4. HEALTH SECTOR INTERVENTIONS FOR HIV PREVENTION

Key findings

- Countries are successfully implementing targeted interventions to promote condom use and to manage sexually transmitted infections among sex workers and their clients, especially in Asia.

- In most countries in Eastern Europe and Central Asia, where injecting drug use accounts for more than 80% of all HIV infections, needle and syringe programmes regularly reach only 10% of the estimated number of injecting drug users.

- Countries in sub-Saharan Africa with high rates of heterosexual HIV transmission and low rates of male circumcision are exploring whether and how to scale up male circumcision.

- Patients continue to be at risk of HIV infection in health care settings owing to the lack of universal quality-assured screening of blood supplies and unsafe injection equipment. Post-exposure prophylaxis is available in 35% of the health facilities in 50 reporting countries.

- Trials of female microbicides, preventive vaccines and suppression of genital infections with herpes simplex virus did not show efficacy.
The scale of the HIV epidemic is a testimony to the failure to scale up and sustain prevention efforts to reduce new infections. Although prevention programmes in some countries have succeeded in scaling up HIV prevention services and decreasing HIV prevalence, more needs to be done: globally 2.5 million people were newly infected with HIV in 2007.

A public health approach to HIV service delivery needs to be balanced and comprehensive, recognizing that, in addition to providing treatment, care and support, the health sector must play a stronger role in HIV prevention (1).

4.1 Preventing HIV infection among the population groups most at risk

Globally, an estimated 80% of all HIV infections are sexually transmitted, and 10% of all new infections (and as many as 30% outside sub-Saharan Africa) are among injecting drug users. The health sector has an important responsibility to reduce the frequency of behaviour that can expose people to HIV infection and to minimize the risk of HIV transmission when this behaviour takes place.

Focusing attention on population groups who may be most at risk of HIV infection through their behaviour, such as sex workers and their clients, injecting drug users, men who have sex with men and prisoners, is an important priority for the health sector. Promoting condom use and appropriately managing sexually transmitted infections are essential to prevent the sexual transmission of HIV. The health sector also delivers a range of interventions to reduce HIV transmission through injecting drug use and to provide treatment and care to injecting drug users, including antiretroviral therapy, opioid substitution therapy and other pharmacotherapy for substance dependence, as well as specific harm reduction interventions such as needle and syringe programmes. In addition, HIV testing and counselling needs to be integrated into services for managing sexually transmitted infections, reproductive health, harm reduction, prison health and primary health care to strengthen efforts to prevent HIV transmission.

In many countries, population groups at high risk of HIV transmission face barriers to accessing health services due to discrimination, social marginalization and unfavourable legislation such as laws criminalizing sex work, injecting drug use and homosexuality. Further, the criminalization of HIV transmission (such as exposing another person to the virus or unintentionally transmitting the virus) may impede efforts to implement HIV prevention services, especially for the people who test positive (2,3). To achieve universal access, the health sector needs to develop models of service delivery to reach out to people at high risk and needs to intensify efforts to make services accessible and acceptable to these people. The health sector also has a role and responsibility to advocate for equitable access to health services for the population groups most at risk and to work with other stakeholders to ensure an enabling legal and policy environment for delivering priority interventions to these groups.

4.1.1 Sex workers and their clients

Sex workers face a high risk of acquiring and transmitting HIV. Sex workers and their clients are fuelling the HIV epidemic in many parts of the world, notably during the early phases of expansion of the epidemic.

Examples from several countries in Asia demonstrate that strong political commitment and appropriate policies to prevent HIV infection among sex workers can result in beneficial outcomes. In four countries in Asia with generalized HIV epidemics – Cambodia, Myanmar, Thailand and four states in India – large-scale implementation of targeted interventions in sex work settings resulted in declining rates of sexually transmitted infections and stabilizing or declining rates of HIV prevalence.

Thailand is widely recognized for its successful 100% condom use programme among sex workers. Rates of curable sexually transmitted infections fell by more than 95% during the 1990s, HIV prevalence declined in most population groups (4) and an estimated 5.7 million HIV infections had been averted by 2002 (5). Since 2000, many other Asian countries, including Cambodia, China, Lao People’s Democratic Republic, Mongolia, Myanmar, the Philippines and Viet Nam, have adapted Thailand’s model to expand HIV prevention programmes among sex workers and their clients. The programmes were initiated with pilot demonstration sites selected based on several criteria, including the availability of health services for managing sexually transmitted infections and the presence of large numbers of establishment-based sex workers. The number of sites has expanded significantly in recent years. In Myanmar, for example, a 100% targeted condom promotion programme was piloted in four townships in 2001 and expanded to cover 154 of 325 townships in the country by 2006 (6).

Experience from such countries as India and Mongolia has shown that such models can also be adapted to places where sex work is less structured or is street-based. The prevalence of sexually transmitted infections has been significantly reduced in countries with high rates of transmission. In India, for example, the Avahan India AIDS Initiative was established
in 2003 to expand outreach, community mobilization and dedicated clinics for sex workers (Fig. 4.1). By the end of 2005, clinics with community outreach for sex workers had been established in 274 settings covering 77 districts. In 65 districts in four large states, 183,000 sex workers were identified, 70% were contacted through peer outreach and 41% attended clinics at least once. The initial results suggest a declining proportion of ulcerative sexually transmitted infections (7,8).

Successful targeted interventions among sex workers in sub-Saharan Africa have also resulted in lower transmission rates of sexually transmitted infections and HIV. A cohort study among female sex workers in Nairobi, Kenya found that the per-act rate of HIV acquisition declined dramatically between 1985 and 2005. This reduction correlated closely with decreases in gonorrhoea prevalence and predated reductions in HIV prevalence among the general population in Kenya by more than a decade. The study notes that this decline may represent the impact of improved prevention and therapy of sexually transmitted infections, among other factors (10). In Abidjan, Côte d’Ivoire, prevention campaigns for female sex workers are likely to have increased rates of condom use and led to declines in the prevalence of HIV infection and other sexually transmitted infections (11).
4.1.2 Injecting drug users

Globally, an estimated 13 million people inject drugs, and 3–4 million of these are living with HIV (12). Injecting drug use accounts for more than 80% of all HIV infections in Eastern Europe and Central Asia. High rates of HIV prevalence among injecting drug users have also been documented in several countries in the Middle East, North Africa, South-East Asia and Latin America.

HIV interventions using a harm reduction approach can reduce HIV transmission and provide effective treatment and care for injecting drug users. Several studies have consistently shown that needle and syringe programmes result in marked decreases in HIV transmission and that opioid substitution therapy is effective in reducing HIV transmission related to injecting drug use and in improving access and adherence to antiretroviral therapy (13). WHO, other United Nations agencies and their partners advocate for a comprehensive package of interventions for prevention, treatment and care of HIV among injecting drug users.

At the end of 2007, 72 countries had introduced at least one needle and syringe programme, and 58 countries provided opioid substitution therapy using either methadone and/or buprenorphine (data from the United Nations Reference Group on HIV/AIDS Prevention and Care among Injecting Drug Users in Developing and Transitional Countries). Standardized global data on access to interventions to reduce the risk of HIV infection among injecting drug users are lacking. The available data suggest that, despite recent efforts, the overall coverage of services among this risk group remains limited.

Data on access to harm reduction services for injecting drug users in the WHO European Region (20) show that, in 2007, all high-income countries in Europe had at least one needle and syringe programme site per 1000 drug injectors, except

Box 4.1. Interventions for HIV prevention, treatment and care for injecting drug users

WHO and partners advocate for a comprehensive package of interventions for prevention, treatment and care of HIV in injecting drug users, which should include:

- needle and syringe programmes;
- opioid substitution therapy and other drug dependence treatment;
- HIV testing and counselling;
- HIV treatment and care, including antiretroviral therapy;
- prevention and treatment of sexually transmitted infections;
- condom programming for injecting drug users and their sexual partners;
- targeted information, education and communication for injecting drug users and their sexual partners;
- hepatitis (B and/or C) diagnosis, treatment and vaccination where appropriate; and

The interventions in the comprehensive package are based on substantial scientific evidence (14–19). These interventions are given priority because they have the greatest effect on HIV prevention and/or treatment and care.

Generally speaking, for most countries, the most effective interventions are needle and syringe programmes; opioid substitution therapy and other drug dependence treatment; HIV testing and counselling; and HIV treatment and care, including antiretroviral therapy.

A comprehensive approach should include all interventions in the package. However, the mix of interventions and their content will depend on the country context and should be based on thorough assessment and understanding of the local situation. This includes the types of services available, the patterns of drug use (the types of drug most commonly used, such as opioids, amphetamine-type stimulants, cocaine and benzodiazepines) and the rate and frequency of injecting. The quality of services is also important.

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for Cyprus, Greece, Sweden and Norway. Needle and syringe availability is lower in central and eastern Europe. In 2007, only the Czech Republic, Estonia, Hungary, Latvia, Lithuania and Poland (European Union (EU) members) and Croatia, Tajikistan, Ukraine and Uzbekistan had more than one needle and syringe site per 1000 injecting drug users.

Needle and syringe programmes regularly reached fewer than 10% of the total estimated number of injecting drug users in most countries in central and eastern Europe (regular reach is defined as at least once per month). In the Russian Federation and Ukraine, the two countries in the European Region with the largest injecting drug user-related HIV epidemics, needle and syringe programmes regularly reached only 5% and 10% (respectively) of the estimated number of injecting drug users (13).

There is evidence of substantial scale-up of opioid substitution therapy in EU countries since the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia was adopted in 2004 (21). Opioid substitution therapy using methadone and/or buprenorphine was available in all EU countries at the end of 2007. Opioid substitution therapy is also becoming increasingly available in central and eastern Europe. Ukraine introduced the provision of methadone for opioid substitution therapy in late 2007. However, Armenia, Kazakhstan, the Russian Federation, Tajikistan and Turkmenistan still did not provide opioid substitution therapy in 2007, and coverage remains low in many other countries.

Injecting drug use is also a major factor in HIV transmission in many countries in Asia. Harm reduction programmes in Asia have had a limited impact to date because most have been implemented on a small scale. An increasing number of countries are making efforts to scale up access to services for injecting drug users. Although data are inadequate to develop regional coverage estimates for 2007, the available evidence suggests that the overall coverage of services remains limited.

Box 4.2. Harm reduction interventions in East and South-East Asia

China
Injecting drug use represents the second largest cause of HIV transmission in China, accounting for 29% of new infections at the end of 2007. China had 1.16 million registered drug users in 2005. The total number, including unregistered drug users, is believed to be much higher.

Needle and syringe programmes have expanded rapidly in recent years as a result of measures to increase the commercial availability of needles, provide health education regarding safe injecting practices and, in some cases, provide free needles. China had 775 needle and syringe programmes at the end of 2007, and more than 45 000 injecting drug users had access to clean needles and syringes every three months. Efforts to scale up needle and syringe programmes have focused on rural areas, where access to methadone maintenance therapy remains limited.

Opioid substitution therapy, in particular methadone maintenance therapy, was introduced on a large scale in 2006, with several measures to expand access to these services. Opioid substitution therapy is now included in the national AIDS regulations as a treatment for drug dependence, and the requirements for entry into methadone maintenance programmes have been relaxed. Many drug treatment clinics provide additional services such as HIV and hepatitis testing, counselling, antiretroviral therapy and skills-building. By the end of 2007, China had 503 methadone maintenance clinics covering 22 provinces, and 97,554 injecting drug users were enrolled. The annual retention rate among participants receiving treatment in these clinics was 72%.

An evaluation of several clinics conducted in 2007 found reductions in the rate of injecting drug use and drug-related criminal offences, increased employment opportunities and improved family relations. China has set a target to establish 1500 methadone maintenance therapy clinics by 2008. However, several challenges remain to be addressed to sustain current efforts and expand outreach.

Viet Nam
Injecting drug users in Viet Nam have a high HIV prevalence (23%), with rates exceeding 40% in some provinces. Harm reduction activities in Viet Nam have expanded in the last few years due to increasing political commitment to address HIV and legislative changes that accelerated the scaling up of harm reduction interventions for injecting drug users (22).
The Ministry of Health has taken the lead in guiding and coordinating the delivery of harm reduction interventions, including condom promotion, needle and syringe programmes and opioid substitution therapy. The number of needles and syringes distributed by two major HIV prevention projects in Viet Nam increased from 0.2 million in 2005 to 11 million in 2007, which is sufficient to provide one needle and syringe per day to nearly one quarter of the registered injecting drug users in the country. The number of peer outreach workers, who have played a critical role in delivering these interventions, increased from 150 in 2005 to more than 1000 in 2007. Several peer support groups of sex workers and injecting drug users living with HIV have also been established. This, along with the expansion of antiretroviral therapy services, has fostered trust and links between the health sector and population groups at risk.

As Viet Nam shifts from a project-oriented approach towards integrated long-term programmes, several challenges need to be addressed. Service delivery needs to be expanded further, and additional efforts are needed to address fears related to the existing practice of compulsory long-term confinement for identified drug users.

Malaysia

Injecting drug use is also the primary mode of HIV transmission in Malaysia. Access to HIV treatment in drug rehabilitation centres began with only one centre during the initial phase of implementation in 2005. As of December 2007, four additional centres had been included under this programme, significantly improving treatment access to this marginalized population.

The availability of needle and syringe exchange has also expanded. Three drop-in centres providing sterile injecting equipment were established in 2006, and two more were added in 2007. The number of outreach service delivery points also increased significantly in 2007 with the establishment of 125 new outreach sites. Increasing support by community leaders, particularly religious leaders, has played a major role in scaling up services for the population groups at risk in Malaysia.

The countries in the Middle East and North Africa have a small but increasing population of injecting drug users, most of whom are in the Islamic Republic of Iran and Pakistan. A few countries have introduced successful harm reduction programmes. Harm reduction is highly developed in the Islamic Republic of Iran, demonstrating the feasibility and effectiveness of adapting harm reduction interventions to predominantly Islamic cultural and religious beliefs. Harm reduction programmes have also been initiated in Morocco.

Harm reduction networks and civil society organizations have played a key role in advocating for and helping introduce harm reduction approaches in many regions but have been weak in the Middle East and North Africa. In 2007, WHO and the International Harm Reduction Association collaborated to establish the Middle East and North Africa Harm Reduction Network to strengthen the role of civil society organizations in harm reduction in this region. Three subregional harm reduction knowledge hubs have also been established in the Islamic Republic of Iran, Lebanon and Morocco. This project is the largest investment to build capacity for harm reduction interventions in the region to date.

4.1.3 Men who have sex with men

The AIDS epidemic was first detected among men who have sex with men in North America and western Europe more than 25 years ago. Men who have sex with men continue to represent the largest population living with HIV in most high-income countries (23). In the United States alone, 6000 men who have sex with men who had AIDS died in 2005, and there is increasing evidence of a resurgent epidemic among this group in North America (24).

Men who have sex with men are the most affected population group in western Europe in terms of reported HIV cases, and HIV incidence rates remain high, especially in the United Kingdom (25). HIV prevention activities targeting men who have sex with men clearly need to be renewed, reassessed and revised in these countries (26).

In eastern Europe, HIV transmission among men who have sex with men appears to be greatly underreported (27). In 2006, for instance, 7410 new cases of HIV were reported among men who have sex with men in western Europe (excluding Italy and Spain) versus only 190 new cases in eastern Europe. Nevertheless, in the same year, 36% of reported new HIV cases were categorized as “other” or “undetermined” in eastern Europe versus 18% in western Europe (28). Many such undetermined cases in eastern Europe probably occurred among men who have sex with men, given the high level of HIV-related stigma in this region (26,29,30).

Unprotected sex among men is an important factor in the HIV epidemic in Latin America, with HIV prevalence rates among men who have sex with men as high as 20% in many countries. The HIV prevalence among men who have sex with men is also high in some countries in Asia (23). In sub-Saharan Africa, which has a generalized heterosexual epidemic, modelled estimates in at least one country suggest that 4.5% of new infections are related to men who have sex with men (31).
A recent review of HIV studies of men who have sex with men in low- and middle-income countries (30) revealed substantially higher rates of HIV among this population group than in the general population in both generalized and concentrated epidemics. It noted that men who have sex with men urgently need prevention and care and appear to be both understudied and underserved.

Examples of successful health projects targeting men who have sex with men have been documented in some countries in Latin America and Asia, which provide evidence that strong community involvement is key for scaling up access to services among this population. (32-34). In Colombia, a communication programme targeting men who have sex with men in Bogotá resulted in increased awareness of HIV prevention, diagnosis and treatment and led to an increase in the number of participants seeking an HIV test (35).

Overall, data on HIV prevalence and access to health services for HIV prevention, treatment and care among men who have sex with men in low- and middle-income countries are limited. This is linked to several factors, including a lack of investment in understanding their health needs, inappropriate design of services and barriers to accessing services due to stigma and discrimination and, in more extreme cases, due to criminalization of sexual behaviour.

Until recently, there has also been a lack of international leadership and advocacy to address issues surrounding HIV transmission and access to health services for men who have sex with men. The health sector has an important role to play in including them in the programming priorities of the national health sector, ensuring links with community support organizations to expand access to health services for this group and advocating for decriminalization of same-sex acts and for legislation against discrimination based on sexual orientation.

### 4.1.4 Prisoners

Prisoners are at high risk of HIV infection, with prevalence rates often significantly higher than those in the general population (36). Although most prisoners contract HIV infection outside of prison, the risk of HIV transmission while incarcerated is high due to sharing contaminated injecting equipment or unprotected sex (37). However, this population is largely out of reach of the formal health care system in the community. Prisons should therefore be an important focus of health sector HIV interventions (Table 4.1).

<table>
<thead>
<tr>
<th>Location</th>
<th>Sample size</th>
<th>Percentage of prisoners who inject drugs</th>
<th>Percentage of prisoners who share needles</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>105 women</td>
<td>19%</td>
<td></td>
<td>DiCenso et al. (38)</td>
</tr>
<tr>
<td>Canada</td>
<td>&gt;1200</td>
<td>27%</td>
<td>80%</td>
<td>Small et al. (39)</td>
</tr>
<tr>
<td>Canada</td>
<td>439 men, 158 women</td>
<td>3.3%</td>
<td>32%</td>
<td>Calzavara et al. (40)</td>
</tr>
<tr>
<td>European Union and Norway</td>
<td>1178</td>
<td>0.2–34%</td>
<td></td>
<td>EMCDD (41)</td>
</tr>
<tr>
<td>Mauritius</td>
<td>100 men, 50 women, 50 youth (25 men, 25 women)</td>
<td>10.8% of adults and 2.1% of youth</td>
<td></td>
<td>Rapid situation assessment Mauritius (43)</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1044</td>
<td>10%</td>
<td>66%</td>
<td>Frost &amp; Tchertkov (44)</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>277</td>
<td>13%</td>
<td></td>
<td>Dolan et al. (45)</td>
</tr>
<tr>
<td>Thailand</td>
<td>689</td>
<td>25%</td>
<td>77.8%</td>
<td>Thaisri et al. (46)</td>
</tr>
<tr>
<td>United States</td>
<td>281 men, 191 women</td>
<td>31% of injecting drug users with a history of imprisonment had used illegal drugs in prison, and nearly half of these had injected in prison</td>
<td></td>
<td>Clarke et al. (47)</td>
</tr>
</tbody>
</table>

Source: Effectiveness of interventions to address HIV in prisons (14).
Even countries that have invested heavily in reducing drug demand and supply within prisons have not been able to stop injecting drug use. Sexual activity, including rape and other forms of non-consensual sex, are also commonly reported. Outbreaks of HIV infection have been documented in a number of prison systems, including Australia, the Islamic Republic of Iran, Lithuania, the Russian Federation and Scotland (UK), demonstrating how rapidly HIV can spread in prison unless effective action is taken to prevent transmission (14).

Since the early 1990s, several countries have introduced HIV programmes in prisons. However, many of these are small in scale, restricted to a few prisons or exclude the interventions that are most effective, such as needle and syringe programmes.

In 2007, WHO commissioned a comprehensive review of the prevalence of HIV and risk behaviour in prison settings. The reviews (15–18) provide extensive evidence demonstrating that needle and syringe programmes, treatment of sexually transmitted infections, condom distribution, opioid substitution therapy and other drug dependence treatment programmes in prisons are feasible and effective (Box 4.3).

Box 4.3. HIV interventions for prisoners in South and South-East Asia

A recent report (48) reviewed access to priority HIV prevention, treatment and care interventions among prisoners in four countries in South and South-East Asia: India, Indonesia, Nepal and Thailand.

The extent of HIV transmission in prisons and its role in HIV prevalence in the broader community has been largely ignored in this region. Prison conditions in the countries reviewed do not meet internationally expected standards, and overcrowding and inadequate nutrition are common. The HIV prevalence in prisons in Thailand, India and Indonesia is estimated to be 2–15 times greater than in the community. No data were available for prisons in Nepal.

HIV risk behaviour such as sharing contaminated injecting equipment, unprotected sex and tattooing are common in all the prisons in the countries reviewed. Between one third and one half of all inmates with a history of injecting drug use continue to inject in prison, and both consensual and coerced sex between inmates is common. The prevalence of TB is up to 100 times higher in prisons than in the community. However, data on HIV and TB are not systematically collected in prisons in these countries.

Access to HIV prevention interventions

HIV education programmes were the most commonly implemented HIV prevention measure in prisons in all the countries surveyed. All countries had made condoms available in prisons through pilot or ad hoc projects; however, no country reviewed had introduced a national condom distribution programme in prisons. None of the four countries had implemented a prison needle and syringe programme. India, Thailand and Indonesia offered drug dependence treatment programmes. Indonesia was the only country to have introduced opioid substitution therapy and is the first country in the region to have done so.

Access to HIV treatment and care

Access to general health care was poor in all countries surveyed. Ad hoc support and care services are available in some prisons, such as support groups for prisoners living with HIV. No country routinely provided antiretroviral therapy to prisoners, although a few prisoners in India and Thailand were receiving antiretroviral therapy. Some prisons in India provided treatment for sexually transmitted infections. The DOTS strategy for TB has been implemented in prisons in Bangkok and the surrounding provinces in Thailand.

Recommendations for improving HIV prevention, treatment and care in prisons

Recommendations for improving HIV prevention, treatment and care in prisons include the following health-sector interventions:

- increasing resources and seeking funding specifically for prison health programmes;
- engaging health ministries closely in improving prisoner health;
- introducing prevention and care strategies, including condom distribution programmes, needle and syringe programmes, opioid substitution therapy, HIV testing and counselling and treatment for sexually transmitted infections;
- ensuring access to antiretroviral therapy for those entering and leaving prison through adequate discharge planning, pre- and post-release counselling and other continuity mechanisms;
- providing management of HIV-associated opportunistic infections; and
- strengthening strategic information such as biological and behavioural data on HIV, sexually transmitted infections and TB among prisoners.

Source: HIV prevention, care and treatment in prisons in the South-East Asia Region (48).
4.2 Prevention and care for people living with HIV

All people living with HIV should have access to a core set of health sector interventions to prevent opportunistic infections, maximize their health, prevent further HIV transmission and, in some cases, delay the progression of HIV disease.

Addressing the prevention needs of people living with HIV is a challenge for the health sector. Increasing access to HIV testing and counselling and antiretroviral therapy will increase the number of people living with HIV who can benefit from comprehensive HIV prevention, care, and treatment services in the health sector. However, people living with HIV may be lost to follow-up after diagnosis or may not access health services due to fear or stigma until they have advanced HIV disease. Expanding HIV prevention and long-term care for people living with HIV will require additional capacity in the health sector, stronger links with networks of people living with HIV and measures to address stigma and discrimination within health care settings.

Box 4.4. Essential prevention and care for adults and adolescents living with HIV

WHO recommends the following areas of intervention of particular importance for people living with HIV:

- psychosocial counselling and support;
- testing and counselling;
- disclosure and partner notification;
- preventing and managing HIV/TB coinfection, including the “three Is” (isoniazid preventive therapy, intensified case-finding and infection control);
- preventing and managing opportunistic infections and comorbidity, including TB;
- preventing and managing sexually transmitted and other reproductive tract infections;
- preventing malaria;
- selected vaccine-preventable diseases (hepatitis B, pneumococcal infection, influenza and yellow fever);
- nutrition;
- family planning;
- preventing the mother-to-child transmission of HIV;
- needle-syringe programmes and opioid substitution therapy; and
- water, sanitation and hygiene.

Although not all countries need all interventions, relevant interventions should be provided depending on the local context and epidemiology. Many of these interventions will continue to be needed even after antiretroviral therapy is initiated and should be maintained throughout treatment.
4.3 Male circumcision

Male circumcision is now recognized as an additional important health sector intervention to reduce the risk of heterosexually acquired HIV infection in men, especially in countries with high rates of heterosexual HIV infection and low rates of male circumcision.

Three randomized controlled trials carried out in sub-Saharan Africa to assess the impact of male circumcision on HIV acquisition among heterosexual men (49–52) reported a strong protective effect, with an approximately 60% reduction in the risk of acquiring HIV. Mathematical models subsequently predicted that male circumcision could avert 2 million new HIV infections and 300,000 deaths over the next 10 years in sub-Saharan Africa and that HIV prevalence could be halved (53,54). Another model estimated that the reduction in HIV incidence that could be obtained under some scenarios could reduce the reproductive rate (the average number of people infected by each person living with HIV) to less than one, effectively reversing the epidemic (55).

It is still uncertain whether circumcision decreases the likelihood of HIV transmission from HIV-positive men to HIV-negative women or decreases transmission among men who have sex with men. Preliminary studies suggest that the female partners of circumcised men may have a lower prevalence of some reproductive tract infections (56).

In 2007, WHO and UNAIDS, with the advice of experts at an international consultation, recommended that male circumcision be recognized as an additional important strategy for the prevention of heterosexually acquired HIV infection among men, an important landmark in the history of HIV prevention (57).

The consultation recommendations emphasize that male circumcision should be scaled up as part of a comprehensive, integrated HIV prevention package, informed by the social and cultural context. Provider-initiated testing and counselling is recommended before male circumcision. The recommendations also reinforce that circumcision should be accompanied by appropriate communication regarding the limits of its protective effect for HIV-negative heterosexual men; that surgery should be delivered in an appropriate clinical setting by trained health care providers; and that human rights principles should guide service delivery. Ensuring sufficient time for wound healing before

Box 4.5. Scaling up male circumcision in Swaziland

In 2004, the HIV prevalence identified through antenatal clinics in Swaziland reached 42.6%, the highest in the world. Swaziland is an example of a country in which scaling up male circumcision services could markedly affect the HIV epidemic because HIV prevalence is high and the prevalence of male circumcision is low. Boys are not regularly circumcised; the prevalence is about 14%. Nevertheless, male circumcision is highly accepted in Swaziland, as it is elsewhere in sub-Saharan Africa (59).

Adult circumcision is offered at the government referral hospital in Mbabane (the capital) two private clinics in Mbabane, several hospitals and the offices of private physicians. To help meet demand for circumcision, the government sponsored several one-day events – Circumcision Saturday – in 2007, where a surgical team circumcises several dozen men.

One Circumcision Saturday in the town of Mankayane addressed a group of 40 men aged 18–30 years. The event was advertised by distributing flyers. Group counselling was provided to the 40 men prior to the procedure. First, the nongovernmental organization Population Services International conducted a risk-reduction counselling session. This was followed by an educational session about male circumcision conducted by a nurse from the Family Life Association of Swaziland, who had clinical and educational experience in circumcision. Individual voluntary testing and counselling was available after the group sessions to men who were interested. One quarter of the participants received an HIV test.

In seven working hours, each surgeon completed an average of 10 procedures. No significant complications arose from any of the procedures. The men were seen for postoperative visits as necessary. Circumcision was provided free of charge, and the cost to the programme of the process was US$82 per circumcision.

Circumcision Saturday demonstrates how a public health programme can deliver safe circumcision services, with appropriate counselling and postoperative follow-up, in a resource-limited setting.
resuming sexual activity may be particularly critical, as evidence indicates an increased risk for HIV transmission during this time (58).

Many high-burden countries in sub-Saharan Africa are exploring whether and how to scale up male circumcision programmes based on recommendations from the international consultation. Several national and international partners are working with countries to develop a range of approaches to delivering male circumcision services. Circumcision is currently not recommended for men living with HIV.

4.4 Preventing HIV transmission in health care settings

Within health care settings, the people receiving and giving health care are at potential risk of HIV exposure, depending on whether universal precautions are implemented. The people receiving care may be exposed to blood from contaminated blood supplies, from needles or instruments used on other people receiving care or, rarely, from the health care worker to the people receiving care during surgery. Health care workers are most commonly exposed to the blood of the people receiving care via accidental injuries from sharps (such as syringe needles, scalpsels, lancets, broken glass or other objects potentially contaminated with blood).

Box 4.6. Vaccines, microbicides and new prevention technologies

Research on HIV vaccines and microbicides has advanced knowledge of immunology and virus-host interactions. However, efforts to develop vaccines and microbicides have had disappointing results over the past several years.

Vaccines

The genetic diversity and mutability of the HIV envelope protein has thwarted efforts to develop an efficacious preventive or therapeutic vaccine. The Phase III STEP trial of the Merck AIDS vaccine candidate, MRK-Ad5, was stopped in 2007 during mid-enrolment after interim data analysis indicated no protective effect; a more recent multivariate analysis of the data from that trial suggested an overall increase in HIV infection risk in the vaccine versus placebo arm of the trial (68).

Microbicides and cervical barriers

A Phase III microbicide trial of cellulose sulfate gel was halted in early 2007 after data indicated that the cellulose sulfate gel may have contributed to an increased risk of HIV infection. The MIRA diaphragm trial reported no evidence of efficacy in July 2007, and in February 2008 the results of the Phase III trial of the Carraguard® microbicide found the product to be safe but ineffective at preventing HIV infection (69,70).

New prevention technologies

Pre-exposure prophylaxis is an experimental strategy using antiretroviral drugs on a daily basis to prevent HIV infection. Clinical trials testing tenofovir and tenofovir + emtrictabine as pre-exposure prophylaxis agents experienced initial challenges, with several trials suspended before or during enrolment in Cambodia, Cameroon and Malawi. However, other trials of pre-exposure prophylaxis evaluating safety and efficacy are proceeding.

A study presented at the 16th International AIDS Conference (71) found tenofovir safe as pre-exposure prophylaxis. The results of large-scale Phase III pre-exposure prophylaxis trials in Thailand (testing the safety and efficacy of tenofovir among injecting drug users) are expected in 2008. Phase III trial results testing tenofovir + emtrictabine among heterosexually active young adults in Africa and among men who have sex with men in Peru and Ecuador are anticipated in 2009 and 2010, respectively (72).

Herpes simplex virus type 2 suppressive therapy

Multiple observational studies have shown that infection with herpes simplex virus type 2, the type that most commonly causes genital herpes, is strongly associated with HIV infection (73). This might be explained by the occurrence of ulcers among individuals infected with herpes simplex virus type 2, which provides an easy route of entry for HIV.

Two randomized controlled trials explored whether the daily use of medication to suppress the multiplication of herpes simplex virus type 2 and the appearance of genital ulcers can affect HIV acquisition. However, both trials failed to show a protective effect (74,75). It is unclear why these well-conducted trials failed to show a protective effect among HIV-negative subjects. Additional trials are testing whether similar treatment of people living with HIV who are infected with herpes simplex virus type 2 can prevent the transmission of HIV.

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HIV continues to be transmitted by blood transfusion due to the lack of universal quality-assured screening, undue reliance on family or paid donors and unnecessary use of blood. Globally, 80.7 million donations of whole blood were collected annually in 167 countries during 2004–2005 (60).

Of these, 77.3 million were tested for HIV, and at least 0.6 million of the remaining 3.4 million donations were untested. However, the quality of testing is uncertain, as 75 (52%) of the 145 countries reporting 100% HIV testing either did not use or did not verify the use of standard operating procedures in all centres. Training health care providers can considerably lower the risk of HIV infection, as up to 50% of transfusions continue to be unnecessary (61,62). Greater attention also needs to be paid to ensure adequate training follow-up and supervision of health care providers.

Unsafe injections continue to put the people receiving health care at risk of HIV infection. In low- and middle-income countries, an estimated 40% of all injections are given with injection equipment that is unsafe (63). Recent studies in sub-Saharan Africa and Thailand suggest that unsafe injections are responsible for between less than 1% and 3% of all HIV infections (31,64).

An estimated 327 000 health care workers throughout the world are percutaneously exposed to HIV annually. The highest numbers of workers exposed are reported in sub-Saharan Africa and South-East Asia. In eastern Africa alone, about 19% of health care workers are percutaneously exposed to HIV annually (65).

The risk of acquiring HIV from a single percutaneous exposure to a needle contaminated with HIV is about 0.43%. However, this is an average figure, and deep injuries or injuries from devices with visible blood carry a higher risk of infection (65). Sharps injuries cause between 200 and 5000 HIV infections among health care workers each year, and about 4% of all HIV infections among health care workers arise from occupational exposure (66).

Post-exposure prophylaxis is a short-term course of antiretroviral therapy that aims to reduce the likelihood of HIV infection after potential exposure. WHO recommends that post-exposure prophylaxis be provided as part of a comprehensive, universal health sector prevention package that reduces staff exposure to infectious hazards (67). In 2007, of 73 low- and middle-income countries that provided information on post-exposure prophylaxis, 64 (88%) had a national post-exposure prophylaxis policy or protocol. However, the reported availability of post-exposure prophylaxis in health facilities is lower, and only 35% of health facilities in 50 reporting countries had post-exposure prophylaxis available. The national post-exposure prophylaxis policy or protocol covered occupational exposure (such as needle-stick injuries in a health care facility) in all 64 reporting countries. However only 40 of 64 countries (62%) covered non-occupational exposure (such as in cases of sexual assault).

Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.
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