HIV/AIDS Programme

HIV PREVENTION IN GENERALISED EPIDEMICS: OPTIMAL INTERVENTIONS FOR GLOBAL FUND APPLICATIONS

Recommendations for a public health approach

2011

World Health Organization

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CONTENTS

ACRONYMS AND ABBREVIATIONS

AIDS	Acquired immunodeficiency syndrome
ARV	Antiretroviral
ART	Antiretroviral therapy
CBO	Community based organizations
CITC	Client initiated testing and counselling
CTHC	Couples HIV testing and counselling
GNP+	Global network of people living with HIV
HIV	Human immunodeficiency virus
HTC	HIV testing and counselling
IDU	Injecting drug user
MARP	Most-at-risk population
M&E	Monitoring and evaluation
MSM	Men who have sex with men
MNCH	Maternal, newborn and child health
NGOs	Non governmental organizations
PE	Peer education
PEP	Post-exposure prophylaxis
PICT	Provider- initiated testing and counselling
PLHIV	People living with HIV/AIDS
PMTCT	Prevention of mother-to-child transmission (of HIV)
RCT	Randomized controlled trial
STI	Sexually transmitted infection
SW	Sex worker
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNGASS	United Nations General Assembly Special Session
UNICEF	United Nations Children's Fund
UNODC	United Nations Office on Drugs and Crime
VCT	Voluntary counselling and testing
WHO	World Health Organization

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INTRODUCTION

This document is designed to help countries with generalized epidemics to be more strategic and focused in the development of national HIV prevention plans. It aims to assist with the first step in developing a prevention plan for a country, for example when planning a National Strategy Application (NSA) within the framework of a country's national HIV/AIDS strategy.

The document prioritizes approaches that are evidence-based, inline with the investment framework[1], appropriate, and meet the needs of the general population as well as being relevant for most-at-risk groups. Although prevention of mother-to-child transmission (PMTCT), because this area is addressed in other documents, is not covered in this document it has become increasingly clear that if we are to succeed at elimination of mother-to-child transmission, we need to achieve success globally and at country level in reducing the number of new HIV infections in women and adolescents and the number of HIV-infected pregnant women.

Box 1. Modes of HIV transmission

- The predominant route of transmission globally is through heterosexual intercourse. However, there are significant HIV epidemics among injecting drug users and men who have sex with men and transgender people in many countries.
- HIV is also transmitted through blood, blood products and donated organs or semen. Blood-borne transmission occurs primarily through the use of inadequately sterilized needles, syringes or other skin-piercing instruments and through the transfusion of infected blood.
- HIV may be transmitted from an infected mother to her infant during pregnancy, delivery or when breastfeeding

In generalized epidemics, HIV is firmly established in the general population. Although sub-populations at high risk may contribute disproportionately to the spread of HIV, sexual networking in the general population is sufficient to sustain an epidemic independent of sub-populations at higher risk of infection. This means that a national response needs to address transmission within and from most-at-risk populations (MARPS) in addition to general prevention interventions for the population at large.

1 Bernhard Schwartländer, John Stover, Timothy Hallett, Rifat Atun, Carlos Avila, Eleanor Gouws, Michael Bartos, Peter D Ghys, Marjorie Opuni, David Barr, Ramzi Alsallaq, Lori Bollinger, Marcelo de Freitas, Geoffrey Garnett, Charles Holmes, Ken Legins, Yogan Pillay, Anderson Eduardo Stanciole, Craig McClure, Gottfried Hirnschall, Marie Laga, Nancy Padian, on behalf of the Investment Framework Study Group*Towards an improved investment approach for an effective response to HIV/AIDS www.thelancet.com Published online June 3, 2011 DOI:10.1016/S0140-6736(11)60702-2

Countries with generalized epidemics are defined as those where HIV prevalence is consistently over 1% in pregnant women [UNAIDS, WHO].

Understanding the characteristics of the epidemic

The selection of HIV prevention interventions and target populations needs to be based on a clear understanding of the epidemiology of HIV in the country—who is being infected, where, how and why—together with a detailed understanding of the most appropriate mix of interventions for the particular setting. To successfully limit transmission, effective prevention services must reach areas and populations where HIV is spreading most rapidly, and the interventions must be of sufficient scale and intensity to achieve an effective and measurable impact.

Many countries with generalized epidemics have in fact *"mixed epidemics"* with significant variations within countries, with differing HIV prevalence rates and different populations who are most-at-risk, so it will often be most appropriate to design and develop a programme which takes into account intra-country variation rather than one uniform country programme.

For each country, the characteristics of its epidemic in the various regions/ districts need to be considered. Successful tailoring requires taking context into consideration by assessing:

- Existing effective (in terms of cost, impact, acceptability, coverage) prevention programmes
- Health system issues, for example who are the service providers, coverage and reach, quality, acceptability, how are they financed, how men and women access services, etc.
- Community provider issues, for example who are the service providers, coverage and reach, quality, acceptability, how are they financed, etc.
- Cultural traditions and practices
- Social attitudes, including gender and stigma and discrimination issues
- Relevant most-at-risk populations
- Political leadership and will, governance
- Legal/policy issues
- Health system requirements for additional staff, facilities, equipment and supplies
- Costs and available sources of financing.

1. THE PROCESS: KEY ACTION FOR EFFECTIVE HIV PREVENTION

Once the national epidemic's typology and context are understood this will guide the selection and prioritization of interventions and appropriate service delivery approaches, according to the following key principles, as outlined in Figure 1.

Figure 1. Key action for effective HIV prevention

1.1 Conduct situation analysis

No single prevention approach alone will be effective and relevant to all populations across a country. Age and sex disaggregated strategic information – from surveillance, research, and existing monitoring and evaluation reports – should be used to guide prevention programme planning and development. Carefully selected data should be used to identify populations and settings where the majority of HIV transmission occurs, to monitor trends and quantify their specific contribution to the epidemic in the country or region/district with the

country. If possible, data from additional sources to estimate HIV incidence in key groups should be collected and analysed in order to continually update HIV prevention planning and to keep it aligned with the current epidemic.

Identifying populations with high rates of HIV transmission

Although in generalized epidemics the focus on comprehensive prevention programmes will be on the general population, an effective national response will need to identify and provide prevention services for those populations most vulnerable and where HIV is spreading most rapidly. These populations (e.g. sex workers and their clients, people who inject drugs, men who have sex with men, incarcerated people, and, in some settings, young women) can be identified through 'second generation surveillance' (which include HIV testing and other biomarkers) including national and sub-national surveys, rapid assessments, estimations of population sizes *(1)* and consultation with affected populations. It is important however to examine data on most-at-risk populations critically, especially in countries where specific populations are criminalized and discriminated against, as this may result in unrealistically low population estimates *(2, 3, 4, 5).*

Geographic differences in prevalence

Within countries, HIV prevalence can be higher in urban than in rural areas and may vary from district to district. In particular in large countries, the analysis of subnational surveillance data remains important for planning.

Modelling

A simple mathematical model was developed by the UNAIDS Reference Group for Estimates, Modelling and Projections to help countries estimate the proportion of new infections that occur through key transmission modes including sex work, intravenous drug use, men who have sex with men (MSM), multiple heterosexual partnerships, stable (discordant) relationships and medical interventions, using basic epidemiological and behavioural data as input. This can be used to help plan HIV prevention programmes *(6).*

1.2 Determine critical enablers

Understanding and focusing on the following areas will help to create the most conducive environment for an effective prevention programme. These critical enablers can also facilitate the selection of the most appropriate mix of individual interventions, ensuring maximum impact.

Addressing the drivers of the HIV epidemic

Interventions to reduce behaviours that put people at direct risk of HIV infection, for example unprotected sex and use of non-sterile injecting equipment, should be combined with appropriate efforts to define and lessen drivers of the epidemic, such as **stigma** and **discrimination, poverty, gender inequality** and **human rights violations.** Failure to identify and address the drivers of the epidemic can undermine the use of prevention services and result in lost opportunities to prevent new HIV infections.

Social interventions which address socio-cultural and economic practices that contribute to unsafe sex can be considered including:

- Review and amend **legislation and policies** that create or enforce barriers to HIV prevention.
- Support campaigns, incentives and laws to discourage or prevent **child marriages, sexual coercion, and gender-based violence**.
- Modify **laws and policies that prevent migrant workers** from having regular contact with partners.
- Provide curriculum-based **sex/sexuality education**, to children and adolescents through the school and community-based organizations and to teachers through teacher education curricula.

Leadership

Successful HIV prevention programmes require strong leadership. Training and support may be needed for leaders (e.g. from the political sector and from within networks of people living with HIV, vulnerable communities, the private sector, faith-based organizations and associations of traditional healers) on the importance of HIV prevention programmes and to address HIV-related stigma and discrimination.

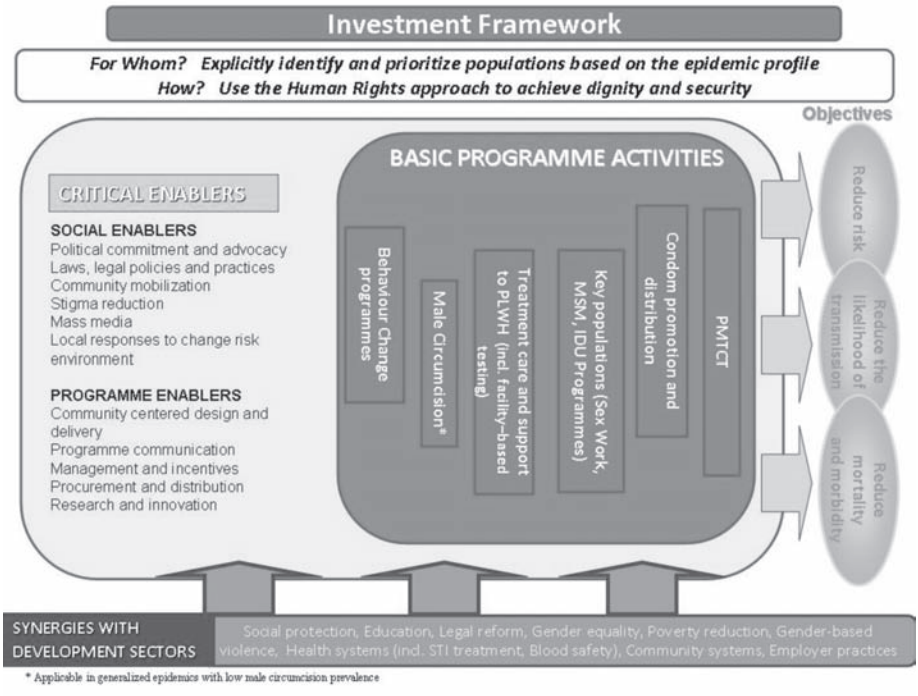
HIV awareness through effective public information, education and mass communication

Individual and community awareness about HIV is not sufficient to produce changes in behaviour to prevent HIV transmission *(7).* However it is a critical enabler, allowing people and communities to have a full understanding of HIV in their community and knowledge of HIV transmission and prevention, dispelling unhelpful or dangerous HIV myths, and alerting people to relevant prevention services. For example, a Cochrane review of mass media interventions for promoting HIV testing demonstrated effectiveness in increasing uptake of services, however no long-term benefits were observed *(8).* Channels of

communication, including popular media, schools, workplaces and community-based and faith-based organizations, can play a role in notifying people of services and informing people and communities about HIV prevention.

1.3 Select prevention interventions

Figure 2. Investment framework



No clinical trial data have studied the effectiveness of combinations of prevention interventions. Data from countries suggest that a mix of interventions implemented for different populations and in different settings is the most effective approach. Often, programmes and funders choose to support certain elements of a comprehensive prevention strategy while ignoring others, diminishing their impact on HIV incidence *(9).* Countries need to determine their prevention priorities, combining prevention interventions with communication and structural interventions relevant to their epidemic. When developing the

combination of prevention interventions in countries with generalized epidemics an effective mix with appropriate ratios of funding should be considered. For example approximately 20-30% for critical enablers, 60-70% evidenced-based prevention intervention for general populations, as indicated in the document, (including interventions for young people and interventions in the health sector) and 10% for most at risk populations.[1]

Table 1. Components of comprehensive prevention

All interventions should comprise a combination of prevention interventions including behavioural interventions, HIV testing and counselling (HTC) and antiretroviral therapy (ART).

Prevention of sexual transmission in generalized epidemics	Most at risk populations	Other key populations	Settings
Condoms	Sex workers	Young people	Health care settings
Male circumcision for HIV negative men (13 countries)[2]	Men who have sex with men and transgender populations	Discordant couples	Prisons
STI management	Injecting drug users	People living with HIV	Workplaces, schools
Behavioral interventions			Community

1.4 Set targets and select key outcome indicators

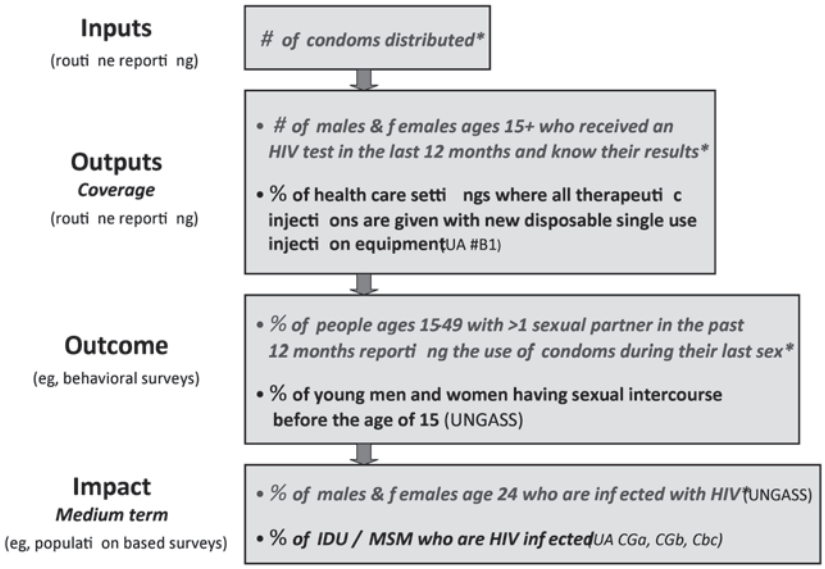
Target-setting is fundamental to effective monitoring and evaluation. Targets concretely define what a successful national program and/ or project should achieve. Targets should be set for both intervention-specific and cross-cutting indicators. Indicators for priority interventions would assess availability, coverage, quality and potential impact and could be defined by population or geographical area. Targets should also be set with the input of national or local level programme managers and could include evaluation of impact. The Global Fund has a series of monitoring and evaluation guidelines and tools ***(10),*** and a series of key indicators

1 Based on UNAIDS investment framework

2 13 countries have been prioritized by WHO scale up of for male circumcision implementation

that can be used to measure coverage in the short term and outcomes and impact in the medium term. Countries can link their monitoring and evaluation of Global Fund programmes to other routine monitoring activities, such as Universal Access Reporting*(11)* or regular Demographic and Health Survey (DHS) *(12),* AIDS indicator survey (AIS) *(13)* or Multiple Indicator Cluster Surveys (MICS)*(14)* when looking at the medium-term output and impact indicators.

Figure 3. Examples of HIV prevention indicators



**Top 10 indicators f or Global Fund reporti ng* http://www.theglobalfund.org/en/me/guidelines_tools/?lang=en

Depending on the capacity of health and community systems and the maturity of the programme response, countries may focus first on populations and geographic areas in the country where HIV is spreading most rapidly.

Population

For targeted interventions, coverage refers to availability to, and utilization by, the population concerned. Wherever possible, coverage targets for populations should be based on standardized size estimation techniques *(1)* and behavioural sero-surveillance surveys, programmatic and other data resources pertaining to the target population, geographic area, programme maturity and scale-

up strategies that are making a substantial impact on the HIV epidemic. It is necessary to determine baselines for intervention targets, namely data and year. Where baseline data are not available, prospective approaches may be useful.

Geography

Assessment of targeted interventions in terms of geographic distribution is done on the basis of administrative units (districts, province, etc). This could be done using similar methods as for population-based targets. For example, a programme might identify priority geographic settings where male circumcision is likely to have the greatest impact on the HIV epidemic and rapidly expand access to safe male circumcision services in that location.

1.5 Implement and improve

When planning for implementation, country stakeholders should plan prevention services focussing on a scalable starting point. **Planning should prioritize interventions that have been proven to reduce incidence in high HIV transmission networks.** This calls for services that are accessible and will be used by those affected or targeted.

Programmes for most-at-risk populations (MARPs) includes designing services that are acceptable to relevant groups such as injecting drug users (IDUs), sex workers (SWs) and MSM and transgender individuals. Prevention efforts must also extend to those in the **general population** with increased vulnerability to HIV – reaching young people, adult men and women with appropriate programmes is a top priority. In the highest prevalence generalized epidemics (>5%), all sexually active adults should consider themselves as being at risk of contracting HIV and services for the whole community are required.

Box 2. Core elements for implementation

- Determine prevention priorities and select interventions that match current patterns of HIV transmission.
- Enhance leadership and partnership
- Develop and implement an advocacy strategy
- Review policy and regulations so they support an enabling environment
- Develop a strategy and operational plan for national implementation
- Implement quality assurance mechanisms
- Apply quality improvement methods
- Develop human resource capacity
- Improve commodity security

Planning processes should consider the most effective service delivery approaches for implementing the interventions—through households, communities (non governmental organizations and community based organizations), health centres, hospitals, or outreach to young people and most-at-risk populations. All relevant government sectors and civil society including people living with HIV, business, non-governmental organizations, faith-based organizations and mass media must be fully engaged. It is recommended to decentralize HIV prevention services to health centres and into the community and to link with community-based organizations (CBOs) and non-governmental organizations (NGOs) where appropriate.

Quality improvement (QI) is an approach to improve service systems and processes through the routine use of health and programme data to meet client, patient and programme needs. This approach applies to HIV prevention as well as to care and treatment services. The focus is on services at district and sub-district level but can also apply to programmes at higher levels. Making participatory quality improvement part of services can help to increase teamwork at clinics/ services and to identify gaps in human and material capacity *(15,16).*

2. INTERVENTIONS

2.1 Prevention of sexual transmission

2.1.1 Male condoms

Rationale: Condoms are a critical element in all comprehensive and effective HIV prevention programmes. The male latex condom is the single most efficient, available technology to reduce the sexual transmission of HIV and other sexually transmitted infections. If used correctly and consistently condoms are very effective in blocking HIV transmission during sexual intercourse *(17).* A Cochrane review estimated the effectiveness of male latex condoms for prevention of HIV transmission as 80% or greater *(18).* A recent review of evidence by WHO showed that the relative effectiveness of consistent condom use reduced HIV transmission by 64% in anal sex among men who have sex with men, and that the higher the HIV prevalence, the higher the intervention effect would be *(19).*

Condoms need to be easily available and in sufficient quantities if they are to have any significant prevention impact. Innovative and regular condom promotion campaigns and marketing of condoms have brought changes in perception and increases in uptake. Analyses of data from the Demographic and Health Surveys have shown increases in the use of condoms by young, unmarried women and young men in sub-Saharan Africa.

Key implementation issues:

Barriers to condom use that need to be addressed in HIV prevention programmes:

- Poor acceptability, sometimes linked with religious opposition to condom use
- Lack of control over use; women (and some men) may lack the negotiating skills to insist on condom use
- Procreation and fidelity issues
- Lack of knowledge or skills in condom use
- Personal reluctance to use condoms
- Low availability and high price
- Poor quality and storage issues.

Therefore **when designing and developing a condom programme,** the following should be considered:

- Condoms must be readily and universally available and promoted in ways that help overcome social and personal obstacles to their use
- Condoms should be available through multiple outlets that reach different populations (young people, MSM, SWs, IDUs, general populations and serodiscordant couples). *See section 6 on specific populations*

- Consistent and creative condom promotion campaigns should be conducted to increase awareness and promote acceptability and benefits
- HIV prevention education and condom promotion should address the challenges of complex gender and cultural factors
- Skills in condom use and negotiating condom use should be taught and practiced
- Condoms must be free or low cost
- A system for forecasting, procurement and supply, quality control of condoms and safe storage should be established.

2.1.2 Female condoms

Rationale: The female condom has been shown in laboratory trials to be an effective barrier to HIV. In a crossover trial in which male and female condoms were compared, increased rates of semen exposure and self-reported mechanical difficulties were noted, which might suggest lower effectiveness of female condoms for prevention of HIV transmission *(20).* However, in a randomized controlled trial that compared women who were provided with condom counselling and male condoms with those who were provided with condom counselling and female condoms, rates of sexually transmitted infections (STIs) did not differ significantly, suggesting that male and female condoms have similar effectiveness *(21).*

Key implementation issues: Uptake of the female condom has been poor, and the high unit cost has limited widespread acceptance of this promising prevention intervention. New designs that reduce the cost are easier to use and reuse, and with better promotion and marketing, might increase uptake. Information on planning and programming for female condoms has been developed by UNAIDS and WHO *(22).*

2.1.3 Male circumcision*(23)*

Rationale: Three randomized controlled clinical trials have shown that male circumcision performed by well-trained medical professionals was safe and reduced the risk of heterosexually acquired HIV infection among uncircumcised men by approximately 60%, and maintained in the medium term *(24)*. WHO and UNAIDS recommend that male circumcision should now be recognized as an efficacious intervention for HIV prevention. Male circumcision can be promoted as an additional HIV prevention strategy in conjunction with correct and consistent condom use in geographic areas with generalized HIV epidemics and low prevalence of male circumcision.

Key implementation issues:
Thirteen countries with high prevalence of HIV and low rates of male circumcision are considered priority: Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe. Ethiopia (Gambela region) and Burundi have also included male circumcision in their prevention package.

Target population
Geographically, priority should be given to countries/regions/districts with low male circumcision rates, high HIV prevalence and predominantly heterosexual epidemics.

WHO and UNAIDS recommend a minimum package of male circumcision services:
- HIV testing and counselling (HTC)
- Active exclusion of symptomatic STIs and syndromic treatment where required
- Provision and promotion of male and female condoms
- Counselling on risk reduction and safer sex
- Male circumcision surgical procedures performed as described in the WHO/UNAIDS/JHPIEGO manual for male circumcision under local anaesthesia ***(25).***

Linkages with other key components for HIV prevention include:
- HTC, including couples counselling and prevention-of-mother to child transmission of HIV
- Diagnosis and treatment of sexually transmitted infections
- Condom programming
- Sexual and reproductive health, in particular for adolescent boys.

2.1.4 Sexually transmitted infection (STI) treatment
Globally, STI is a major cause of acute illness, infertility, long-term disability and death, with serious medical and psychological consequences for millions of men, women and infants. There are over 30 bacterial, viral and parasitic pathogens that have been identified to date that can be transmitted sexually. STI, including sexually transmitted HIV, can be prevented by the same measures.

Rationale: The sexual transmission of HIV infection seems to be facilitated by several STIs. Studies have shown that STIs in HIV-uninfected men and women increase susceptibility to HIV infection, particularly when associated with genital ulcerative disease.

However, **there is limited evidence from randomized controlled trials that STI control is an effective HIV prevention strategy.**

Key implementation issues: Only one *(26)* of nine *(27,28,29,30,31,32,33,34)* randomized controlled trials (RCT) of STI treatment for HIV prevention has demonstrated efficacy. This RCT was conducted in Mwanza, Tanzania (1991-1995) in a concentrated epidemic (defined as an epidemic where HIV has spread rapidly in one or more defined subpopulations but is not well-established in the general population). HIV incidence was reduced by 38% with improved syndromic management of curable STIs. The other 8 trials that showed no reduction in HIV incidence were conducted in generalized epidemics. The most likely explanation for the differences in effect between the trials is that the epidemic in the other settings was more established than that in Mwanza where there was less evidence of risk behaviour and lower rates of curable STIs. The implication is that the effect of treatment services for curable STIs depends on STI prevalence, type of STI and degree of STI control measures.

2.1.5 Early treatment of HIV-infected partner

Rationale: Early results of the HPTN 052 clinical trial demonstrate a significant HIV prevention benefit (96% protection) leading to the recommendation of offering ART for preventing transmission in serodiscordant couples in which the HIV-infected partners have CD4+ cells >350 cells/μL. The study also suggests significant treatment benefit in terms of the health of the HIV-infected person, though this was of less magnitude than the prevention effect.

A GRADE process to assess the strength of the evidence is currently being conducted prior to WHO consideration of issuing formal guidance on this new intervention.

Key implementation issues: With increased access to couples HIV testing and counselling (CHTC), there are likely to be important programmatic and policy implications for programmes where serodiscordant couples may be reached.

- **PMTCT** - New WHO guidance on CHTC and the HPTN 052 results will provide a strong impetus for increased couples testing and counselling in ANC and other maternal, newborn and child health (MNCH) settings. With a primary focus on testing and counselling couples, programmes should also prioritize early treatment for HIV-infected pregnant women in HIV serodiscordant relationships (or, when identified, for HIV-infected male partners). In these settings, earlier treatment will likely have significant benefits for prevention of vertical and sexual transmission of HIV as well as improving the health of many mothers.

- **Tuberculosis prevention and treatment** - The 2010 ART guidelines (WHO, 2010) recommend ART for all people living with HIV who are diagnosed with active tuberculosis (TB) irrespective of their CD4 count. HIV testing of all TB patients is already recommended as part of the 2004 Interim TB/HIV Collaborative Activities and many countries are reaching high levels of testing every TB patient for HIV. Additionally, HIV prevention is part of these recommended activities, however, to date the prevention interventions have been of varying quality. The new HTC guidelines have been incorporated into the revised 2011 HIV/TB Collaborative Activities Policy so that TB programs will now be aware of the recommendations regarding couples testing and counselling and using ART to prevent HIV transmission.
- **ART** - The HPTN 052 study results do not warrant an immediate change of the WHO guidelines on ART for adults and adolescents, but they raise important questions about when to start ART in various settings - a full review of the HPTN 052 data, and other evidence is needed.
- **Male circumcision** - MC services as an entry point for strengthened couples counselling and links to early treatment could be considered in selected countries that already have strong MC programmes. This approach would need to be piloted in a few settings to determine the feasibility and practicality of large-scale implementation. Additionally, males in priority countries who are identified as HIV-negative through CHTC should receive information about and access to MC services.

2.2 Voluntary HIV Testing and Counselling: Cross-cutting interventions

Rationale: Knowledge of HIV status through HTC is an important component of many of the key prevention interventions and clearly essential for enabling people to access treatment and care. There is a moderate effect of HTC alone in reducing HIV risk behaviours *(35).* This is most marked for people who test positive and for serodiscordant couples. An emphasis on universal HTC is essential if significant progress toward universal access to prevention and care is to be achieved, and more effective approaches and models to increase access and uptake to HTC need to be explored. Provider-initiated HIV counselling and testing (PITC) *(36)* has been successfully implemented in many health care settings in countries with generalized epidemics, complementing free or subsidized client-initiated testing and counselling (CITC) services commonly known as voluntary counselling and testing (Table 2).

Key implementation issues:

To increase the uptake and acceptability of testing the following have been shown to be important: *(37)*

- Targeted media campaigns (effective in increasing uptake for some groups)
- Modifying health services to make them more responsive to clients' needs and preferences *(38)*
- Improving the quality of testing and counselling services
- Scaling up PITC in the context of medical care including antenatal clinics, labour and delivery, and post partum wards, and TB, STI, general medical and paediatric clinics
- Training and offering clients a choice of providers – characteristics such as sex or ethnic group, attitudes, and the extent to which providers are trusted by their clients can be important
- Using rapid tests – these can be more acceptable and achieve higher delivery of test results (same day), and can facilitate links to follow up services
- Providing tests in locations and under conditions that are convenient and acceptable to clients — such as workplaces, health facilities, and mobile clinics; at night; through home-based voluntary HTC services that facilitate reaching family members; and through the routine offer of testing in clinical settings
- Supporting acceptable HTC linked to prevention, treatment and care services in prisons or other closed settings.

Offering testing to couples/partners has also been shown to be an effective prevention approach in generalized epidemics where high levels of serodiscordance in stable relationships are reported *(39).*

There are many models of HTC, and a single approach is unlikely to reach all groups. In planning HTC services, attentiveness to the personal dimension, the local context, and the social context is necessary.

Table 2. Models of HTC

Approach	Setting	Target populations
Voluntary counselling and testing	Free-standing services.	General public. May attract more motivated, affluent and educated clients and therefore may not reach vulnerable and most-at-risk populations.
	Private sector.	Private practice clients; employees with workplace clinics.
Community outreach	Often mobile, may be linked to NGO outreach services for most-at-risk groups.	Targeted communities or high-risk groups; often directed at those "hard-to-reach"; general public.
Home-based	Door-to-door testing.	Targeting general populations. Has been shown to be highly acceptable and reaches populations who would not attend VCT or attend health facilities, e.g. young men ***(40).***
Campaigns	HIV testing campaigns (National/regional/ district).	Can reach large populations quickly and cheaply. Linkage to follow up prevention and care services may be inadequate.
Provider-initiated counselling and testing (PITC)	Integrated into existing health services.	Widespread in ANC, L&D, MNCH, SRH as part of PMTCT now being integrated into a range of health services, e.g. TB, paediatric, STI, general medical.

Decisions around **designing, developing and implementing** HTC services will depend upon an assessment of the situation in a particular country/region/ district, including local epidemiology, needs of most-at-risk populations, available infrastructure, financial and human resources, locally available standards of HIV prevention, treatment, care and support and the existing social, policy and legal frameworks for protection against HIV-related discrimination. Coordinated planning, training and procurement are important to help ensure synergies between PITC and other HTC approaches and will help to facilitate referral between different types of supportive health services.

2.3 Behavioural interventions

2.3.1 Behavioural interventions and behaviour change programmes

Rationale: Behavioural strategies to prevent the sexual transmission of HIV include programmes that aim to delay sexual debut, reduce the number of sexual partners and concurrent sexual partners, increase the proportion of 'protected sexual acts', increase uptake of HTC and improve consistent use of biomedical interventions such as condoms. They can target individuals, couples, groups or communities and there are many interventions described. Decreasing HIV transmission in generalized epidemics may therefore require changing individual perceptions and social norms as well as increasing the perceptions of risk and risks of specific sexual behaviours that are often considered normal. How these changes can be achieved through behavioural interventions is less clear.

Box 3. HTC for couples

Couples HTC (CHTC) is an opportunity to strengthen the impact of efforts to prevent HIV transmission and to increase access to HIV care and treatment through services currently used by individuals. It facilitates beneficial communications and knowledge-sharing in a way that enables couples to understand the complex issues associated with HIV serodiscordance and to make informed joint decisions about their health and family life. CHTC creates an environment for mutual support and facilitates access and adherence to treatment and prevention strategies. The intervention can be offered in a variety of clinical and community settings, and there are a number of issues and conditions that are common to all settings.

Guidance is currently being developed for CHTC.

Key implementation issues: Many studies of effectiveness of behavioural approaches detail a reduction in self-reported sexual risk behaviour. A review of 18 meta-analyses of sexual risk reduction interventions found significant increases in condom use and reductions in unprotected sex *(41).* Studies in low- and middle-income countries among young people *(42),* SWs *(43),* MSM *(19)* and other populations have demonstrated that prevention programs have the ability to change sexual and drug-use behaviours to prevent HIV transmission. However reported sexual and drug using behavior may be subject to recall and reporting bias and there is a lack of data on the effect of behavioural interventions in reducing HIV transmission.

In a systematic review of behaviour change interventions designed to prevent HIV infection among women, 11 studies on 8 different interventions which reported HIV were identified. Only two interventions showed a significant effect on HIV incidence among women and only three of ten analyses that measured behavioural outcomes were linked to reduced HIV-related risk behaviour.

WHO conducted systematic reviews of individual and community level behavioural interventions for MSM. Four studies of individual level behavioural interventions showed a moderate (18% NS), benefit for behavioral outcomes *(19)* and one study showed a moderate (18% NS), reduction of HIV incidence *(19).* Community level behavioral change interventions were not found to be effective for MSM *(19).*

As results are mixed, ongoing research is therefore needed to determine whether behaviour change interventions can be incorporated as independent efficacious components in HIV prevention packages or simply as complements to biomedical prevention strategies *(44).*

Furthermore few behavior interventions have followed participants for more than 12 months. Evidence suggests that favorable behavior changes seen during the first year following a prevention intervention can lessen over time. At the population level, behavior changes often fail to continue because they require a level of commitment (e.g. consistent condom use) that is often difficult to maintain. In Uganda, Thailand, and some high-income countries, early prevention successes have been followed by increases in risk behavior.

2.3.2 Peer education

Rationale: Peer education (PE) typically involves the use of members of a given group to effect change among other members of the same group. PE is often used to effect change at the individual level by attempting to modify a person's knowledge, attitudes, beliefs, or behaviours. PE programmes have been widely implemented to increase awareness of HIV and to attempt to influence behaviour to prevent HIV infection. They have been implemented among youth populations and most-at-risk populations such as SWs, IDUs and MSM.

Two systematic reviews have been carried out to assess the effectiveness of this approach *(45,46).* The studies reviewed could not demonstrate any effect on biological outcomes such as STI rates. However some positive outcomes were achieved. PE programmes were associated with increased knowledge, decreased reported needle sharing among IDUs and increased condom use, but

the effects were only moderate. These findings suggest that if there are limited resources, peer education programmes should be prioritized for hard-to-reach populations *(16).*

Key implementation issues: Maticka-Tyndale *(15)* synthesizes the results and lessons learned from 24 evaluated peer-led programmes with an HIV risk reduction component that targeted youth. These demonstrated success in effecting positive change in knowledge and condom use and have demonstrated some success in changing community attitudes and norms. However effects on other sexual behaviours and STI rates were equivocal. The authors outline **characteristics of successful peer educations programmes for youth:**

- Perform a community needs assessment
- Ensure community involvement
- Adequate quality training covering issues including HIV knowledge, issues of gender and sexuality, ethical and legal issues and a focus on communication skills
- Refresher training
- PE supervision to support ongoing PE activities
- PE retention (this was improved by reimbursements for expenses, pay, microcredit, bicycles, ability to sell condoms for profit, development of professional and job related skills, participation in decision-making and project development, support or supervision).

2.3.3 Sex/sexuality education

Rationale: Young people remain at the centre of the HIV epidemic in terms of rates of infection, vulnerability, impact, and potential for change. There has been a fall in prevalence rates among young people in many countries with generalized epidemics between 2000-2008 that coincided with a change in reported sexual behaviour (fewer sexual partners or increased condom use). However, in 2009 alone, there were 890,000 new HIV infections among young people aged 15-24 and about 40% of new HIV infections are still among young people. Furthermore it is difficult to identify which specific HIV interventions contributed to the change in behaviours resulting in decreased new infections. It is likely that HIV and sex education programmes had a role.

Key implementation issues: Evidence does not indicate that **abstinence-only interventions** effectively decrease HIV risk among participants in high-income countries and trials suggest that the programmes are ineffective; generalizability may be limited to US youth *(47).* However **abstinence-plus interventions** which promote sexual abstinence as the best means of preventing acquisition of HIV,

but also encourage safer-sex strategies (e.g. condom use) for sexually active participants, appear to reduce short-term and long-term HIV risk behaviour among youth in high-income countries. Evidence for programme effects on biological measures is limited *(48).*

A systematic review of **curriculum-based sex and HIV education programmes** on sexual behaviour showed that the majority of the programmes significantly improved one or more sexual behaviours. The evidence is strong that programmes do not hasten or increase sexual behaviour but, instead, some programmes delay or decrease sexual behaviours or increase condom or contraceptive use. Effective curricula commonly incorporated 17 characteristics that describe the curricula development; the goals, objectives, and teaching strategies of the curricula themselves; and curricula implementation *(49).* A further review reported that a large majority of school-based sex education and HIV education interventions reduced reported risky sexual behaviours in developing countries *(50).*

2.4 Cash transfers

Rationale: Conditional cash transfer programmes (a structural intervention) targeted to poor households have become widely used over the past decade, for example to induce beneficiary households to invest in their children's human capital. Unconditional cash transfers have also been employed to reduce poverty-related inequalities. South Africa's unconditional Child Support Grant (CSG), in which cash grants are made to families without conditions have been shown to have significant benefits on children's health status *(51).*

Key implementation issues: Two recent studies looking at cash transfers in relation to HIV *(52,53)* demonstrate that young women and men in Malawi and Tanzania who were given cash payments had significantly lower HIV and other STI rates than other groups in their communities. Another recent study, from Tanzania *(54)* which gave cash payments to adults to avoid unsafe sex and prevent STIs demonstrated a 25% drop in STI cases among those 'rewarded' for not getting STIs compared to people in control groups who were not paid to stay STI-free.

These are single studies and have not been replicated in other settings; although the outcomes are promising if cash transfers are to be used as part of HIV prevention programmes, careful monitoring and evaluation is recommended.

2.5 Key target groups

2.5.1 General population

Within the general population there are three key target groups who must be reached with effective HIV prevention messages and services.

Young people

Rationale: Young people are at the forefront of the HIV epidemic particularly in countries with generalized epidemics ***(55)***. In 2008, young people accounted for 40% of all new HIV infections in 15-49 year olds; every day there are an estimated 2400 new cases in young people ***(56)***. Over 5 million young people (15-24) have HIV ***(57),*** but there are hopeful signs of prevention working with HIV prevalence among young people falling in 16 of the 25 coun¬tries most affected by HIV ***(58).***

Box 4. UNGASS indicators related to youth

UNGASS Indicators specific to young people:

- Prevalence of HIV
- Age of sexual debut
- Knowledge of HIV prevention practices
- Availability of life skills-based HIV education in schools
- School attendance by OVC (captures 10-14)
- Support to households with OVC

UNGASS Indicators to be age disaggregated for youth (<25; 25+)

- Condom use
- Multiple Sexual partnerships
- Condom use by FSW, MSM, IDU
- Safer injection practices among IDU
- Coverage of prevention programs for MARPs

The most important action to undertake in the development of an HIV prevention plan is to understand the epidemiology. There is international agreement on key indicators (see box at left) and data are increasingly available ***(59).*** It is crucial that data are sex disaggregated (60% of young people with HIV are females); the heterogeneity of young people requires different intervention and delivery strategies with strategic information to inform these.

For adolescent girls, maintaining school attendance has major overall individual and social benefits, and there is increasing evidence that keeping girls in school and educational attainment is associated with lower risk of HIV infection ***(60).***

Younger women are more biologically susceptible to HIV infection *(61),* so delay of sexual debut is an important objective. Data from 1990-2008 demonstrate a reduction in the proportion of 15-19 year olds with early sexual debut among young women in 13/17 countries in sub-Saharan African countries *(62).* This study does not provide intervention evidence, however, of 63 studies which measured the impact of sexuality education programmes upon the initiation of sexual intercourse among adolescents; 37% of the programmes included in the studies delayed initiation. Notably none hastened the initiation of intercourse *(63).* For many girls, early sexual activity is associated with coercion or violence. The younger the girl is at first sex, the greater likelihood that that it was forced *(64).* Legal and policy interventions are critical to protect adolescents in addition to empowerment approaches *(65)* and school based violence prevention interventions *(66,67).* Age-disparate sex also increases vulnerability for girls *(68)*. Interventions focusing on changing social norms related to acceptable sexual relationships and masculinity as well as laws to protect against the sexual exploitation of girls are relevant.

Key implementation issues: A systematic review of the effectiveness of interventions to increase reported safe sexual behaviour and biological outcomes in sub-Saharan Africa *(69)* found sufficient evidence to recommend widespread large-scale implementation of in-school interventions that are adult-led and curriculum based *(70);* there is evidence to suggest that the following interventions are effective, but large scale implementation must be accompanied by further monitoring and evaluation:

- **Interventions in health facilities** that train service providers and take actions to make the facility more youth-friendly, coupled with activities in the community with or without the involvement of other sectors to link or refer young people to health services
- **Community interventions** that target youth and create their own system/ structure for intervention delivery, and those which target the whole community using traditional networks for intervention delivery.

Increased focus on HIV prevention for young people is a key area in the new UNAIDS business cases *(71),* which aims to achieve reductions of 30% in new infections by 2015 among young people through improved targeting and tailoring combination prevention interventions. Efforts in a number of countries will be focussed on the following targets:

- At least 80% of young people in and out of school will have comprehensive knowledge of HIV
- Young people's use of condoms during last sexual intercourse will double
- Young people's use of HIV testing and counselling will double.

Information available at the global level confirms the need for progress in all three areas:

- While comprehensive and correct knowledge about HIV among young people has increased slightly since 2008, the current estimate of 34% is only one-third of the UNGASS target of 95% by 2010 ***(72).***
- An increased proportion of young people using condoms was seen among women in 6 of 11 countries and among men in 11 of 12 countries with trend data ***(73).***
- In eighteen countries in sub-Saharan Africa with national survey data that allows for the calculation of HIV testing in the past 12 months among youth, less than 10% of youth in all but four countries have received an HIV test ***(74).***

Young people also comprise a significant proportion of MARPs and they often have higher HIV prevalence than older persons in these groups. Special factors need to be considered in tailoring responses to young MARPs ***(75).***

Serodiscordant couples

Rationale: In sub-Saharan Africa, approximately 1 in 2 people with HIV, living in a couple, has a serodiscordant partner. Recent data suggest a large proportion of new HIV infections in mature epidemics occur within these serodiscordant relationships, making discordancy a major contributor to the spread of HIV in sub-Saharan Africa. However, the majority of people in serodiscordant relationships are unaware that they are. Furthermore, serodiscordancy is poorly understood by the general population and health workers alike, and to date inadequate attention has been given to supporting couples to test together, leaving many people to be vulnerable to HIV infection.

Key implementation issues: Findings from several published studies suggest HIV-positive individuals and discordant couples are more likely to adopt preventive behaviours after learning their HIV status, and there are promising indications that provision of ART to the positive partner may decrease transmission to the negative partner in serodiscordant couples. Several studies from sub-Saharan Africa have shown that knowledge of one's own and one's partner's HIV status significantly increased reported condom use ***(76,77,78)*** and several studies show evidence that CHTC is associated with reduced seroconversion rates in couples found to have serodiscordant test results ***(79,80,81).*** WHO has undertaken a systematic review of the evidence on CHTC which reveals that this is a beneficial prevention intervention; in addition, when ART is given to the seropositive partner in a serodiscordant couple, this has significant prevention potential.

Please see section 2.1.5 for further discussion of these issues.

Prevention with positives[1]*/'Positive Health, Dignity and Prevention' programmes*
Rationale: Current evidence suggests that interventions targeting people living with HIV in developing countries increases condom use, especially among HIV-serodiscordant couples. Comprehensive positive prevention interventions targeting diverse populations and covering a range of intervention modalities are needed to keep HIV-positive individuals physically and mentally healthy, prevent transmission of HIV infection and increase the agency and involvement of people living with HIV ***(82).***

Key implementation issues: The Global Network of People living with HIV (GNP+) has defined a comprehensive approach for HIV prevention programmes for people with HIV, **'Positive Health, Dignity and Prevention',** which requires a human rights framework supported by *'protective laws to ensure non-discrimination, reduce stigma, and change harmful gender norms. The law must enable HIV-positive individuals to protect themselves and others, not through fear, but through empowerment and with dignity'*. Key elements of this programme are articulated by GNP+ and UNAIDS ***(83),*** and WHO ***(84).***

2.5.2 Most-at-Risk Populations

Effective HIV prevention programmes in generalized epidemics will also prioritize those who are most affected by and those particularly vulnerable to HIV infection, often termed 'most-at-risk populations' or MARPs. These are defined as sex workers (SWs), injection drug users (IDUs) and men having sex with men (MSM) and transgender people in the community, and people in prison and other closed settings. In some literature the preferred nomenclature for MARPs is 'key populations'. The definition for key populations may also include young people or women or other groups defined at being most at risk in a defined setting. For the purpose of this paper we will use MARPs with is defined definition to be consistent with Global Fund literature.

A coercive approach to HIV prevention including mandatory HIV testing, restriction of movement and criminalization has been rejected as being ineffective and a violation of human rights. These approaches drive individuals away from health and other prevention services.

1 Helping people to reduce the risk of transmitting HIV to others is sometimes referred to as «prevention with positives» (PWP). http://www.cdc.gov/hiv/topics/prev_prog/ahp/AHP-Strategy3.htm

Effective HIV prevention measures are those that emphasize human dignity, responsibility and empowerment through access to services and community support and participation. Effective programmes create an enabling environment by adopting and implementing non-discriminatory laws and policies. This means that HIV prevention efforts do not label any group as 'vectors of HIV' do not single out populations for blame and persecution and do not marginalize or stigmatize them. Because MARPS often fear criminalisation, stigma or discrimination, programmes that include outreach particularly by peers may help to reach these populations more effectively and to ensure their access these critical services. Involving people from most-at-risk populations in designing, developing and implementing prevention programmes will help to make them more acceptable and relevant.

Sex workers

Shortly after the first cases of HIV were documented in Africa in the early 1980s, the WHO highlighted the high prevalence of HIV among female sex workers (SWs) and their clients, and called attention to their unmet needs for HIV prevention. HIV and STI prevalence rates in SWs in the majority of countries with generalized epidemics are significantly higher than in the general population, however few countries have comprehensive, acceptable prevention programmes for SWs of adequate coverage, reach and impact.

Rationale: Sex work is an important feature of the transmission dynamics of HIV within early, advanced and regressing epidemics in sub-Saharan Africa ***(85,86).*** HIV prevalence among sex workers and their clients is commonly 10–20-fold higher than among the general population. With high rates of partner change, the potential for onward transmission of HIV from an infected sex worker to their partners may be more than 100 times greater than from other people living with HIV (PLHIV). In addition, sex workers who have other STIs (especially ulcerative STIs such as herpes simplex virus [HSV]-2 and chancroid) are more likely to transmit HIV, particularly in settings where men are uncircumcised. Together, these factors may contribute to a differential in HIV transmission potential of more than 1000 times compared with lower-risk populations. Yet, in much of Africa, there is little evidence that transmission of HIV and other STIs in sex work settings has been controlled. WHO has conducted a review of the evidence on HIV prevention in sex work settings and is preparing public health guidelines for countries to scale up evidence-based programmes for SWs and their clients.

Key implementation issues: There are two levels of a comprehensive, evidence-based programme for sex workers. The basic package is the minimum set of

interventions needed to have an impact in all settings. The extended package will increase impact and should be added when capacity and budget are available. The boundaries between basic and extended package may vary depending on the level of health systems.

The basic prevention package includes:

- **Condom programming.** Consistent condom use should be strongly promoted and supported in commercial sex settings
- **STI management/treatment.** STI syndromic management should be provided for patients with symptomatic STIs, including sex workers and their clients
- **Participation.** Interventions with sex workers should be rights-based, promote supportive environments, address structural factors, and include empowerment of sex workers (meaningful participation in planning and execution of prevention and care activiities) and sex worker-led outreach and mobilization
- **HTC.** HIV counselling and testing should be offered to individuals at high risk including sex workers and their clients
- **HIV treatment and care.** Condoms and ART should be available to HIV-positive individuals who meet eligibility criteria
- Access to **comprehensive health and social services.**

Injecting drug users

People who inject drugs are at increased risk of HIV infection and transmission. Once HIV is introduced in this population prevalence rates can reach epidemic proportions in a very short time and explosive HIV epidemics occur in populations of IDUs where re-use and sharing of injecting equipment are common. Globally, around 16 million people inject drugs and 3 million of them are living with HIV.

Wherever injecting drug use occurs, countries should implement a comprehensive set of interventions for HIV prevention, treatment and care for IDUs. These interventions are also known as harm reduction programmes. Despite overwhelming public health evidence demonstrating the effectiveness of harm reduction interventions, many decision-makers remain reluctant to implement or scale up these interventions. Advocacy, citing public health evidence, is often required to initiate and sustain harm reduction programmes.

Where there are barriers to implementing harm reduction interventions, there is a need to create a supportive policy, legal and social environment that facilitates equitable access to prevention and treatment for all, including IDUs. There is also

a need for appropriate models of service delivery, health systems strengthening, and strategic information to guide harm reduction programmes. For example, procuring and distributing opioid agonist medicines, such as methadone, may require special measures and procedures.

Rationale: An effective and evidence-based response to HIV among people who inject drugs is required to curtail the rapid spread of HIV among drug-using populations, but also to prevent transmission to the general population. In order to achieve these goals, according to WHO, UNODC and UNAIDS, the implementation of a 'comprehensive package' of nine interventions for the prevention, treatment and care of HIV among people who inject drugs is essential. This package – also widely referred to as the 'harm reduction' approach – consists of interventions for which there is a wealth of scientific evidence supporting their efficacy in preventing the spread of HIV *(87).*

Key implementation issues: There are two levels of a comprehensive, evidence-based programme for injecting drug users.

The basic interventions package includes:

- Needle and syringe programs (NSPs)
- Opioid substitution therapy (OST) and other drug dependence treatment.

The extended package, sometimes already implemented together with the basic, should add:

- HIV testing and counselling
- Antiretroviral therapy (ART)
- Prevention and treatment of STIs
- Condom distribution programs for people who inject drugs and their sexual partners
- Targeted information, education and communication for people who inject drugs and their sexual partners
- Vaccination, diagnosis and treatment of viral hepatitis
- Prevention, diagnosis and treatment of tuberculosis.

No single intervention will reverse the HIV epidemic in IDUs. The greatest impact will be achieved if interventions are implemented as a package *(88).* The interventions should be delivered through clinical services, community outreach and peer-to-peer work, *(89)* and should be implemented both in the community and in prisons and other closed settings *(90).* Services for IDUs should take into account that the majority of IDUs are male and have sexual partners, that some

sell sex, and that injecting drug use occurs at all levels of society. The health sector should play a major role in providing advocacy—together with the evidence to support that advocacy—to obtain the political commitments necessary to initiate and sustain harm reduction programmes for IDUs.

Men who have sex with men and transgender people

The term 'men who have sex with men' describes same sex behaviour between men, including gay men, bisexuals, men who do not identify as gay or bisexual in spite having had sex with men, male sex workers and a range of culture- and country-specific populations of men who have sex with men. ***(91)*** The estimated lifetime prevalence of male same sex practices in generalized epidemics such as Eastern and Southern Africa is 1-4% and 41% of MSM reported lifetime heterosexual sex ***(92).*** HIV prevalence is reported as ranging between 9-25% and HIV incidence is 21.7% per year among MSM reporting sex with men only, compared to 1.1% among men reporting sex only with women in Kenya ***(93)***. Epidemiologic studies among transgender people have shown HIV prevalence to range from 8 to 68% ***(94,95,96,97)*** and HIV incidence from 3.4 to 7.8 per 100 person-years ***(98,99).*** Despite well-characterized risks for HIV and other STI, MSM and transgender people continue to be ignored in many HIV prevention programmes, particularly in countries with generalized epidemics.

Rationale: In many countries with generalized epidemics, MSM and transgender people are often marginalised and face criminalization, and awareness of their needs and demographics are inadequate. However, as everywhere, MSM and transgender people are at significant risk from HIV, and prevention services should be provided in an acceptable and safe way. Designing and implementing prevention programmes for these populations in many countries with generalized epidemics will pose difficult challenges. As with other MARPs, careful collection and analysis of surveillance and other strategic information relating to MSM and transgender populations will be needed to guide planning of services to ensure optimal reach, coverage and impact of interventions. Involvement of those affected as well as NGOs working with MSM and transgender people will be essential.

Key implementation issues: WHO, UNDP and UNAIDS recommend a minimum set of interventions in order to have an impact on HIV epidemics among MSM and transgender people ***(19).*** The extended package will increase impact and should be added when capacity and budgets are available. The boundaries between basic and extended package may vary depending on the level of health systems.

There are two levels of a comprehensive, evidence-based programme for MSM and transgender people. When planning and delivering services for these groups, particular care must be taken to ensure that basic principles of human rights are understood and upheld by providers.

Key human rights principles

- Establishment and enforcement of anti-discrimination and other protective laws
- Inclusive health services based on the principles of medical ethics and the right to health.

The basic prevention intervention package

- Condom programming
- STI treatment (including symptomatic rectal infections).

The **extended package**, sometimes already implemented together with the basic:

- HIV testing and counselling
- Access to HIV care and treatment
- Individual and community level behavioural intervention
- Internet-based, targeted information
- Sex venue-based outreach strategies
- STI testing for rectal infections – asymptomatic
- Hepatitis B vaccination.

2.6 Specific settings

2.6.1 Blood safety

An estimated 93 million blood donations *(100)* are received globally every year *(101).* About half are collected in high-income countries and the remaining half in low- and middle-income countries. While important progress was made in the last decade in improving the supply of quality-assured blood and blood products worldwide, the availability and safety of blood supplies for transfusion remain issues of concern in many settings, especially in lower-income countries. Blood shortages not only lead to serious health consequences such as death from postpartum haemorrhage but also contribute to an increased risk of HIV and hepatitis because an inadequate stock of blood forces a reliance on unsafe family or paid donors and increases pressure on health providers to issue blood without testing. Data provided by 115 countries (out of 172) on the percentage

of blood supplies screened in a quality-assured manner in 2007-2008 continue to show an important gap among countries: while 99% and 85% of donations in high-income and middle-income countries, respectively, were screened following standard quality procedures, in low-income countries the comparable figure was substantially lower, at 48% *(102).*

Rationale: The clinical transfusion of HIV-infected blood carries the highest risk of all modes of transmission (9,250 per 10,000 exposures to an infected source) – about 100 times more efficient than injecting with a contaminated syringe *(103).*

Key implementation issues:
Decreasing the incidence of HIV due to unsafe blood transfusion requires an integrated strategy *(104):*

- A nationally-coordinated blood transfusion service
- Collection of blood from voluntary, unpaid donors
- Screening all donated blood for transfusion-transmissible infections such as HIV
- Ensuring adequate training and follow-up of health care providers.

2.6.2 Injection safety

Rationale: Each year at least 16 billion injections are administered in developing and transitional countries. The vast majority, around 95%, are given in curative care while immunization accounts for around 5% of all injections. WHO has estimated that about 5% of new HIV infections in developing and transitional countries may be attributable to unsafe health care injections, including unsafe blood and occupational exposures. This global estimate varies according to regions, with higher percentages for sub-Saharan Africa compared to other parts of the world. It is important to point out that for a number of reasons, there is substantial uncertainty around this estimate, and it is currently being updated. In addition, in the year 2000 WHO estimated that contaminated injections annually caused 21 million HBV infections, two million HCV infections and 260,000 HIV infections. These infections led to 49,000, 24,000, and 210,000 deaths, respectively. Forty per cent of the global burden of hepatitis B and C among health workers is attributable to occupational exposure.

Key implementation issues: Injection safety is one of the essential elements of the prevention of HIV transmission in complementary health care settings and should be integrated in a comprehensive health sector response. Unsafe injections are a well-documented mode of transmission of HIV and other blood-borne pathogens, mainly hepatitis B and hepatitis C.

2.6.3 Occupational post-exposure prophylaxis*(105)*

Rationale: The transmission rate of HIV from an infected patient to an exposed person through significant needle stick accidents is approximately 0.3% (3 in 1000) and approximately 0.09% in the case of mucous membrane exposure ***(106).*** Recommendations for the use of antiretroviral drugs to prevent HIV acquisition in HIV negative health care workers, called occupational post-exposure prophylaxis (PEP), are based on animal studies, one single case control study, ***(107)*** eight observational studies and extrapolation from prevention of mother to child transmission studies ***(108).***

Key implementation issues: Universal standard precautions for the prevention of exposure to potentially contaminated material are key components of all programs that provide PEP. PEP should be provided following exposure of non-intact skin or mucous membranes to a potentially infected body fluid from a source that is HIV-positive or has unknown HIV status ***(109,110).*** In the broader context of public heath interventions, evidence supports the provision of PEP for sexual and other non-occupational exposure ***(101,111).*** PEP works best when started within hours of initial exposure as shown in animal studies. The benefit is less likely if PEP is started more than 24-36 hours post-exposure. Current recommendations for humans recommend administering antiretroviral prophylaxis within 72 hours ***(105,106).*** Therefore systems need to be in place for health care workers to access PEP services and antiretroviral medicines in health facilities within the given time frame.

PEP refers to the set of services that are provided to prevent the acquisition of HIV following a potential exposure. PEP core package includes:

- Reporting assistance and possible referral capacity
- Risk assessment
- Counselling services (providing consent to PEP; pre- and post-HIV test counselling (for both the exposed person and the source person); drug adherence and managing side effects; preventing the risk of transmission)
- HIV testing (initial testing of exposed individuals and testing of the source person, when possible)
- Providing PEP medication (the initial dose as soon as possible preferably within 72 hours; and the full course of 28 days of treatment)
- Provision of services specifically related to sexual exposure, including testing and treatment for other sexually transmitted disease and provision of emergency contraception
- HIV re-testing at three and six months
- Support and follow-up, and appropriate record-keeping and documentation.

2.6.4 Prisons and closed settings

Rationale: The principle of equivalency of care demands that prisoners are entitled, without discrimination, to the same standard of health care that is found in the outside community, including preventive measures and ART.

Key implementation issues: The UNODC/WHO framework *(112)* indicates effective approaches and ways to evaluate and set targets for HIV prevention and care programmes in prisons. It is important to address other opportunistic infections or co-morbidities such as TB and viral hepatitis as well *(113).*

2.7 Mass media

Use of the mass media is one of the most commonly employed strategies in HIV prevention. Initially mass media campaigns were designed to increase knowledge and awareness about HIV, but more recently, campaigns have been designed around 'behaviour change' objectives.

A systematic review of HIV mass media campaigns *(114)* reported that these campaigns had become more sophisticated over time, often using a combination of media channels and approaches including, most recently, internet-based approaches. However few mass media interventions are rigorously evaluated, so it is difficult to attribute behaviour change outcomes, although increases in HIV knowledge and awareness of services have been demonstrated. For example, a Cochrane review which assessed the impact of mass media interventions on promoting HIV testing showed that these interventions have immediate and overall effects in the promotion of HIV testing, however no long-term effects were seen. Also there was no significant impact in terms of increased detection rate of people with a seropositive status after mass media interventions promoting HIV testing *(115).*

These observations have resonance for mass media interventions in other health areas where they can have an important role in increasing public awareness of an issue and alerting people to available services. The need to continually update messages to maintain accuracy and appropriateness, and to increase engagement and message retention levels of audiences is important. However it is unrealistic to expect that media campaigns alone will have a significant impact on promoting long-term behavioural outcomes.

2.7.1 Internet-based strategies

Every day, people seek out health information from various web sites and other online resources. This has created multiple opportunities for internet-based HIV prevention interventions that allow people to access information on their own if services are not readily available or they feel reticent to obtain information from more traditional sources such as health workers. For example, internet-based resources can make it easier for most-at-risk populations MARPs such as MSM/transgender persons or young people to anonymously obtain relevant HIV prevention messages, at convenient times and in private settings. These types of interventions have the potential to provide the most appropriate information or strategies to meet an individual's unique needs. Internet strategies may be particularly relevant for young people who regularly use the internet for various social, information and educational purposes and who have low attendance at health services.

A systematic evidence review of MSM suggests that there might be a benefit offering targeted internet-based information to decrease risky sexual behaviours and to increase uptake of HIV testing. However there is little data on the impact and effectiveness of virtual social networks in HIV prevention and access to HIV diagnosis, care and treatment and whether these have any impact on HIV/STI incidence.

2.7.2 Social marketing strategies

Assuring access to commodities for HIV prevention is an important element of any prevention effort. One of the ways this is commonly done is through social marketing programmes. Social marketing programmes have long demonstrated that their efforts result in increased sales *(116)* but evidence of the effect of social marketing on use has been more limited. A systematic review and meta analysis *(117)* has pooled the evidence of the effect of condom social marketing on condom use using six studies *(118,119,120,121,122,123).* The pooled analysis showed a positive and statistically significant effect of condom social marketing on increasing condom use, and all individual studies showed trends for a positive effect. These evaluations were time-limited; over years, the cumulative effect of condom use could be substantial.

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