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Use of family planning services in the transition to community clinics in Abhoynagar: 1998-2002

A major change in rural health service delivery was introduced in Bangladesh under the government's five-year sector programme (1998-2003). Family planning services previously provided through household visits by fieldworkers and satellite clinics were transferred to new static community clinics. Data on use of services from an ICDDR,B surveillance area in Abhoynagar show that in a period of considerable change in service delivery, women switched to new sources of contraceptive supply and the overall contraceptive prevalence rate was maintained at about 60%. Within two years (2001-2002) community clinics became the source of contraceptives for about one-third of users, and a steady increase in use of shops and pharmacies continued. The data suggest that where community clinics are made operational, women will use them and despite cultural constraints on mobility they have not become dependent on home-delivery of contraceptives.

Household delivery of contraceptives by fieldworkers was introduced in Bangladesh in 1978 (1). However, concerns over cost, coverage and quality of these services led to a new strategy under the Government's Health and Population Sector Programme for 1998-2003 (2,3). An extended range of services, the essential services package, was to be provided through community clinics built to serve catchment populations of about 6,000 people (4). Fieldworkers providing domiciliary services were to be retrained, with one female family welfare assistant and one male health assistant assigned to run each community clinic. Paramedics would continue to provide reproductive and child health services at monthly satellite clinics, usually held at someone's house, but services would be transferred to a community clinic when it became

operational. These supply-side changes necessitated a major change in women's service seeking behaviour and there was some concern that contraceptive use might be affected if women had become dependent on home delivery in a culture that traditionally restricted their movements (5).

In practice, the transition to community clinic service provision was much delayed and the programme of building about 13,500 community clinics was not completed. By 2002, no upazilas had fully implemented the community clinic system and a mixed system was in place. Each union (population about 25,000) consists of three wards, some of which had at least one community clinic functioning to some extent and some did not. By December 2002, 9,413 community clinics were reported as constructed and over 6,000 were reported as "functioning" in 2002 (6).

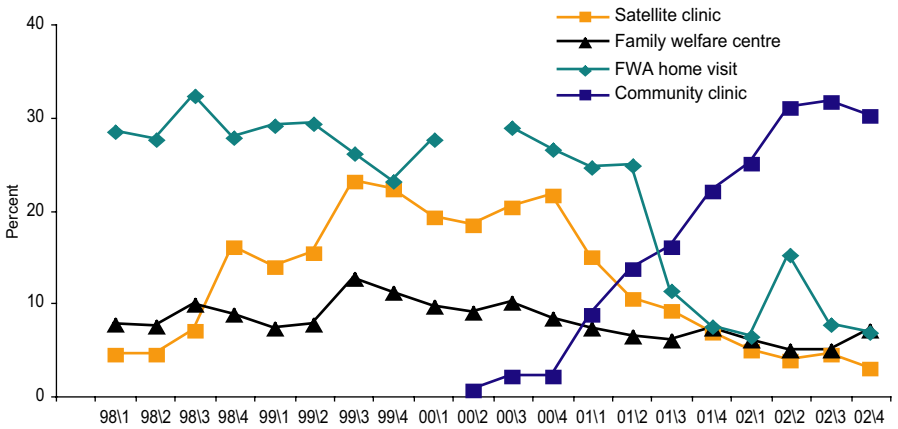
This short paper is based on a larger study of essential services package use in the period 1998-2002 conducted in two ICDDR,B (Health Systems and Infectious Diseases Division) surveillance areas. The user-reported data are particularly valuable as local-level information about utilization and coverage of services is not available from national surveys. Because of space limitations we report here on data from just one area (Abhoynagar in Jessore District), focusing on trends in family planning service use and coverage only in wards that had at least one community clinic made operational. As most community clinics did not become operational until 2001-2002, the period before the transition (1998-2000) serves for comparison. The working definition of operational was that a family welfare assistant or health assistant attended on most working days providing some services, for at least 12 months continuously during 2001-2002.

A survey was conducted among the government's local health staff to ascertain what changes in service provision occurred. The upazila health and family planning officer decided on the best location for the community clinics based on population distribution and consultation with field staff. He allocated fieldworkers to the clinics who were given three weeks training at local level, and allocated supplies. When the community clinics became operational, nearby satellite clinics were closed. Of the five surveillance unions in Abhoynagar, one had no community clinics made operational. In the other four unions, one ward had no community clinic made operational and three had a union-level Health and Family Welfare Centre. Eight wards had at least one community clinic, with 12 altogether becoming operational, one towards the end of 2000, the rest in 2001. At the end of 2002, 2,426 married women of reproductive age (15-49 years) were under surveillance in these eight wards (1 in 6 households). Data were routinely collected through quarterly survey rounds and quarterly time series trends were plotted for selected family planning indicators for these eight wards combined.

Data from the surveillance show that the proportion of women who reported a visit to a community clinic between rounds increased steadily in 2001, then

leveled off in 2002 at about 30%. Figure 1 illustrates that the planned strategic shift from domiciliary/satellite clinic to community clinic service delivery was largely achieved in these wards. In the period 1998-2000, around 25-30% of women reported a home visit from a family welfare assistant in the previous quarter (excluding April-June 2000 when they assisted with a geographical reconnaissance). This compares with 21% of women in rural Bangladesh as a whole (7). The decline in Abhoynagar, to about 10% in 2001-02 occurred when many family welfare assistants were being transferred to community clinics. Reported use of satellite clinics also declined from about 20% to 5%, reflecting the transfer of services to the community clinics.

Figure 1: Percentage of married women of reproductive age (MWRA) who reported use of Government facilities (wards of Abhoynagar with a community clinic)

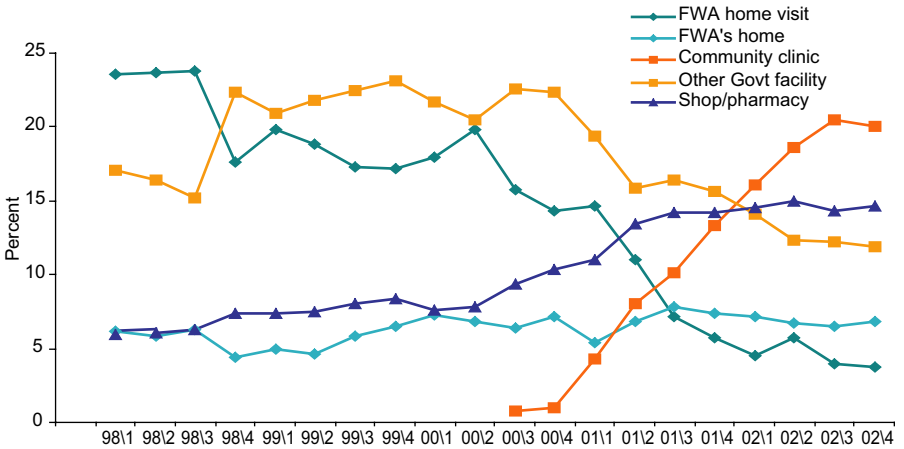


Women clearly switched to sources of contraceptives outside the home as visits by family welfare assistants declined. Community clinics very quickly became the most common source of supply in wards that had one operational. Figure 2 shows that by 2002, 20% of women were obtaining supplies from a community clinic, about one-third of all users. There was a decline in the proportion of users obtaining contraceptives from other government facilities in 2001-2002, mostly reflecting the phasing out of satellite clinic services. There was an increase in the proportion using shops and pharmacies in the period 1998-2000, which became more rapid in 2001-2002, reaching 15%.

Figure 2 also shows the considerable decline in the proportion of users obtaining contraceptives in their own home from a family welfare assistant, from around 20-25% in 1998 to only 5% in 2002. The decline in the period 2001-2002 when community clinics were operational in part reflects the reduction in reported home visits, although a decline also occurred before community clinics were operational when the level of reported home visits was

fairly steady. Throughout the whole period 1998-2002, about 5% of women were supplied at the family welfare assistant's home. However, the decline in domiciliary supply of contraceptives over the period 1998-2002 was offset by an increasing use of other sources outside the user's home.

Figure 2: Percentage of women using contraceptives, by source (wards of Abhoynagar with a community clinic)

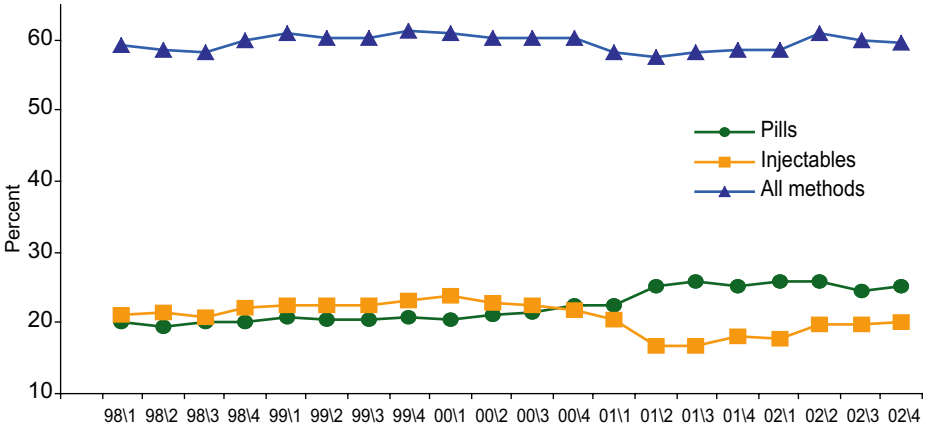


Despite the considerable changes in the service delivery system and in the sources of contraceptive supply, the overall contraceptive prevalence rate (CPR) remained fairly steady at around 60% from 1998-2002 in the wards in Abhoynagar with an operational community clinic (Figure 3). This compares with the CPR for rural Bangladesh of 54% in 1999-2000 (7). The main methods used were pills and injectables and there appears to have been some switching to pills. Earlier studies had suggested that reliance on the pill might be reduced where family welfare assistants were trained to administer injectables (1). This was not the case in Abhoynagar where they had been trained and provided doorstep delivery of injectables, as CPR for both methods remained around 20% from 1998-2000. When domiciliary visits were phased out, there was a slight dip in the proportion of women using injectables, although it recovered to 20% in 2002 when family welfare assistants provided the service at the community clinics. Family welfare assistants had also been major suppliers of pills in the home, but the proportion of women using pills actually increased to about 25% when the community clinics were operational (2001-2002) and routine household visits were withdrawn. Generally, women do not appear to have been dependent on home delivery of injectables or pills.

A survey in September 2003 of 800 randomly selected women in the eight wards with community clinics found that only a minority of contraceptive users

(21%) had changed their method in the previous two years, and usually because of side effects (79%) rather than supply-side changes (7%).The major changes in family planning service seeking reported here were consistent with the strategy of encouraging use of services outside the home

Figure 3: Percentage of women using any contraception, pill and injectable (wards of Abhoynagar with a community clinic)



at one fixed site. Most women with a community clinic in their ward had used it at least once particularly those with no schooling (92%) and those aged 15-29 years (83%). Most women were satisfied with services at the community clinic, mainly because it was near their house (42%), the quality of services was good (38%), and many services were available in one place (14%). On the other hand, there was dissatisfaction because of lack of medicines (65%) and because not all services were available (17%). Only a few women reported having problems when satellite clinic services were transferred to the community clinic (11%), usually because they had further to walk. A key finding from the surveillance is that women in rural Bangladesh will rapidly switch to using static clinics for family planning services if they are operational. Many women also switched to shops and pharmacies as a source of contraceptives, which raises important issues of quality of care, as in most cases (91%) the husband collects supplies. Clearly, this could be more of a problem if women are not receiving a regular home visit from a family welfare assistant and a static clinic is not operational.

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

Supported by: Department for International Development, United Kingdom

Comment

The transition to a static clinic system was partially achieved in several wards

in the surveillance area of Abhoynagar. The area cannot be taken as representative of rural Bangladesh, but the data indicate what can be achieved with even a partial implementation of a static clinic system. The steady level of CPR is typical of the Khulna Division as a whole: 64.0 in 1999-2000 and 63.8 in 2004 (8). However, if trends were less favourable in other parts of rural Bangladesh this could reflect less progress in operationalising community clinics rather than deficiencies in the static clinic strategy, which was not given a complete trial (9). By the end of 2003, service providers reported that most community clinics were just being used for immunization or had closed. The Ministry reinstated domiciliary services for the next sectoral programme, but the future of over 10,000 community clinics has yet to be decided. The recommendation from this study is that decisions about service delivery should be evidence-based. A prospective study should be conducted to monitor essential services package service use and coverage in selected areas where domiciliary/satellite clinic services are provided, and in other areas with a static clinic system fully implemented, possibly in collaboration with non-governmental organizations. This would allow proper evaluation of the cost and effectiveness of the two systems based on user-reported data.

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Surveillance for encephalitis in Bangladesh: preliminary results

In Asia, the epidemiology and aetiology of encephalitis remain largely unknown, particularly in Bangladesh. A prospective, hospital-based study to identify the causes of encephalitis in Bangladesh began in June 2003 at Dhaka, Mymensingh, and Rajshahi Medical College Hospitals. Ten of the first 176 patients (6%) enrolled in the study tested positive for Japanese encephalitis, including 11% (7/63) of patients recruited from Rajshahi Medical College Hospital. Other pathogens identified during preliminary testing included dengue virus, herpes viruses, *Neisseria meningitidis*, *Streptococcus pneumoniae*, and *Haemophilus influenzae*. Since Japanese encephalitis is a vaccine preventable disease, future efforts should characterize more completely the disease burden and evaluate the appropriateness of a vaccination programme. This study is ongoing.

Acute encephalitis is a severe neurological syndrome commonly associated with significant morbidity and mortality (1). In Asia, the epidemiology and aetiology of encephalitis remain largely unknown, particularly in Bangladesh. A prospective, hospital-based study to define the causes of encephalitis in Bangladesh began in June 2003. Every fourth encephalitis patient admitted to Dhaka, Mymensingh and Rajshahi Medical College Hospitals who met the case definition of fever (T≥38˚C), hypothermia (T≤35˚C), or history of fever during present illness, indication for a lumbar puncture (LP), pleocytosis (>4 cells/mL of cerebrospinal fluid [CSF]), and onset of neurological illness within five days of hospitalization was recruited for the study. From the beginning of the study to 10 June 2004, 264 encephalitis patients were enrolled after they or their guardians provided informed consent. Clinical and epidemiologic data were collected from each patient along with serum, CSF, saliva, oropharyngeal swabs, urine, and stool samples. Patients were also interviewed at a follow-up visit four to six weeks after recruitment into the study to evaluate short-term neurological and functional outcome and collect a convalescent serum sample. The specimens were tested for over 100 pathogens at twelve laboratories at the Centers for Disease Control and Prevention (CDC) in Atlanta and Ft. Collins, USA, including alphaviruses, flaviviruses, enteroviruses, herpesviruses, influenza, measles, mumps, rubella, Nipah virus, rabies virus, respiratory viruses, rickettsial agents, and by 16S ribosomal testing for bacterial meningitis.

Among the first 218 patients enrolled, the mean age was 18 years (range one month- 80 years); 66% were male. Twenty-five percent (N=55) died in hospital or before completing follow-up.

Japanese encephalitis testing was performed on the first 176 patients enrolled; 10/176 (6%) patients had recent Japanese encephalitis infection demonstrated by a four-fold rise in virus-specific antibody detected in paired

acute and convalescent sera by enzyme-linked immunosorbent assay and validated by ruling out dengue through enzyme-linked immunosorbent assay testing and subsequent plaque reduction neutralizating testing for virus specificity of the antibody (Table 1). When convalescent sera were not available, Japanese encephalitis infection was determined by presence of virus-specific antibody in acute sera. At Rajshahi Medical College Hospital, 11% (7/63) of patients enrolled in the study had recent Japanese encephalitis infection. The remaining Japanese encephalitis cases were identified among patients at Mymensingh Medical College Hospital. The ages of Japanese encephalitis patients were similar to the study group as a whole; 40% were male. Four Japanese encephalitis patients resided in Chapai Nawabganj District, two were from Kishoreganj District and four patients were from Naogaon, Pabna, Rajshahi and Mymensingh Districts respectively (Figure 1). No patients with Japanese encephalitis had a history of travel outside Bangladesh within 30 days prior to illness onset.

Table 1: Pathogens associated with study patients and the number of fatalities by pathogen

Pathogen	Number of cases	Number of fatalities
N=176		
Japanese encephalitis	10	1
Dengue	6	1
N=110		
Neisseria meningitidis	11	2
Streptococcus pneumoniae	7	3
Haemophilus influenzae	2	0
Herpes simplex viruses	2	2
Mumps	2	0
Human parainfluenza viruses	2	0
Human herpes virus a	1	1
Epstein-Barr virus	1	1
Echovirus	1	0
Nipah	0	0

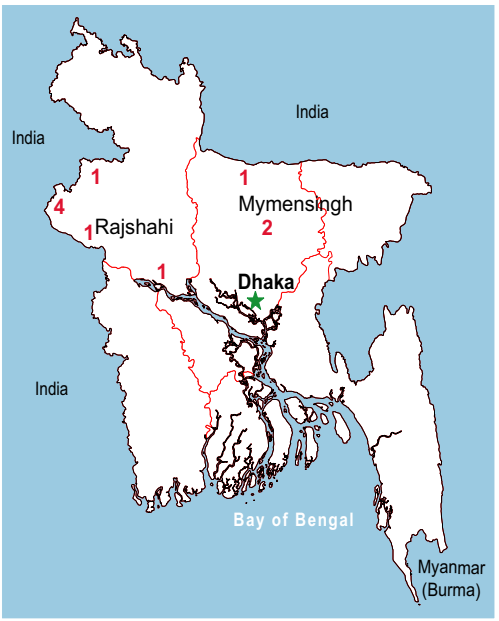
Six of the encephalitis patients had evidence of a recent infection with dengue virus, i.e. a four-fold rise in dengue virus-specific antibody in paired acute and convalescent serum samples measured by enzyme-linked immunosorbent assay and confirmed by testing to confirm virus specificity.

Bacterial meningitis was also common among persons who met the case definition. Among the first 110 CSF samples evaluated, 11 (10%) were polymerase chain reaction (PCR) or culture positive for *Neisseria meningitidis,* 7 (6%) for *Streptococcus pneumoniae*, and 2 for *Haemophilus influenzae*. At

Dhaka Medical College Hospital, 28% of patients enrolled in the study had *N. meningitidis* infection by PCR or culture. There were no Nipah virus infections identified among the first 110 serum samples tested.

Two cases of herpes simplex virus infection (2%) were also identified through PCR testing on CSF. Twenty-nine (13%) of enrolled patients received treatment with acyclovir, including one of these patients with positive herpes simplex test results.

Figure 1: Number and location of ten patients with positive Japanese encephalitis results identified from first 176 patients tested



Reported by: Dhaka Medical College Hospital; Mymensingh Medical College Hospital; Rajshahi Medical College Hospital; Centers for Disease Control and Prevention, Atlanta and Ft. Collins, USA; Clinical Sciences Division and Health Systems and Infectious Diseases Division, ICDDR,B: Centre for Health and Population Research

Supported by: Centers for Disease Control and Prevention, Ft. Collins, USA

Comment

These data suggest that Japanese encephalitis virus is an emerging cause of encephalitis in Bangladesh. Japanese encephalitis infection has not been recognized in Bangladesh since an outbreak in 1977 near Mymensingh (2). No

new cases were documented in that area for two years following the outbreak and the outbreak was thought to be due to local introduction of the virus from an endemic area. Most of the Japanese encephalitis cases found in the current study were in Rajshahi Division, which borders areas of known endemic Japanese encephalitis transmission in India. Since Japanese encephalitis is a vaccine preventable disease, future efforts should focus on characterizing the disease burden and evaluating the appropriateness of a vaccination programme.

Six of the patients had serological evidence of acute dengue infection coinciding with their episode of clinical encephalitis. It is unclear if dengue was the cause of the encephalitis. Further evaluation of these patients' CSF for dengue virus or dengue antibodies is planned.

In the June 2004 issue of the *Health and Science Bulletin*, ICDDR,B reported a dramatic increase in *N. meningitidis* isolations from patients admitted to the Mohakhali diarrhoea hospital in the past five years (3). In this study, the large percentage of patients presenting to Dhaka Medical College Hospital with *N. meningitidis*, another vaccine preventable disease, further demonstrates its public health burden. Further investigation into disease burden and feasibility of vaccination is indicated.

Herpes simplex viruses were associated with a small proportion of cases in this study (2%). Many patients presenting with symptoms of meningo-encephalitis are empirically treated with antibiotics, anti-malarials and often acyclovir on the presumption that herpes simplex virus is a common cause of sporadic encephalitis. Acyclovir is extremely costly for patients'families. These data suggest that a more specific clinical algorithm to guide acyclovir treatment may save money.

Despite recent outbreaks of Nipah virus encephalitis in Bangladesh, there were no Nipah virus infections identified in the first 110 serum samples tested. One possible explanation is that Nipah patients did not meet the study inclusion criterion of pleocytosis. During recent Nipah outbreaks, only 50% of laboratory-confirmed Nipah patients who received a lumbar puncture had evidence of pleocytosis in the CSF (ICDDR,B: unpublished data).

The reason behind the predominance of male patients enrolled in the study is not known. However, at each study site the proportion of males to females enrolled was similar to the proportion of male to female beds at the hospital. Surveillance for encephalitis is ongoing and the study is being expanded to include an additional geographic area of Bangladesh, at Sylhet Medical College Hospital. Future results from this study will be published in the *Health and Science Bulletin*.

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Arsenic contamination in Matlab, Bangladesh

Tube wells in Matlab, Bangladesh were identified and tested for arsenic. Arsenic mitigation options were offered to households using wells with elevated arsenic levels (>50µg/L). Of 13,734 functioning tube wells, 8,473 (62%) had arsenic levels >50µg/L and 1,273 (9%) had levels >500 µg/L. The most popular systems for arsenic removal were an activated alumina filter (Alcan) in the households and pond sand filters in the community.

Chronic ingestion of arsenic contaminated drinking water has multiple adverse long-term health effects including painful, potentially debilitating skin lesions, malignancy, diabetes and cardiovascular disease (1-5). Between 25 and 77 million people of Bangladesh's 130 million population are ingesting dangerously high levels of arsenic in their drinking water (5,6). We report the results of screening for arsenic contamination in tube wells in Matlab, Bangladesh, and the efforts to bring arsenic mitigation to those households in need.

The study team attempted to identify all tube wells in the Matlab area and test them for arsenic content. Each identified tube well was pumped for 30 strokes. Merck field kits for arsenic content were used to immediately classify wells into arsenic contaminated (>50µg/L) or not in accordance with government regulations (contaminated tube wells were painted red; tube wells with an arsenic concentration below 50 µg/L were painted green).

Thereafter two 20-ml polyethylene vials (Merck Eurolab) marked with the tube well ID and pre-treated with acid to prevent precipitation of iron and co-precipitation of arsenic, were filled with tube well water and transported to the Matlab hospital laboratory. The samples were kept at -20^{0}C until analysis in the Dhaka lab. Total water arsenic was measured by hydride generation atomic absorption spectrophotometer (HG-AAS, Shimadzu Model AA-6800). The lower limit of detection was <1µg/L. Each sample was assayed twice.

A total of 16,461 tube wells were identified in the Matlab area of which 13,734 tube wells (83%) were functioning and were evaluated for arsenic content. Among samples evaluated by atomic absorption spectrophotometry, 8,473

(62%) had arsenic levels >50µg/L and 1,273 (9%) had levels >500µg/L (Table 1).

Table 1: Tube well water with arsenic concentration in Matlab, Bangladesh

Concentration µ/L	Number	Percentage	Cumulative percentage
<1	1,422	10.4	10.4
1-49	3,839	28.0	38.3
50-149	1,383	10.1	48.4
150-299	3,048	22.2	70.6
300-499	2,769	20.2	90.7
>500	1,273	9.3	100.0
Total	13,734	100.0	

Arsenic mitigation options were chosen in consultation with BRAC and based on their wide experience providing alternative water options to arsenic exposed populations in the country. The available budget was insufficient to provide an arsenic mitigation intervention to each exposed household. Thus, households were prioritized based on their willingness to bear 20% of the total cost and 100% of the operation and maintenance cost, the level of arsenic contamination in the water, the presence of persons with clinical signs of arsenicosis in the village, and comparatively worse socioeconomic conditions. Arsenic mitigation included both household and community options (Table 2).

Table 2: Safe water options distributed in Matlab

Safe water options	Units installed	Families Covered
Household-based		
Alcan filer	800	800
Rainwater harvester	200	200
Bishuddya filter	140	140
Three pitcher filter	99	99
Safi filter	24	24
Community-based		
Pond sand filter	24	2,400 (100/Filter)

Alcan filter. This system runs water through an activated alumina medium which efficiently removes arsenic.

Rainwater harvesting. Rainwater harvesting systems use a tin rooftop or sometimes a sheet of plastic, to collect rainwater and store it in large cement tanks. Users let the first five minutes of rainfall run off the roof without collecting the water to clean the roof and gutters. Once in the tank, the rainwater can be safely stored indefinitely without being contaminated by bacteria. With a large enough tank, a family can store enough water for drinking and cooking all through the dry season.

Bishuddhya filter. This is a plastic filter that does not remove arsenic, but instead is designed to remove bacteria from arsenic free surface water.

Three-kolshi or three-pitcher filter. The three-pitcher filter is based on an indigenous method of filtration which has been used in Bangladesh for centuries. Local clay pitchers (kolshi) are partially filled with sand and charcoal, and a small hole is made in the bottom. A piece of synthetic cloth is placed over the hole to prevent the sand from escaping.

Safi filter. The Safi system includes two15 L concrete vessels, one on top of the other, with a single Safi filter in the upper container. The Safi filter is a ceramic candle filter composed of hydrated aluminium, manganese, iron oxides, silica and alkaline earth silicate and aluminate. One small Safi filter is designed to filter 40 litres of tube well water per day.

Pond and sand filters. In areas where deep tube wells are not feasible, it is possible to treat surface water from ponds, that are exclusively reserved for drinking purposes, and to make it safe for drinking and cooking. The Department of Public Health Engineering, supported by UNICEF, has designed a community-based slow sand filtration system, or pond sand filter, which removes bacteria from surface water by filtering it through a large tank filled with sand and gravel. Community members must periodically clean pond sand filters by washing the top layers of sand.

Reported by: Bangladesh Rural Advancement Committee; Laboratory Sciences Division and Public Health Sciences Division, ICDDR,B

Supported by: United States Agency for International Development, Washington; World Health Organization; Swedish International Development Cooperation Agency (Sida)

Comment

The findings from this population-based study suggest that over half of the population in this rural area of Bangladesh has been drinking arsenic contaminated water for many years.

No single intervention is universally affordable and acceptable, but villagers are using several different methods. The most popular household method was the Alcan filter. This efficiently removes arsenic, but it requires a replacement element that costs 700 taka (12 US$) in every two years.

The twenty-four pond sand filters installed reached more persons than all the household level interventions combined. However, construction of a pond sand filter does not guarantee that families will always collect their water from the pond sand filter, rather than from their typically more conveniently placed tube well.

These data demonstrate that there are a number of potential strategies to reduce arsenic exposure in at-risk populations in Bangladesh. Further research is necessary to evaluate the most effective, sustainable approaches.

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Surveillance Updates

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.

Proportion of diarrhoeal pathogens susceptible to antimicrobial drugs: December 2003-November 2004

Antimicrobial agent	*Shigella* (n=124)	*V. cholerae* O1 (n=589)	*V. cholerae* O139 (n=2)
Nalidixic acid	41.1	NT	NT
Mecillinam	98.1	NT	NT
Ampicillin	58.1	NT	NT
TMP-SMX	35.5	0.3	50.0
Ciprofloxacin	99.1	100.0	100.0
Tetracycline	NT	99.5	100.0
Erythromycin	NT	99.5	100.0
Furazolidine	NT	0.0	50.0

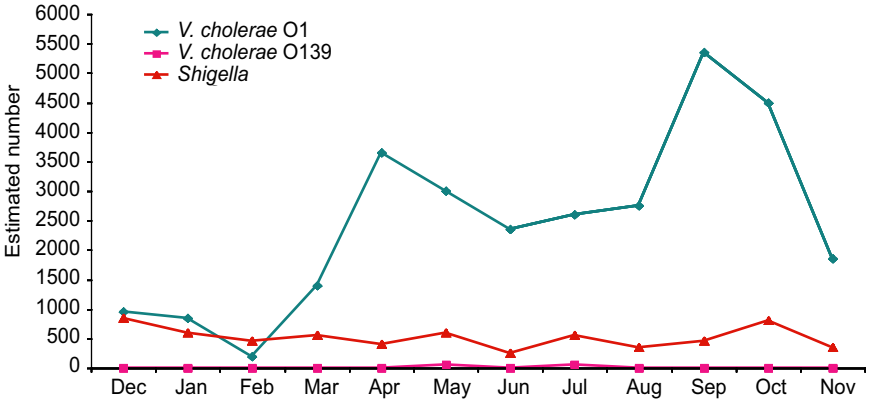
NT=Not Tested

Antimicrobial resistance patterns of 59 M. tuberculosis *isolates*: *July 2003-February 2004*

Drugs	Resistance type		Total (n=59)
	Primary (n=50)	Acquired* (n=9)	
Streptomycin	29 (58.0)	6 (66.7)	35 (59.3)
Isoniazid (INH)	5 (10.0)	5 (55.6)	10 (16.9)
Ethambutal	1 (2.0)	2 (22.2)	3 (5.1)
Rifampicin	2 (4.0)	1 (11.1)	3 (5.1)
MDR (INH+Rifampicin)	2 (4.0)	1 (11.1)	3 (5.1)
Any drug	30 (60.0)	6 (66.7)	36 (61.0)

( ) column percentages * Antituberculous drugs received for 1 month or more

Monthly isolations of V. cholerae *O1,* V. cholerae *O139 and* Shigella*: December 2003-November 2004*



Antimicrobial susceptibility of N. gonorrhoeae *isolated during July-September 2004 (n=31)*

Antimicrobial agent	Susceptible (%)	Reduced susceptibility (%)	Resistant (%)
Azithromycin	100.0	0.0	0.0
Ceftriaxone	100.0	0.0	0.0
Ciprofloxacin	19.4	0.0	80.6
Penicillin	38.7	48.4	12.9
Spectinomycin	100.0	0.0	0.0
Tetracycline	6.5	6.5	87.1
Cefixime	100.0	0.0	0.0

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Photo: Household rainwater harvest system used to reduce exposure to arsenic and bacteria-contaminated water sources (Courtesy: Arsenic Team)

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