

Central Asia: 'hot spots' in the global HIV epidemic

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Summary

The HIV epidemic in Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) started relatively recently but has dramatically accelerated since 2000. This expansion in the epidemic is largely attributable to escalating injection drug use, reflecting Central Asia's geographic position on major drug trafficking routes. Although up to 75% of cumulative HIV cases have been among injection drug users (IDU) to date, HIV infections are increasing in other population groups, including female sex workers and their clients, prisoners and migrants. Among IDU, risky injecting practices are highly prevalent, whilst the intersecting epidemic of sexually transmitted infections, particularly syphilis, highlights the potential for sexual transmission of HIV to bridging populations. Few HIV cases in children have been reported to date, with most resulting from nosocomial outbreaks in hospital settings. Some recent progress has been made towards scaling-up prevention, treatment and care services, including harm reduction for IDU, although key challenges remain.

Introduction

The republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan comprise the Central Asian sub-region, home to nearly 60 million ethnically heterogeneous people, distributed across a geographic area of nearly 4 million km² (Table 1). These five countries are classified as transitional economies by the World Bank, with Kyrgyzstan, Tajikistan and Uzbekistan having Gross National Incomes below US\$650 per capita, less than 20% of their pre-independence levels(1).

The Central Asian Republics (CAR) have inherited Soviet health care infrastructures, including vertical systems of care, which focus disproportionately on narrow provision of specialized curative care for TB, sexually transmitted infections (STI) and drug use (1-3). Transition (political, social and economic) since the early 1990s resulted in declining life expectancies and re-emerging infectious diseases, including explosive syphilis outbreaks (4-7), together with a weakening public health infrastructure (8;9). Ongoing health reforms across Central Asia (CA) have focused on primary care and maternal and child health (MCH), aiming to address the problems of fragmented primary care provision, over-hospitalization and over-specialization (2;10). However, the infant mortality rate in the CAR remains around 5-9 times higher than that in the European Union (Table 1) (11).

Eastern Europe (EE) and CA together have one of the most rapidly accelerating HIV epidemics worldwide (12), with recent exponential increases in HIV cases (Figure 1). Our aim was to explore the published literature and provide a concise review of the current HIV epidemic in CA and national responses, including HIV testing and prevention activities, treatment and care.

Search strategy and selection criteria

A literature search was carried out using the PubMed and Web of Science databases, not restricted to date but restricted to papers with English language abstracts. The keywords

used in the search included "HIV", "human immunodeficiency virus", "AIDS", "acquired immune deficiency syndrome", "Central Asia", "Kazakhstan", "Kyrgyzstan" "Uzbekistan", "Tajikistan", "Turkmenistan". Reference lists of relevant articles and reviews were searched for relevant studies, as were the abstracts of recent conferences. Publications and web pages of organizations such as WHO, UNAIDS, UNICEF, UNODC, the World Bank, the Central Asia AIDS Control Project and the Eurasian Harm Reduction Network were searched. This review makes little reference to the situation in Turkmenistan, where there is only limited national data available. A recent report by Medecins Sans Frontieres outlines the disincentives to reporting of data with respect to infectious diseases including HIV (13).

Overview of HIV epidemic in Central Asia

Unfavorable socioeconomic conditions in CA, including increasing poverty, unemployment and migration created the potential for a rapid increase in HIV infection driven by rising numbers of injecting drug users (IDU), sex workers and high-risk sexual behaviors (4;5). The evolution of and response to the HIV epidemic in CA needs to be considered in the context of the overlapping epidemics of TB and STIs (4-7); syphilis prevalence in CA reaches 2% in pregnant women and 40% in female sex workers (FSW), while TB incidence is five to nine times higher than in the EU (14).

Although fast-growing HIV epidemics are in evidence across CA, Uzbekistan has the largest number of HIV cases and is experiencing a particularly deteriorating situation (Table 2). Newly diagnosed HIV cases increased more than 11-fold in Uzbekistan between 2001 and 2006 compared with four-fold increases in Kyrgyzstan and Tajikistan (15). Young people have been most affected by the HIV epidemic: in Uzbekistan 64% of cumulative HIV cases have been among individuals aged ≤ 34 years, in Kyrgyzstan 57% of cases are in those aged < 30 and in Kazakhstan 54% of cases are in the 20-29 year age group (16;17). The predominant HIV genetic subtype in CA is subtype A, as found

elsewhere in EE, distinguishing the epidemic in this sub-region from that in Western Europe, where subtype B predominates (18-20).

National programmes for HIV/AIDS treatment and prevention have been established in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan and all four countries have successfully applied to the Global Fund for AIDS, TB and Malaria (GFATM) for grants to finance scale-up of prevention, testing, treatment and care. The World Bank, bilateral donors, UN agencies and other international organisations have provided considerable financial and technical assistance in developing these programmes. Second generation HIV sentinel surveillance has been ongoing in CA for several years, allowing accurate data collection on the epidemic (17, 21-29). Such data are essential for programme development and evaluation, but this is hindered by uncertainty regarding the size of most-at-risk populations across CA.

Epidemiology: HIV prevalence and risk factors among at risk populations

Injecting drug use

CA is experiencing substantial increases in both trafficking and use of illicit drugs, driven by its geographic position on drug-trafficking routes from Afghanistan, domestic opium production in the south of the sub-region and prevailing socio-economic conditions (1;9;30-32). Although injection of heroin or home-made opiates (e.g. "khanka") predominates, stimulant injection has also substantially increased, with 69% of IDU in one Kazakhstan study reporting methamphetamine use (33). Injecting drug use has driven the HIV epidemic in CA to date, accounting for 50-70% of cumulative HIV cases. Reported HIV cases among IDU increased substantially between 2002 and 2006, with increases of 482% in Tajikistan, 130% in Uzbekistan, 132% in Kazakhstan and 30% in Kyrgyzstan (34) and HIV prevalence among IDU is increasing across the sub-region (17). However, HIV surveillance among IDU is subject to selection bias, often focusing on registered IDU who have longer injecting histories and/or are more likely to be in contact with services (21). Sentinel surveillance data indicate HIV prevalence of around 7%

among IDU in Kyrgyzstan (ranging from 2% in Bishkek to 13% in the Osh province), 4% in Kazakhstan and 16% in Uzbekistan and Tajikistan overall (21), but outbreaks of HIV among IDU in specific cities have recently been reported, resulting in considerably higher prevalence (Table 3); e.g. in Dushanbe, HIV prevalence increased from 3.9% in 2001 to 12% in 2004 and 24% in 2006 (Table 3), while in Karaganda, Kazakhstan, HIV prevalence has reached 19% (17). Dramatic and rapid increases in HIV infections have recently been reported in Western Siberia, in the Russian Federation, with increases of up to 700% mostly among IDU (35); increasing HIV prevalence has also been reported among IDUs living in Kazakhstan along the Russian border (35).

The rapid spread of HIV among IDU in CA has been facilitated by high prevalence of risky behaviours; 50-70% share injecting equipment, purchase pre-filled syringes or draw-up from common containers, while condom use is low (1;21;23;36-39) (Table 4). Specific drug preparation practices may also potentially increase risk, with blood used in the preparation of "vtoryak", a solution obtained by reprocessing materials after preparation of "khanka"; however, "vtoryak" was used by less than half of IDUs in a 2002 study in Kazakhstan (26). Studies have demonstrated average durations of injecting of 3-9 years among IDU, the average age of whom is decreasing (23;39-41). In Tajikistan, recent initiates were twice as likely to be HIV-infected as those with longer injecting histories, suggesting riskier HIV behaviours (42) and potentially less use of harm reduction services than older, more established IDU. Prevalence of HCV and of syphilis among IDU can indicate the extent of risky injecting and sexual behaviours respectively. HCV prevalence among IDU exceeds 60% in Tajikistan and Uzbekistan and 70% in parts of Kazakhstan, and up to one in six IDU have syphilis (17;39;43) (Table 3). Female IDU are particularly vulnerable to acquisition of HIV, HCV and STIs, due to exchange of sex for drugs or money and risky injecting behaviours (36;44): 28% of female IDU in a study in Dushanbe, Tajikistan had syphilis (75% of whom reported transactional sex) compared with 13% of males (39), while in a study in Kazakhstan, female IDU were 2.3 times more likely to be HIV-positive than males and had a syphilis prevalence of 11% compared with

5% among male IDU (26), The estimated 20-24% of male IDU who have sex with FSW also underscores how these risk groups intersect (21;40;41;45).

Sex work

The size of the sex worker population in CA is difficult to estimate, reflecting the illegal and often temporary nature of sex work. In Kazakhstan, 1-4 per 1000 residents in major cities are estimated to engage in sex work, with estimates of 8 per 1000 in Dushanbe and 2-3 per 1000 in Tashkent (46). As little is known about male sex work in CA, this section will focus on FSW and their clients. FSW tend to be young (average <25 years), single and are often highly mobile, which may contribute to HIV spread (36). At least 10-30% of FSW are thought to inject drugs and around 50-65% of female IDU across the sub-region are estimated to exchange sex for drugs or money (21;23;40;41). Overall, HIV prevalence among FSW is around 2% in CA (Figure 2), although among FSW who inject drugs, prevalence is at least five- to six-fold higher (21;27;28). High syphilis prevalence among FSW, at between 15-40%, highlights their increased risk for both HIV acquisition and transmission (21;27;38;47). In one study of FSW in Tashkent (Table 3), 53% of those HIV-infected were IDU (45) and second generation surveillance demonstrated substantially higher HIV prevalence among FSW who injected drugs compared with those who did not inject, e.g. 14% versus 2% in Kazakhstan and 31% versus 5% in Uzbekistan (17). Surveillance has also demonstrated substantially higher syphilis prevalence among FSW who inject drugs, e.g. 42% versus 25% in Uzbekistan (17), suggesting that this sub-group of FSW are also at greater risk of sexual acquisition of HIV.

FSW clients are generally married or cohabiting, for example, two-thirds had long-term partners in studies in Kyrgyzstan and Kazakhstan (40;41). Three-quarters of FSW clients in a study in Karaganda, Kazakhstan had at least four new sex partners in the previous 12 months, indicating the importance of this group as a bridging population, particularly as they are at risk of concurrent STI infections (40;41). A survey of 600 students in

Semey, Kazakhstan reported that 30% of the men had purchased sex, an unexpectedly high proportion given their young age (median 20 years) (48).UNAIDS estimates that one in eight to nine HIV cases in EE and CA are among sex workers and their clients (38).

Migrant workers

Migrants can link low and high prevalence populations, "seed" new outbreaks, may engage in risky behaviours (49), and appear to play a key role in the spread of HIV in EE & CA (50). There is a growing reliance on migration for employment in parts of CA, with large numbers of labour migrants travelling to Kazakhstan and the Russian Federation (1;21). Around 600,000 to 1 million workers in Tajikistan, 300,000-500,000 in Kyrgyzstan and 330,000 in Uzbekistan are estimated to work abroad (1;36;51). Most migrant workers are male, but increasing numbers of women are participating in labour migration. Sex trafficking of women from and within CA is also a growing problem (52;53). A study of 30 Tajik male migrant workers in Moscow found that all had regular sex with FSW, rarely with condoms, returning home to their wives for several months each year (51). In a study in Tajikistan, IDU who had worked abroad were 2.5-times more likely to be HCV-positive than other IDU, suggesting risky injecting behaviour (39). In Kazakhstan, there was an approximate 30% increase in HIV cases among non-nationals between 2005 and 2006, while in Tajikistan around half of all registered HIV cases have been among labour migrants (21).

Men who have sex with men (MSM)

MSM are a marginalized group in CA, hard-to-reach for surveillance and prevention. Homosexuality is criminalized in Uzbekistan and Turkmenistan (54) and generally in CA MSM face considerable stigma and discrimination (1;21). Sentinel surveillance among MSM has been based on small numbers to date and prevalence estimates should be interpreted with caution (Figure 2). Syphilis prevalence of 23% has been reported among

MSM in Kyrgyzstan, while in Uzbekistan, surveys among MSM have indicated that 39% do not use condoms with non-regular male partners (38).

Prison populations

HIV testing within prison populations has been widespread in CA, reflecting sentinel surveillance and mandatory testing policies. HIV prevalence among prisoners ranges from 2% in Kazakhstan to nearly 7% in Tajikistan (Figure 2). By the start of 2007, >25% of cumulative registered HIV cases in Kazakhstan were in prisoners, while in Tajikistan, a fifth of the registered HIV population are prisoners (21;50); these proportions reflect HIV testing policies, criminalization of illicit drug use and high rates of risk behaviours among prisoners, both inside and outside prison settings (44). In CA, 5-25% of prisoners are estimated to have drug dependence (33) and up to 70% share injecting equipment (21;55). In one study in Kazakhstan, the prevalence of syphilis among prisoners in temporary detention was 5% (25). TB prevalence among inmates is 60-100 times higher compared to the general population, with high TB mortality (50) .

Women, mother-to-child HIV transmission and pediatric AIDS

Women

Around one in three registered HIV cases are female in Uzbekistan and Kazakhstan, decreasing to one in four in Tajikistan and Kyrgyzstan (Table 2). Disaggregated data by sex and risk group are lacking, but around 15% of IDU in CA are female (33) and it is likely that across the sub-region most HIV-positive women to date have injecting drug use-related acquisition, either their own or that of their partners. In Kyrgyzstan, 66% of HIV-positive women have reported sexual acquisition of infection (21). However, classification of HIV cases by transmission route can be difficult, as injecting drug use is frequently under-reported. Studies in the Russian Federation have demonstrated that at least 25% of women reporting sexual acquisition of HIV were HCV-positive, suggesting an injecting drug use history (35), while second generation surveillance in Kazakhstan indicated that 27% of FSW were HCV positive but only 10% reported injecting drug use

(29). Heterosexual transmission of HIV is increasing (21), now accounting for 19-26% of cumulative HIV reports, with a concomitant rise in female cases; e.g. in Uzbekistan the proportion of female HIV cases increased from 10% in 2001 to 34% in 2007 (16). IDU in CA are sexually active, have high sexual partnership rates, high rates of STI coinfection and low rates of consistent condom use (17;23;40;41). These factors can all facilitate heterosexual spread of HIV and having an IDU sexual partner is one of the main risk factors identified among newly diagnosed HIV-infected women, together with having a partner who is an ex-prisoner or a migrant worker, consistent with the evolution of the epidemic in EE (56).

Children

By the end of 2006, 94 vertically-infected children had been reported from Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan (15). However, most HIV-infected children diagnosed to date in CA were infected nosocomially. Major outbreaks of hospital-acquired HIV infection were reported in Shymkent, Kazakhstan and Osh, Kyrgyzstan in 2006 and 2007 respectively (57;58), with another subsequently identified in Uzbekistan, in Andijan and Namangan in the Ferghana Valley (59). Of note, these outbreaks occurred in hospitals situated on major drug trafficking routes from Afghanistan. Investigation of the first two outbreaks by the national authorities in collaboration with the USA Centers for Disease Control and Prevention (CDC) CA regional office identified a combination of factors including poor blood safety, unsafe injections and lack of adequate sterilization procedures as likely causes, whilst prolonged hospitalizations extended exposures. A previous WHO-led assessment of paediatric hospital care in Kazakhstan identified high rates of lengthy and unnecessary hospitalisations and widespread yet avoidable administration of drugs by injection (60). Substantial anecdotal reporting of inadequate supplies of disposable equipment including needles and syringes across CA has been confirmed in Kyrgyzstan following a recent situation analysis which identified chronic shortages of such commodities (61). The number of children with hospital-acquired HIV infection in CA is uncertain, as investigations in some countries are ongoing and there

are disincentives to publish these data. In Kyrgyzstan 164 cases had been officially reported by mid 2009 (62), in Kazakhstan, 118 cases were reported between May 2006 and June 2007 (63) and in Uzbekistan 147 cases in the Namangan outbreak had been reported by March 2010 (64).

Most-at-risk adolescents and young people

Approximately one third of new HIV infections in EE and CA are among 15-24 year olds (12) and there were an estimated 340,000 young people aged 15-24 living with HIV in the Region in 2007 (65). Data on the numbers of youth engaged in drug use, sex work and young MSM are extremely scarce. A survey in Uzbekistan among adolescents (aged 10-18), who injected drugs, sold sex and engaged in male-to-male sex, showed that 66% lacked basic knowledge of HIV prevention and skills to protect their own health (66). No data are published on HIV prevalence among street children in CA, but a prevalence of 37% was reported in St. Petersburg, Russian Federation (67), indicating extremely high vulnerability of this population to HIV.

HIV testing

Funding through GFATM grants to Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan have helped to facilitate the scale-up of HIV testing programmes in CA. In Kazakhstan and Tajikistan the number of health facilities providing HIV testing and counselling increased by 50-100% between 2007 and 2008, with 3,000 adults covered by each testing facility in Kazakhstan, which has the highest rate of HIV testing in the European Region, at 119.1 per 1000 (68); in contrast there are >100,000 adults per facility in Kyrgyzstan (69). Mandatory HIV testing of some groups continues to occur in CA, including detained FSW and prisoners; in a Kyrgyzstan study of FSW, among those recently tested, half had received a compulsory test (41). Networks of "Trust Points" have been established across CA where individuals can access voluntary counselling and testing (VCT) anonymously, although the fact that these are largely government-run may prevent some individuals, especially FSW or IDU, from seeking testing. HIV testing can

also be accessed at HIV/AIDS Centres and in antenatal care settings. Coverage of FSW with a recent HIV test (within past 12 months) is estimated to be high in Kazakhstan and Kyrgyzstan (70% and 53% respectively), partly due to compulsory testing, and is 29% in Tajikistan and 19% in Uzbekistan (12). Coverage of IDU with a recent HIV test is lower than among FSWs, ranging from 42% in Kazakhstan to 18% in Uzbekistan (Table 4) (12). In the general population, coverage with HIV testing is <5% (12), and specific groups such as labour migrants working illegally are likely to have very low coverage, reflecting difficulties accessing health care (70). Point-of-care HIV testing is carried out in the context of PMTCT in Kazakhstan and Kyrgyzstan, mainly rapid HIV testing in labour of women with undocumented HIV status, although there is some use of rapid tests in antenatal care settings as well.

Treatment and care

HIV/AIDS services throughout CA are organised through a network of Republican and regional HIV/AIDS Centres, with a similarly vertical approach for drug addiction, STIs and TB services. The weak functional linkages between HIV/AIDS Centres and these other service providers (e.g. TB Institutes and Narcology (Addiction Service) Centres) is a key barrier to provision of comprehensive care to PLHIV (50). Specific experience relating to antiretroviral therapy (ART) is usually limited to HIV/AIDS Centres, with restricted knowledge of HIV treatment elsewhere. Estimates derived from epidemiological modelling indicated that <25% of adults and children with advanced HIV disease in CA received ART in 2007 (12);(69). There is wide variation in laboratory capacity for diagnosis and monitoring of HIV infection in CA. Kazakhstan has achieved the highest capacity, including DNA PCR testing for early infant diagnosis and CD4 count monitoring, with high coverage achieved (Table 5). However, limited laboratory capacity exists elsewhere, for example, with CD4 count facilities available in only two districts in Tajikistan.

Prevention

Primary prevention

With financial support from national GFATM grants and cooperation from international organizations, prevention efforts are scaling-up across CA, largely concentrating on IDU and FSW to date. Harm reduction efforts for IDU have been impeded by a lack of strong political support and legislative barriers, including punitive laws regarding drug use and hard-line policing (23-25). However, Kyrgyzstan has achieved substantial progress in harm reduction, reflecting the explicit political support received and removal of some legal barriers (24;33). Some CA countries have achieved medium coverage of IDU with low threshold services, mainly through Trust Points and outreach; for example, coverage has reached 61% in Kyrgyzstan and around 35% in Kazakhstan and services include provision of clean needles/syringes and condoms and VCT or referral for HIV testing. However, coverage with needle and syringe exchange programmes (NEP) and opioid substitution therapy (OST) remains sub-optimal in CA (71) (Table 4). Efforts are ongoing to scale-up harm reduction activities and Kazakhstan now has a pilot OST programme, with a pilot planned in Tajikistan, although the pilot in Uzbekistan was recently closed by the government (24). In Kyrgyzstan, OST has been available since 2002 and recently became available to prisoners, along with NEP (33). A recent study indicated that awareness of HIV services among IDU is highest in Kyrgyzstan at 70%, is around 50% in Kazakhstan and <10% in Tajikistan (23).

Trust Points across CA provide targeted prevention services for FSW. Higher rates of condom use among FSW and their clients (80-90% with last new partner) compared with other respondents in studies in Kyrgyzstan and Kazakhstan suggest that some prevention messages are reaching these groups; however, only 60% used condoms consistently (27;36;40;41;72-74). In a Tashkent study, 31% of FSW used condoms consistently with clients, but only 11% of those married or cohabiting did so with their regular partners (27;36;72-74). Prevention activities have focused on FSW and not their clients, despite their potential for introducing HIV into the general population. In particular, migrant workers should be targeted, as many have contact with the lowest stratum of sex

workers, who have the highest HIV risk (52), yet have limited HIV awareness, with no or rare condom use (51). Media campaigns raising HIV prevention awareness directed at labour migrants are ongoing in Tajikistan.

In CA, barriers preventing vulnerable groups from accessing harm reduction services include the legislative environment (including criminalization of sex work and homosexuality), stigma and discrimination and access issues (coverage, geographic barriers) (9;23;36;75;76). These barriers are likely to contribute to ongoing high risk behaviours. In particular, coverage of most-at-risk adolescents and young people with prevention services is considerably lower than for older most-at-risk populations. The most recent DHS in Kazakhstan indicated that 10% of married men had extramarital sex with at least one woman during the past 12 months, increasing to 22% of those aged 20-24 years; condom use at most recent intercourse with non-cohabiting partners was nearly 60% among men (77). Culture and traditions can impede open discussion of issues relating to sexual practices, and may present obstacles to sensitising communities and increasing awareness of HIV. Targeting unmarried youth, particularly women, with sex education may be problematic in CA (78), which may partly explain current low levels of adequate knowledge of HIV transmission and prevention among youth (Figure 3). In Kazakhstan, 96% of pregnant women had heard of HIV/AIDS, but knowledge tended to be superficial and 42% reported having insufficient prevention information; 36% of Kazakh women reported adequate knowledge compared with 63% of ethnic Russians (79).

Prevention of infections in infants

All CA countries have endorsed the European Region goal of eliminating HIV infection in infants (i.e. reducing MTCT rates to 2%) by 2010 (80). Estimates of HIV prevalence among pregnant women range from 0.5 to 7 per 1000 (Figure 2) (21;22). Numbers of registered HIV-infected pregnant women are increasing annually across CA, reflecting both transmission patterns and improved ascertainment. Nonetheless, official numbers of

pregnant HIV-infected women are likely to be underestimated, particularly where antenatal testing is limited to selected groups (Table 5). Progress in PMTCT has occurred across CA but has been particularly noteworthy in Kazakhstan, where high coverage with antenatal HIV testing and with PMTCT prophylaxis has been achieved, indicating good linkages with MCH services (12) (Table 5).

Blood safety

The World Bank recently investigated blood services in CA and identified patchy and poor quality screening, including undetected cases of HIV (prevalence of 0.2%)(81). The report highlighted fragmented and under-resourced services, lacking national coordination; other systemic deficiencies included use of glass bottles, use of paid and replacement donors and lack of supplies. The existence of illegal trade in donor blood, incentivizing unnecessary blood transfusions, was highlighted in the trials of Kazak medical workers in 2007 following hospital-based HIV outbreaks among children (82); blood transfusion services have since been upgraded. Some initial measures have also been implemented by the other countries (83).

Viewpoint on national responses to HIV in Central Asia: the case of PMTCT and paediatric HIV/AIDS as an entry point for health systems' strengthening

Prompt identification of HIV-infected pregnant women and children, with provision of effective PMTCT interventions and HIV treatment, are global priorities and central to the aim of moving towards an HIV-free future generation (84). Important progress in PMTCT has been achieved in practically all CA countries although there are some key challenges remaining, in particular on issues of quality of care. The barriers limiting progress in the implementation of HIV prevention and treatment in CA can be clearly illustrated by national responses to PMTCT and paediatric HIV/AIDS. The vertical care system is a key barrier to progress, with no or weak coordination between HIV/AIDS care providers and other services which may identify and/or provide services to HIV-infected women and children, including antenatal/maternity care, reproductive health, primary care and

narcology (addiction) services. There is also a lack of cross-referrals and functional linkages across service providers, including between the health and broader social services, and insufficient coordination between ongoing initiatives, including between paediatric AIDS treatment and Integrated Management of Childhood Infections (84). However, in Kazakhstan recent collaboration between the Safe Motherhood and PMTCT has had good results.

The nosocomial HIV “outbreaks” among children in Kazakhstan, Kyrgyzstan and Uzbekistan, with at least 400 infected children identified to date, have demonstrated structural and systemic weaknesses of health care systems, including fragmented service delivery, limited resources, interrupted medical supplies, outdated infection control and blood use protocols, flawed blood management systems and limited staff capacities (59;81;82). Ongoing responses have focused on implementing specific measures to address these weaknesses. However, the punitive nature of the system in CA, exemplified by the conviction and imprisonment of health care workers following the nosocomial outbreaks (63), generates distrust and hinders constructive approaches to change.

The relatively sudden emergence of a sizable population of HIV-infected children meant that there was an initial lack of preparedness and limited capacity for paediatric HIV care and treatment, although subsequently large-scale trainings, clinical mentoring and establishment of pools of regional expertise took place, which will benefit the system overall. The response has boosted governmental commitment to scaling-up paediatric HIV treatment and care in CA, although national scale-up plans have not yet been formalized. All countries will benefit from technical assistance with regard to specific aspects of increasing treatment access, including programme development and effective supply management, and are receiving an external support with this from UN agencies and other international organizations. Work by national and international organizations with families affected by HIV/AIDS has enabled a much needed strengthening of

community involvement. Emergence of parent support groups, advocating for infected children's rights to treatment, care and education has been an important catalyst in the emergence of civil society organizations addressing HIV.

Conclusions

In CA, HIV prevalence has reached concerningly high levels among IDU, reaching 25-30% in some cities, and up to 30% among FSW who inject drugs. Recent surveillance has identified very high levels of risky injecting behaviour and the continued expansion of the HIV epidemic among and beyond the IDU population demonstrates that harm reduction services have not achieved the coverage necessary to stabilize HIV spread. Furthermore, in Uzbekistan there has been reversal of policies on harm reduction and OST, highlighting the relative fragility of some achievements made. The increasing HIV infections among women who do not inject drugs themselves highlights how a large and growing HIV epidemic among IDU has the potential to fuel heterosexual transmission, as has been the case in parts of EE. Considerable scope for continued expansion of the HIV epidemic is provided by sexual mixing between populations at higher and lower risk, high STI coinfection rates and low consistent condom use, with labour migration another key driver. Improving coverage of IDU, FSW and clients and migrants with prevention services should be a key priority, including addressing current legislative barriers to access, but is impeded by the stigma around behaviours linked with HIV and by a lack of strong political commitment towards serving the needs of these populations.

There is heterogeneity within the sub-region regarding capacity for HIV diagnostics, treatment, prevention and care. Kyrgyzstan is recognized as having led the way with harm reduction for IDU, with evidence of a slowing of the spread of HIV among IDU compared with other countries in CA. Kazakhstan has good capacity for surveillance, diagnostics and treatment, reflecting its relative wealth and economic growth, but this means that it is not eligible to apply further to GFATM. Important failures in the health system and the need for restructuring and investment in health care systems have been

exposed by the nosocomial spread of HIV in CA. Development and implementation of HIV prevention programmes in general should be seen as an opportunity to enhance ongoing health care reforms and strengthen the prevention, care, support and protection systems with a view towards addressing the needs of the affected populations. However, the vertical systems of care, insufficient linkages between services, limited capacity and inadequate resources are barriers to scaling-up a multi-sectoral response to the HIV epidemic. Stigma and discrimination around HIV remains a key challenge, although the growing civil society movement should help to engender change.

Much of the data presented in this review were officially reported by the governments of the CAR, for example through UNAIDS reporting exercises. Difficulties in estimating the size of HIV epidemics in countries with concentrated epidemics are well recognized (85), and are likely to be compounded in CA where there remains tight governmental control regarding national data reporting and dissemination and where there has been a very recent acceleration in the HIV epidemic, such as in Uzbekistan. Although second-generation surveillance is ongoing, limitations include a lack of accurate estimates of the size of most-at-risk populations. It is therefore likely that the data presented here considerably under-estimate the actual magnitude of the HIV epidemic in CA and provide an incomplete picture of the current situation. However, it is clear that there is an urgent need to implement effective HIV prevention measures in CA, which will require robust and consistent national political support.

Table 1 Socio-demographic, economic and health indicators, Central Asian Republics

| Indicator | Kazakhstan | Kyrgyzstan | Tajikistan | Turkmenistan | Uzbekistan |
|---|-------------------|-------------------|-------------------|---------------------|-------------------|
| Population size | 15.3m | 5.26m | 6.64m | 4.90m | 27.0m |
| Annual births | 289 000 | 113 000 | 185 000 | 108 000 | 619 000 |
| Total fertility rate | 2.2 | 2.5 | 3.5 | 2.6 | 2.6 |
| Infant mortality rate per 1000 livebirths | 62-63 | 58-61 | 91 | 74-80 | 57-62 |
| Life expectancy at birth (yrs) | 66 | 66 | 66 | 63 | 67 |
| Population annual growth rate (1990-2006) | -0.5% | 1.1% | 1.4% | 1.8% | 1.7% |
| Human Development Index ranking | 73 | 116 | 122 | 109 | 113 |
| GNI per capita (US\$) | 3790 | 490 | 390 | 1 340 | 610 |
| Total health expenditure as % of GDP (2005) | 3.9% | 6.0% | 5.0% | 4.8% | 5.0% |
| % population urbanized | 58% | 36% | 25% | 47% | 37% |
| Antenatal care coverage | 100% | 97% | 77% | 99% | 99% |
| % births with skilled attendant | 100% | 98% | 83% | 100% | 100% |
| Life-time risk of maternal death | 1 in 360 | 1 in 240 | 1 in 160 | 1 in 290 | 1 in 1400 |

(11;77;86-88)

Table 2 The HIV epidemic in Central Asia – key data

| | Kazakhstan | Kyrgyzstan | Tajikistan | Turkmenistan | Uzbekistan |
|---|-------------------|-------------------|-------------------|---------------------|-------------------|
| Estimated adult HIV prevalence (%) (2007) | 0.1% | 0.1% | 0.3% | <0.1% | 0.1-0.2% |
| UNAIDS estimate of number of PLHIV (2007) | 12,000 | 4,200 | 10,000 | <500 | 16,000 |
| Estimated cumulative number of PLHIV (start 2009) | 14,200 | 4,200 | 8,000 | <500 | 16,000 |
| HIV cases officially reported in 2007 | 1,979 | 409 | 339 | N/A | 3,169 |
| Number PLHIV enrolled in HIV care | 7575 | 840 | 995 | N/A | N/A |
| % HIV cases female (2007) | 30% | ~25% | 24% | N/A | 34% |
| Prevalence of injecting drug use | 1-3% | | 0.5-1.5% | N/A | |

[[11;12;32;68;89]]

Table 3
HIV prevalence from selected studies among IDU and FSW

| Study details | Setting | HIV prevalence | Other details | Ref |
|--|----------------------------------|--|--|------------|
| Cross-sectional survey of community recruited IDU, 2003-2004 (n=701) | Tashkent, Uzbekistan | 29.8% | 5% female | (90) |
| Community-recruited IDUs (injected within past month), May – November 2004 (n=491) | Dushanbe, Tajikistan | 12.1% overall, 19% amongst ethnic Tajiks | 15% female; 61.3% HCV positive; 16% had syphilis | (42) |
| Unlinked anonymous seroprevalence survey, 2006 (n=400) | Dushanbe, Tajikistan | 24% | | (34) |
| Cross-sectional survey of IDU, Respondent-driven sampling: 34% syringe exchange programme clients, 66% community-recruited by clients; 2002 (n=1799) | Temirtau & Karaganda, Kazakhstan | 24.7% (18.8%)* in Temirtau and 2.3% (1.2%)* in Karaganda | 25% female; 85% and 74% HCV positive in Temirtau & Karaganda respectively; 6.5% had syphilis | (26) |
| Cross-sectional study of FSW with outreach worker recruitment, 2003-2004 (n=448) | Tashkent, Uzbekistan | 10.0% | 9.2% also IDU | (45;73) |

* estimates adjusted for sample selection process

Table 4
Risk behaviours among IDU and coverage of harm reduction programmes

| | % reporting use of sterile injecting equipment at last injection ¹ | % reporting condom use at last sexual contact ¹ | % sharing syringe at last injection | Number NEP per 1000 IDUs ¹ | OST sites per 1000 IDU ¹ | % IDU reached with HIV prevention programmes in past 12 months | % IDU who received HIV test and results in past 12 months ⁴ |
|------------|---|--|-------------------------------------|---------------------------------------|-------------------------------------|--|--|
| Kazakhstan | 60% | 42% | 20% ² | 1.2 | 0 | 47% ¹ | 42% |
| Kyrgyzstan | 23% | 27% | 21% ³ | 2.0 | 0.7 | - | 34% |
| Tajikistan | 63% | 39% | - | 1.2 | - | 25% ⁴ | 24% |
| Uzbekistan | 84% | 36% | - | 7.0 | 6.7 ⁵ | 40% ¹ | 18% |

NEP: Needle and syringe exchange programme; OST: oral substitution therapy

¹ 2006-2008 data (69)

² 2003 data (40)

³ 2003 data (41)

⁴ 2007 data (12)

⁵ OST is no longer available in Uzbekistan

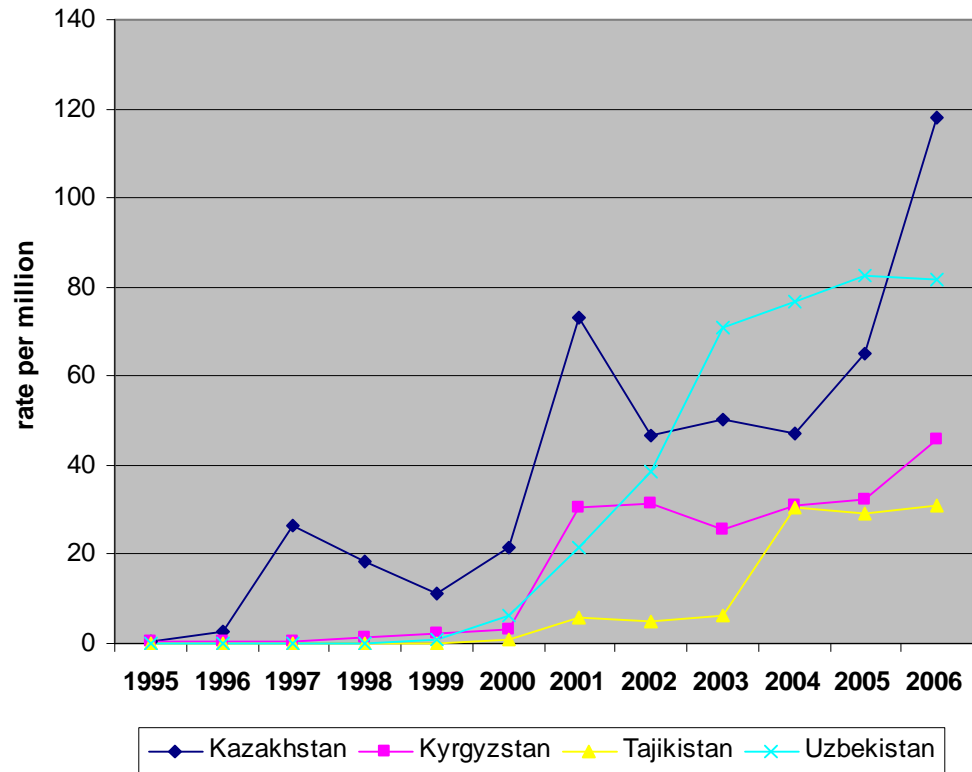
Table 5
Prevention of mother-to-child transmission services in Central Asia

| Components of PMTCT programme | Current situation |
|---|--|
| Antenatal screening | <p>Policies</p> <ul style="list-style-type: none"> • Kazakhstan & Kyrgyzstan: routine provider-initiated testing for all women, provided on an opt-out basis • Turkmenistan: mandatory testing • Uzbekistan: selective opt-out, but routine for all women in some areas • Tajikistan: selective opt-in, but routine for all women in high prevalence areas <p>Coverage</p> <ul style="list-style-type: none"> • >95% in Kazakhstan and Kyrgyzstan, 78% in Uzbekistan and 21% in Tajikistan |
| Antiretroviral prophylaxis for PMTCT | <p>UNAIDS low to high estimates of % coverage of HIV-positive pregnant women</p> <ul style="list-style-type: none"> • Kazakhstan: >95% • Kyrgyzstan: 2 – 8% • Tajikistan: 5 – 19% • Uzbekistan: 17 – 74% <p>UNICEF coverage figures: antenatal and/or neonatal prophylaxis</p> <ul style="list-style-type: none"> • Kazakhstan: 88% antenatal, 95% neonatal • Kyrgyzstan: 5% antenatal, 6% neonatal • Tajikistan : 52% • Uzbekistan: 69% <ul style="list-style-type: none"> • Centralisation of antiretroviral prophylaxis provision at HIV/AIDS Centres • No or restricted provision for antiretroviral supply at maternity hospitals • Triple-drug prophylaxis from 24 weeks used in Kazakhstan • Prophylaxis mainly based on single dose nevirapine and/or short-course zidovudine elsewhere, although with some triple-drug use in Uzbekistan |
| ART for women requiring treatment | <ul style="list-style-type: none"> • 96% of HIV-infected pregnant women were assessed for ART eligibility in Kazakhstan (CD4 count and clinical assessments) |
| Early diagnosis of infants born to HIV-positive mothers | <ul style="list-style-type: none"> • In Kazakhstan, 4 laboratories have the capacity for PCR testing for infant diagnosis and in 2008 95% infants born to infected mothers received a virological test within two months of birth |

| | |
|--|---|
| | <ul style="list-style-type: none">• Limited PCR facilities/laboratory staff capacity in Uzbekistan and Tajikistan, and one laboratory in Turkmenistan |
|--|---|

(UNICEF report card data, 2007, 2008; (12))

Figure 1
New HIV infections (rates per million population) by country and year of report



(91;92)

Figure 2
HIV infection prevalence according to sentinel epidemiological surveillance surveys, 2007

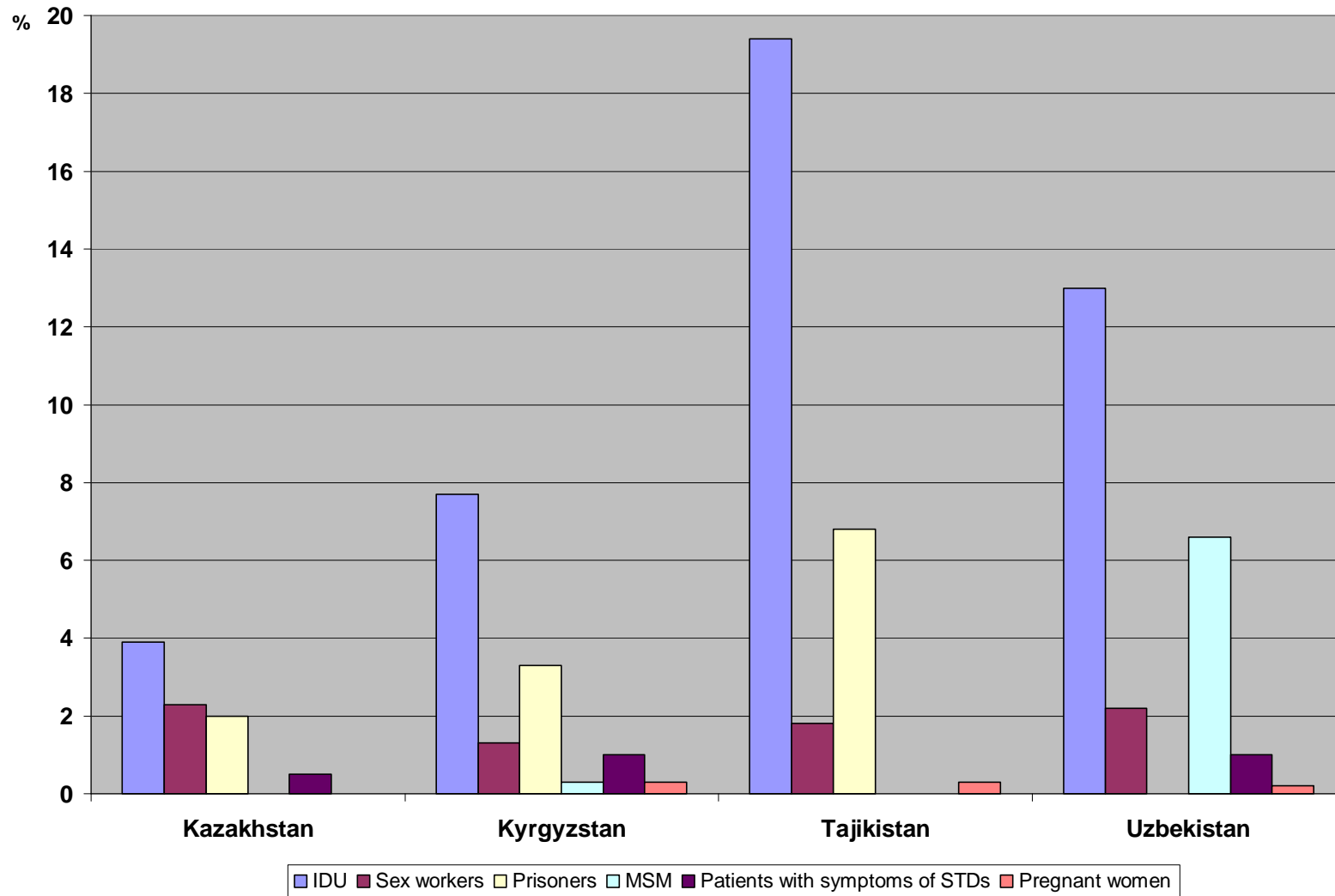
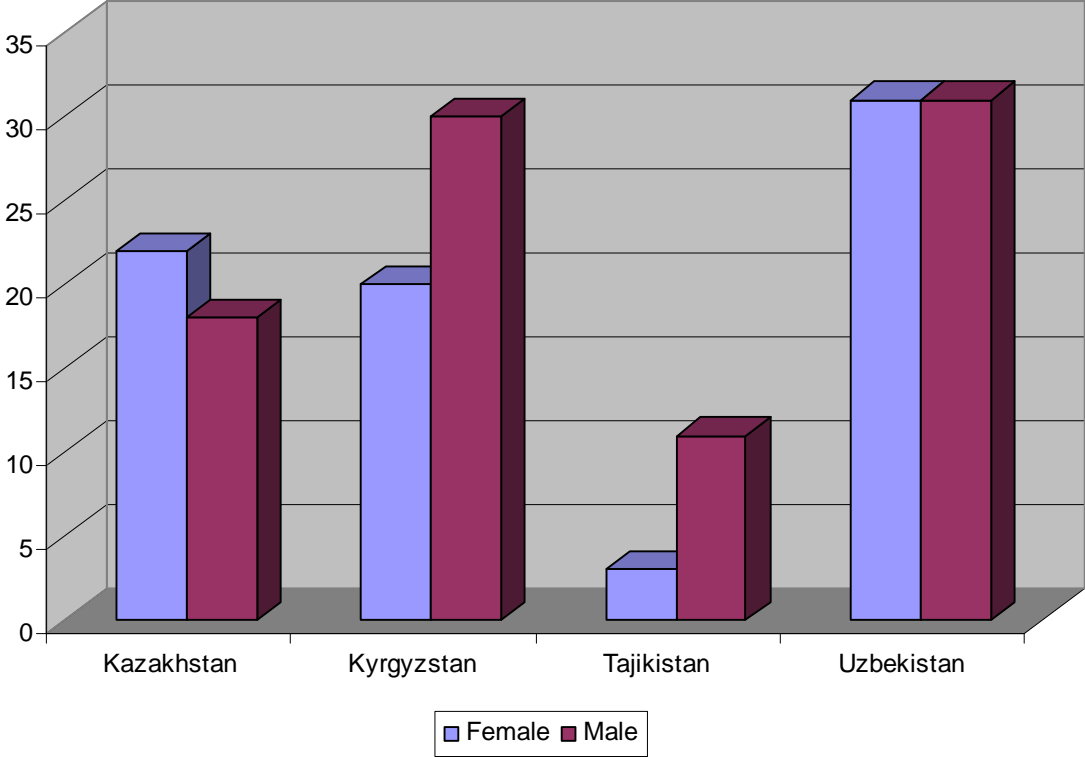


Figure 3
Percentage of young women and men (15-24 years) who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions regarding HIV transmission (UNGASS indicator 13) (12)



Conflicts of interest

The authors confirm that they have no conflicts of interest.

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