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## Patterns and implications of male migration for HIV prevention strategies in Maharashtra, India

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## Patterns and Implications of Male Migration for HIV Prevention Strategies in Maharashtra, India

Niranjan Saggurti, Ravi K. Verma, Anrudh Jain, Pranita Achyut and Saumya Ramarao

**M**aharashtra was one of the first states to be affected by HIV in India. Results from the National Family Health Survey (NFHS-3) in 2005-2006 indicate that 0.62 percent of men and women in aged 15-49 years were infected with HIV, as compared to the national average of 0.28 percent (IIPS and Macro International, 2007). HIV sentinel surveillance data from sites across Maharashtra indicate that 1.25 percent of pregnant women receiving antenatal care (ANC) and 10.4 percent of patients receiving treatment for sexually transmitted diseases (STD) in 2005 were infected with HIV (NACO, 2006). Further, 24 of the state's 35 districts have recorded HIV prevalence of more than 1 percent among pregnant women receiving antenatal care in sentinel sites (NACO, 2006).

At the same time, Maharashtra ranks first nationally in the proportion of total migrants (Registrar General of India 2001). Migration of males from other states of India to select districts of Maharashtra is common, and there is a growing consensus among policy makers and program managers that migration could be a major contributor in the spread of HIV in the state (NACO, 2003). However, empirical evidence to support or refute this conjecture is limited.

To address this research gap, the Population Council, through funding from the Avahan, it's India AIDS Initiative of the Bill &



*Construction Site in Maharashtra. Large Numbers of Migrant Men in India are Employed Under Contract System.*

Melinda Gates Foundation, studied the patterns and motivations related to migration of male laborers and their linkages with HIV risk. As part of this study, the Council conducted a systematic analysis of 2001 census data on migration and district-level sentinel surveillance data on HIV prevalence. The purpose of the research was to document patterns of male migration and determines whether there was a relationship between migration and HIV prevalence. In particular, the analysis sought to answer the following questions:

- What is the pattern of male in- and out-migration at the state level? What is the volume of male in-migration and the change over time?
- What is the pattern of male in- and out-migration at the district levels? Which districts attract large numbers of migrant men and from where?
- Are the dominant streams of male in-migration rural to rural, rural to urban, or urban to urban?
- Is there a relationship between HIV prevalence and migration patterns at the district level?

### Data and Methods

The male migration data from India's 2001 census and HIV prevalence data from India's HIV surveillance system among ANC clinic attendees and STD clinic attendees are presented here. The 2001 census, like previous censuses, collected information on migration for all individuals by place of birth and last residence. Data on last residence, along with details such as duration of stay at the current residence and reason for migration, provided useful insights for studying migration dynamics.

District-level data on HIV prevalence among ANC and STD clinic attendees were obtained from the published reports of annual HIV sentinel surveillance systems (NIHFW and NACO, 2006). A range of methods univariate statistics for measuring levels, bivariate and rank correlation are used to examine relationships. The place of last residence data was cross-tabulated with duration of stay at the place of enumeration to examine the patterns and changes in volume of migration over time. The percentages of men who migrated within district (intra-district)<sup>1</sup>, across districts (inter-district)<sup>2</sup> and across state (inter-state)<sup>3</sup> were calculated to define the patterns of movement along with the dominant migration streams.

The rank order correlation method was used to examine the relationship between volume of migration and HIV prevalence at the district

level. For this, the districts were first ranked according to volume of in-migration (inter-district and inter-state) and out-migration, with higher migration volume assessed a lower rank. The averages of these three ranks were then calculated. Further, the average of the HIV prevalence data of ANC clinic attendees for the years 2003, 2004, 2005 and 2006 were calculated. This average HIV prevalence data was then ranked, with higher HIV prevalence assessed a lower rank. The rank of districts according to migration was plotted on a scatter diagram against the rank of districts according to HIV prevalence among ANC clinic attendees to examine on the relationship. Similarly, the ranks of in-migration only against ranks of HIV prevalence among STD clinic attendees were plotted on a scatter diagram to assess the relationship.

### Male Migration in Maharashtra: A State-Level Analysis

According to the 2001 census, Maharashtra has experienced a net male in-migration at the state level. During 1991-2001, nearly 2 million men (1,922,629) entered into Maharashtra, while nearly 0.4 million men (393,097) moved out of the state. Over the past two decades, migration into Maharashtra increased from 21 percent from 1981-1991 to 27 percent from 1991-2001.

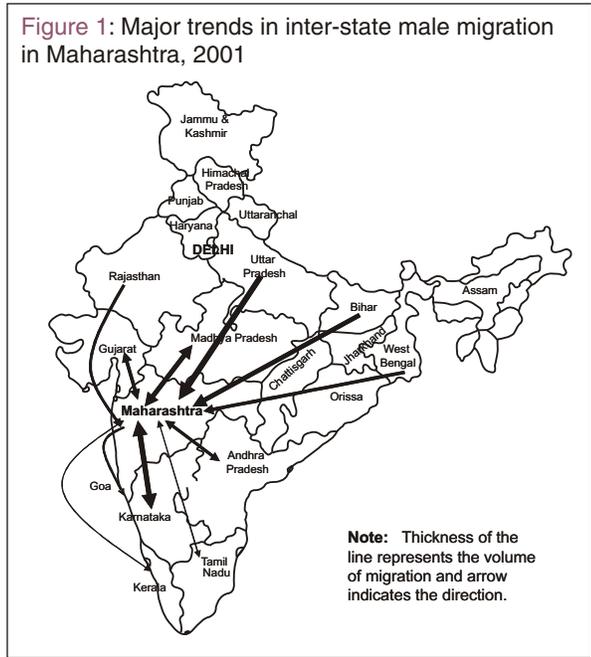
From 1991-2001, three-fourths of the migrants from outside the state entered five districts - Mumbai (suburban) (27 percent), Thane (25 percent), Mumbai (10 percent), Pune (9 percent) and Nagpur (6 percent). However, the state has recently witnessed some change in this trend. During 2000-2001, the share of migrants coming into Mumbai (suburban), Thane and Mumbai declined while it increased in Nagpur, Ratnagiri, Kolhapur and several other districts.

<sup>1</sup> A person who moves from his place of usual residence or birth to another politically defined area (village/town) within the same district of enumeration is an intra-district migrant.

<sup>2</sup> A person who crosses the boundary of the district of enumeration but remains within the state of enumeration is an inter-district migrant.

<sup>3</sup> A person whose place of enumeration lies in a different state from his/her place of birth or last residence is an inter-state migrant.

Men entered Maharashtra from almost all the states of India (Figure 1). The most popular sending states are Uttar Pradesh (33 percent), Karnataka (12 percent), Bihar (9 percent),



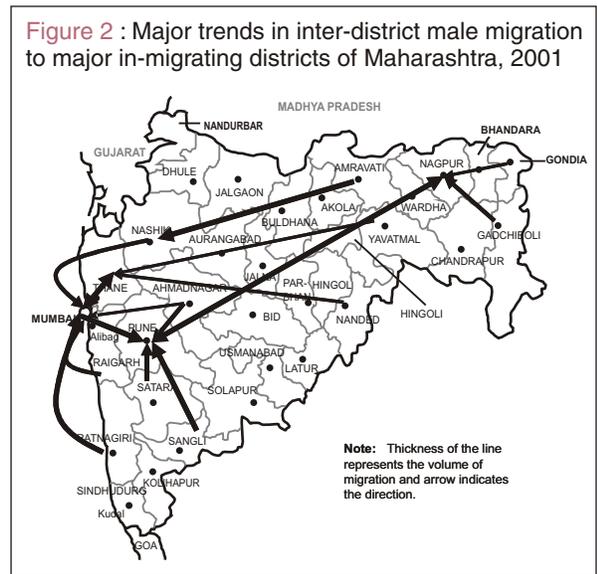
Madhya Pradesh (7 percent), Rajasthan (7 percent), Gujarat (6 percent), Andhra Pradesh (5 percent), West Bengal (5 percent), Chattisgarh (3 percent), Kerala (3 percent) and Tamil Nadu (3 percent) (Figure 1). Among the migrants who entered Maharashtra, 72 percent are from the districts of Jaunpur, Azamgarh, Allahabad, Gorakhpur, Varanasi, and Basti districts in eastern Uttar Pradesh; Gulbarga, Bijapur, Belgaum, and Bidar in Karnataka; Madhubani and Darbhanga in Bihar; Balaghat and Chindwara in Madhya Pradesh; Pali in Rajasthan; Surat and Ahmedabad in Gujarat; Hyderabad and Mahbubnagar in Andhra Pradesh; Raipur and Rajnandgaon in Chattisgarh. Men from Maharashtra moved out to states of Gujarat, Karnataka, Madhya Pradesh, Andhra Pradesh, Rajasthan and Goa.

A comparison of source and destination districts suggests a trend of group migration. More than 30 percent of the total male in-migrants into the districts of suburban Mumbai and Thane are from eastern Uttar Pradesh,

specifically from the districts of Jaunpur and Azamgarh. In Pune, the majority of male migrants are from the northern Karnataka districts; in Nagpur, most male migrants are from the districts of Chattisgarh and Madhya Pradesh.

### Male Migration: District-Level Analysis

Inter-district migration data show a predominance of male migration to a few districts in the western Marathwada and Vidharba regions of Maharashtra. Out of the 35 districts in the state, eight districts Thane (24 percent), Pune (14 percent), Mumbai (suburban) (8 percent), Nashik (5 percent), Aurangabad (4 percent), Ahmednagar (4 percent), Mumbai (urban) (4 percent) and Nagpur (3 percent) drew two-thirds of all male migrants from other districts in the state (Figure 2).



A notable decline in the percent share of male inter-district in-migration occurred in Mumbai (suburban) (3 percent versus 8 percent) and Mumbai (urban) (1 percent versus 3 percent) during 2000-2001 as compared to 1991-2001. An

increase in in-migration took place in Ahmadnagar (9 percent versus 4 percent), Satara (5 percent versus 2 percent) and Solapur (6 percent versus 2 percent) districts. Pune, Nashik, Mumbai (urban) and Ahmednagar, which are destination districts for male migrants, also are the common sending districts. Other primary out-migration districts in Maharashtra are Bid, Jalgaon, Ratnagiri, Sangli and Dhule.

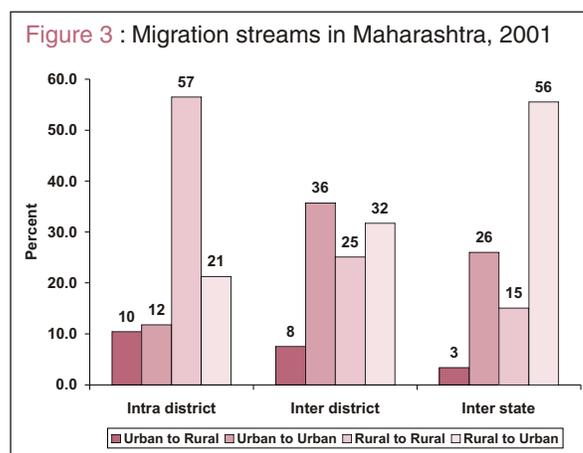
Intra-district migration accounts for two-fifths of the total male migration in Maharashtra. Eight districts Nashik, Pune, Thane, Ahmednagar, Kolhapur, Jalgaon, Satara and Solapur contribute half of intra-district migration. Districts in eastern and southeastern Maharashtra experienced very low levels of migration within the district.

### Male Migration Streams

During the last two census periods (1981-1991 and 1991-2001), the number of male migrants increased by 40 percent. In 2001, 33 percent of the male population were migrants compared to 23 percent in 1991.

Three-fourths of the male migrants moved within the state, either from elsewhere in the same district or from other districts. One-fourth of the men in Maharashtra are inter-state migrants and this proportion is high compared to many other states in India (Verma et al., 2007; Saggurti et al., 2008).

Rural-to-rural migration (57 percent) is the dominant type of movement among males who move within districts, whereas the urban-to-urban<sup>4</sup> (36 percent) and rural-to-urban (32 percent) migration dominate among those who move between districts. Rural-to-urban migration (56 percent) is the dominant type of movement for men entering Maharashtra from other states of India (see Figure 3).



Two-thirds of men who came from other states of India to Maharashtra districts of Thane, Pune, Mumbai (suburban) and Nagpur moved from rural to urban areas.

Census data also provide a socio-demographic profile of migrants. In Maharashtra, 40 percent of males who migrated during last decade are aged 20-39 years; around two-thirds are currently married. Three-fourths of migrant men moved for work/employment.

**Table 1: Percent share in type of male in - migration by duration of residence at the place of enumeration, Maharashtra, 2001**

Type of male in-migration	Duration of Residence **					Total
	Less than 1 year	1-4 years	5-9 years	10+ years	Duration not stated	
Intradistrict	38.4	40.0	39.0	38.1	71.6	43.2
Interdistrict	36.7	31.2	32.9	33.8	19.0	31.3
Interstate	24.5	28.2	27.8	27.3	9.1	24.9
Total# (percent*)	1032.2 (100.0)	3356.7 (100.0)	2595.2 (100.0)	7503.4 (100.0)	2276.4 (100.0)	16763.9 (100.0)

\*\* Total in - migrants by the year 2001 (includes migrants with 10+ years of duration, those who have not stated any duration).  
\* Total may not add to 100.0 due to small number of international migrants and unclassified category.  
# Number of in-migrants is given in thousands. Column percentages are given in the parentheses.  
**Source:** Calculated from Census 2001

<sup>4</sup> The 2001 census of India defined urban areas as follows:(a) All statutory places with a municipality, corporation, cantonment board, or notified town area committee, etc., (b) A place satisfying the following three criteria simultaneously:

- (i) a minimum population of 5,000;
- (ii) at least 75 percent of male working population engaged in nonagricultural pursuits; and
- (iii) a population density of at least 400 per sq. km. (1,000 per sq. mile).

## Links Between Migration and HIV Prevalence

High male in-migration rates (the proportion of migrant males among all males from 1991-2001) exist in the districts of Thane, Mumbai (suburban), Pune, Nashik, Mumbai, Ahmednagar, Nagpur and Kolhapur. Districts with high male out-migration are: Beed, Jalgaon, Satara, Solapur and Sangli. Most of the out-migrating districts have also recorded a very high prevalence of HIV

**Table 2 : HIV prevalence in Maharashtra by district, 2003 and 2006**

Districts	ANC clinic attendees*		STD clinic attendees	
	2003	2006	2003	2006
Ahmadnagar	1.63	0.75		
Akola	0.56	0.63	8.8	9.2
Amravati	0.50	0.25		
Aurangabad	0.13	0.75	14	10
Bhandara	1.00	0.38		
Bid	1.50	0.75		
Buldana	0.25	0.88		
Chandrapur	1.50	1.75	8.8	8.4
Dhule	1.01	1.13		
Gadchiroli	0.25	0.25		
Gondiya	0.88	0.63		
Hingoli	0.38	1.63		
Jalgaon	1.50	1.50	7.6	10.8
Jalna	0.25	1.13		
Kolhapur	1.50	1.38		
Latur	1.51	0.88	10	10
Mumbai (Suburban)	1.15	1.00	19.6	8.9
Mumbai	2.26	2.25	37.5	21.2
Nagpur	1.75	0.88	22	20.4
Nanded	0.63	0.50		
Nandurbar	1.25	0.38		
Nashik	0.88	0.63		
Osmanabad	0.75	1.50		
Parbhani	1.38	0.88		
Pune	1.38	0.50	8.4	
Raigarh	0.38	0.88		
Ratnagiri	1.00	0.25		
Sangli	4.00	2.00	15.6	28.4
Satara	2.75	1.50		
Sindhudurg	0.13	0.13		
Solapur	1.25	1.00		
Thane	2.88	0.88	14.4	6
Wardha	0.38	0.25		
Washim	0.00	0.13		
Yavatmal	2.25	1.38		

\* For each district, average of the sentinel sites data from urban and rural areas were presented.

Source: NIHFV and NACO, 2006. Annual HIV Sentinel Surveillance Country Report. National Institute of Health and Family Welfare and National AIDS Control Organisation, New Delhi, India.

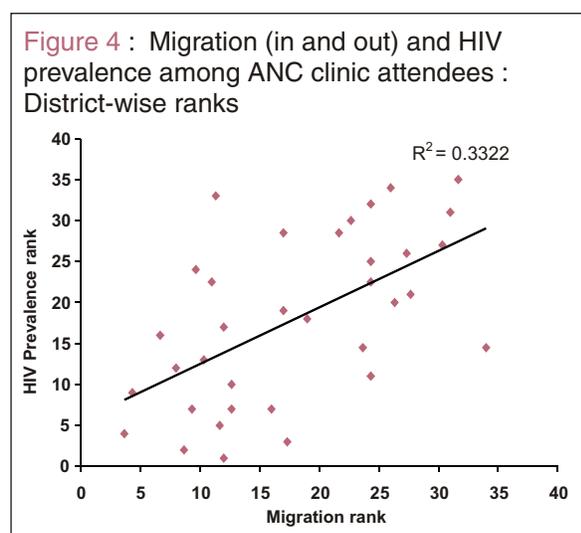
infection among ANC (more than 2.8 percent) and STD (more than 8 percent) clinics attendees. Table 2 indicates district-level HIV prevalence among ANC and STD clinic attendees for 2003 and 2006.

Figure 4 suggests that districts in Maharashtra with high levels of migration both in- and out-migration also rank high on HIV prevalence among pregnant women attending ANC clinics. Figure 5 suggests a similar relationship between high in-migration and HIV prevalence among patients receiving treatment at STD clinics.

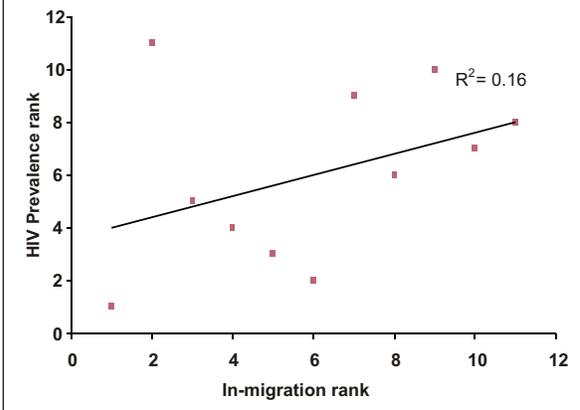
## Discussion

Maharashtra is India's leading industrial state and attracts men from almost all the states of India. Census data suggest a predominance of inter-state migration to the districts of Thane, Mumbai suburban, Nagpur and Pune. A considerable volume of the inter-state in-migrants come from some of the high HIV prevalence districts of Karnataka and Andhra Pradesh.

When comparing Maharashtra to Andhra Pradesh (Verma et.al., 2007) and Karnataka (Saggurti et.al., 2008), the relationship between migration and HIV prevalence is strong.



**Figure 5 : In-migration and HIV prevalence among STD clinic attendees : District -wise ranks**



However, we caution against making conclusions on this relationship because migration per se does not put a male migrant at risk of acquiring HIV. Clarification of the relationship between migration patterns and HIV prevalence requires more in-depth analysis of individual-level factors.

Thane, Pune, Nashik, Ahmednagar, Mumbai (urban), Mumbai (suburban) and Nagpur districts received more than half of total male migrants during 1991-2001. These districts also have recorded a high HIV prevalence among pregnant women attending ANC clinics. In addition, the primary out-migration districts such as Sangli, Satara, Solapur, Jalgaon and Bid have recorded high HIV prevalence. Thus, both the origin and destination districts demonstrate a link to HIV.

The results of this analysis suggest that Thane, Pune, Ahmednagar, Mumbai (urban), Mumbai (suburban), Nagpur, Sangli, Satara, Solapur and Jalgaon districts, with such a large volume of in- or out- migration, are sites for HIV prevention program in Maharashtra. In addition, the districts from which men migrated, such as eastern districts of Uttar Pradesh, should also be considered as sites for HIV interventions, given the possibility of migrant men contracting HIV and infecting their wives and others upon their return.

## Questions for Future Research and Programs

Compared to Karnataka and Andhra Pradesh, the relationship between migration and HIV in Maharashtra is much more evident from the analysis of census data on migration and sentinel sites data on HIV. Migration data from the 2001 census are indicative of broad patterns and trends over time. Some of the questions to be addressed in future research to inform program design and investments include:

- What are the implications for male migrants moving from areas with low/high HIV prevalence areas to low/high HIV prevalence areas in terms of sexual networking and high-risk sexual behavior?
- What are the factors responsible for increasing the vulnerability of male migrants in the destination areas?
- How do migrant populations' risk patterns influence the risk patterns of non-migrant populations in various destination areas?
- What are the implications for migrants' wives and their vulnerability to HIV?
- Should there be different types of programs for origin and destination migration sites?
- Who should be the primary and secondary beneficiaries of programs in places of origin and destination areas? For example, should interventions focus equally on migrants and non-migrants?
- What should be the content of the interventions for example, education, outreach, condom promotion?



*Officials believe that migration could be a major contributor to the spread of HIV within the state*

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