIV-positive births than HIV counselling and testing coupled with nevirapine prophylaxis. Moreover, adding family planning to PMTCT services would cut in half the cost of each HIV infection averted – from US$ 1300 per infection averted with treatment alone to an estimated US$ 660 with family planning.

To date, most attention and resources for PMTCT programmes have gone towards implementing element 3 – the provision of antiretroviral prophylaxis to HIV-infected pregnant women. While this intervention represents a major public health achievement, the current impact of PMTCT programmes is limited by their failure to effectively link with sexual and reproductive health services and address the contraceptive needs of women with HIV. Population-based estimates of unintended pregnancies in women with HIV are not available, but selected studies of HIV-infected women suggest alarmingly high levels of unintended pregnancies, ranging from 51% to 91%.

**Missed connections**

Why are PMTCT programmes falling short in making essential connections with sexual and reproductive health policies and programmes? Currently, PMTCT programmes are constrained by four key factors: (i) a focus on women who are HIV-positive and already pregnant; (ii) separate international funding streams for reproductive health and HIV programmes; (iii) political resistance to stronger linkages between reproductive health and HIV policies and services; and (iv) lack of evidence of effective integrated service delivery approaches.

**Thinking outside the box**

The point of entry for most PMTCT programmes is the antenatal care setting. The emphasis is on identifying HIV-infected pregnant women and increasing their access to prophylactic antiretroviral drugs. However, this setting is limited in its reach and its post-facto prevention approach. Only 33% of HIV-positive pregnant women in low- and middle-income countries have access to antiretroviral therapy to prevent vertical transmission. Moreover, antenatal care-based PMTCT services are characterized by a “cascade effect.” At each step in the PMTCT process – from initial contact to HIV pre-test counselling, to HIV testing, to obtaining results, to receiving treatment and more – fewer and fewer clients access services. For HIV-positive women who are served in the antenatal care setting and followed through the postpartum period, a PMTCT programme offers multiple provider contacts, including during antenatal, intrapartum and postpartum care. With the transition into paediatric care and care for the woman, all these contacts are opportunities to present and reinforce messages about contraception for healthy timing and spacing of pregnancies and create linkages to sexual and reproductive health services. While efforts are warranted to strengthen linkages between PMTCT
and reproductive health services as they are currently organized, the impact of those linkages will be mitigated by the overall strength and reach of the base PMTCT programme. Furthermore, they will only help PMTCT clients prevent subsequent unintended pregnancies.

A more effective PMTCT programme would reach women and their partners outside of the antenatal care setting before they become infected (element 1 – prevention of primary HIV infection in women) and, if infected, before they become pregnant (element 2 – prevention of unintended pregnancies in HIV-positive women). Implementing element 2 can be accomplished two ways. One approach is to strengthen vertical family planning services. The other is to integrate family planning services into HIV prevention, care and treatment services. Both approaches, however, are hindered by international funding mechanisms.

**Funding constraints**

Global family planning and HIV/AIDS programmes are funded through separate mechanisms. While resources for HIV/AIDS have dramatically increased in recent years, efforts to strengthen international family planning programmes have been hampered by a decline in funding. In 2008 US$ 3600 million for HIV services went to the 15 PEPFAR focus countries compared to US$ 67.5 million for family planning/reproductive health, a greater than 50-fold difference. This represented a 225% increase for HIV programmes over the 2006 allocated level and an 11% decrease for family planning/reproductive health. In addition, a severe funding shortfall currently exists for the provision of contraceptives and condoms at a global level. Fortunately, funding from the United States of America (USA) for family planning increased in 2009 to US$ 545 million under the new political administration. Still, the gap between the two funding streams remains striking.

At current funding levels, the ability of international family planning programmes to reduce unmet need for contraception, including among women with HIV, is constrained. Moreover, despite unintended pregnancies accounting for 14–58% of all births in countries where the burden of HIV is the greatest, burgeoning resources for HIV/AIDS programmes in those countries are not used to support family planning programmes. These funding limitations minimize the potential for existing family planning programmes to have a greater impact on the prevention of vertical transmission of HIV.

The separate funding streams for reproductive health and HIV/AIDS programmes also pose a key obstacle to efforts to integrate the two service areas, although some progress with respect to resource coordination has been observed. The Global Fund to Fight AIDS, Tuberculosis and Malaria has funded HIV/AIDS proposals with sexual and reproductive health components, and PEPFAR encourages linkages with reproductive health “wrap-around” programmes. However, neither includes contraceptive use as an indicator of programmatic success. Because “what gets measured gets done”, actual implementation of contraceptive services as part of an HIV programme on the ground has not been a priority.

In some countries, the United States Agency for International Development (USAID) has acknowledged the importance of family planning/HIV integration and combined funding into a single health programme, but HIV funds comprise most of the resources and primarily support HIV service delivery. The reproductive health integration efforts are typically relegated to the limited family planning resources. Separate funding streams further hinder opportunities for linkages in recipient countries by cultivating parallel reproductive health and HIV/AIDS departments within ministries of health, which in turn create vertically oriented policies, strategies, training programmes and, ultimately, service delivery systems.

**Political resistance**

Unfortunately, the issue of linkages between sexual and reproductive health and HIV is rooted in ideological debate. During the reauthorization of PEPFAR, some congressional views equated family planning services with abortion, implying that providing contraceptive services to women with HIV who do not want to become pregnant is “anti-life”. As a result, while the current PEPFAR legislation supports integrating HIV activities with a range of services that AIDS-affected families may need, including nutrition, safe water and sanitation, and substance abuse services, it does not include support for linkages with sexual and reproductive health services. The exclusion of sexual and reproductive health linkages by PEPFAR contrasts with other donor countries, such as the United Kingdom, which explicitly encourage proposals that link HIV and reproductive health services. Moreover, it ignores the call for “improving the link between HIV/AIDS activities and sexual and reproductive health and voluntary family planning programmes” issued by world leaders at the Group of Eight (G8) summit in July 2008.

As the single largest funder of global AIDS programmes, the USA’s current PEPFAR legislation poses a challenge both to ensuring that the reproductive health needs and rights of people with HIV are met, and also to enabling HIV prevention programmes to have the greatest possible impact. However, since the legislation passed, a new political administration has been installed in the USA. By rescinding the Mexico City Policy and reinstating funding for the United Nations Population Fund, the new administration has already acted strongly in support of women’s rights and reproductive health. These actions also signal the possibility that current restrictions within PEPFAR to implement sexual and reproductive health activities will be loosened.

**Gaps in the evidence base**

The dearth of evidence-based best practices in this area is still another obstacle to widespread implementation of a comprehensive PMTCT programme that includes efforts to prevent unintended pregnancies in HIV-positive women. A recent systematic review of the literature on linkages between sexual and reproductive health and HIV found that integrating family planning and HIV services was beneficial and feasible. However, few studies included rigorous evaluation designs that allowed for the identification of evidence-based recommendations on how to effectively link sexual and reproductive health and HIV services. Moreover, limited data exist to confirm whether the costs of providing integrated services are equal to or less than the costs of offering those services separately. In the absence of data-driven best practices, the majority of current efforts at linked programming are weak.

A recent study of family planning/HIV integrated service delivery programmes in five countries found that, even in high-performing sites, providers and systems are not prepared to offer in-
Providers at HIV care and treatment sites and HIV counselling and testing sites, in particular, were not adequately trained in family planning, did not use job aids to support counselling on family planning, were not well supervised and had poor knowledge of safe and effective family planning methods for women with HIV. Moreover, clients of these HIV services reported receiving low levels of family planning counselling and referrals to family planning services from providers.19

In a separate study of a family planning/voluntary counselling and testing integration intervention in Kenya, providers’ discussions about fertility desires and contraceptive methods with clients improved, though not significantly. In addition, the intervention did not result in uptake of effective contraception, despite almost one-third of clients being at risk of unintended pregnancy.20

In Uganda, findings from a comprehensive family planning/antiretroviral therapy (ART) integration programme at a pilot site were more encouraging. The programme, which supported supply, demand and advocacy intervention activities, found that the number of ART clients accepting a family planning method increased threefold following the introduction of family planning services in the ART setting.21

Just as with other health services, no “one size fits all” approach to family planning/HIV service integration exists. Reports based on the aforementioned family planning/voluntary counselling and testing and family planning/ART integration experience in Kenya and Uganda, respectively, suggest that different levels of integration may be appropriate for different health care facilities or programmes.21,22

The data suggest that on-site provision of family planning methods may be more conducive to initial contraceptive uptake than referral; however, it may not be feasible for all HIV service delivery settings to make contraceptive methods available on-site.23 For some facilities, it may be a better use of resources to equip HIV providers to screen a client for risk of unintended pregnancy and provide a same-day referral to the family planning clinic for those who want to initiate a method. Different approaches will be required for different facilities or programmes depending on factors such as available resources, staff capacity, facility set-up, strength of the base service and scale of the HIV epidemic.

Efforts to integrate sexual and reproductive health and HIV services will require multiple technical inputs that address needs at different levels, or “building blocks”, of the health system. These include service delivery, health workforce, health information system, medical products and technologies, health financing and leadership/governance.24 For example, a health systems approach to integrating family planning into HIV services would demand consideration of inputs such as: (i) establishing mechanisms to ensure the addition of family planning services does not compromise the quality and coverage of the base HIV service (service delivery); (ii) equipping providers and supervisors with the technical knowledge and skills to address the contraceptive needs of clients with HIV (health workforce); (iii) ensuring a steady supply of contraceptives in the HIV clinic (medical products and technologies); (iv) modifying HIV programme monitoring and information systems to capture routine data on family planning services provided (health information system); (v) advocating for a line item for family planning within the national HIV programme budget (health financing); and (vi) revising relevant policies and guidelines to reflect the role of family planning within HIV service delivery settings (leadership/governance).

Ideally, these inputs will be implemented in the context of a broader, country-driven process to systematically strengthen linkages between the two fields. However, no single country or programme will be able to implement all of the possible interventions at each level and the relative importance of each intervention is not known. Without more definitive best practices for solidifying the linkages between sexual and reproductive health and HIV services, opportunities to address the contraceptive needs of clients with HIV will continue to be missed.

Towards a more comprehensive response

Despite clear evidence of the importance of contraception as an HIV prevention strategy, the prevention of unintended pregnancies in women with HIV continues to be low priority among most HIV prevention interventions. Linkages between sexual and reproductive health and HIV policies and programmes have been impeded by both political resistance and operational challenges. However, targeted advocacy in three key areas could produce substantial progress in breaking down the linkages barriers and tip support in favour of more comprehensive programming.

Engage political will

Greater political will from government leaders and HIV funders to prioritize family planning services must be reflected in both financial and technical commitments. The new political administration in the USA provides an opportunity to move past an ideological debate that hindered efforts to expand access to family planning in recent years. We must use this opportunity to advocate for increased funding for traditional family planning programmes, as well as funding for family planning within HIV programmes. The evidence of the impact and cost-effectiveness of contraception as a PMTCT intervention should be enough to warrant increases in funding for family planning programmes in high HIV prevalence countries. We hope donors and policy-makers will be motivated to use PEPFAR and other HIV funds for family planning activities within HIV programmes.

We also must continue to advocate for policy-makers and donors to embrace family planning as a core technical component of the HIV prevention, care and treatment services they fund. A PEPFAR-funded programme in Viet Nam, recently publicized by USAID as a success story, is working to expand access to comprehensive, family-centred HIV/AIDS care—including nutrition, HIV treatment, HIV prevention, care for opportunistic infections and palliative care—so that families can receive coordinated medical services “in the same facility, at the same time and by the same staff”. Family planning services should be an integral part of this package of care. Adding voluntary family planning services to family-centred care would represent an important step towards stronger linkages between sexual and reproductive health and HIV services, would protect the reproductive health and rights of HIV-positive clients and would enhance the HIV-prevention impact of the programme by preventing unintended pregnancies among its clients. All of these benefits are sound reasons to...
advocate for the allocation of PEPFAR resources for family planning activities, as well as for making family planning a core component of guidelines for programmes reaching people living with HIV.

Position as health systems strengthening

The emergence of health systems strengthening as a priority global health initiative is a prime opportunity for advancing the agenda on sexual and reproductive health and HIV linkages. International consensus exists that progress on all health-related Millennium Development Goals will depend on the strengthening of health systems, and the influx of HIV/AIDS funding has required greater attention to health systems constraints to establishing and scaling up HIV services.24 As a result, many HIV donors, including The Global Fund, are committed to providing funding for health systems strengthening activities.26 Effectively integrating vertical programmes into a comprehensive approach is central to the concept of health systems strengthening. Therefore, advocating for services that address the comprehensive sexual, reproductive and HIV-related needs of individuals in the context of health systems strengthening may provide much needed traction for better sexual and reproductive health and HIV linkages. Moreover, the WHO’s six building blocks of a health system provide a useful framework for a more systematic approach to strengthening linkages between sexual and reproductive health and HIV.

Investments in health systems strengthening to ensure that health workers, medicines, supplies, equipment and well-functioning facilities are in place over the long-term will naturally result in stronger linkages between sexual and reproductive health and HIV services. A recent study in Rwanda showed that adding basic HIV services funded by PEPFAR to primary health centres contributed to an increase in use of reproductive health and other services in those facilities.27 However, as HIV donors fund initiatives to improve the underlying health systems, we must advocate not only that better sexual and reproductive health are among the health outcomes they aim to achieve with these investments, but also that the sexual and reproductive health outcomes are effectively measured.

Promote evaluation

What gets measured gets done. We must continue to advocate for investments in programme evaluation and operations research to identify best practices of linkages between sexual and reproductive health and HIV, and demonstrate their cost-effectiveness. Applying strong monitoring and evaluation components to high quality, replicable and scalable integrated services are needed to facilitate better documentation of current efforts. In addition, operations research to test the impact of integration efforts on outcomes such as contraceptive uptake, prevention of unintended pregnancies and HIV-positive births averted are greatly needed to contribute to the evidence base on linkages between sexual and reproductive health and HIV. However, generating this evidence also requires improvements in the programmes that are being evaluated. More systematic approaches to linkages between sexual and reproductive health and HIV that address the six building blocks of the health system are needed to enhance the likelihood of programmatic success.

Prior to pursuing integration of sexual and reproductive health and HIV, national ministry of health officials should consider which specific sexual and reproductive health and HIV services should be integrated given their particular country context, the extent to which they should be integrated at the facility and/or community level, and the priority action steps and interventions that are needed within the health system to achieve the desired type of integration. Stronger evidence of strategically implemented integrated service delivery approaches and the resource requirements to achieve them, in turn, will serve to improve existing programmes, inform scale-up and bolster advocacy efforts among policy-makers and donors.

Conclusion

From both a human rights and a public health perspective, the call for stronger linkages between the sexual and reproductive health and HIV fields is well-founded. All women, regardless of HIV status, have a right to make informed reproductive choices. However, because infected women may be more vulnerable to rights abuses than uninfected individuals, sexual and reproductive health and HIV linkages at policy, programme and service delivery levels are especially important to ensure their sexual and reproductive needs are met. Such linkages will also produce important gains against the HIV epidemic by ensuring women with HIV who do not wish to become pregnant have access to contraception. Preventing unintended pregnancies in women with HIV will not only improve maternal and child health but also prevent new HIV infections in infants.

Unfortunately, despite consensus that preventing unintended pregnancies in HIV-positive women is critical to achieving PMTCT goals, HIV programmes are falling short in making essential sexual and reproductive health linkages. HIV funders and policy-makers must overcome the obstacles rooted in parallel funding systems and embrace sexual and reproductive health programmes, and contraceptive services in particular, as central to HIV prevention efforts. Vertical family planning programmes and initiatives to integrate family planning services into HIV care and treatment programmes must be prioritized as key strategies for strengthening PMTCT efforts.

Acknowledgements

The authors thank Tricia Petruney for helping in the early draft of this manuscript.

Funding: Support for this manuscript was provided by Family Health International (FHI) with funds from the United States Agency for International Development (USAID), Cooperative Agreement Number GPO-A-00-05-00022-00.

Competing interests: None declared.
Options à la disposition des femmes vivant avec le VIH dans le domaine de la reproduction

Pour que les besoins sur le plan de la reproduction des femmes vivant avec le VIH soient satisfaits et que leurs droits dans ce domaine soient protégés, il est essentiel que ces femmes aient accès aux services de santé génésique. En outre, prévenir les grossesses non désirées chez les femmes infectées par le VIH est une composante très importante du programme complet de prévention de la transmission de la mère à l’enfant (PTME). En conséquence, plusieurs organisations internationales ont appelé à renforcer les liens entre la santé sexuelle et génésique (SRH) et les politiques, les programmes et les services de lutte contre le VIH. Néanmoins, les personnes chargées de mettre en œuvre les programmes de PTME et autres programmes contre le VIH se sont heurtées à des obstacles dans la réalisation de ces objectifs. Parmi ces obstacles figurent : (i) la focalisation étroite des programmes de PTME actuels sur le traitement des femmes séropositives pour le VIH déjà enceintes ; (ii) l’existence de mécanismes séparés et parallèles pour le financement des programmes en faveur de la SRH et de ceux contre le VIH ; (iii) la résistance politique des principaux financeurs et décideurs politiques dans le domaine du VIH/sida à l’intégration de la SRH comme composante importante dans les programmes contre le VIH ; et (iv) les lacunes des bases d’éléments factuels relatives aux approches efficaces pour l’intégration des services de SRH et des services liés au VIH.

Cependant, une nouvelle opportunité s’offre à nous maintenant de prendre en compte ces liens essentiels. Les points de vue politiques plus favorables qui s’expriment aux États-Unis d’Amérique et l’élèvement du renforcement des systèmes de santé au rang d’initiative prioritaire pour la santé mondiale fournissent un tremplin pour faire avancer les actions visant l’établissement de liens entre SRH et lutte contre le VIH. En utilisant ces bases pour plaider en faveur de tels liens et en continuant à investir dans la recherche pour identifier les meilleures pratiques intégrées de prestation de services, il sera possible de renforcer les liens synergiques entre ces deux champs d’activité.

Resumen

Opciones reproductivas para las mujeres con VIH

El acceso a los servicios de salud reproductiva por parte de las mujeres con VIH es fundamental si se quiere atender sus necesidades y proteger sus derechos en materia de reproducción. Además, la prevención de los embarazos involuntarios en las mujeres con VIH es un componente esencial de cualquier programa integral de prevención de la transmisión del virus de la madre al niño (PTMN). Como consecuencia de ello, varias organizaciones internacionales han exhortado a reforzar los vínculos entre los programas, políticas y servicios de salud sexual y reproductiva y los centrados en el VIH. Sin embargo, los responsables de la aplicación de los programas de PTMN y de otro tipo contra el VIH han tropezado con dificultades a la hora de traducir esos objetivos en medidas prácticas. Entre esas dificultades cabe citar: (i) la tendencia de los actuales programas de PTMN a limitarse al tratamiento de las mujeres VIH-positivas que ya están embarazadas; (ii) los mecanismos de financiación paralelos e independientes de los programas de salud sexual y reproductiva y los programas de salud sexual y reproductiva contra el VIH; (iii) la resistencia política de los principales agentes de financiación e instancias decisorias contra el VIH a incluir la salud sexual y reproductiva como un componente importante de los programas contra el VIH; y (iv) las lagunas que presenta la evidencia sobre las tácticas más eficaces para integrar los servicios de salud sexual y reproductiva y los de VIH.

Sin embargo, se nos presenta ahora una nueva oportunidad de abordar esos vínculos imprescindibles. El más favorable clima político reina en los Estados Unidos y la emergencia del fortalecimiento de los sistemas de salud como una iniciativa de salud mundial prioritaría brindar una sólida plataforma para impulsar la agenda sobre los vínculos entre la salud sexual y reproductiva y el VIH. Si se aprovecha dicha plataforma para resaltar la importancia de esa cuestión y se sigue invirtiendo en investigaciones encaminadas a identificar las mejores prácticas de prestación integrada de servicios, tenemos la oportunidad de fortalecer los vínculos entre esos dos campos sinérgicos.
References


22. Fischer S. Integrating family planning into HIV voluntary counseling and testing services in Kenya: progress to date and lessons learned. Research Triangle Park, NC: Family Health International; 2006. Available from: http://www.fhi.org/NR/rdonlyres/e5c5f44af17f22557d29e296d41f29e0/49295/259269fa15f39f3a3ba7776e0f4930b2/52085945d63209e7060c5b.pdf [accessed on 3 September 2009].


