

# Epidemiology of HIV, programmatic progress and gaps in last 10 years in Nepal

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## Abstract

**Background and objectives:** Nepal has made progress with the control of HIV infection in recent years. There have been changes in epidemiology, programme interventions in different population groups, and changes in policies over the last 10 years, particularly in diagnosis and treatment. Therefore, this review was conducted to identify the effectiveness of different interventions/policies in different sub-populations at risk, targeted towards epidemiology and treatment outcomes for those with HIV infection in Nepal.

**Methods:** This review was prepared based on a review of published and unpublished documents from the Nepalese HIV infection control programme, published articles in different journals, different survey reports including integrated bio-behavioural surveillance (IBBS) survey reports.

**Results:** The prevalence of HIV infection among adults in 2014 was 0.20% with a progressive decreasing trend from 2005. The prevalence of HIV infection among injecting drug users (51.7% in 2005 and 6.4% in 2015 in Kathmandu valley) was relatively high in all years as compared to other risk groups. HIV infection prevalence among women attending antenatal clinics was higher in the year 2006 (0.25%) but there was a decreasing trend in the following years to 2015, when prevalence was 0.077%. Although different interventions were conducted to cover key populations at risk, the coverage in some risk population was very low. HIV testing status among the general population was very low (7.5% among males and 2.9% among females) in 2011. Only one-third of HIV-infected individuals were on ART in 2015, although this proportion has increased since 2005. The share of domestic budget among the total expenditure on HIV control program is below 15%.

**Conclusions:** There is the need for implementation of control programmes more efficiently and effectively with expanding geographical and population coverage. Surveillance systems should be strengthened to get up-to-date information for evidence-based planning and developing strategies. The domestic budget for HIV control programme should be increased to improve their sustainability.

Keywords: epidemiology, HIV infection, control programmes, gaps, Nepal

## Introduction

The first case of HIV was reported in Nepal in 1988, thereafter, there was a trend for increasing numbers of infections being recorded among specific groups of the population and in the low-risk general population for 20 years. However, numbers appear to be decreasing [1]. Although Nepal's HIV control programme has achieved some progress in reducing the incidence of HIV infections, it needs to be implemented effectively and efficiently to achieve the targets set.

HIV in Nepal is characterised as a concentrated epidemic in specific groups of the population, for example people who inject drugs (PWID), men who have sex with men (MSM) and female sex workers (FSW) [2]. Male migrants who work particularly in India, where migrant labourers often visit female sex workers, are considered a bridging population that transfers infections to the general population. Forty-eight per cent of Nepal's population are between the age of 15 and 49 years, and are vulnerable for acquiring and transmitting HIV infection [2].

There is a commitment to ending the HIV epidemic globally by 2030 [3]. The global health sector strategy on HIV 2016–2021 has proposed the vision of zero new infections, zero new deaths and zero HIV-related discrimination in a world where people living with HIV are able to live long and healthy lives [4].

Nepal's National HIV/AIDS Strategy 2011–2016 has adopted strengthening of the Second Generation Surveillance (SGS) system [5]. However, before starting SGS, it is important to know the status and progress made in HIV/AIDS control so as to further strengthen control programmes based on identified intervention gaps.

The epidemiology of HIV in Nepal has changed due to evolutions in policies over the last 10 years, particularly in diagnosis and treatment, and the various efforts to control HIV in the different population groups. Therefore, this review aims to improve knowledge on the effectiveness of the interventions/policies in different sub-populations at risk.

## Methodology

This article was prepared by reviewing published and unpublished documents from the Nepalese HIV control programme, published journal articles and various survey reports including IBBS surveys. Medline and PubMed were searched for key peer-reviewed literature published up to April 2016 for information on key affected populations as well as the general population.

Furthermore, the strategic information unit of the National Centre for AIDS and STD Control (NCASC) was consulted for routine programme data on epidemiology and services on the current status of HIV infections in different risk populations and control efforts of the programme in Nepal.

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Apart from epidemiological data sources, financial investments in HIV control interventions were also collected and analysed from secondary sources.

## Results

Estimation of the number of HIV infections in 2015 has shown a trend of decreasing HIV incidence since 2008. The estimated prevalence of HIV in 2015 was 0.2%, and had progressively decreased since 2005. The estimated prevalence of HIV has shown a reverted trend as targeted by the programme but reported

number of HIV cases did not show such trend. Reports from ART centres show cumulative deaths due to HIV had reached 2204 in Nepal up to 2015 (Table 1).

The prevalence of HIV infection among PWID (51.7% in 2005 and 6.4% in 2015) was relatively high in all years compared with other risk groups in the population. In addition, prevalence amongst PWID was higher in the Kathmandu valley than in the Pokhara and Terai districts. However, for FSW, HIV prevalence was 2% in 2015 in the Kathmandu valley but a cross-sectional survey in Pokhara in 2011 and 22 Terai districts in 2012 showed prevalences of 1.2% and 1%, respectively, having remained almost constant over the years from 2006.

Similarly, prevalence of HIV among migrants was relatively higher in the mid- and far-western regions in 2006 (2.8%) but had reduced to 0.6% by 2015. Prevalence of HIV among migrants in western districts constituted 1.1% in 2006, 1.4% in 2008, and 0.3% in 2015.

The prevalence of HIV infection among MSM varied from 1.7 to 14.4 in different years, and was 2.4% in 2015 (Table 2).

We assessed HIV prevalence among different population groups. Reported HIV prevalence among women attending antenatal clinics was higher in 2006 (0.25%), decreasing over the following years and was lowest in 2015 (0.08%). Among blood donors, HIV prevalence has been consistently below 0.5% and was 0.03% in 2014 (Table 3).

The number of people having an HIV test nationally was highest in 2013 and lowest in 2008. Percentage HIV positivity among all those who tested decreased over the years. Among 164,051 tested in service centres, 0.9% were HIV positive in 2015. The cumulative number of individuals treated with antiretroviral drugs was 11,089 in 2015 through 61 ART antiretroviral treatment sites. ART was first given to 50 individuals in Nepal in 2004. Of those who tested

**Table 1.** Trends of HIV infections in Nepal (2005–2015)

Year	Reported number of HIV cases <sup>a</sup>	Estimated number of HIV infections <sup>b</sup>	Estimated prevalence <sup>b</sup>	Reported cumulative deaths due to HIV on ART <sup>a</sup>
2005	1234	46,532	0.34	–
2006	2681	47,242	0.34	–
2007	2037	47,520	0.33	175
2008	2387	47,262	0.32	349
2009	2110	46,569	0.31	540
2010	2015	45,691	0.29	720
2011	2060	44,681	0.27	980
2012	2433	43,463	0.26	1305
2013	2426	42,082	0.24	1613
2014	1907	40,713	0.22	1931
2015	1610	39,397	0.20	2204

<sup>a</sup> NCASC Routine Programme data, 2015

<sup>b</sup> National HIV Infection Estimation, 2015

**Table 2.** Prevalence of HIV infections among key risk groups of populations

MARP	Location	2005	2006	2007	2008	2009	2010	2011	2012	2015
FSWs	Kathmandu		1.4		2.2			1.7		2.0
	Pokhara		2.0		3.0			1.2		
	22 Terai districts		1.5			2.3			1.0	
Client of FSW (Truckers)	Terai districts		1.0			0.0				
PWID	Kathmandu	51.7		34.8	23.02	20.7		6.3		6.4
	Pokhara	21.7		6.8		3.4		4.6		2.8
	Eastern Terai	31.6		17.1		8.1			8.0	8.3
	Western Terai	11.7		11.0		8.0			5.0	
MSM	Kathmandu			3.3	1.7	3.8		14.4	3.8	2.4
MSW	Kathmandu			2.9		5.2				
Migrants	Mid far west	1.9	2.8		0.8		1.8		1.4	0.6
	Western districts		1.1		1.4				1.1	0.3
Spouses of migrants	Far west districts				3.3		0.8			

FSW: female sex worker; MARP: most at-risk population; MSM: men who have sex with men; MSW: male sex workers; PWID: people who inject drugs; Source: IBBS survey reports, 2005–2015 [8–23, 32]

**Table 3.** HIV prevalence in the general population of Nepal

Risk group of population	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Women in antenatal clinics <sup>a</sup>	0.25%	0.18%	0.20%	0.20%	0.15%	0.14%	0.14%	0.10%	0.10%	0.08%
Blood donors <sup>b</sup>	0.40%	0.19%	0.09%	0.09%	0.08%	0.08%	0.15%	0.05%	0.03%	–

<sup>a</sup> NCASC Routine Programme data, 2015

<sup>b</sup> GDDBS data, 2006–2014; [6,7]

**Table 4.** National HIV testing and treatment (2005–2015)

Year	Number tested <sup>a</sup>	HIV positive among tested <sup>a</sup> (%)	New cases on ART <sup>a</sup> (%)	Number of ART sites <sup>a</sup>	Number of HTC sites <sup>b</sup>
2005	7654	1234 (16.1)	122 (9.9)	3	
2006	16,890	2681 (15.9)	350 (13.1)	9	
2007	28,103	2037 (7.2)	811 (39.8)	17	106
2008	53,309	2387 (4.5)	1203 (50.4)	23	137
2009	62,672	2110 (3.4)	1014 (48.1)	25	179
2010	106,325	2015 (1.9)	1317 (65.4)	35	
2011	95,501	2060 (2.2)	1616 (78.4)	36	214
2012	120,450	2433 (2.0)	1236 (50.8)	39	225
2013	139,566	2426 (1.7)	1147 (47.3)	44	245
2014	116,439	1907 (1.6)	1541 (80.8)	53	263
2015	164,051	1610 (0.9)	682 (42.4)	61	263

HTC: HIV testing and counselling

<sup>a</sup> NCASC Routine Programme data, 2015<sup>b</sup> Health System Reports, 2010, 2013**Table 5.** HIV control intervention activities among key populations (cumulative as of July 2015)

Interventions	Population covered <sup>a</sup>				
	PWID	MSM	MLM/ spouses	FSWs	Clients of FSW
Reached through BCC	13,478	40,230	119,863	33,138	88,706
Distribution of condoms	606,171	2,385,565	1,340,286	4,712,296	2,805,769
HIV testing and counselling	9777	6674	40,623	10,006	12,957
STI diagnosis and treatment	1110	1909	11,793	10,104	627
Provided needle/syringe	1,663,213	–	–	–	–
Enrolled on methadone	314	–	–	–	–
Enrolled on buprenorphine	381	–	–	–	–
Distribution of lubricants	–	853,396	–	–	–

BCC: behaviour change communication; PWID: people who inject drugs; MLM: male labour migrants; MSM: men who have sex with men; FSW: female sex workers

<sup>a</sup> NCASC Routine Programme data, 2015

positive in 2005, 9.9% started ART. However, by 2014, this proportion had gradually increased to 80.8% although this decreased to 42.4% in 2015. The number of sites offering ART increased from three sites (in three districts) in 2005 to 61 sites (in 55 districts) by 2015 (Table 4).

Although different interventions have been conducted to cover key populations at risk from HIV, the coverage in some at-risk populations has been very low. Less than 15% of migrants have been reached by prevention programmes. Similarly, HIV testing and counselling, STI diagnosis and treatment coverage have also been low as compared to vulnerable populations, based on their exposure due to migration, intravenous drug use, MSM, FSW and the national estimates of people living with HIV which is around 39,397 (Table 5).

The Nepal Demographic and Health Survey 2011 revealed that the proportions of young men and women with knowledge of HIV prevention was slightly reduced compared to 2006. Approximately 4% of males had multiple sexual partners. HIV testing status among the general population was very low (among males: 7.5%; and among females: 2.9%). The percentage of male and female sex workers using condoms was 93.1% and 82.6%, respectively. In 2015, 86% of MSM used condoms and 96% of PWIDs used safe injecting practices. Early infant diagnosis of HIV was increased

satisfactorily in 2015 to 16% compared to previous years; however, only one-third of HIV patients were receiving ART in 2015 although this was an increase on the years since 2005 (Table 6).

Between 2005 and 2015, various plans, policies and strategies have been formulated:

- National HIV Strategy 2006–2011;
- National HIV and AIDS Action Plan 2008–2011;
- National HIV and AIDS Strategy 2011–2016;
- National Blood Transfusion and Safety Policy, 2006;
- National guideline on Antiretroviral (ARV) therapy 2005.

In addition, various guidelines were developed and came into practice:

- National guideline on paediatric HIV and AIDS 2006;
- National guidelines on management of blood transfusion services in Nepal 2008;
- National AIDS and STI Policy, 2011;
- National HIV AIDS Strategy, 2006–2011;
- National HIV and AIDS Action Plan, 2008–2011;
- National HIV and AIDS Strategy, 2011–2016;
- National blood transfusion and safety policy, 2006;
- National guideline on Antiretroviral (ARV) therapy 2005;
- National guideline on paediatric HIV and AIDS 2006;
- National guidelines for HIV testing and counselling, 2011;

- National guidelines on management of blood transfusion services in Nepal 2014;
- National consolidated guidelines for treating and preventing HIV in Nepal, 2014;
- National guidelines on case management of sexually transmitted infections – 2014;
- Prevention of mother-to-child transmission of HIV in Nepal, standard operating procedures – 2012;
- National guidelines for early infant diagnosis – 2012;

The share of the domestic budget for total expenditure on HIV control programmes is very low: 0.8% in 2007 [23]; 1.3% in 2009 [2]; 2.0% in 2010 [24]; and 13.3% in 2014 [21]. Most of HIV control programmes were financed from foreign support including one-third of funds that came from the Global Fund.

## Discussion

Nepal has made progress in HIV control programmes in recent years but reduction of the number of HIV infections is not as expected. The reported number of HIV/AIDS cases and recent estimations

**Table 6.** Status of Nepal's AIDS response indicators

Indicators	2010	Values				References
		2012	2013	2014	2015	
Young people: knowledge about HIV prevention	Male=43.6%; Female=27.6%	–	–	–	Male=33.9%; Female=25.8%	[8,9]
Multiple sexual partners	–	–	–	–	Male=3.8%	[8]
Condom use during higher risk-sex	–	–	–	–	Male=26.5%	[8]
HIV testing among the general population	–	–	–	–	Male=7.5%; Female=2.9%	[8]
Sex workers: prevention programmes	MSW=93.3%; FSW=60%	MSW=93.3%; FSW=60%	MSW=79.3%; FSW=60%	–	–	[10–12]
Sex workers: condom use	MSW=37.8%; FSW=75.0%	MSW=37.8%; FSW=82.6%	MSW=90.4%; FSW=82.6%	–	MSW=93.1%; FSW=82.6%	[10–13]
Sex workers: HIV testing	MSW=65.2%; FSW=32.4%	MSW=65.2%; FSW=54.6%	MSW=58.5%; FSW=54.6%	–	MSW=67.8%; FSW=56.0%	[10–13]
MSM: prevention programmes	77.3%	77.25%	64.0%	–	–	[14–16]
MSM: condom use	75.3%	75.25%	91.4%	–	86.0%	[14,16]
MSM: HIV testing	42%	42%	42%	–	43.8%	[14,16]
PWIDs: prevention programmes (number of syringes distributed per PWID annually by needle and syringe Programmes)	–	71.4%	34.9%	36%	–	Save The Children Nepal and United Nations Office on Drugs and Crime, 2011
PWIDs: condom use	50.8%	46.5%	46.5%	–	52.5%	[17–19]
PWIDs: safe injecting practices	99.1%	95.3%	95.3%	–	96.0%	[17–19]
PWIDs: HIV testing	21.5%	21.4%	21.4%	–	27.9%	[17–19]
Prevention of mother-to-child transmission (PMTCT)	3.3%	134 (12.2%)	142 (20.9%)	162 (32.53%)	–	[20]
Early infant diagnosis	–	22 (2.4%)	21 (3.1%)	32(6.4%)	16%	[1,2,21,22]
MTCT rate (modelled)	–	39.7%	35.6%	35.7%	35.0%	Estimation and projection package (EPP) 2011, 2015
HIV treatment: ART	19.0%	23.7%	21.8%	26.5%	35.0%	[1,2,21,22]
HIV treatment survival after 12 months on antiretroviral therapy	90.6%	82.5%	85.7%	83.9%	83.7%	NCASC; ART Cohort report-2015

in 2015, showed an almost constant trend over the years. Although there was progress in indicators set in the Millennium Development Goals, it seems that the 90-90-90 target set in 2014 by the Joint United Nations Programme on HIV/AIDS [25] and partners, in which 90% of people living with HIV know their HIV status, 90% of people who know their status receive treatment, and 90% of people on treatment have suppressed viral load by 2020, may not be achieved.

IBBS surveys revealed that HIV prevalence among FSW is not changing. FSW are considered the key drivers of HIV transmission in Nepal [26]. Women are at high risk of becoming HIV positive due to biological vulnerabilities, low socio-economic status, dominant sexual practices of males and epidemiological factors [27] and they are also more vulnerable to transmitting HIV [28].

The prevalence of HIV among PWID is still relatively high compared to other risk population groups, but it has been reduced significantly over the years. Among PWID, 96% used safe injecting practices and condom use was almost 53% only [1], both of these practices may have also attributed to a reduction in incidence of HIV among PWID. Therefore, drug abuse should be reduced as well as focusing on harm reduction, rehabilitation and re-integration, with further emphasis on preventing non-injecting drug users from becoming PWID. Further, expanded interventions are essential to control HIV among PWIDs.

Incidence of HIV in MSM and MSW populations is not reducing predictably. Therefore, comprehensive HIV prevention activities should be implemented among MSM and MSW to ensure a reduction.

There is decreasing trend of HIV/AIDS among migrants. Risk behaviour among migrants includes unprotected sex with multiple partners and sex workers and is promoted by substance abuse, loneliness, separation from families, peer pressure, long working hours and poor living conditions. Negligence about good sexual health and lack of comprehensive knowledge about HIV among male migrants are major obstacles that have exacerbated the disease prevalence [29]. Once home, migrants also have extramarital sex in their villages and do not see any reasons for using condoms with village women [30]. Literacy and awareness about HIV is a key measure to decrease the prevalence of the disease among migrants.

HIV prevalence among pregnant women attending antenatal care clinics, and who represent the general population, was 7 per 10,000. Similarly, prevalence of HIV among blood donors was 0.15%; however, data on other groups within the general population is not available. Therefore, the National HIV AIDS Strategy 2011–2016 focusing on linkages and integration of the HIV/AIDS control programme with other services such as HIV testing and counselling, TB, HIV, PMTCT, antenatal care, safe

motherhood, family planning, etc. should be explored and strengthened to assure comprehensive management of patients and future sustainability [5].

The cumulative number of HIV patients treated with antiretroviral drugs was 11,089 in 2015, which constitutes only 35% of the total population of people living with HIV. The number of people receiving treatment has been increasing year on year. In Nepal, HIV treatment initiation occurs at district health facilities and ART sites are also fairly limited in numbers. This inadequate decentralisation of care limits access to HIV treatment in rural villages. Interrupted procurement and supply of antiretroviral drugs and commodities for early diagnosis has also been reported [31]. Early initiation of ART in discordant couples for the reduction of HIV transmission to the uninfected sexual partner is important.

Analysis of programme coverage indicators revealed that knowledge on HIV prevention, condom use during high-risk sex, and HIV testing in the general population are very poor [8]. This suggests that HIV control programmes should also focus on the general population in addition to those most at-risk. Although coverage of prevention programmes among the most at-risk populations (MARPS) is satisfactory, HIV test uptake is very low among these populations. A comprehensive programme for the most at-risk populations should be expanded to increase geographical coverage. Greater focus on condom promotion, STI management and partner treatment should be promoted.

HIV policies, plans and strategies have been developed to address the HIV response in Nepal. Those strategies also cover most of the interventions to control HIV among at-risk populations. However, there are the questions of implementation of strategies, inadequate geographical and population coverage, and security of a sufficient budget. The budget allocation indicates that there is less than a 15% [2,21,23,24] share from the domestic budget, which raises the question of the sustainability of the intervention programmes.

There is a lack of adequate surveillance data to provide sufficient evidence on programme success. IBBS were also conducted irregularly with less geographical coverage of risk populations. Therefore, a continuous capacity-building process needs to be institutionalised for making monitoring and evaluation an ongoing activity at all levels. The monitoring and evaluation systems need to be integrated with the national health management information system, therefore a phase-wise approach needs to be initiated. A policy guideline also needs to be adopted for rational implementation of the spirit of public-private partnership (PPP) at every level, from prevention to care of HIV/AIDS.

The programmatic gaps identified that need to be addressed are as follows:

- (a) HIV testing and counselling (HTC) centres with other relevant health services should be established and expanded. Access to services such as STI, TB, HIV, PMTCT, antenatal care, Safe motherhood and family planning, should be expanded through integration with other reproductive and primary healthcare services to assure comprehensive management of patients and future sustainability.
- (b) There is a need for expansion of the ART services, but prior to that there is need for scaling up the case-detection capacity through various strategies such as awareness raising, HTC expansion, incentive provision, and stigma and discrimination reduction. Scaling up of ART should be done on the basis of needs assessment and geographical MARP mapping data.

- (c) There is a need to significantly expand prevention and develop better strategies to reach larger numbers of Nepali migrants working in India.
- (d) Drug abuse should be reduced including harm reduction, rehabilitation and re-integration with emphasis on preventing non-injecting drug-users from becoming PWID.
- (e) A system should be established to enable MARPs and PLHIV to address the issue of stigma and discrimination and other violations of their rights through continuous scale up of awareness programmes with greater involvement of PLHIV, community based organisations, NGOs, faith groups and media personnel. Comprehensive programmes for MARPs should be expanded to increase geographical coverage. Greater focus on condom promotion, STI management and partner treatment should be promoted.
- (f) A continuous capacity-building process needs to be institutionalised for making monitoring and evaluation an ongoing activity at all levels. The monitoring and evaluation system needs to be integrated with the national health management information system.
- (g) The domestic budget for HIV prevention activities should be increased for sustainability of the programme.
- (h) There is a strong need of harmonisation and co-ordination of programmes implemented by various partners. A central data bank should be in place at NCASC and data should be shared based on the national monitoring and evaluation guideline.

## Conclusions

Nepal has maintained a constant incidence of HIV infection with little progress in reducing the number of cases of HIV infection. Therefore, there is a need for implementation of more efficient and effective control programmes, with expanded geographical and population coverage. The surveillance system should be strengthened to get up-to-date information for evidence-based planning and developing strategies. The domestic budget for the HIV/AIDS control programme should be increased for sustainability of the intervention programmes.

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### Author contributions

PG with the cooperation of TP, RP MRB and NS designed the concept for analysis and manuscript designing; PG and MRB with support from TP, BBR, MC and KB collected the available data and analysed; PG with support from MRB drafted the initial versions of the manuscript with analysed information as above and circulated to other co-authors for their review and inputs; all authors reviewed the final manuscript and agreed to the analysis, gaps and final draft for submission to the journal for publication.

### Disclaimer

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