CENTRE FOR HEALTH AND POPULATION RESEARCH

HSB

Health and Science Bulletin

Vol. 1 No. 4 ISSN 1729-343X September 2003

Inside

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HIV Surveillance in Bangladesh

Surveillance for human immunodeficiency virus (HIV) infection is conducted annually among population groups most vulnerable to HIV infection. The rate of HIV prevalence among injecting drug users in an urban area in central Bangladesh has increased significantly over the past three years to a level of 4% in 2002. Through 2002, in all other population groups sampled, HIV prevalence has remained <1%. The findings of this report suggest a trend in Bangladesh toward a concentrated HIV epidemic among injecting drug users.

Since 1998, the Government of Bangladesh has been conducting surveillance (known as 2nd generation surveillance) for HIV (1–5) which includes serological and behavioural surveillance; 2nd generation surveillance attempts to capture the potential diversity of HIV distribution by classifying an epidemic into low, concentrated, and generalised categories, and sampling population groups based on the epidemic situation in the country. On behalf of the Government of Bangladesh, ICDDR,B has conducted the serological component for each of the four rounds, while other organisations have conducted behavioural surveillance.

Surveillance is conducted among population groups that are most vulnerable to HIV infection. They include male and female sex workers, transgenders (hijra), injecting drug users (IDU), men who have sex with men (MSM), clients of sex workers, such as "babus" who are regular partners of female sex workers in brothels, patients with symptoms of sexually transmitted infections (STI), and transport workers, including truckers, rickshaw pullers, launch workers and dockworkers.

Table 1: Prevalence of HIV and syphilis during the 4th round of surveillance

Study population geographical Location (total no. tested)	HIV-Positive %; 95% CI	Syphilis-Positive %; 95% CI	
		Non-active	active
IDU:			
NEP* Central A (403)	4.0; 2.3-6.4	19.4; 15.6-23.6	3.5; 1.9-5.8
NEPNorth West A (405)	0; 0-0.9	9.4; 6.7-12.7	1.7; 0.7-3.5
NEPNorth West B (200)	0; 0-1.8	11.0; 7.0-16.2	2.0; 0.5-5.0
Heroin smokers:			
Central A (388)	0; 0-0.9	13.9; 10.6-17.8	3.4; 1.8-5.7
Brothel Based Female Sex workers:			
Central B (406)	0.2; 0-1.4	23.2; 19.1-27.6	3.9; 2.3-6.3
Central C (152)	0; 0-2.4	40.1; 32.3-48.4	9.2; 5.1-15.0
Central D (402)	0.7; 0-2.2	32.6; 28.0-37.4	6.7; 4.5-9.6
South West A,C (241)	0; 0-1.5	17.4; 12.9-22.8	5.0; 2.6-8.5
South West B (195)	0.5; 0-2.8	26.2; 20.1-32.9	3.6; 1.5-7.3
Street Based Female Sex Workers:			
Central A (403)	0.2; 0-1.4	29.8; 25.4-34.5	8.4; 5.9-11.6
Central B (199)	0; 0-1.8	12.1; 7.9-17.4	3.0; 1.1-6.4
South West A** (317)	0; 0-1.2	13.6; 10.0-17.8	4.7; 2.7-7.7
Hotel Based Female Sex Workers:			
Central A (405)	0.2; 0-1.4	11.4; 8.4-14.9	4.9, 3-7.5
Hijra:			
Central A (393)	0.8; 0.2-2.2	34.9; 30.2-39.8	10.4, 7.6-13.9
Male Sex Workers:			
Central A (401)	0; 0-0.9	14.2; 10.9-18.0	3.2; 1.7-5.5
MSM (non sex workers):			
Central A (406)	0.2; 0-1.4	3.7; 2.1-6.0	0.7; 0.2-2.1
MSM group (sex workers and non sex workers): †			
Central C (400)	0; 0-0.9	8.8; 6.2-12.0	2.3; 1-4.2
South East A (397)	0; 0-0.9	11.8; 8.8-15.4	4.3; 2.5-6.8
North East A (402)	0; 0-0.9	6.2; 4.1-9.0	3.0; 1.6-5.2
Babus (Brothel):			
Central B (252)	0; 0-1.5	10.7; 7.2-15.2	1.6; 0.4-4
Central D (200)	0; 0-1.8	23.0; 17.4-29.5	6.0; 3.1-10.2
STI Patients:			
North East A (106)	0; 0-3.4	3.8; 1-9.4	0.9; 0-5.1
Truckers:			
Central A (402)	0; 0-0.9	7.0; 4.7-9.9	1.0; 0.3-2.5
Launch Workers:			
Central A (402)	0; 0-0.9	5.0; 3.1-7.6	1.5; 0.5-3.2
Total: (7877)	0.3; 0.2-0.5	15.8; 15.0-16.6	3.9; 3.5-4.4

*NEP–Needle/syringe exchange programme

**Southwest A and C, two geographical related areas together representing one site

† In some sites male sex workers (MSW) and non-sex worker MSM could not be differentiated and they were sampled as a single group

These population groups are sampled from five regions, based on five of the divisions of Bangladesh. People within vulnerable population groups are accessed for serological surveillance from a variety of sentinel sites through organisations providing intervention programmes. Blood specimens are obtained within clinical settings following community mobilisation, and tested for HIV, syphilis and hepatitis C (HCV). HCV is tested only among IDUs. In order to achieve ±1% precision and 95% confidence, approximately 380 people are tested within each group, based on an assumption of HIV prevalence of 1%. For groups with fewer than 380 people available for testing, all individuals agreeing to participate are surveyed.

During the 4th round of serological surveillance between May and October 2003, 7,877 blood samples were collected. Samples were initially tested for HIV by an ELISA kit (Organon Teknika, Boxtel, The Netherlands); positive assays were confirmed by Line Immunoassay (LIA, Organon Teknika). An indeterminate result in the LIA test was considered to be negative. Syphilis was tested by the Rapid Plasma Reagin test (RPR; Organon Teknika) and the ***Treponema pallidum*** haemagglutination assay (TPHA; Organon Teknika). Specimens positive for TPHAwith an RPR titre of ≥8 were considered to reflect active syphilis. Sera from IDU were tested for HCV using an ELISA kit (UBI HCV EIA, United Biomedical Inc., USA). All HCV ELISA-positive specimens were re-tested with a second ELISA kit (Abbott IMx HCV, version 3.0, Abbott Laboratories, USA). Specimens with discrepant results were retested by LIA (INNO-LIA HCV Ab III update, Innogenetics N.V., Ghent, Belgium). Samples positive for any two tests were considered to be positive for HCV.

Overall HIV prevalence was 0.3% (Table 1). This figure is comparable to that found during previous rounds (0.4%, 0.2%, and 0.2% in the 1st, 2nd and 3rd rounds respectively). However, prevalence of HIV in IDU in one city in central Bangladesh (City A), has increased dramatically to 4% (Fig. 1). This figure represents the highest recorded rate in any group during any surveillance round. IDUs also had high rates of HCV (ranging from 59.8-79.5%) which are similar to findings in the 2nd surveillance round (Table 2).

While HIV infection was documented in other population groups, the prevalence was less than 1%. No HIV was detected among male sex workers or among male clients of female sex workers (truckers, launch workers, STI patients and babus).

Syphilis rates have remained high, especially among female sex workers and hijra (Table 1). Declining rates for syphilis were observed at many of the brothel sites (but not all of them) (Fig. 2) and from the streets of City A, possibly as a result of intense interventions in those groups.

Reported by: Health Systems and Infectious Diseases Division and Laboratory Sciences Division, ICDDR,B

Supported by: The Government of Bangladesh, with the support of the Department for International Development (DFID), United Kingdom, and the World Bank

Figure 1: HIV among injecting drug users in Bangladesh

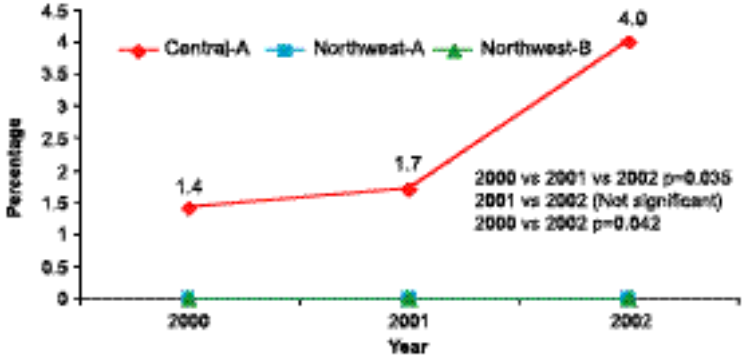
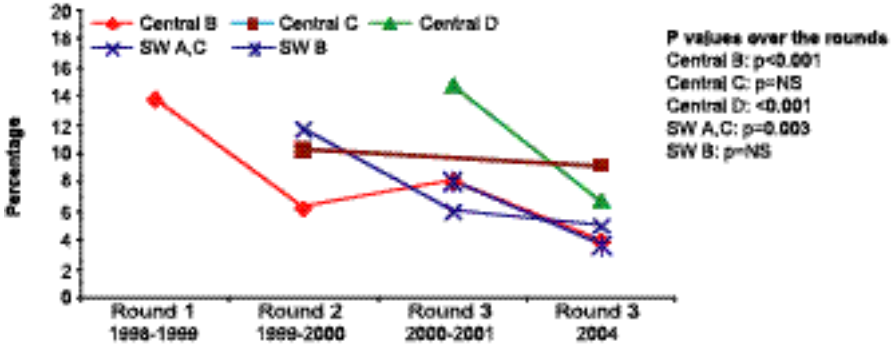


Table 2: Prevalence of hepatitis C among injecting drug users

	Hepatitis C positive, % positive, (95% CI), (total number tested)		
	Round II	Round IV	P value§
IUD from detoxification clinics in Central Bangladesh	17.4 (13.9-21.5) (402)	ND±	
IUD from the NEP* from Central Bangladesh	66.5 (61.8-71.0) (418)	62.3 (57.4-67.0) (403)	NS**
IUD from the NEP* from Northwest A	59.6 (54.7-64.8) (416)	59.8 (54.8-64.6) (405)	NS**
UD from the NEP* from Northwest B	ND±	79.5 (73.2-84.9) (200)	NS**

*NEP= needle/syringe exchange programme
±ND = not done
§Chi-square statistic was used to compare the rounds
**NS= not significant

Figure 2: Active syphilis rates in female sex workers from brothels over the four rounds of surveillance



Comment

Bangladesh has been conducting Second-generation Surveillance for HIV for several years with both serological and behavioural surveillance data providing information on the national risk for an epidemic (6). Data generated by surveillance are used by policy makers and intervention organisations, and for mobilizing and focusing the application of funds (7).

Data from serological surveillance show that Bangladesh may be at the brink of an epidemic among IDUs. Many Asian countries are now reporting epidemics in IDU (8). In Central Bangladesh, the behavioural surveillance shows that more than 50% of IDU do not have access to interventions (5), and some IDU with access to needle/syringe exchange programmes share needles/syringes, though the rate of injection sharing is much less than among IDU who are outside the interventions (5,9). Since serological surveillance is conducted only among IDU attending needle/syringe exchange programmes, it is possible that an epidemic of HIV among IDU who are outside the intervention is already taking place. Once an HIV epidemic among IDU becomes established, it is unlikely to remain limited to IDU as has been shown in other countries (10). Behavioural surveillance data show that IDU both buy and sell sex; many are married, and they rarely use condoms (2-5). The relatively high rates of syphilis infection in IDU confirm that IDU are practicing unsafe sex.

Sex workers in Bangladesh continue to have low levels of HIV, but sex workers are very much at risk of an epidemic because they have large numbers of partners, and condoms are used infrequently (2-5). Syphilis rates are highest among female sex workers (1-5). As serological surveillance is coordinated with existing intervention programmes, changes in syphilis rates to some extent reflect the success or failure of the programmes.

Hijras are a marginalized population group with documented risky behaviours for HIV (4,5). The highest rate of active syphilis was recorded in this group during the 4th round of surveillance. Interventions focusing on hijras have recently been implemented, but are focused primarily in one city. All other population groups surveyed also have documented high risk behaviours (2-5). Networks of risk connecting each population group (2-5) will increase the level of difficulty for controlling an epidemic of HIV, should the disease become established within any of the groups.

Bangladesh has little time to avert a concentrated epidemic. Mobilisation and action at all levels requires urgent expansion. Despite being a country with a low prevalence of HIV, Bangladesh has for many years had a variety of organisations working to prevent HIV/AIDS. Given the findings of this round of surveillance, scaling up interventions is urgently required to stop the further spread of HIV among drug injectors and other vulnerable people.

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Surveillance for *Haemophilus influenzae* type b Invasive Infections Among Hospitalized Children in Urban Bangladesh (1999-2002)

Surveillance was conducted in Dhaka during 1999-2002 to study the epidemiology and antimicrobial resistance of H. influenzae type b (Hib) infections in children hospitalised with pneumonia and meningitis. Fifty-three invasive Hib infections were identified; 35 were from CSF of children with meningitis and 18 from blood cultures of children with pneumonia. Most Hib meningitis and pneumonia cases occurred in infants aged 4-12 months. Decreased susceptibility to co-trimoxazole, ampicillin, erythromycin, and chloramphenicol was frequent. Emergence of drug-resistance to Hib will make treatment more complicated and costly, increasing the potential benefit of prevention of Hib disease through immunization in Bangladesh.

Haemophilus influenzae type b (Hib) is an important cause of meningitis, community-acquired pneumonia and septicaemia in children <5 years old in many countries where children are not vaccinated against Hib (1,2). Limited data are available on Hib disease in Asia (3). Optimal laboratory facilities are not routinely available for detecting aetiological agents of meningitis, pneumonia and septicaemia, the most important invasive diseases caused by Hib. The World Health Organization (WHO) has recommended that surveillance for Hib disease be undertaken in developing countries to determine the burden of preventable Hib diseases and to ascertain the potential utility of Hib vaccines in those regions (2,4). This report summarizes data from Hib disease surveillance among children hospitalised with pneumonia, meningitis and septicaemia in three hospitals in Dhaka city during 1999-2002.

Children were assessed for pneumonia using World Health Organization criteria: cough or difficult breathing and a respiratory rate of 50 breaths per minute or more in children aged 2-11 months or 40 breaths per minute or more in children

aged 12-59 months. Cerebrospinal fluid (CSF) from 261 children with symptoms and signs of meningitis, including lethargy, convulsions, bulging fontanel, and neck rigidity was cultured and analyzed by Gram stain, cytology and biochemical tests. Blood cultures were processed for 1,575 children with clinical evidence of pneumonia (1,314 children) or meningitis (261 children).

H. influenzae was isolated from 65 children; 53 (81.5%) isolates were Hib–18 were from children with pneumonia and 35 were from children with meningitis. Most (89%) Hib infections were in infants aged 4-12 months. Four (22%) children with Hib bacteraemic pneumonia and six (16%) with Hib meningitis died.

Parents acknowledged that antimicrobial drugs had been taken by 70% of the children with pneumonia and 78% of the children with meningitis, before they were evaluated at the hospital (and before blood was obtained for culture). Among the 18 children with pneumonia who had Hib isolated from the blood, 11 (61%) received antimicrobial drugs before blood culture was obtained. The Hib isolation rate for children with pneumonia who received antimicrobial

Table 1: Prevalence of antimicrobial resistance among invasive Haemophilus influenzae ***strains isolated from children with meningitis, pneumonia and septicaemia***

Antimicrobial agents	Percentage of *H. influenzae* type b by resistance category (N=49)*		
	Resistant	Intermediate	Fully Susceptible
Ampicillin	35	4	61
Chloramphenicol	37	2	61
Co-trimoxazole	57	0	43
Erythromycin	1.4	98.6	0

* All isolates were susceptible to ciprofloxacin and ceftriaxone.

drugs was 1.0%, compared to 1.5% for children with pneumonia who were not reported to have received drugs. Among the 35 children with Hib meningitis, 30 (85%) were reported to have been receiving antimicrobial drugs before evaluation. The Hib isolation rate from CSF for the children with meningitis who had received antimicrobial drugs was 14.7% and 8.8% for children who had not received drugs.

Antimicrobial susceptibility was determined for 49 Hib isolates by E-test. Decreased susceptibility to co-trimoxazole, ampicillin, chloramphenicol and erythromycin were common; all isolates were susceptible to ciprofloxacin and ceftriaxone (Table 1). Sixteen (32.6%) of 49 Hib isolates, were multi-drug (resistant to >3 drugs) resistant (MDR).

Reported by: Dhaka Medical College Hospital and Sir Salimullah Medical College Hospital, Dhaka, Bangladesh; Clinical Sciences Division and Public Health Sciences Division and Acute Respiratory Infections Laboratory, Laboratory Sciences Division, ICDDR,B

Supported by: The United States Agency for International Development (USAID) and the Government of Bangladesh

Comment

While population-based incidence data are not available, the findings of this report suggest that Hib is an important cause of meningitis and pneumonia in Bangladesh. Undoubtedly, the early use of antimicrobial drugs masks many cases of invasive H. influenzae disease. Type B is the most important serotype responsible for invasive ***H. influenzae*** infections in children. It is likely that frequent antimicrobial use before evaluation reduced the sensitivity of blood culture for documentation of invasive Hib disease. Oral antimicrobial use is less likely to interfere with isolation of Hib from cerebrospinal fluid; thus, the higher isolation rate from children with meningitis who were receiving antimicrobial drugs may reflect appropriate case management with early antimicrobial therapy.

High rates of resistance to co-trimoxazole, ampicillin and chloramphenicol were detected. No resistance to third generation cephalosporins (represented by ceftriaxone in this surveillance) was observed, suggesting that ceftriaxone may be the drug of choice for treatment of severe ***H. influenzae*** infections (like meningitis) in Bangladesh.

Emergence of multi-drug resistant Hib increases the costs associated with therapy and the potential of treatment failure. Introduction of Hib conjugate vaccines, which have dramatically reduced the impact of Hib infections in other countries (4,5), would likely provide substantial benefit, although data for Bangladesh and south Asia on the burden of disease due to Hib are needed to precisely estimate their impact. Most cases of Hib meningitis and pneumonia occurred during infancy at 4-12 months of age suggesting that Hib vaccines given with the EPI programme (at 6, 10 and 14 weeks of age) would be optimally timed.

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Malaria due to *Plasmodium falciparum* in Chakaria, Cox's Bazaar District

Community-based surveillance in Chakaria, Cox's Bazaar district, during June-September 2002 confirmed 95 cases of ***P. falciparum*** malaria. The estimated incidence rate was 2,025 per 100,000 population during the three-month period. Nearly half (47.4%) of the cases were in children <18 years old, including 10.5% in children aged less than 5 years

Malaria is a major public health problem in south Asia, made worse by the emergence of multiple drug resistance (1). In Bangladesh, 90% of episodes of malaria due to ***Plasmodium falciparum*** occur in and around the forest areas of 13 districts in the northeast and southeast (Figure 1); about two thirds of cases are reported from four districts. An estimated 10 million people live in areas with high risk of malaria transmission (2).

To characterize the epidemiology of malaria in a high-incidence area, surveillance was conducted in Kakara union in Chakaria upazilla, Cox's Bazaar district, where ICDDR,B operates the Chakaria Community Health Project (CCHP) (3). The aim of CCHP is to improve health through the activities of community self-help organizations. CCHP has successfully introduced a community cooperative system to deliver primary healthcare services primarily through trained paramedics. All 12,590 people living in a high-risk zone (within 3 km of a hill tract forest area) were assigned unique identification numbers and each family was visited every two weeks, and monitored for fever. There is one Village Health Post (VHP) and three trained paramedics in the study area. In addition to the VHP, malaria can also be diagnosed at two newly established "malaria" posts, where paramedics are trained to use a rapid diagnostic test to detect ***P. falciparum*** (Paracheck® dipstick, Orchid Biomedical Systems, India) with a specificity of >90% (4).

Figure 1: Malaria affected areas of Bangladesh

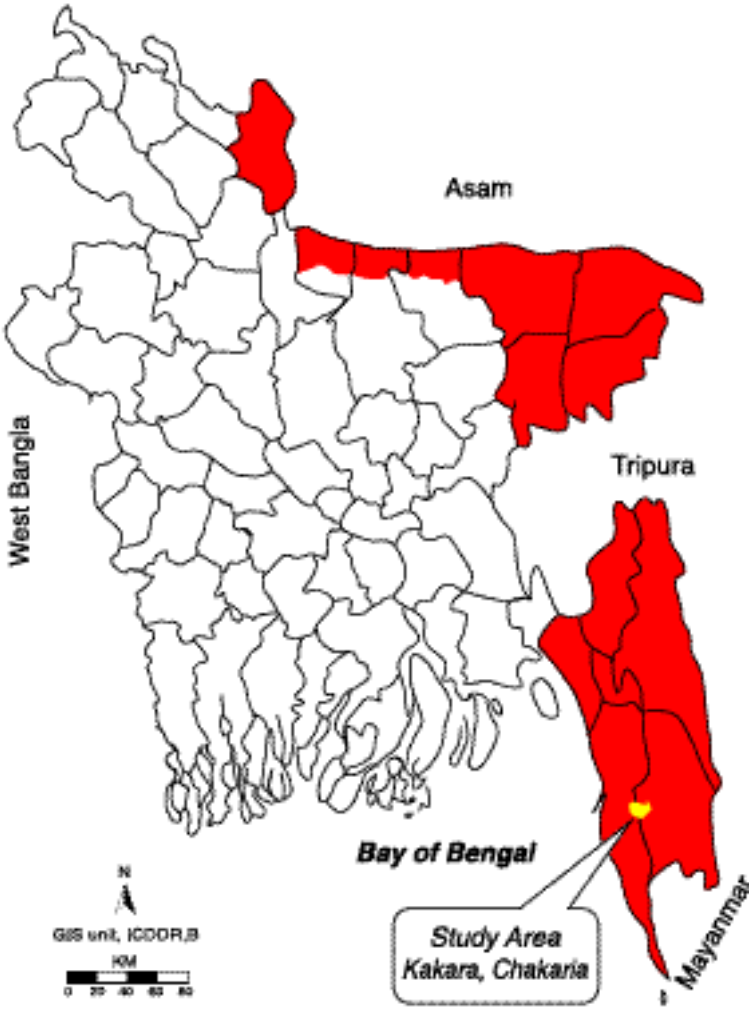
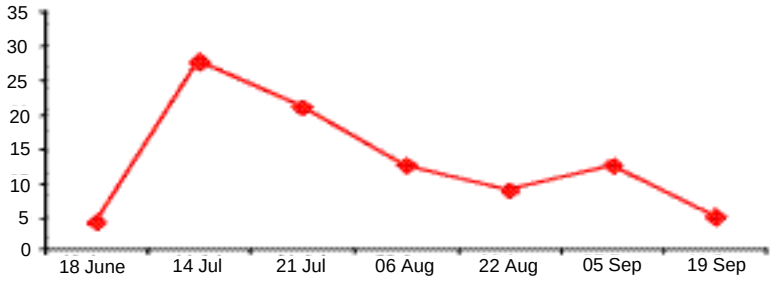


Figure 2: P. falciparum ***cases in Kakara union, Chakaria, Cox's Bazaar district, June-September 2002***



Clinical malaria was defined as an illness with at least one of the following criteria: parasitemia; reported history of fever; or prescription of >1 antimalarial drug by a physician or paramedic. Patients meeting the case definition for clinical malaria had their blood evaluated by the Paracheck® dipstick. During June-September 2002, 1,543 clinical malaria cases were identified. Of these, 575 came either to the VHP or malaria post and were evaluated with the dipstick test, where 95 (16.5%) were confirmed to have ***P. falciparum*** infection. All cases were treated with a 3-day course of quinine and one dose of sulfadoxine/pyrimethamine.

Half (47.4%) of the cases with confirmed ***P. falciparum*** infection were in children <18 years old (10.5% were <5 years old). Three cases died. ***P. falciparum-***confirmed cases occurred most commonly during July (Figure 2). Assuming a 16.5% ***P. falciparum*** rate among those with clinical malaria, the estimated incidence for ***P. falciparum*** malaria was 2,025 per 100,000 population for the 4-month period (which is the peak malaria transmission season).

A total of 31,051 mosquitoes were collected by the human-landing aspiration technique (5) at various times over a 15-hour period; 37.0% of mosquitoes were ***Anopheles*** spp. ***Culex*** species accounted for most (57.4%) of the other mosquitoes. Among ***Anopheles***, ***Anopheles minimus*** (50%) and ***A. dirus*** (15%) were most commonly found. Biting of anopheline mosquitoes was observed throughout the evening and night hours with two peaks at 18:00-22:00 and 04:00-07:00.

Reported by: Social and Behavioural Sciences Unit, Public Health Sciences Division, Parasitology Laboratory, Laboratory Sciences Division, and Infectious Diseases Unit, Health Systems and Infectious Diseases Division, ICDDR,B.

Supported by: Department for International Development (DFID), United Kingdom

Comment

The findings from this community-based incidence study suggest that the burden of ***P. falciparum*** malaria is substantial in endemic areas in Bangladesh. Children appear to be heavily affected. The study was not able to define incidence of malaria due to other parasites, including ***Plasmodium vivax,*** which likely contribute substantially to the overall burden of malaria. There may be a need to examine healthcare for people living in endemic communities to determine whether malaria is recognized and optimally managed.

Limited data were previously available on mosquito biting behaviour in Bangladesh. As in neighbouring countries, ***A. minimus*** and ***A. dirus*** were the predominant anopheles mosquitoes. Knowledge of prevalent malaria-transmitting mosquitoes is relevant for prevention interventions. ***A. minimus*** and ***A. dirus*** are early evening and early morning feeders as shown in this study and elsewhere (6), in contrast to ***A. gambiae sensu lato*** mosquitoes, which tend to feed from midnight to early morning in most sub-Saharan African countries, where community-based disease control interventions using insecticide-treated nets (ITNs) have been reported to be effective (7). In South Asian countries, ITN interventions might be effective if they are combined with other disease control techniques such as early and effective case-management of uncomplicated malaria in endemic communities, and with vector control. Since 1994, two insecticides, malathion (57% EC) for indoor residual spray and deltamethrin (2.5% EC) for treatment of bed-nets, have been used for malaria vector control on a limited scale in Bangladesh.

Drug resistance of malaria parasites has been reported to be emerging in Bangladesh (7,8). According to national guidelines, uncomplicated malaria due to ***P. falciparum*** and ***P. vivax*** is treated with chloroquine (25 mg/kg body weight) in a 3-day regimen followed by primaquine (45 mg for adults) in a single dose. For severe malaria cases, treatment with parental quinine (quinine dihydrochloride, 10 mg/kg bodyweight) is felt to be effective. During epidemics, health workers are to be trained to detect severe malaria cases and to give a first dose of quinine injection (IM) prior to referral to hospital.

A study conducted in 1997 in Ramu, Cox's Bazar district found a 56% treatment failure in a 28-day test in patients aged 12-60 years treated with chloroquine (9). The second-line regimen (three doses of quinine + one dose of sulfadoxine/pyrimethamine) was associated with a treatment failure rate of 21% (95% CI, 15-29%) in the same location.

Malaria and poverty are thought to be tightly linked—impoverished people are at greatest risk of malaria, and malaria tends to depress economic development and sustains poverty (10). Malaria remains a substantial threat to health and to poverty reduction in Bangladesh.

ICDDR,B initiated surveillance for drug-resistant malaria in July 2003 in several endemic sites in Bangladesh. Results of ***in vitro*** drug resistance assays will be correlated with clinical responses. This study should provide information helpful for optimizing treatment regimens and for developing strategies to minimize the burden of malaria in Bangladesh. Bangladesh is represented in World Health Organization Roll Back Malaria (RBM) Technical Support Networks in Southeast Asia, and national chapters are being established on Transmission Risk Reduction (TRR), Drug Resistance and Policy (DRP), and Surveillance, Information Management and Epidemic Preparedness and Response (SIE).

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Alert—Potential for Epidemic Dysentery in Bangladesh, Associated with the Emergence of Multi-Drug Resistant *Shigella dysenteriae* type 1, Resistant to Ciprofloxacin

In South Asia, epidemics of dysentery due to ***Shigella dysenteriae*** type 1 (Sd1) have occurred at about 10-year intervals since 1973 (1). The most recent epidemic occurred during 1994-95. Epidemic Sd1 disease can be severe, causing high case-fatality rates, especially in malnourished children. During the 1984 epidemic, a 42% increase in mortality among children aged 1-4 years was attributed to Sd1 infections (2). With each epidemic period, new strains have emerged, resistant to antimicrobial drugs which had been previously effective (3). Most strains of Sd1 are now resistant to ampicillin, chloramphenicol, co-trimoxazole, and nalidixic acid, although these were very effective in the past (2). Because Sd1 seems to acquire resistance more rapidly than other enteric bacteria, there is concern that the next Sd1 epidemic might be with strains resistant to ciprofloxacin. If Sd1 were to become resistant to ciprofloxacin and norfloxacin, this would make treatment much more difficult since there would be few drugs that could be effectively used.

During the past year, outbreaks of dysentery due to ciprofloxacin-resistant Sd1 strains have occurred in eastern India, including Kolkata, Siliguri, and Aizwal (4). During May and June, similar strains have been isolated from ill patients in Matlab and Dhaka, Bangladesh. All strains were resistant to ampicillin, ciprofloxacin (minimum inhibitory concentration=6-24 mcg/mL), norfloxacin (minimum inhibitory concentration=2-6 mcg/mL), co-trimoxazole, nalidixic acid, and tetracycline. They were susceptible to azithromycin, ceftriaxone, pivmecillinam, and ofloxacin.

Given the previously observed 10-year cycle for Sd1 epidemics, the occurrence of the last epidemic about ten years ago, and the recent episodes of illnesses due to drug-resistant Sd1, there is a potential for an epidemic to occur in the near future. Health providers should be on the alert for epidemic dysentery and complications of Sd1 infection (which may include haemolytic-uraemic syndrome), and the potential that illness may be caused by Sd1, resistant to multiple, commonly-used antimicrobial drugs. A new diagnostic test to rapidly identify Sd1 infection, now under evaluation at ICDDR,B, hopefully, will be useful for diagnosis and outbreak detection. Public health interventions, including improving personal hygiene and using safe water, will be needed to minimize the public health impact of an epidemic. The antimicrobial drug currently being used in resistant cases is pivmecillinam (5), but additional studies will be needed to test other alternative drugs.

Reported by: Laboratory Sciences Division and Health Systems and Infectious Diseases Division, ICDDR,B

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Surveillance Update

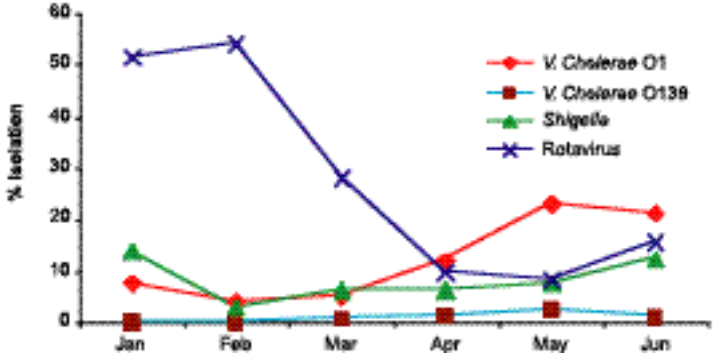
With each issue of the HSB, updates of surveillance data described in earlier issues will be provided. These updated tables and figures will represent the most recent observation period available at the time of publication. We hope these updates will be helpful to health professionals who are interested in current patterns of disease and drug resistance.

Susceptibility of diarrhoeal pathogens to antimicrobial drugs: January-June 2003

Antimicrobial Agent	*Shigella* (n=142)	*V. cholerae* O1 (n=233)	*V. cholerae* O139 (n=21)
Nalidixic acid	39.4	NT	NT
Mecillinam	99.3	NT	NT
Ampicillin	48.6	NT	NT
TMP-SMX	41.5	1.3	100
Ciprofloxacin	99.3	100	100
Tetracycline	NT	100	100
Erythromycin	NT	100	100
Furazolidine	NT	0.0	100

NT=Not Tested

Monthly isolations of V. cholerae ***O1,*** V. cholerae ***O139,*** Shigella ***and Rotavirus: January-June 2003***



Antimicrobial resistance patterns of 135 M. tuberculosis ***isolates: August 2002-May 2003***

Drugs	Resistance type		
	Primary (n=105)	Acquired *(n=30)	Total (n=135)
Streptomycin	50 (47.6)	18 (60.0)	68 (50.4)
Isoniazid (INH)	14 (13.3)	7 (23.3)	21 (15.6)
Ethambutol	5 (4.8)	7 (23.3)	12 (8.9)
Rifampicin	4 (3.8)	4 (13.3)	8 (5.9)
MDR (INH+Rifampicin)	4 (3.8)	4 (13.3)	8 (5.9)
Any drug	52 (49.5)	18 (60.0)	70 (51.9)

( ) column percentages

* Antituberculous drugs received for 1 month or more

Antimicrobial susceptibility of N. gonorrhoeae ***isolated during May to July 2003 (N=106)***

Antimicrobial agents	Susceptible (%)	Intermediate (%)	Resisant (%)
Azithromycin	84.0	16.0	0.0
Cefixime	100.0	0.0	0.0
Ceftriaxone	99.1	0.9	0.0
Ciprofloxacin	2.8	1.9	95.3
Penicillin	5.7	39.6	54.7
Spectinomycin	99.1	0.0	0.9
Tetracycline	0.9	12.3	86.8

The ICDDR,B, Centre for Health and Population Research receives financial support from countries and agencies which share its concern for the health problems of developing countries. Current nations providing unrestricted support include: Australia, Bangladesh, Belgium, Canada, Japan, the Netherlands, Sweden, Sri Lanka, Switzerland, the United Kingdom and the United States of America.

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Bangla Desktop Publishing: Mahbub-ul-Alam

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Announcements

7-9 December 2003
10th Asian Conference on Diarrhoeal Diseases and Nutrition
The 10th Asian Conference on Diarrhoeal Diseases and Nutrition (ASCODD) will be held in Dhaka. The theme of this conference will be: *Improving child health and nutrition.*
Further information is available on the web site at http://www.icddrb.org/enrollment/? type=Ascodd.

If you would like to contact the organisers or require any more information, please send an e-mail to ascodd@icddrb.org, or write to ASCODD 10, ICDDR,B, GPO Box 128, Dhaka 1000.