chapter 9

COMMUNICABLE DISEASES

Epidemics under control for better surveillance and management

Caused by various types of transmissible infectious agents, including bacteria, viruses, parasites, and fungi, communicable diseases constitute the major proportion of disease burden in Bangladesh. Over the last few years, Bangladesh had to face and address several newly-emerging and re-emerging diseases, like Nipah encephalitis, avian influenza (bird flu), swine flu, anthrax, malaria, kala-azar (leishmanisis), dengue, HIV/AIDS, viral hepatitis, enteric fever, leptospirosis, and poliomyelitis, with the continuing burden of diarrhea and acute respiratory infection (ARI). One human case of avian influenza was detected in Bangladesh in 2008, with no report of death. In late 2009 and early 2010, there was a great panic due to global pandemic of swine flu. A few positive human cases were also detected. However, there were only two recorded deaths in Bangladesh.

The program under Communicable Disease Control Division of the DGHS has been moving forward with the aim of zero death and substantial reduction in malaria cases by 2015...

Malaria

Malaria is now a localized disease of Bangladesh, endemic in 13 districts of eastern and northern parts of the country. Among these, the districts of Rangamati, Khagrachhari, Bandarban, Chittagong, and Cox's Bazar are hyper-endemic. Mymensingh, Sherpur, Netrakona, Kurigram, Sylhet, Maulvibazar, Sunamganj, and Hobiganj districts are prone to low epidemic. The three hilly districts account for 80% of the total burden of malaria in Bangladesh. During the last decade, the annual average number of reported cases was 56,775, of whom 45,880 (>90%) contracted the disease due to *Plasmodium falciparum*. The rest were due to *Plasmodium vivax*, and a few cases were due to mixed infection. The overall prevalence of malaria in the 13 endemic districts was 3.1% (Malaria Baseline Socioeconomic and Prevalence Survey 2007). Over 10.9 million people of Bangladesh are at high risk of malaria. Most vulnerable groups are under-five children and pregnant women. About 0.03 annual deaths per thousand people at risk in Bangladesh are attributed to malaria. The country has a malaria-control program and has achieved remarkable success in terms of reduction in the number of malaria cases and deaths. Early diagnosis and prompt treatment through doorstep facilities provided by GO-NGO partnership with financial support of GFATM has been proved effective. The use of LLIN (long-lasting insecticidal nets) and ITN (insecticide-treated nets) has supplemented the effort. The program under Communicable Disease Control Division of the DGHS has been moving forward with the aim of zero death and substantial reduction in malaria cases by 2015. Table 9.1 summarizes year-wise epidemiological data on malaria from the endemic districts.

Table 9.1. Epidemiological data on malaria (2000-2011) from the endemic districts

Institute	Positive case (falciparum+vivax)	*P. falciparum*		*P. vivax*		Death	
		No.	%	No.	%	No.	%
2000	54,223	39,272	72.4	14,951	27.6	478	0.4
2001	54,216	39,274	72.4	14,942	27.6	490	0.4
2002	62,269	46,418	74.5	15,851	25.5	588	0.5
2003	54,654	41,356	75.7	13,298	24.3	577	0.5

Table 9.1 Continued

Institute	Positive case	*P. falciparum*		*P. vivax*		Death	
		No.	%	No.	%	No.	%
2004	58,894	46,402	78.8	12,492	21.2	535	0.5
2005	48,121	37,679	78.3	10,442	21.7	501	0.5
2006	32,857	24,828	75.6	8,029	24.4	307	0.3
2007	59,857	46,791	78.2	13,066	21.8	228	0.2
2008	84,690	70,281	83.0	14,409	17.0	154	0.1
2009	63,873	57,020	89.3	6,853	10.7	47	0.0
2010	55,873	52,049	93.2	3,824	6.8	37	0.0
2011	51,773	49,194	95.0	2,579	5.0	36	0.0
Average per year	56,775	45,880	80.5	10,895	19.5	332	0.03

Figure 9.1 gives an idea about the share of total malaria burdens by endemic district, and Figure 9.2 shows the seasonal pattern of malaria in Bangladesh in 2000-2011.

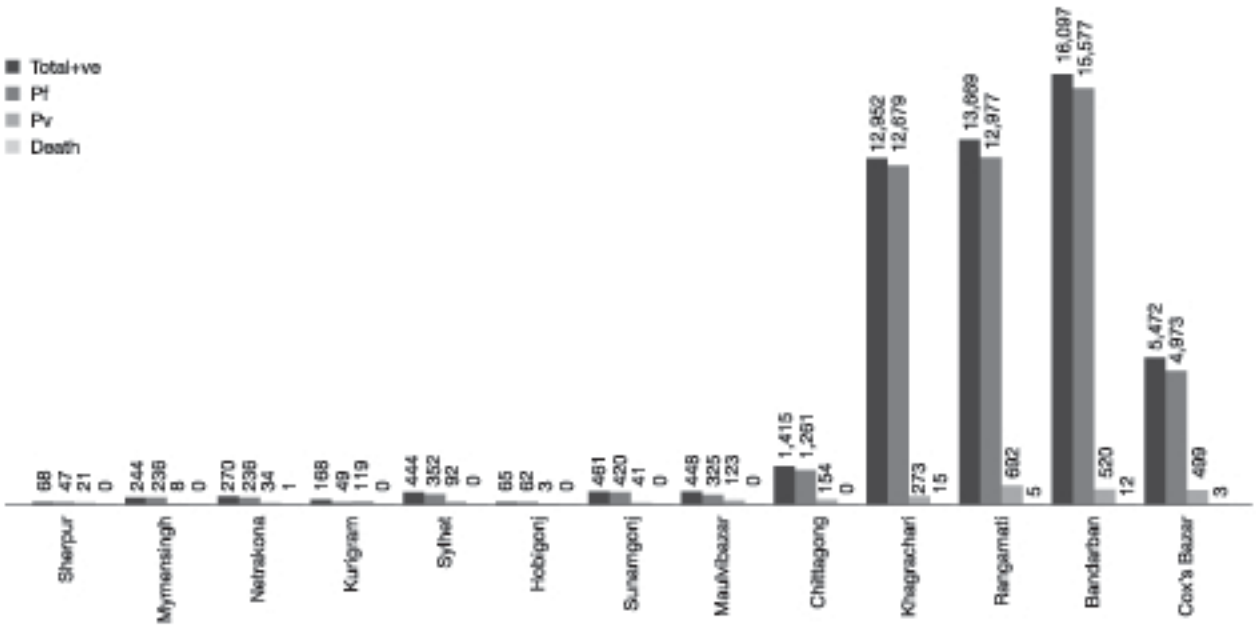

Figure 9.1. Cases and deaths due to malaria in 2011

Kala-azar

Visceral leishmaniasis (VL) is a neglected tropical disease. Annually, 500,000 visceral leishmaniasis (kala-azar) cases are reported globally. An estimated 147 million people are at risk in three countries—Bangladesh, India, and Nepal, with about 100,000 cases occurring annually. The disease is predominant in the poor and marginalized communities. In the ministerial meeting held in Maldives in 2004, the three countries expressed their commitment to eliminate kala-azar from the Indian Subcontinent by the year 2015 (Report of the 22nd Meeting of Health Ministers of South-East Asian countries, Maldives; 5-6 September 2004). A Regional Technical Advisory Group (RTAG) was formed by WHO, SEARO for kala-azar elimination. Kala-azar transmission can be interrupted since humans are the only reservoir, and *Phlebotomus argentipes* is the only vector. For these reasons, kala-azar elimination from these three countries is feasible and will contribute to alleviation of poverty through decreasing disease burden in this region.

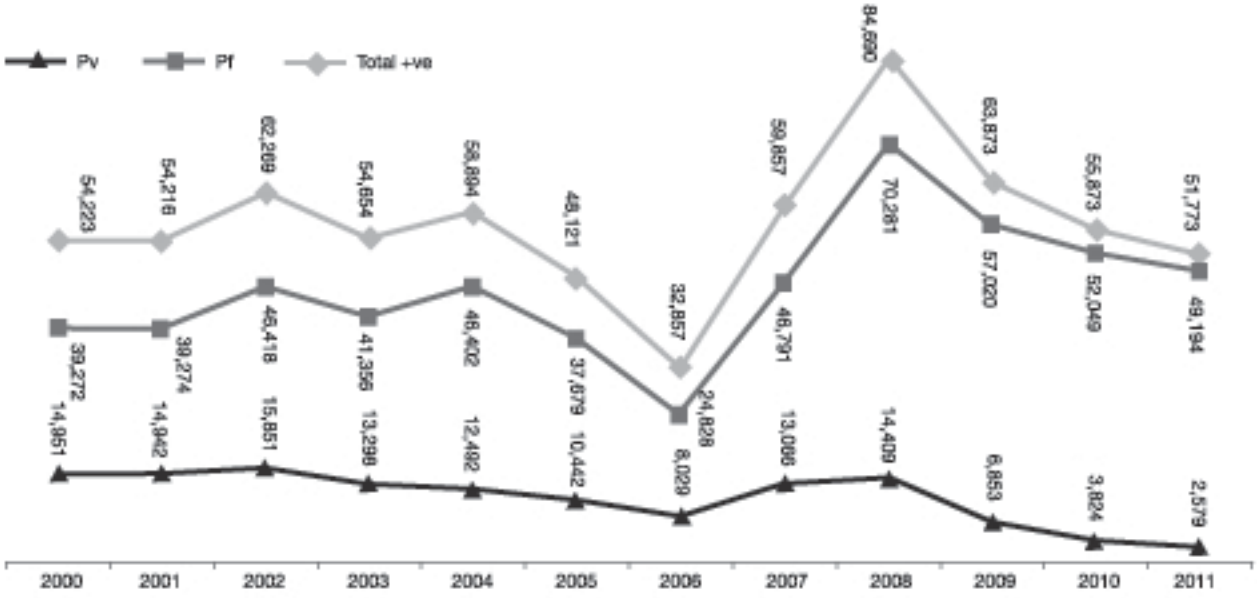

Figure 9.2. Year-wise prevalence of malaria from 2000 to 2011

Kala-azar is one of the major public-health problems in Bangladesh, and the disease has been endemic for many decades. During the Malaria Eradication Program, blanket DDT spraying controlled kala-azar transmission. In the late 1970s, kala-azar re-emerged sporadically. During 1981-1985, only 8 upazilas (subdistricts) reported kala-azar, which increased to 105 upazilas in 2004. During the last few years, the kala-azar situation has assumed epidemic proportion, with the number of reported cases increasing from 3,978 in 1993 to 8,505 in 2005. For the last few years, however, the incidence declined to some extent and reached 3,376 cases in 2011.

The graph at Figure 9.3 shows the number of kala-azar cases reported during 1999-2011. The highest case-fatality rate recorded from research on known kala-azar patients in Mymensingh district has been 6.4% (Desjeux P., 1991). The prevalence rate in some selected villages in the same district has been found to be as high as 6% of the total population (unpublished report, 1993). However, definite data on morbidity and deaths due to kala-azar are not available from the current reporting system. Age- and sex-segregated data are not available with the control program at present.

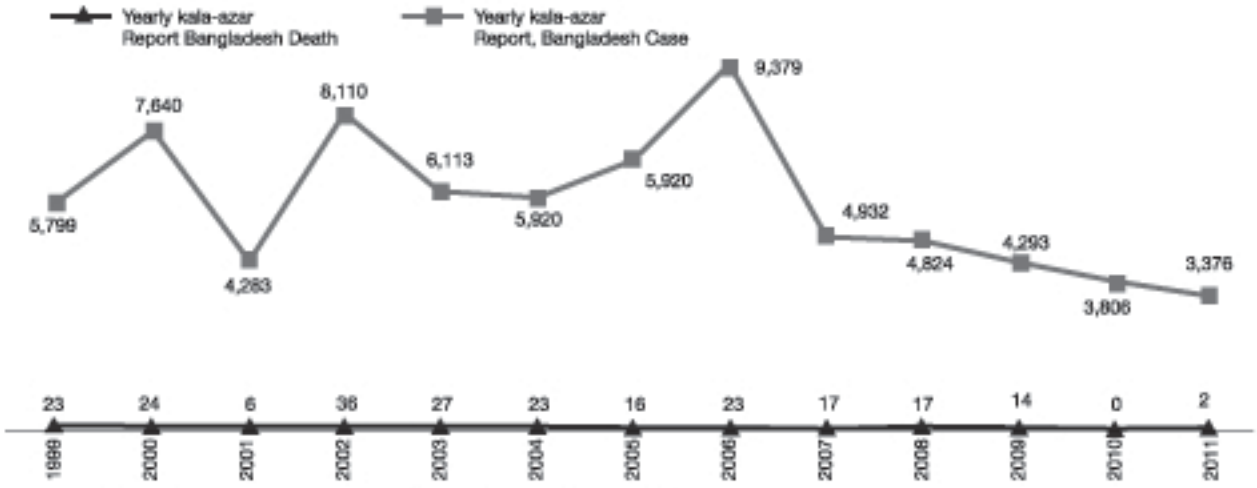

Figure 9.3. Kala-azar cases and deaths during 1999-2011

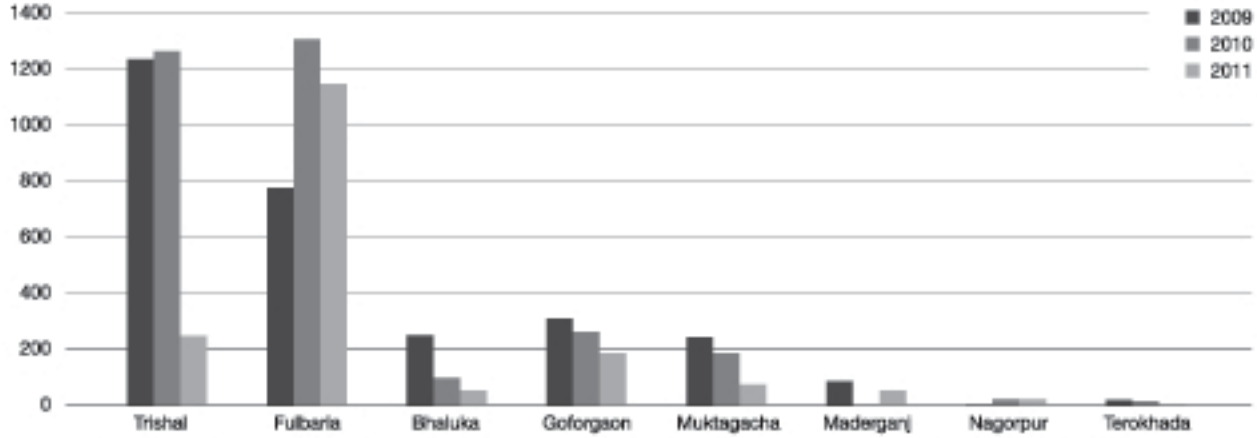

Figure 9.4. Upazilas hyper-endemic for kala-azar, showing the prevalence rates during 2009-2011

In Bangladesh, kala-azar patients are detected and treated mainly through primary healthcare centers (upazila health complexes-UHC). ICT-based rK39 is being used for the diagnosis and oral Miltefosine for treatment of cases. Injection Sodium Stibogluconate (SSG) had long been used for the treatment of kala-azar and PKDL cases but now to be phased out. In the context of the current situation of kala-azar in Bangladesh, the strategic plan has been revised and updated incorporating rapid diagnostic methods, newer effective drugs, active surveillance, indoor residual spraying, and interventions needed for successful implementation of the kala-azar elimination program. Fig. 9.4 shows the upazilas that are hyper-endemic for kala-azar.

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Dengue

The reported number of cases and deaths from dengue from 2003 to 2011 are shown in Table 9.2. The medical communities of Bangladesh were fairly unfamiliar with the presence of dengue in the country before 2000. The outbreak started in the summer of 2000, and since then every year some cases are being reported. However, case-fatality rate has been decreased.

Table 9.2. Division-wise reported dengue cases and deaths (2003-2011)

Division	2003		2004		2005		2006		2007		2008		2009		2010		2011	
	Case	Death	Case	Death	Case	Death	Case	Death	Case	Death	Case	Death	Case	Death	Case	Death	Case	Death
Barisal	0	0	8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Chittagong	21	1	9	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Dhaka	450	9	3,875	13	1,033	4	2,144	472	0	11	465	0	1,151	0	409	0	1362	0
Khulna	15	0	41	0	11	0	53	2	0	0	1	0	2	0	0	0	0	0
Rajshahi	0	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0
Sylhet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	486	10	3,934	13	1,048	4	2,200	474	0	11	466	0	1,153	0	409	0	1362	0

Diarrhea

Diarrhea is a highly-prevalent communicable disease in Bangladesh. Table 9.3 shows the year-wise reported number of diarrhea cases and deaths from different divisions of Bangladesh.

Table 9.4. shows the year-wise case-fatality rates calculated based on the reported numbers of cases and deaths from different divisions of Bangladesh.

Data in the table show that the number of deaths due to diarrheal disease has reduced remarkably. icddr,b carries out a surveillance system based on a 2% systematic subsample of all patients regardless of their severity of illness. The demographic, etiologic, clinical and therapeutic aspects of these patients are studied in detail. Table 9.5 shows the etiologic agents of diarrheal disease and number of cases in 2011.

Table 9.3. Year-wise reported diarrhea cases and deaths by division (2003-2011)

Division	Status	2003	2004	2005	2006	2007	2008	2009	2010	2011
Barisal	Attack	14,412	17,986	15,078	29,072	31,695	42,584	47,118	28,611	29.978
	Death	11	19	12	5	5	12	6	6	5
Chittagong	Attack	379,276	432,829	405,446	363,710	446,965	410,195	366,092	367,202	333.225
	Death	265	277	162	84	148	123	79	95	36
Dhaka	Attack	700,525	720,705	717,296	654,172	770,972	808,390	1,064,279	1,026,813	915.866
	Death	471	275	400	46	180	160	214	215	6
Khulna	Attack	455,683	401,339	428,502	413,268	445,631	476,231	585,667	456,591	437.118
	Death	82	98	81	32	37	26	27	18	7
Rajshahi	Attack	528,211	474,848	441,132	349,203	461,969	372,203	355,095	252,854	229.461
	Death	285	382	247	49	88	38	26	2	3
Rangpur	Attack	Rangpur was not a division before 2010. It was part of Rajshahi division							110,743	121.405
	Death								3	8
Sylhet	Attack	209,156	198,650	144,467	152,425	178,094	185,376	200,347	184,574	197.488
	Death	168	119	27	23	79	34	8	6	5
Total	Attack	2,287,263	2,246,357	2,151,921	1,961,850	2,335,326	2,294,979	2,618,598	2,427,388	2264.541
	Death	1282	1170	929	239	537	393	360	345	70

Source: Director, Disease Control, DGHS, Mohakhali, Dhaka

Table 9.4. Year-wise reported diarrheal case-fatality rate by division

Division	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Barisal	0.13	0.10	0.08	0.11	0.08	0.02	0.02	0.03	0.01	0.021	0.002
Chittagong	0.05	0.06	0.07	0.06	0.04	0.02	0.03	0.03	0.02	0.026	0.011
Dhaka	0.02	0.02	0.04	0.03	0.03	0.01	0.02	0.02	0.02	0.021	0.001
Khulna	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.005	0.004	0.002
Rajshahi	0.02	0.02	0.05	0.08	0.06	0.01	0.02	0.01	0.01	0.001	0.001
Rangpur	Rangpur was not a division before 2010. It was part of Rajshahi division									0.003	0.007
Sylhet	0.05	0.04	0.08	0.06	0.02	0.02	0.04	0.02	0.01	0.003	0.003
Average	0.03	0.03	0.05	0.05	0.03	0.01	0.02	0.02	0.01	0.014	0.003

Source: Disease Control Section, DGHS, Mohakhali, Dhaka

Table 9.5. Etiologic agents of diarrheal disease

Etiologic agent	Overall (n=2,393)	< 5 years age-group (n =1,302)	5+ years age-group (n =1,091)
V. cholerae O1	251 (10.5)	46 (3.5)	205 (18.8)
Classical			
Inaba			
Ogawa			
El Tor			
Inaba	02 (0.1)		
Ogawa	248 (10.4)	0	2(0.2)
V. cholerae O139	0	45 (3.5)	203 (18.6)
Shigellae	67 (2.8)	35 (2.7)	32 (2.9)
S. dysenteriae I	0		
S. flexneri	32	14	18
Other *Shigella* spp.	35	21	14
Salmonella	38 (1.6)	14 (1.1)	24 (2.2)
Typhi	2	1	1
Non-Typhi	36	13	23
Campylobacter	172 (7.2)	102 (7.8))	70 (6.4)
ETEC	232 (9.7)	114 (8.8)	118 (10.8)
Rotavirus	645 (27.0)	577 (44.3)	68 (6.2)
E. histolytica	12 (0.5)	1 (0.1)	11 (1.1)
Giardia lamblia	24 (1.1)	6 (0.6)	18 (1.7)
No pathogen identified	1,117 (46.7)	508 (39.0)	609 (55.8)
Single pathogen	1,007 (42.1)	642 (49.3)	365 (33.5)
Mixed pathogens	269 (11.2)	152 (11.7)	117 (10.7)
Male	1,456 (60.8)	809 (62.1)	647 (59.3)
Female	937 (39.2)	493 (37.9)	444 (40.7)

Source: Hospital Surveillance, icddr,b, Dhaka

Filariasis

Lymphatic filariasis (LF), a mosquito-borne disabling parasitic disease caused by tissue nematodes, is a public-health problem in Bangladesh. It is a major social and economic burden in the tropics and subtropics of Asia, Africa, Western Pacific, and part of Americas, affecting over 120 million people in 81 countries. Bangladesh is considered to be a major LF-endemic country with 70 million people at risk. LF Elimination Program in Bangladesh is implementing Mass Drug Administration (MDA) in endemic districts as a strategy to eliminate LF by 2015. Bangladesh is on the way of elimination, and MDA has been stopped in five districts (Meherpur, Barguna, Patuakhali, Rajshahi, and Dinajpur) out of 19 endemic districts since 2011 on the basis of the results of Transmission Assessment Survey (TAS). This is a WHO-recommended protocol. However, filariasis control program identified 34 endemic districts in 2002-2004 by ICT mapping. Later, 19 were selected from 34 districts for MDA on the basis of Microfilaria (Mf) survey. MDA was not started in the remaining 15 districts as Mf prevalence was below 1%. Recent endemic status in these districts will be re-evaluated in 2012. Out of 19 endemic districts, we achieved elimination target in 5 districts in 2011. Therefore, MDA is continuing in the remaining 14 districts. Another 5 of 14 districts are also on the way to

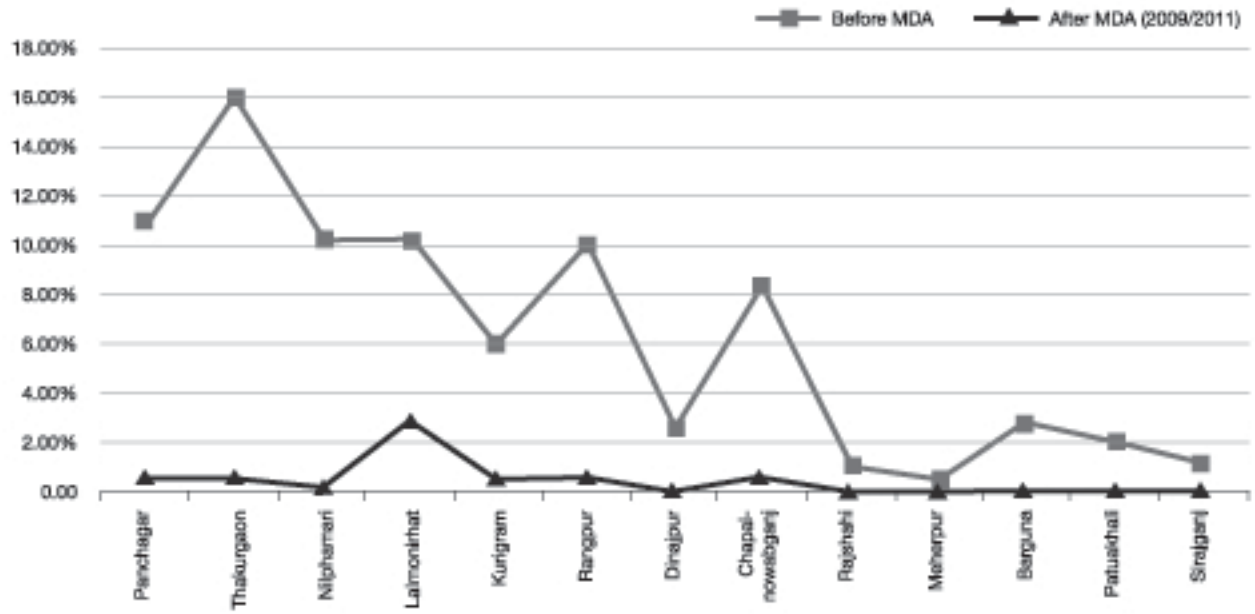

Figure 9.5. District-wise % distribution of filariasis cases (Microfilaria+ve) before and after 2009-2011 MDA

achieve the target of elimination, and TAS is ongoing in 2012. It is anticipated that we will achieve elimination target in these districts also.

Recent survey reveals that Mf prevalence has come down in other highly-endemic districts also.

Figure 9.5 shows results of Mf survey (2009-2011) against baseline data.

Home-based morbidity control program is being implemented to alleviate the suffering of patients in the highly-endemic districts. About 556 hydrocele operation was done in district- and upazila-level hospitals in filariasis-endemic districts in 2011.

HIV/AIDS

Bangladesh is still considered to be a low-prevalence country for HIV/AIDS but the country remains extremely vulnerable to HIV epidemic because of the high prevalence in neighboring countries and the high mobility of people inside the country and beyond, driven by poverty and overpopulation. Limited correct knowledge about HIV/AIDS due to illiteracy and ignorance, and gender inequity aggravated this vulnerability. High rate of needle-sharing among injecting drug-users (IDUs), low rate of condom-use among the most-at-risk population, low level of voluntary blood donation, and high prevalence of STDs are the most important factors that may contribute to the suspected HIV epidemic.

The Government of Bangladesh has been undertaking precautionary measures to slash the spread of HIV and AIDS since detection of the first case in 1989. National AIDS Committee (NAC) was formed in 1985 and reconstituted in 2010. The Ministry of Health and Family Welfare (MoHFW) is playing the leading role in the prevention of HIV/AIDS. National AIDS/

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STD Program (NASP) is implementing HIV/AIDS prevention activities in Bangladesh through a coalition of the following three functionaries:

- National AIDS Committee (NAC)
- MoHFW
- Directorate General of Health Services (DGHS)

The NASP is one of the wings of the DGHS responsible for coordinating activities of all stakeholders and development partners involved in HIV/AIDS Program. The national response to

HIV/AIDS guided by a number of well-developed strategies includes the following:

- National Strategic Plan for HIV and AIDS Response, 2011-2015
- National AIDS Monitoring and Evaluation (M&E) Framework and Operation Plan
- Assessment of National M&E System at Final State
- Safe Blood Transfusion Act (passed in 2002)
- National Harm Reduction Strategy for Drug-use and HIV, 2004-2010
- National HIV Advocacy and Communication Strategy, 2005-2010
- National Anti-retroviral Therapy Guidelines, 2006
- National STI Management Guidelines, 2006
- National Policy and Strategy for Blood Safety, 2007
- Guidelines for VCT
- National Standards for Youth-friendly Health Services (YFHS), 2007
- Standard Operating Procedures for Services to People Living with HIV and AIDS, 2009

Since detection of the first case of HIV/AIDS in Bangladesh in 1989, a total of 2,533 HIV+ve cases have been identified as of December 2011, among whom, 1101 developed AIDS (Fig. 9.6). Out of the total HIV/AIDS cases, 325 deaths have been reported. Although HIV prevalence among the general population as well as among the most-at-risk population remains at a very low level (<0.01% and <1.0% respectively), the UNAIDS/WHO (2008) estimate that there can be about 12,000 (ranging between 7,700 and 19,000) persons living with HIV as of 2007. The numbers of new cases are also on the rise (Fig. 9.7).

The National AIDS/STD Program introduced a surveillance system since 1998 based on facilities of HIV/AIDS and STD service providers. The most-at-risk population, which includes female and male sex workers (FSW and MSW), men who have sex with men (MSM), transgendered individuals (Hijra), injecting drugs-users, and other bridging population with risky behaviors, are covered in the surveillance.

The 9th round of serological surveillance was conducted in populations most at risk of HIV, i.e. sex workers, people who inject drugs (PWID), heroin-smokers, combined PWID and heroin-smokers, MSM, and Hijra. This round was conducted during December 2010 to June 2011; 12,894 individuals were sampled from 36 geographical areas of Bangladesh. The overall prevalence of HIV and active syphilis was found to be 0.7% and 3% respectively.

The population group with the highest rate of HIV continues to be PWID in Dhaka but the prevalence declined to 5.3% from 7% (in the 8th round). However, the decline is not statistically significant. Fortunately, the localization of the PWID epidemic to one neighborhood of Dhaka observed in previous years has also remained static. HIV was also detected in another four groups of people

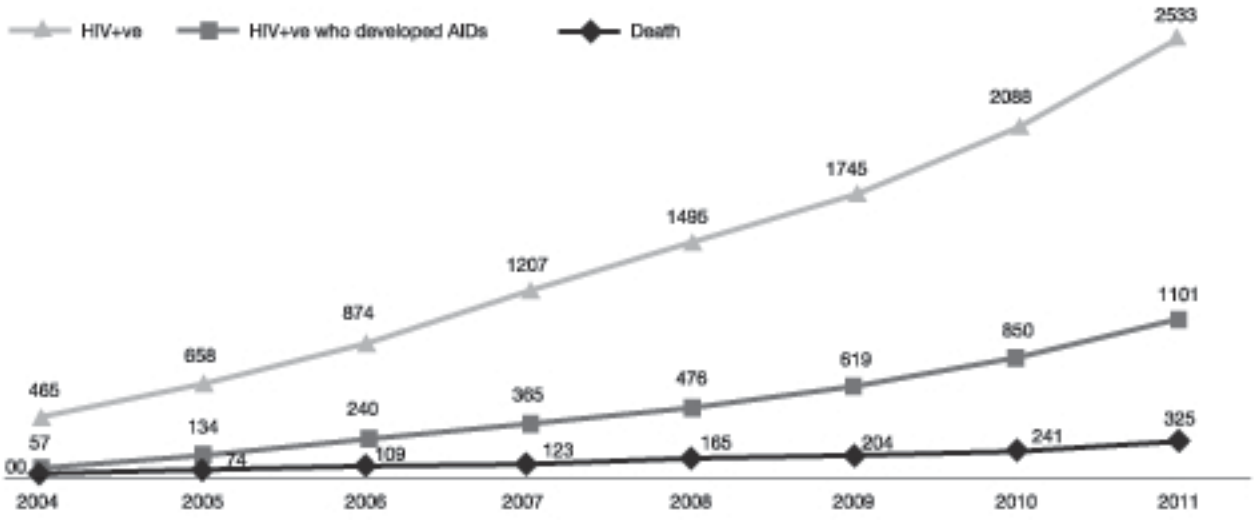

Figure 9.6. Year-wise cumulative number of HIV+ve, AIDs cases and death due to HIV/AIDs

who use drugs (PWUD), e.g. male PWID from Narayanganj (1.5%) and Satkhira (0.4); female combined PWID and heroin-smokers from Dhaka, Narayanganj, Tongi (1.2%), and Benapole (1%). Active syphilis rate at >5% was detected among six groups of PWUD, and the highest proportion was found in male PWID in Narsingdi (7.9%), followed by PWID in Chandpur (6.1%), and female PWUD in Dhaka, Tongi, and Narayanganj (5.9%). High prevalence of active syphilis indicates practice of unsafe sex.

Antibodies to hepatitis C virus (HCV) were measured in all PWID and groups of combined PWID and heroin-smokers but not in the groups consisting of only heroin-smokers. The rates varied in different cities, and in six cities, HCV-positive cases were found to be >50%. The higher prevalence for HCV was found among PWID from several towns of Rajshahi division, with Kanshat having the highest prevalence (95.7%). In Dhaka, HCV rates have declined significantly ($p<0.05$) over the rounds of the surveillance.

A total of 3,568 female sex workers were sampled from 13 areas of Bangladesh. Overall, HIV prevalence was low (<1%) in all groups of female sex workers except in casual sex workers from Hili where two in 125 samples were positive (1.6%). Active syphilis rates at >5% was detected in three groups and sites–street-based sex workers of Hili (12.5%) and Chittagong (10.3%) and hotel-based sex workers of Sylhet (9.3%). Male sex workers (MSW) and MSM continue to have low levels of HIV and active syphilis. Approximately 1% of Hijra had HIV. Among the group of MSM, MSW, and Hijra, active syphilis rates were the highest in Hijra of Dhaka and Manikganj (6.1%). High rates of active syphilis highlight the need for intensification of ongoing HIV/STI prevention programs in these population groups and sites.

In this round of surveillance, more population groups were sampled from border towns, and Benapole was included for the first time. Male PWID, street-based female sex workers, combined MSM/MSW and Hijra from Hili, male and female combined group of PWID and heroin-smokers of Benapole, casual female sex workers from Burimari, a combined group of hotel- and residence-based female sex workers from Teknaf were sampled. However, for all these groups, the sample-size was small. HIV was detected in two groups from Hili and Benapole each but the numbers were small. Cross-border mobility was more commonly reported by respondents from Hili.

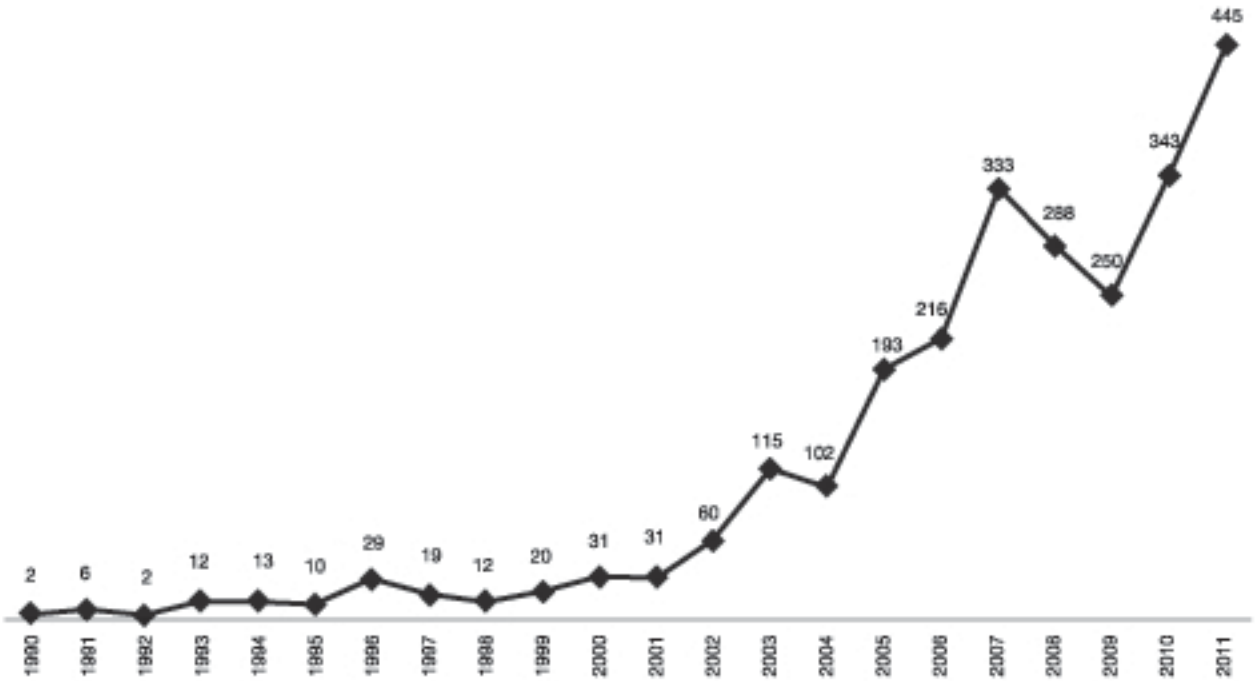

Figure 9.7. Year-wise number of new AIDS cases in Bangladesh from 1990 to 2011

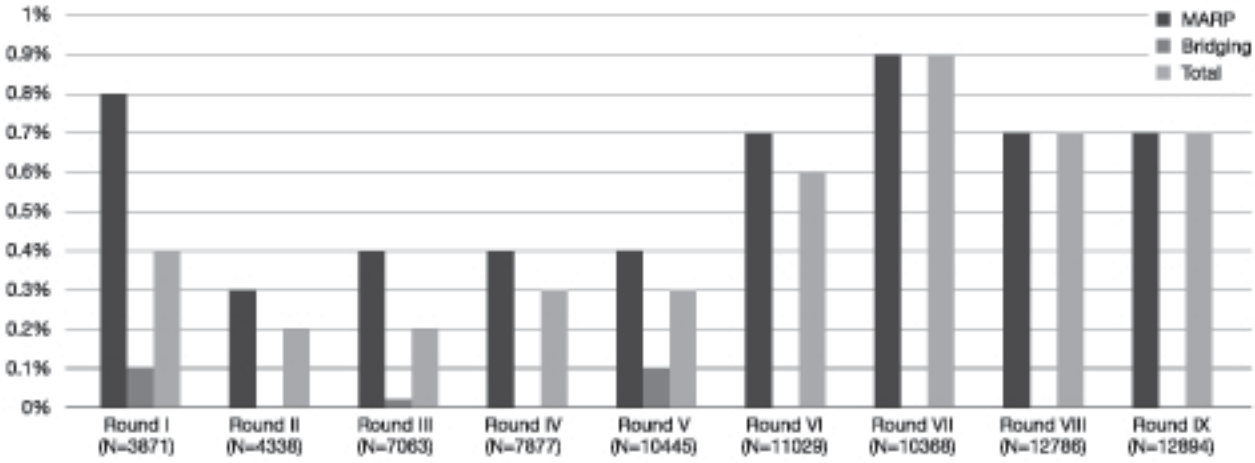

Figure 9.8. HIV-posiitve cases in Bangladesh found during different HIV serosurveillance carried out mostly among at-risk population groups (from Round I to 9)

HIV prevalence over the rounds

The overall HIV prevalence has remained at <1% over the rounds of surveillance, irrespective of whether the total population is considered or when segregated for the most-at-risk and the bridging populations. It is to be noted that the bridging population groups were not sampled since the 6th round of surveillance. Figure 9.8 presents the HIV prevalence rates found during serosurveillance

HIV in people who use drugs over the rounds of surveillance in Dhaka city

Although the prevalence rate of HIV among PWID in Dhaka has declined in this round of surveillance, the overall trend in HIV still shows an increase ($p<0.05$). No changes were observed in all other PWUD groups where HIV was detected in either the 8th or the 9th rounds of surveillance.

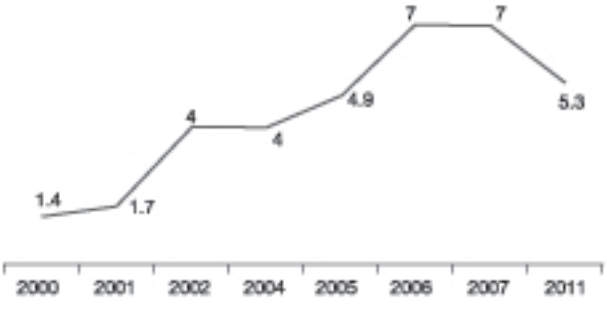

Figure 9.9. Prevalence of HIV+ve cases among the injecting drug-users of Dhaka city

Active syphilis in PWID, heroin-smokers, and combined PWID and heroin-smokers

In six cities, none of the PWUD had active syphilis in 2011, and one of these included female PWUD in Benapole. However, in another six cities, >5% PWUD had active syphilis, and the highest proportion was found in male PWID in Narsingdi (7.9%). This was followed by PWID in Chandpur (6.1%) and female PWUD in Dhaka, Tongi, and Narayanganj (5.9%). Figure 9.10 shows prevalence of active syphilis among PWID, heroin-smokers and combined PWID and heroin-smokers, during the year 2011. Figure 9.11 shows the prevalence of active syphilis among female sex workers in 2011.

Comparison of active syphilis rates among PWUD was done for those cities where data from three or more consecutive rounds were available. The comparison showed that active syphilis rates declined significantly over time ($p<0.05$) in Dhaka but no significant changes were observed for other cities.

Active syphilis rates are compared across the rounds among street-, hotel- and residence-based sex workers and casual sex workers. In three sites (Dhaka, Khulna, and Rangpur) of four, active syphilis rates declined significantly among street-based female sex workers over the rounds. However, in Chittagong, the rates were high (10.3%) during the 9th round, and no significant change was observed over the rounds.

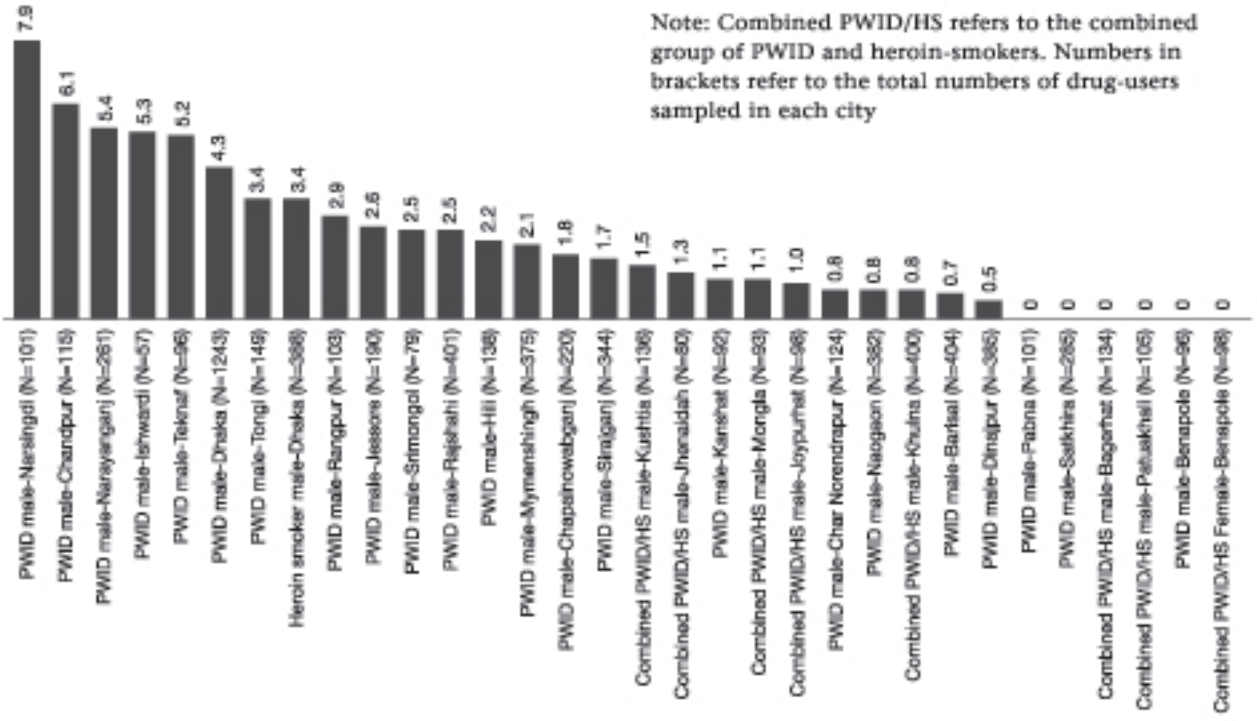

Figure 9.10. Prevalence of active syphilis in PWID, heroin-smokers, and combined PWID and heroin-smokers, 2011

HCV prevalence among PWID and combined PWID and heroin-smokers, 2011

Comparison of HCV rates over the surveillance rounds was done for those sites where data from three or more rounds were available. In some sites, significant decline in HCV rates were observed while in others the rates increased significantly, which was mainly observed within Rajshahi division. In Mymensingh and Tongi of Dhaka division; Rajshahi, Chapainowabganj, Kanshat, and Chor Narendrapur of Rajshahi division, HCV rates rose significantly ($p<0.05$).

Cross-boarder mobility in the last years among female sex workers, MSM, MSW, and Hijra

It is well-recognized that mobility and migration can enhance vulnerability to HIV, and women are particularly vulnerable (Blanchet, Biswas *et al*,. 2003). Fig.9.13 shows the percentage of female sex workers, MSM, MSW, and Hijra living in border areas, who crossed the border in the last year and sold sex. It shows clearly that cross-border mobility is more common in Hili. Little is known about the sex workers (male, female, and Hijra) living in

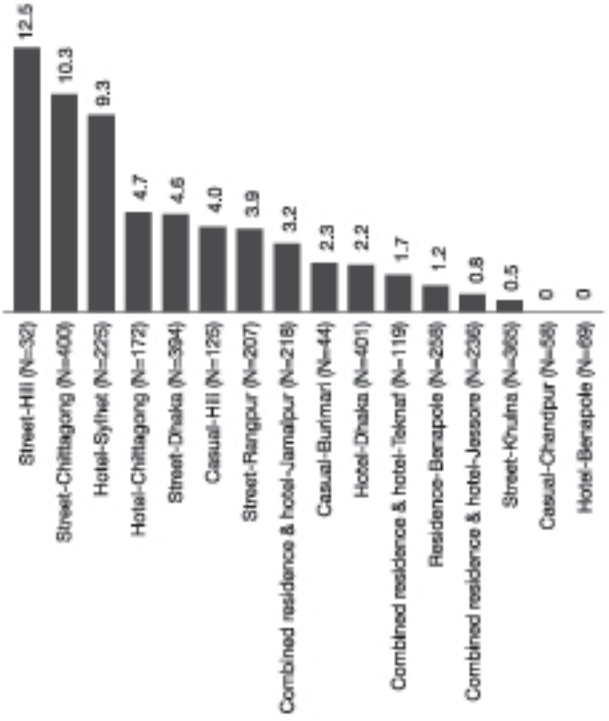

Figure 9.11. Prevalence of active syphilis among female sex workers, 2011

these border areas, and the BSS does not sample sex workers from these towns (Government of Bangladesh, 2007). A better understanding is essential for evidence-based programming.

A surrogate marker of unsafe sex is active syphilis. The significant decline in active syphilis rates in hotel- and street-based female sex workers in Dhaka suggests strong programming in this location. However, there were some population groups that had unacceptably high levels of active syphilis rates at >5% found in PWUD, female sex workers, and Hijra from 10 cities. Among them, six cases were in PWID, three in female sex workers, and one in Hijra.

A surrogate marker of unsafe sex is active syphilis. The significant decline in active syphilis rates in hotel- and street-based female sex workers in Dhaka suggests strong programming in this location...

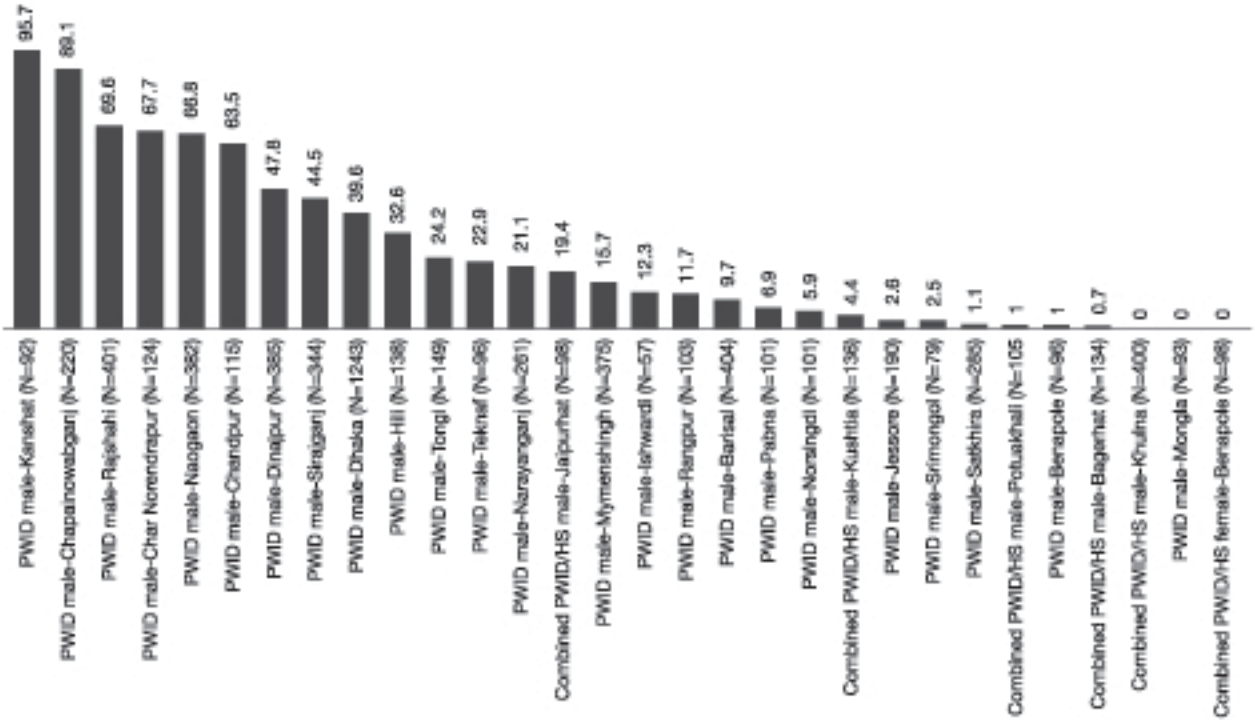

Figure 9.12. Prevalence of hepatitis C+ve cases among PWID and combined heroin-smokers (9th round of serosurveillance)

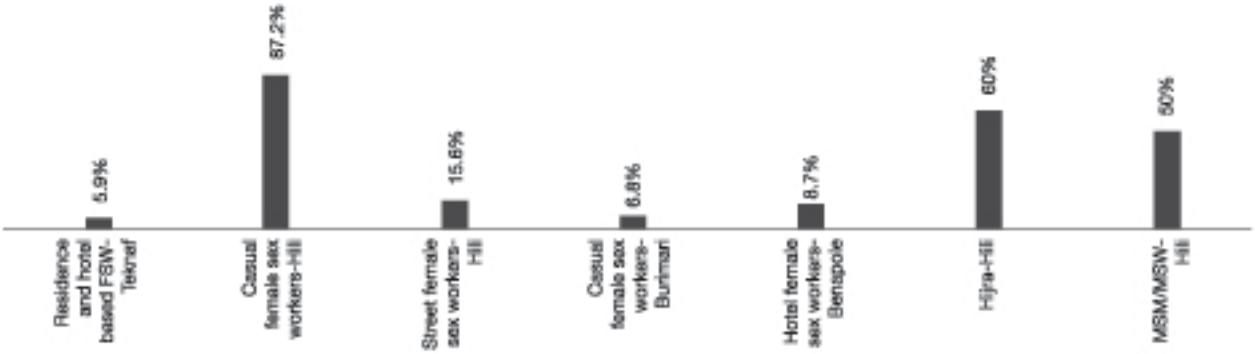

Figure 9.13. Percentage of female sex workers, MSM, MSW, and Hijra in border areas, who crossed the border and sold sex during 2011

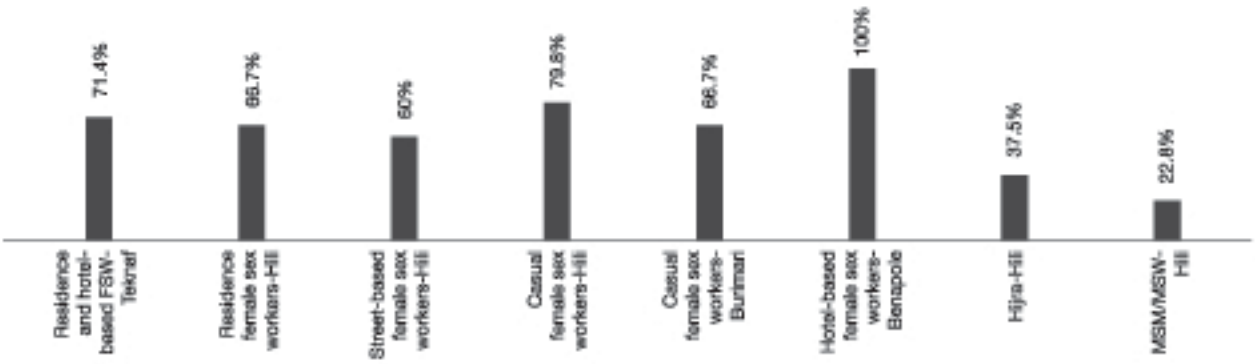

Figure 9.14. Population groups who sold sex while abroad in the last year (Percentage of active syphilis among those who crossed the border in the last year)

Geographical and occupational distribution

The 9th round of surveillance in 2011 has been conducted among the high-risk population of Bangladesh and found the highest prevalence in Dhaka city.

Figure 9.15. Division-wise distribution of new infection of HIV in 2011

Surveillance (2011) also determined the new cases by occupation as shown in Table 9.6.

Comparatively, the females were the most vulnerable group for HIV/AIDS.

Figure 9.16. Distribution of new cases of HIV by gender in 2011

Table 9.6. New cases of HIV

Occupation	N	%
Migrant worker	138	31
Housewife	94	21.1
Small businessmen	30	6.7
Service-holder	23	5.2
Garbage collector	14	3.1
Sex worker	12	2.7
Unemployed person	12	2.7
Transport worker	11	2.5
Student	8	1.8
Day-laborer	5	1.1
Farmer	5	1.1
Garments worker	5	1.1

Figure 9.16 shows the distribution of new cases of HIV by gender in 2011

Nipah virus

Human Nipah virus (NiV) infection, an emerging zoonotic disease, was first recognized in a large outbreak of 276 reported cases in Malaysia and Singapore from September 1998 through May 1999. Almost all patients had contact with sick pigs and presented primarily with encephalitis, of which 39% died. Large fruit-bats of *Pteropus* genus are the natural reservoir of NiV. Presumably, pigs became infected after consumption of fruits partially-eaten by bats that dropped in pigsty. In 1994, Hendra virus similar to Nipah was detected among horses in Australia. So, Nipah and Hendra virus together constitute the *Henipah* genus of viruses. In India, two outbreaks in

humans during 2001 and 2007 were reported from West Bengal neighboring Bangladesh.

In Bangladesh, NiV was first identified as the cause of an outbreak of encephalitis in 2001. Since then, 11 Nipah outbreaks have been identified in Bangladesh, involving 20 districts—all occurring between December and May. The Nipah outbreaks have been identified in Meherpur (2001), Naogaon (2003), Rajbari (2004), Faridpur (2004), Tangail (2005), Thakurgaon (2007), Kushtia (2007), Manikganj, Rajbari (2008), Faridpur (2010), and Lalmonirhat (2011). Till December 2011, a total of 197 human cases of Nipah infection in Bangladesh were recognized; 151 (76.6%) died, indicating a very high case-fatality rate.

Respiratory health problems, including pneumonia, have been found to be considerably more among patients in Bangladesh than in Malaysia. This may be due to genetic diversity of the virus strains. Prominent involvement of respiratory problems is probably responsible for human-to-human transmission.

Table 9.7 shows morbidity and mortality due to Nipah or Nipah-like viral encephalitis in Bangladesh during the period from 2001 to 2011.

Anthrax

Anthrax is primarily a disease of the ruminants caused by the spore-forming bacteria *Bacillus anthracis*. Human exposures to *B. anthracis* spores may cause cutaneous, gastrointestinal or respiratory tract infections based on the route of entry. Naturally-occurring anthrax is a common problem around the globe. Sporadic cases and epizootics occur in livestock and in wild animals in the USA, Canada, and other high-income countries. Outbreaks in animals, frequently with associated human illness, are reported from countries in Africa and in Middle and South Asia, especially in countries with poor coverage of anthrax vaccination in livestock. Published reports of anthrax in animals in Bangladesh date back to 1948. Anthrax was periodically reported both in animals and humans in Bangladesh between 1949 and 1986. After 25 years of no reported anthrax outbreaks in humans, a cutaneous anthrax outbreak was detected in Bangladesh in August 2009. Since then, anthrax outbreaks have repeatedly been reported from different parts of the country.

Since 2009, collaborative teams from the Institute of Epidemiology, Disease Control and Research (IEDCR) and International Centre for Diarrheal Disease Research, Bangladesh (icddr,b)

Table 9.7. Morbidity and mortality due to Nipah or Nipah-like viral encephalitis in Bangladesh during the period from 2001 to 2011

Year/Month	Location	No. of cases	No. of deaths	Case-fatality rate (%)
April-May 2001	Meherpur	13	9	69
January 2003	Naogaon	12	8	67
January 2004	Rajbari	31	23	74
April 2004	Faridpur	36	27	75
Jan-March 2005	Tangail	12	11	92
Jan-Feb 2007	Thakurgaon	7	3	43
March 2007	Kushtia, Pabna, Natore	8	5	63
April 2007	Naogaon	3	1	33
February 2008	Manikganj	4	4	100
April 2008	Rajbari and Faridpur	7	5	71
Jan 2009	Gaibandha, Rangpur, and Nilphamari	3	0	0
	Rajbari	1	1	100
Feb-Mar 2010	Faridpur, Rajbari, Gopalganj, and Madaripur	16	14	87.5
Jan-Feb 2011	Lalmohirhat, Dinajpur, Comilla, Nilphamari, and Rangpur	44	40	91
Feb 2012	Joypurhat, Rajshahi, Natore, Rajbari, and Gopalganj	12	10	83
Total		197	151	76.6

have been investigating cutaneous anthrax outbreaks in humans, which were associated with anthrax infection in livestock. During 2009-2011, the teams investigated 14 outbreaks, in which 273 persons were identified with suspected cutaneous anthrax. These outbreaks in humans were all preceded by the slaughtering of moribund cattle suspected of having anthrax in the affected areas. There was no report of human deaths relating to anthrax in those outbreaks. With many outbreaks reported through informal sources, the actual disease burden of both animal and human anthrax cases in the country is unknown.

Although the virus is not easily transmitted from poultry to humans and from humans to humans, it is believed that a pandemic due to H5N1 virus or its genetically-altered form is imminent...

Avian influenza prevention and control

Introduction/Background of AI

Avian influenza or bird flu is a zoonotic viral disease caused by a subtype of Influenza A, known as Avian Influenza H5N1 (AI/H5N1), which is highly contagious in birds. It spreads very rapidly through poultry flocks and carrier ducks. The disease affects multiple internal organs of the bird, and mortality can reach up to 100% often within 48 hours. The primary risk factor for human infection appears to be direct or indirect exposure to infected live or dead animals or contaminated environments. Although the virus is not easily transmitted from poultry to humans and from humans to humans, it is believed that a pandemic due to H5N1 virus or its genetically-altered form is imminent. There is grim history of influenza pandemics of 1918 (Spanish flu), 1957 (Asian flu), 1968 (Hong Kong flu), 1977 (H1N1 virus) and 2009 (H1N1 virus 'swine flu').

Global situation

According to WHO, 63 countries reported avian influenza in poultry and, out of these, 15 countries (including Bangladesh, Myanmar, and Pakistan) reported human infection with the virus. There have been 597 human cases of avian influenza, with 351 fatal cases around the world. Infection in human often has serious consequences, with a high case-fatality rate averaging about 60%.

Bangladesh scenario

The first human case of avian influenza in Bangladesh was reported on 22 May 2008. With reporting of the first human case, Bangladesh has entered into the pandemic alert period. Subsequently, two more human cases of H5N1 and one human case of H9N2 have been detected in 2011. The cases were detected from surveillance site at Kamalapur, Dhaka.

The first case of Influenza A (H1N1) 2009 (swine flu) was identified in Bangladesh on 18 June 2009. Since then, one thousand and fifty-three cases were identified, and seven laboratory-confirmed patients died (as of 30 April 2010). On 10 August 2010, the World Health Organization declared an end to the 2009 H1N1 influenza pandemic. This declaration was based on strong indications that influenza is transitioning toward seasonal patterns of transmission worldwide.

Activities of Bangladesh Government in the control of AI in poultry and humans

Planning and coordination

The Bangladesh Government formed committees and made these functional at different levels of health services. Avian/ Pandemic Human Influenza is added as a separate component in the HPNSDP (2011-2016).

Surveillance

Surveillance for influenza-like illnesses (ILI) is being conducted at 12 hospitals by IEDCR in collaboration with icddr,b and is expanded to additional 14 district hospitals by IEDCR with support from avian and pandemic influenza programs of the Communicable Disease Control Division of the DGHS. Procurement of equipment and logistics for establishing laboratories at 14 sentinel sites and procurement of equipment and accessories for BSL 2 and prefabricated BSL 3 laboratory for IEDCR have been completed. IEDCR, with Dhaka City Corporation (DCC), has started ILI surveillance among handlers of live birds in 20 selected wet markets of 10 zones of DCC from February 2009. Surveillance is also conducted among cullers of HPAI-infected poultries.

Prevention and control

In collaboration with WHO, the Government of Bangladesh has established 'Avian Influenza ward' in Asthma Center of NIDCH at the national level, and establishment of isolation units in 64 districts by December 2012 is progressing. The Government has already distributed 251,000 antiviral (Oseltamivir), 1,000 sets of PPE, disinfectants, and handwashing solution to the district level. Procurement of 400,000 capsules, 100,000 syrups of antiviral (Oseltamivir), 50,000 sets of PPE, 50,000 bottles (500 mL) of disinfectants, and 5,000 bottles (100 mL) of handwashing solution is done.

Sector response

Development and production of guidelines and SOP on different activities under AI in humans and guidelines for case management have been completed. Laboratory manual on diagnosis of AI, training modules, guidelines and SOP on International Health Regulation (IHR) and Public Health Emergency of International Concern (PHEIC) have been developed.

Tuberculosis

Tuberculosis (TB) is a major public-health problem in Bangladesh for a long time. Under the Mycobacterial Disease Control (MBDC) Unit of the Directorate General of Health Services (DGHS), the National Tuberculosis Control Program (NTP) is working with a mission to eliminate TB from Bangladesh. The goal of the program is to reduce morbidity, mortality, and transmission of TB until it is no longer a public-health problem while its main short-term objectives are to sustain the global targets of achieving at least 70% case detection and 85% treatment success among new smear-positive TB cases under DOTS. The medium-term objectives include reaching the TB-related Millennium Development Goals with targets of halving TB mortality and prevalence by 2015. At present, the NTP is working for achieving universal access to high-quality care for all people with TB.

The NTP adopted the DOTS strategy and started its field implementation in November 1993. 'DOTS' that stands for 'Directly-observed Treatment-Short course', has evolved to be a brand name for the TB control strategy with five components: (1) political commitment with increased and sustained financing; (2) case detection through quality-assured bacteriology; (3) standardized treatment with supervision and patients' support; (4) an effective drug supply and management system; and (5) monitoring and evaluation system, and impact measurement. The program progressively expanded to cover all upazilas by mid-1998. By 2007, the DOTS services were made available throughout the country, including the metropolitan cities. Now the NTP is providing tuberculosis-control services through 850 DOTS centers, 1,050 microscopy centers, and 35 external quality assessment (EQA) centers all over the country.

The quality of the NTP continues to improve. High rates of treatment success were achieved from the beginning, and the target of 85% treatment success has been met since 2003, and the achievement crossed the target of detecting 70% of estimated new smear-positive cases by 2007.

Tuberculosis situation in Bangladesh

According to the revised estimates by WHO, the incidence and prevalence rates of all forms of tuberculosis in 2010 were 225 and 411 per 100,000 people respectively. It is further estimated that about 43 per 100,000 people died of TB in the same year. Although the HIV prevalence is still low, HIV poses a threat to TB control. The estimated incidence rate of HIV-positive TB cases was about 0.45 per 10,000 people. The proportion of multidrug-resistant tuberculosis (MDR-TB) among new TB cases was 2.1%, and that among retreatment cases was 28%. (Table 9.8)

Progress in TB control

Since the introduction of DOTS in Bangladesh in 1993, remarkable progress in TB control has been made in terms of DOTS coverage, detection of TB cases, and treatment success. DOTS coverage

Table 9.8. Estimated population and TB burden in Bangladesh

Population	149 million
Mortality rate (excluding HIV)	43/100,000 people
Prevalence rate (all cases, including HIV+ve))	411/100,000 people
Incidence rate (all cases, including HIV+ve)	225/100,000 people
Incidence rate (HIV positive TB cases)	0.45/100,000 people
Proportion of new TB cases with MDR-TB	2.1%
Proportion of retreatment TB cases, with MDR-TB	28%

DOTS coverage in all upazilas was achieved by June 1998, and by 2007, the NTP reached 100% DOTS coverage...

in all upazilas was achieved by June 1998, and by 2007, the NTP reached 100% DOTS coverage. DOTS coverage refers to the population living in areas where DOTS services are available. This does not mean that all people have equal access to diagnostic and/or treatment facilities.

Case notification and treatment success

Now WHO is not providing any estimate for new smear-positive cases—rather providing estimated incidence of all types of new cases. So, for program-monitoring purposes, the NTP is using case notification rate which is defined as the number of cases registered and reported to the NTP per one hundred thousand people per year. A total of 155,557 cases (including 4,666 combined cases of return after failure, return after default, and others) have been reported to the NTP in 2011. So, the overall case notification rate, excluding those 4,666 cases, was 99 per 100,000 people. The case notification rate for new smear-positives cases in 2011 was 65 per 100,000 people. (Figure 9.17, 9.18, and Table 9.9)

The program has successfully treated almost 92% of the new smear-positive cases registered in 2010 (Figure 9.19).

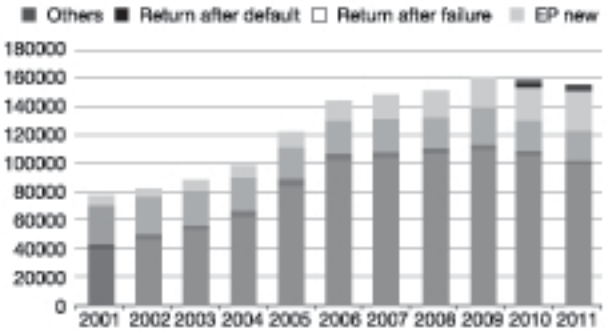

Figure 9.17. Nationwide case notification; absolute number, 2001-2011

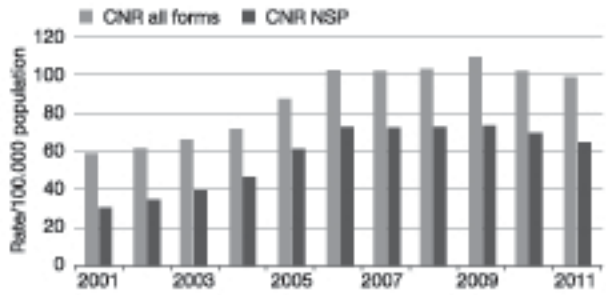

Figure 9.18. Nationwide case notification rate (per 100,000 people/year), 2001-2011

Multidrug-resistant tuberculosis (MDR-TB) in Bangladesh

The emergence of resistance to anti-TB drugs, particularly the multidrug-resistant tuberculosis (MDR-TB), has become a significant public-health threat globally against effective TB control.

Table 9.9. Year-wise tuberculosis case notification by type of reporting unit, 2006-2011

Year	Area	Smear-positive		Smear-negative	Extra-pulmonary	Total
		New	Relapse	New	New	
2006	Rural/Upazila	89,704	2,645	16,717	9,707	118,773
	Urban/Metro	9,255	1,279	5,409	3,499	19,442
	CDC	2,806	287	2,375	1,155	6,623
	Total	101,765	4,211	24,501	14,361	144,838
2007	Rural/Upazila	91,606	2,517	15,852	10,861	120,836
	Urban/Metro	10,264	1,049	5,449	4,164	20,926
	CDC	2,437	222	1,934	1,093	5,686
	Total	104,307	3,788	23,235	16,118	147,448
2008	Rural/Upazila	93,659	2,753	15,069	12,825	124,306
	Urban/Metro	10,289	1,165	5,660	4,486	21,600
	CDC	2,425	220	1,463	1,048	5,156
	Total	106,373	4,138	22,192	18,359	151,062

Table 9.9 Continued

Year	Area	Smear-positive		Smear-negative	Extra-pulmonary	Total
		New	Relapse	New	New	
2009	Rural/Upazila	96,333	2,692	17,759	15,768	132,552
	Metro	10,390	1,136	5,829	4,872	22,227
	CDC	2,171	150	1,548	1,225	5,094
	Total	108,894	3,978	25,136	21,865	159,873
2010	Rural/Upazila	93,937	2,101	15,539	17,255	128,832
	Metro	9,977	770	4,788	4,943	20,478
	CDC	1,858	129	1,298	1,308	4,593
	Total	105,772	3,000	21,625	23,506	153,903
2011	Rural/Upazila	87738	1888	16428	20345	126399
	Metro	9390	699	4441	5648	20178
	CDC	1814	113	1048	1341	4316
	Total	98942	2700	21915	27334	150891

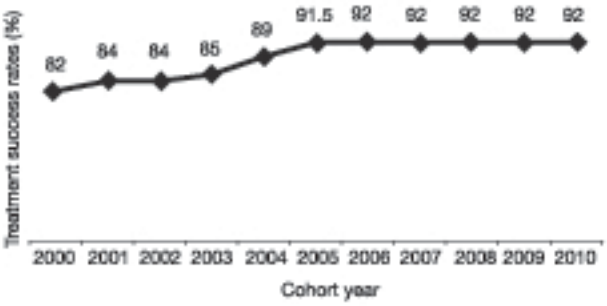

Figure 9.19. Trends in treatment success rates, 2000-2010 cohorts

According to the WHO estimates, there were estimated 650,000 cases of MDR-TB in 2010 among the world's 12 million prevalent cases of TB. Global estimates of incidence and country-level prevalence of MDR-TB have not been provided. However, estimates of the proportions of new and retreatment cases with MDR-TB have been given and, accordingly, these estimates are 2.1% and 28% respectively (Table 9.8).

For diagnosis and management of MDR-TB, a National TB Reference Laboratory (NTRL) has been established in the National Institute of Diseases of Chest and Hospital (NIDCH)—a tertiary-level hospital having 685 beds, including 330 beds for complicated and MDR-TB patients. The NTRL started functioning since 27 June 2007 for culture and drug sensitivity test (DST). It is linked with supranational reference laboratory (SRL) in Antwerp, Belgium. In August 2008, the NIDCH started enrolment of MDR-TB patients with GLC-approved 24 months regimen and supported by the Global Fund. By the end of December 2011, a total of 681 MDR-TB patients have been enrolled. The MDR-TB patients are also managed in the chest disease hospital (CDH) of Rajshahi division but with a shorter regimen of 9 months; this supported by Damien Foundation, Bangladesh. Since May 2005, this center has been managing MDR-TB patients and, by the end of December 2011, a total of 773 MDR-TB patients have been enrolled. A regional TB reference laboratory (RTRL) has been established in the CDH, Rajshahi, in May 2008. Another RTRL has been established in CDH, Chittagong, in October 2010. During 2011, a total of 41 MDR-TB patients have been enrolled.

> Private care providers for TB have important and strategic roles in reaching groups of the population, particularly those who bypass the public healthcare delivery system...

The NTP has completed a Drug Resistance Survey (DRS), and now the burden of MDR-TB in Bangladesh may be estimated.

Public-private mix strategy for TB control in Bangladesh

Public-private mix (PPM) is a strategy which aims to link the resources of public and private healthcare providers to achieve national TB control targets. The PPM approaches for TB control in Bangladesh involve partnership of public with

private (for example: the NTP collaborating with NGOs and private sector), public with public (for example, the NTP collaborating with Defense, Police Health Services, etc.), and private with private healthcare providers (for example, NGOs working with private practitioners). Private care providers for TB have important and strategic roles in reaching groups of the population, particularly those who bypass the public healthcare delivery system. So, the NTP has expanded its collaboration with public and private healthcare providers. The NTP has already developed effective collaboration with the health authorities of city corporations to mobilize the staff of the city corporations in six metropolitan areas in the TB control program. The NTP has established the Memorandum of Understanding with the largest association–Bangladesh Garments Manufacturers and Exporters Association (BGMEA) and started TB control program in garments industries throughout Bangladesh. At present, the NTP established DOTS centers in public and private health facilities, such as in public medical college hospitals, private medical college hospitals, Sadar (district) hospitals, chest disease hospitals and clinics, NGO hospitals, city corporation hospitals, defense hospitals, and prison hospitals, with support from partner NGOs.

Advocacy communication and social mobilization

As an important component of STOP TB STRATEGY, the NTP has developed a national strategic plan for Advocacy Communication and Social Mobilization (ACSM) in collaboration with partners to conduct the ACSM activities countrywide. The materials and methods used for this purpose are posters, leaflets, pamphlets, flipcharts, flash-cards, billboards, cinema-slides, TV and radio-spots, street-drama, talk-show, and concert to raise public awareness about TB and its control activities. Additionally, every year World TB Day is observed on 24 March to increase awareness among mass people.

Leprosy

Leprosy is a very ancient and chronic infectious disease caused by *Mycobacterium leprae*, affecting mainly the peripheral nerves. The disease also affects the skin, mucosa of the upper respiratory tract, muscles, eyes, bones, testes, and internal organs. Before 1873 AD, the cause of leprosy was not known, and no effective treatment was available. The discovery of *M. leprae* (Hansen's Bacillus) by Dr. Armuer Hansen in 1873 marked the beginning of a new era in the management of leprosy. In 1943, dapsone monotherapy with the sulphone drugs was introduced in the treatment of leprosy. In 1985, multidrug therapy was introduced in leprosy treatment due to emergence of dapsone-resistant strains of *M. leprae*.

> Bangladesh has achieved elimination of leprosy as a public-health problem at the national level by the end of December 1998. It was two years ahead of the WHO-targeted date...

Bangladesh has achieved elimination of leprosy as a public-health problem at the national level by the end of December 1998. It was two years ahead of the WHO-targeted date. The elimination is defined by WHO as reducing registered prevalence

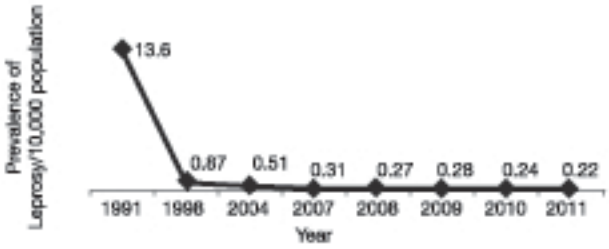

Figure 9.20.: Registered prevalence rate of leprosy (per 10,000 people), Bangladesh, 1991-2011

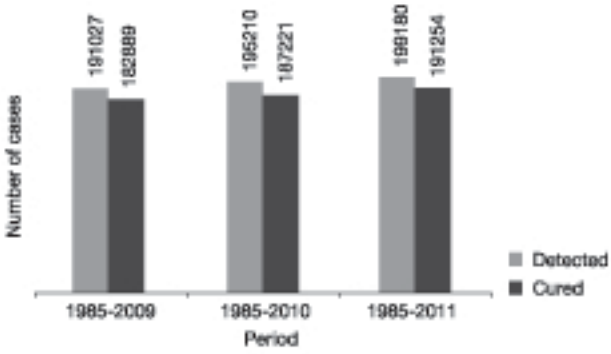

Figure 9.21. Cumulative number of new leprosy cases detected and completed MDT (cured), under NLEP, Bangladesh, 1985-2009, 1985–2010, and 1985-2011

to less than 1 case per 10,000 people. At that time, the registered prevalence was 0.87/10,000 people, and the number of endemic districts/areas was 15. After achieving elimination at the national level, the National Leprosy Elimination Program (NLEP) is consolidating its effort to achieve subnational (district-level) elimination. At the end of December

2004, the registered prevalence came down to 0.51/10,000 people, and the number of endemic districts/areas came down to 10. The NLEP has been experiencing a very slow decline of leprosy prevalence since the last 12 years, with 0.22/10,000 people by the end of December 2011 (Figure 9.20).

At the end of 2011, the number of endemic districts came down to 2—Gaibandha (1.09/10,000 people) and Bandarbon (1.19/10,000 people) Another important indicator for evaluating leprosy program is the disability Grade 2 rate among newly-detected cases per annum, which was 21.4% in 1993—the year of launching the revised National Leprosy Elimination Program (NLEP). Although the target is to reduce deformity Grade 2 to less than 5%, it is still remaining high (12% at the end of 2011)

Figure 9.21 shows the cumulative number of new leprosy cases and completed MDT from 1985 to 2011. Table 9.10 and 9.11 show respectively the division-wise new case detection and completed MDT (cured) during 2009-2011.

Table 9.10. Division-wise profile of the newly-detected leprosy cases, Bangladesh, 2009-2011

Division	Year	Population (N)	MB (N)	PB (N)	Total (N)	Registered prevalence/ per 10,000 people
Barisal	2009	9,170,109	10	1	11	0.01
	2010	9,254,080	4	0	4	0.00
	2011	9,338,999	1	1	2	0.002
Chittagong	2009	28,901,453	400	358	758	0.19
	2010	29,387,800	226	202	428	0.16
	2011	29,883,564	229	141	370	0.122
Dhaka	2009	47,845,021	652	930	1,582	0.26
	2010	48,795,514	542	897	1,439	0.24
	2011	49,771,330	563	893	1,546	0.227
Khulna	2009	17,163,458	50	15	65	0.34
	2010	17,410,525	52	16	68	0.03
	2011	17,661,430	49	12	610	0.037
Rajshahi	2009	35,208,052	916	1,537	2,453	0.53
	2010	35,702,832	697	1,269	1,966	0.44
	2011	36,204,971	697	1,007	1,704	0.378
Sylhet	2009	9,350,784	218	151	369	0.45
	2010	9,496,717	199	79	278	0.41
	2011	9,644,939	169	118	287	0.384
Total	2009	147,638,877	2,246	2,992	5,238	0.28
	2010	150,047,468	1,720	2,463	4,183	0.24
	2011	152,505,233	1,798	2,172	3,970	0.216

Table 9.11. Division-wise completed MDT in Bangladesh during 2009-2011

Division	MB (>5 lesions)			PB (1 to 5 lesions)			Total		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
Dhaka	603	644	539	809	583	816	1412	1227	1355
Barisal	12	2	2	0	0	1	12	2	3
Chittagong	454	281	346	409	220	185	863	501	531
Sylhet	166	172	196	98	121	79	264	293	275
Khulna	64	42	44	21	16	20	85	58	64
Rajshahi	906	826	798	1454	1425	1010	2359	2259	1808
Total (%)	2205 (44.15)	1967 (45.41)	1925 (47.7)	2790 (55.85)	2365 (54.59)	2111	4495 (100)	4332 (100)	4036 (100)