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Inside

No evidence of chikungunya virus in Dhaka, Bangladesh

Transmission of chikungunya virus was suspected in Bangladesh by local clinicians and public health professionals because of the ongoing outbreaks in neighbouring India. From June to August 2006 blood samples from 175 patients detected during surveillance for febrile illness from two sites in Dhaka were collected, sent to Centers for Disease Control and Prevention, USA, and tested for IgM antibodies to chikungunya and dengue viruses. The majority of patients (74%) tested suffered from fever and/or joint pain and rash. No evidence of chikungunya infection was found; however, dengue infection was common.

Chikungunya virus is a mosquito-borne alphavirus whose clinical presentation in humans closely resembles that of dengue fever. Patients suffer from fever, arthralgia, headache, rash, and rarely haemorrhage. First identified in Tanzania in 1952, chikungunya virus has caused outbreaks in Africa and South and Southeast Asia (1-3). During the past seven

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years, the virus has re-emerged in epidemics in Malaysia, Indonesia, and most recently in the Indian Ocean and several states in India (4-7).

Because of recent outbreaks reported in the region, local clinicians and scientists suspected that chikungunya virus might also be circulating in Bangladesh. Blood samples were collected from two different surveillance activities to test for chikungunya virus to investigate this hypothesis. From 13 to 19 June 2006, researchers from the Institute for Epidemiology, Disease Control and Research (IEDCR) at the Ministry for Health and Family Welfare conducted surveillance for febrile illness in patients >2 years of age who presented at Dhaka Medical College and Hospital outpatient department. One hundred twenty-two blood samples were collected from patients who presented with documented fever (>38°C) and rash and/or joint pain. An additional 46 blood samples were collected from patients who experienced febrile illness without rash or joint pain. Blood samples were also collected by ICDDR,B researchers in the Kamalapur health and demographic surveillance site in Dhaka as part of ongoing surveillance for febrile illness. From 27 June to 14 August 2006 acute and convalescent serum samples were obtained from 7 children <5 years of age who presented to the ICDDR,B clinic with fever and joint pain. In total, serum samples from 175 patients were sent to the Centers for Disease Control and Prevention, USA and were tested for antibodies to chikungunya and dengue viruses using IgM antibody capture ELISA (MAC-ELISA) specific for either DENV-2 or CHIKV. Briefly, serum specimens and positive and negative control samples were tested in triplicate at a 1:400 dilution. Plates were coated with goat anti-human IgM, incubated overnight at 4°C, and subsequently blocked with phosphate-buffered saline containing 0.5% Tween 20 and 5% nonfat dry milk. IgM was detected by stepwise addition of either positive or negative antigen, followed by the addition of a flavivirus or alphavirus group-reactive monoclonal antibody conjugated to horseradish peroxidase. Detection of HRP activity utilized 3,3'5,5'-tetramethylbenzidine (Neogen Corporation, Lexington, KY) substrate and the absorbance at 450 nm was read on a microplate reader.

No patients tested positive for antibodies to chikungunya virus. (Table 1) However, a total of 21 patients tested positive for IgM antibodies to dengue virus, including 15% of those who presented to Dhaka Medical College and Hospital with fever, rash and/or joint pain.

Reported by: Institute for Epidemiology, Disease Control and Research, Ministry of Health and Family Welfare, Government of Bangladesh; Programme on Infectious Diseases and Vaccine Sciences, ICDDR,B

Supported by: Centers for Disease Control and Prevention, Atlanta, GA, and Fort Collins, CO, USA

Table 1: Chikungunya and dengue virus testing results for patients from Dhaka Medical College and Hospital and ICDDR,B's community clinic in Kamalapur, June-August 2006

Signs/symptoms Patients	Dhaka Medical College & Hospital		Kamalapur clinic
	Fever with rash and/or joint pain	Fever	Fever and joint pain
Total patients sampled	122	46	7
Chikungunya positive (N, %)	0, 0%	0, 0%	0, 0%
Dengue positive (N, %)	18, 15%	2, 4%	1, 14%

Comment

There is no evidence from this investigation that chikungunya virus is circulating in Dhaka. However, the findings must be interpreted in the context of the limitations of the study. The study was conducted in Dhaka; transmission could be occurring in other parts of the country. The number of patients sampled was small and neither of the surveillance activities that contributed samples for testing was designed to detect patients with dengue or chikungunya virus infections. Given the ongoing transmission of chikungunya virus in India (4,8), clinicians and public health officials should remain vigilant for its possible emergence in Bangladesh. Without specific testing for both viruses, patients with chikungunya infections could be misdiagnosed as dengue fever.

Although the first outbreaks of dengue virus were reported in Bangladesh in 2001, we now have evidence that dengue has been circulating here since before 1996 (9,10). This study shows that endemic transmission continues and likely contributes significantly to morbidity, especially in Dhaka. Surveillance activities specific for dengue and chikungunya viruses are recommended to increase our understanding of the epidemiology of both of these pathogens in Bangladesh.

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Essential laboratory services for NGO primary health care clinics in Bangladesh

Laboratory services support effective health care delivery. We selected non-governmental organization service delivery clinics and compared their laboratory services to those recommended by experts. None of the rural clinics had laboratory services. Among urban clinics that had laboratories, most lacked essential laboratory supplies, and biosafety and waste disposal procedures. Adding laboratory services to available clinics will require improvements in laboratory facilities and procedures.

Laboratory services are essential health care services. In developed countries, laboratory-aided preventive, diagnostic and prognostic testing plays a central role in modern medicine. Similar advantages should be possible in developing countries, but this will require the application of appropriate technologies that optimize the use of limited resources. In Bangladesh, diagnoses made at the primary health care (PHC) level are mainly based

upon presenting complaints, history taking and clinical examination (1). The extent to which this is aided by laboratory tests is largely unknown. Unlike the case for essential medicines, there is no consensus among experts as to what constitutes an essential laboratory service that stems from applied research and evidence-based reviews of effectiveness and efficiency (2).

In order to better understand the existing situation and needs of laboratory services in NGO PHC clinics in Bangladesh, a cross sectional descriptive study was conducted within the USAID-funded NGO Service Delivery Programme (NSDP) clinics situated throughout the country. The rationale behind considering NSDP clinics were: 1) uniformity in structure of the clinics; 2) distribution of the clinics throughout the country; 3) good record keeping systems and 4) the uninterrupted provision of services (3). Among 321 functioning NSDP clinics (rural and urban), only 18 urban clinics were identified as having laboratory services and all were included in the study to assess the existing situation. None of the rural clinics had laboratory services. In addition, 60 randomly selected clinics without laboratory services from both rural and urban sites (23 urban and 37 rural) were included in the study to examine patients' symptoms and disease patterns in the catchment populations. Information on disease patterns were collected from the copies of the prescriptions made for the patients in the first week of each month during the preceding one-year. The prescription copies contained either the patients' symptoms and/or the clinical diagnosis made by the service providers. We collected both symptoms and clinical diagnoses from the prescriptions and coded them later. A team of two data collectors (one medical graduate and one laboratory technician) was responsible for data collection. In-depth interviews of laboratory staff, recording of inventory and physical facilities, and two-day observations of laboratory practices were carried out.

The symptoms and/or conditions for seeking care and recorded in the 60 NSDP clinics without laboratory facilities are summarized in Table1.

An extensive literature search was done to identify what were considered to be appropriate tests that should be made available at the primary health care level. This literature is largely subjective, without analytical confirmation of test reliability, validity or cost benefit. The tests identified were shared with experienced laboratory specialists, programme specialists and policy makers in order to establish a baseline of recommended tests appropriate to the context of Bangladesh, as summarized in Table 2. Two sets of tests were identified, one for rural clinics and the other for urban clinics. We next matched these recommended laboratory tests with tests currently available in those NSDP clinics with laboratory facilities (Table 2). Table 3

outlines the equipment required to perform the tests identified and their availability in the clinics where laboratory facilities are already available.

Table 1: Ten most frequent conditions for which patients attended the clinics

Diagnosis/symptoms	% Al n=19,793	% rural n=10,191	% urban n=9,602
Pregnancy (ANC)	24%	25%	22%
Cough/ARI	11%	10%	12%
Amenorrhoea	7%	8%	7%
Vaginal discharge	6%	8%	4%
Diarrhoeal diseases	6%	5%	4%
Skin problems	5%	5%	4%
Fever	5%	4%	5%
Epigastric pain	5%	5%	4%
Helminthiasis	4%	4%	5%
Anaemia	3%	5%	2%

Table 2: Recommended laboratory tests to be made available at PHC facilities

Name of recommended test	Rural Clinics	Urban Clinics	% Urban Clinics having test
1. Urine for albumin	Yes	Yes	100%
2. Urine sugar	Yes	Yes	100%
3. Urine microscopic examination	Yes	Yes	67%
4. Urine for physical examination	Yes	Yes	67%
5. Urine for pregnancy test	Yes	Yes	100%
6. Stool for routine examination	Yes	Yes	61%
7. Blood for Hb%	Yes	Yes	100%
8. Blood grouping	Yes	Yes	100%
9. Sputum for AFB	Yes	Yes	55%
10. Blood sugar	No	Yes	83%
11. HbsAg	No	Yes	100%
12. RPR	No	Yes	89%
13. Serum Bilirubin	No	Yes	61%
14. ALT/SGPT	No	Yes	0%
15. Complete blood count (CBC)	No	Yes	6%
16. Blood film for malarial parasite (MP)	No	Yes	28%
17. Widal test	No	Yes	50%
18. Serum cholesterol	No	Yes	0%

Table 3: List of recommended equipment in rural and urban areas

Equipment recommended	Equipment available (n=18)
Basic equipment for all setting	
- Microscope	78%
- Shali's haemoglobinometer	83%
- Equipment for pipetting & dispensing	61%
- Autoclave and/or pressure cooker	89%
- Refrigerator	89%
Additional equipment for urban setting	
- Balance	6%
- Centrifuge	94%
- Colourimeter	72%
- Mixer and rotator	40%
Essential laboratory supplies for all settings	
- Test slides	94%
- Mixing sticks	28%
- Stool specimen containers	39%
- Cover slips	89%
- Calibration charts	0%
- Chromatography paper	0%
- Glass slides	94%
- Stirrers	0%
- Flasks	28%
- Disposable syringes and needles	100%
- Test tubes	100%
- Urine specimen containers	78%
- Bunsen burners	22%
Additional laboratory supplies for urban setting	
- Improved Neubauer haemocytometers	56%
- Counting chamber cover glasses	55%
- Counting chambers for platelet count	56%
- Westergren ESR pipettes	100%
- Westergren ESR stands	100%
- Pipette/calibrated capillaries	56%
- WBC pipettes	61%
- Hand counters	17%
- Staining racks	56%
- Timers	72%
- EDTA	22%
- Centrifuge tubes	89%
- Lancets	100%
- Blotting paper	0%

Sterilization and waste disposal equipment/capacities are summarized in Table 4. Ten (56%) laboratories had equipment for the sterilization of laboratory instruments. This included six with an autoclave. Only 2 laboratories reported that sterilized items were stored properly. Proper storage was defined as keeping the sterilized items in a sterilized closed surgical drum or similar container. All the laboratories reported using disposable syringes for collection of blood. Seventeen of the laboratories reported that they did not recap, bend or break needles before disposal. Seven (39%) laboratories used puncture-resistant sharp containers for disposing needles. One (6%) laboratory had separate waste containers for medical and general waste. Seventeen (94%) laboratories burnt solid waste materials in an incinerator but used a sink/basin and/or toilet for disposing of liquid waste, including body fluids.

Table 4: Bio-safety and waste disposal status of the 18 laboratories

Name of the activity	Available Number (%)
Have infection prevention guidelines	3 (17%)
Universal precaution training and monitoring	2 (11%)
Reported hand washing before and after specimen collection	15 (83%)
Reported using protective gloves while working in laboratory	6 (33%)
Reported use of disinfectant in the laboratory	16 (89%)
Reported use of chlorine solution for disinfection	6 (33%)
Reported soaking reusable instruments in chlorine solution after use	1 (6%)
Reported cleaning of instruments before processing for sterilization	1 (6%)
Reported use of utility gloves for handling used instruments	12 (67%)

Internal quality assurance included repetition of abnormal results (94%), ensuring proper collection of specimens from the right person (100%), proper container labelling (89%), reporting to supervisors (83%), supervision by management (78%), prompt sending of samples to the laboratory (78%), inspection of equipment, structures and materials (94%), and maintenance of equipment (72%). There was no cross-checking of staff for strict adherence to standard operating procedures. One laboratory reported sending specimens to a reference laboratory for external quality assurance. Eleven (61%) laboratories reported using supervisory visits with observation checklists for facility-wide reviews, 12 (67%) reported client satisfaction surveys, 15 (83%) periodic audits, 8 (44%) have an infection control programme, and 5 (28%) a quality assurance programme.

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Comment

To aid health care delivery planning, further clarification of the health benefits to a population of a basic package of essential laboratory services would be useful.

Using a consensus list of essential services and supplies, this survey of NSDP laboratory facilities found they were lacking physical infrastructure, essential equipment and quality control procedures. No standard operating procedures for conducting the tests performed was available at any of the laboratories. A record keeping system should contain all the requisite information related to test procedures. The lack of procedures to prevent dangerous infections are particularly worrying as poor practices have resulted in the spread of blood-borne infections in other settings (4,5).

Primary health care clinics would benefit from the availability of appropriate tests, but this should coincide with improved quality control, waste control and training of laboratory staff.

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Molecular typing of group A rotavirus strains in Bangladesh

Rotaviruses (RVs) are the single most important cause of severe diarrhoeal illness in infants and young children in both developed and developing countries worldwide. The high disease burden motivated major efforts to develop rotavirus vaccines. Fortunately, two RV vaccines, RotaTeq (developed by Merck and Co.) and RotaRix (developed by GlaxoSmithKline) passed a large safety trial and showed high efficacy against the major RV G types and have been approved by the Food and Drug Administration. We performed G and P genotyping on a subset of 10% of the rotavirus positive stool specimens (n=471) collected from diarrhoea patients attending the hospital surveillance system of ICDDR,B during January 2001-May 2006. G1P[8] (36.4%) and G9P[8] (27.7%) were the dominating strains but G2[4] and G12P[6] were present in 15.4% and 3.1% of the rotavirus positive patients respectively through the 2004-2005 rotavirus season. But during 2005-2006, G2P[4] (43.2%) appeared as the most prevalent strain and G12P[6] became more prevalent (11.1%). Since the recently licensed rotavirus vaccines include only the P[8] specificity, it is unclear how the vaccines will perform in settings where the non-P[8] types are prevalent.

Group A rotaviruses (RVs) are the major aetiological agents of severe infantile diarrhoea worldwide. More than 125 million infants and young children develop RV diarrhoea globally each year, resulting in 440,000 deaths in children, mostly in developing countries (1). In Bangladesh, RV causes between 6,000 and 14,000 deaths each year in children below 5 years of age (2).

Rotaviruses are classified based on two outer capsid proteins, VP7 (defining G genotypes) and VP4 (defining P genotypes). So far, at least 16 G and 27 P genotypes have been described in humans and a variety of animals (3,4). The major human G types which account for more than 80% of rotavirus gastroenteritis episodes worldwide are G1, G2, G3, G4 and G9, combined with the P types P[8], P[4] and P[6]. Genotyping of RVs is important to assess whether vaccine efficacy might be altered by the changing pattern of the distribution of different G and P genotypes. The objective of this study is to elucidate the genomic diversity of rotaviruses in an urban and a rural area in Bangladesh, with the ultimate goal being to provide information for RV vaccine development programmes. A more

detailled report of this study has been recently published (5).

From January 2001 through May 2006, 19,039 stool specimens were tested for group A rotavirus VP6 antigen; 4,644 (24.4%) samples had positive results. Table 1 shows the distribution of rotavirus-positive patients in the hospital surveillance systems in Dhaka and Matlab. The average detection rate of rotavirus was 25.2% in Dhaka and 23.3% in Matlab.

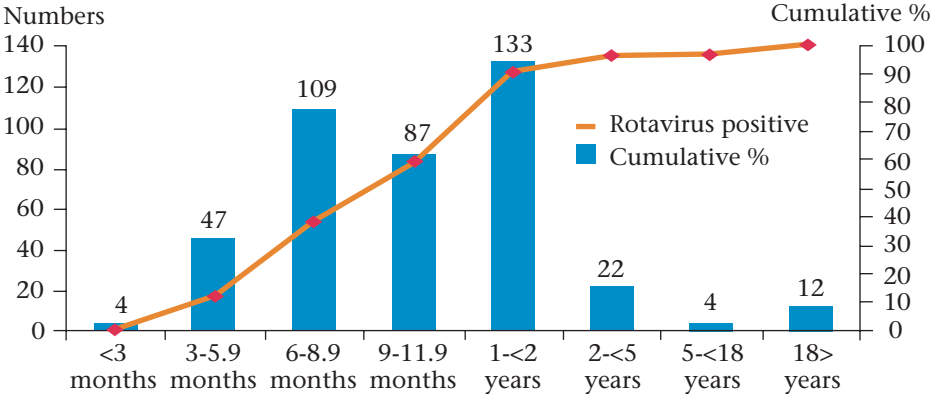
Table 1: Distribution of specimens positive for rotavirus: Dhaka and Matlab hospitals Jan 2001-May 2006

	Dhaka		Matlab	
RV seasons*	Total number tested	RV positive N(%)	Total number tested	RV positive n(%)
2000-2001**	879	214 (24.3)	715	202 (28.3)
2001-2002	1,824	563 (30.9)	1,665	428 (25.7)
2002-2003	1,806	458 (25.4)	1,583	338 (21.4)
2003-2004	1,786	458 (25.6)	1,425	281 (19.7)
2004-2005	2,374	521 (21.9)	1,547	350 (22.6)
2005-2006	2,070	492 (23.8)	1,365	339 (24.8)
Total	10,739	2,706 (25.2)	8,300	1,938 (23.3)

*Starts in June and ends in May of the following year.
**Incomplete RV season (Jan-May 2001).

The age range of the rotavirus diarrhoea patients (2001–2005) was 1 month–63.2 years, median age 10 months, and mean age 22.8 months. Most of the rotavirus positive patients (91%) were <2 years of age (Figure 1). Infection rates were lowest in patients <3 months and >5 years of age.

Figure 1: Age distribution for the RV positive patients during 2001-2005.



G and P genotyping were carried out on 471 RV antigen positive stool samples (10% of all RV positive patients) by using a type-specific-primer based multiplex RT-PCR (6-7) which could detect 6 G genotypes (G1, G2, G3, G4, G8, G9) and 5 P genotypes (P[8], P[4], P[6], P[9], P[11]). Samples untypeable by this method were successfully typed and confirmed by using nucleotide sequencing. Table 2 shows the distribution of G and P types of RV strains detected in Dhaka and Matlab. No significant difference in distribution of RV strains between Dhaka and Matlab was observed (p value >0.05). Overall, the most prevalent genotype was G1P[8] (33.8%) followed by G9P[8] (25.3%), G2P[4] (20.2%) and G4P[8] (8.3%). A very uncommon human rotavirus strain G12 (5.6%) and an unusual porcine-like G11 RV strain (0.6%) were detected. Strains with unusual G-P combinations such as G1P[6], G2P[6] and G2P[8] and mixed infections were also isolated.

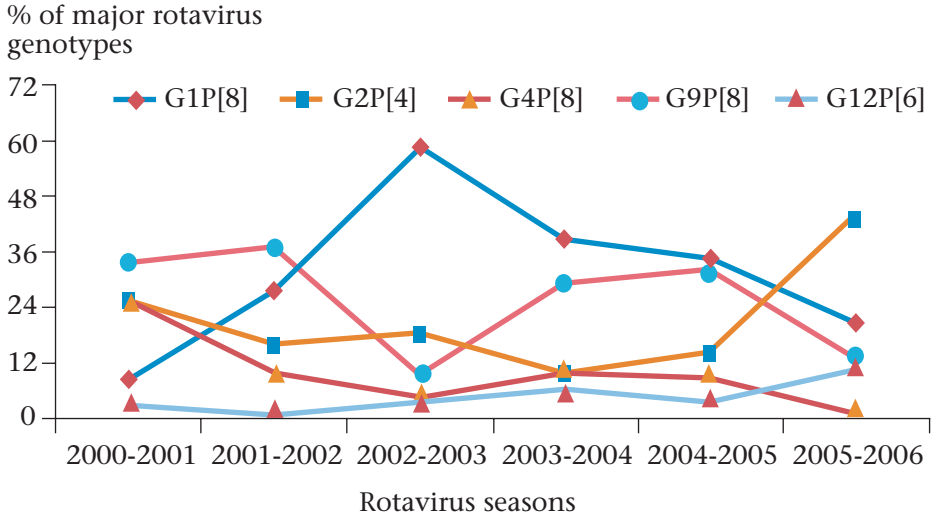
Table 2: Distribution of G and P genotypes of RV strains: Dhaka and Matlab: January 2001-May 2006

G type	P type	No. (%) of RV strains		
		Dhaka	Matlab	Total
G1	P[6]	1 (0.4)	2 (1.0)	3 (0.6)
G1	P[8]	85 (31.3)	74 (37.2)	159 (33.8)
G2	P[4]	55 (20.2)	40 (20.1)	95 (20.2)
G2	P[6]	1 (0.4)	0 (0.0)	1 (0.2)
G2	P[8]	2 (0.7)	0 (0.0)	2 (0.4)
G4	P[8]	26 (9.6)	13 (6.5)	39 (8.3)
G9	P[6]	7 (2.6)	2 (1.0)	9 (1.9)
G9	P[8]	67 (24.6)	52 (26.1)	119 (25.3)
G11	P[6]	1 (0.4)	0 (0.0)	1 (0.2)
G11	P[8]	1 (0.4)	1 (0.5)	2 (0.4)
G12	P[6]	16 (5.9)	5 (2.5)	21 (4.5)
G12	P[8]	2 (0.7)	3 (1.5)	5 (1.1)
Mixed G/P		8(3.0)	7 (3.5)	15 (3.2)
Total		272 (100.1)	199 (99.9)	471 (100.0)

The percentage of the total for Dhaka is >100% and for Matlab <100% because each number was rounded off to the nearest 1/10 of 1%.

Large fluctuations of the RV genotype distribution were observed both in Dhaka and Matlab. However, no significant difference between the urban and rural setting was observed with regard to the yearly distribution of genotypes (p value >0.05). The overall distribution of the major genotypes over time is shown in Figure 2. The G1P[8] strains were less common in 2001 whereas they became the most predominant strains in the following years and decreased again in 2005-2006. G9P[8] strains were dominant in the first two RV seasons and decreased sharply in 2002-2003. They were dominant again for the two following years and decreased again in 2005-2006. G4P[8] which had been the most prevalent strain in the 1990s in Bangladesh were found to be less common in our study and constituted only 1.2% in 2005-2006. G2P[4] strains were the most predominant in the 2005-2006 RV season (43.2%) although they were less common in the previous seasons (15.4% during 2001-2005). The uncommon strains G12P[6] and G12P[8] were just introduced in Bangladesh for the first time in 2000-2001 season and they became important strains (13.6%) in this region in the 2005-2006 season (8).

Figure 2: Temporal changes of the distribution of major RV genotypes in Bangladesh during 2001-2006.



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Comment

Our main goal was to characterize the VP7 (G genotype) and VP4 (P genotype) gene segments of the RV strains, which could be helpful for a future vaccine development programme in Bangladesh. We identified most of the globally common RV types (G1, G2, G4 and G9) in our study. Results of RV strains from this study were compared to the previous findings in Bangladesh (8). It was clearly observed that the distribution of rotavirus genotypes was changing over time. During 1992-1997, the most common RV genotype was G4 (47% of the typeable RV strains), but they gradually decreased and became a less common RV strain over time (1.2% during 2005-2006). The distribution of G2 strains, on the other hand, remained nearly unchanged through RV season 2004-2005 (19.5% during 1992-1997 and 16.2% during 2001-2005) but suddenly became the most prevalent genotype in the RV season 2005-2006 (43.2%).

Three G11 strains, which are commonly found in pigs, were isolated from humans in the present study. In Bangladesh, pigs are uncommon farm animals, and no genotyping studies on pigs or other animals have been conducted thus far. Therefore, the identification of the strains with an animal-like-G11 VP7 specificity and a human-P[8] or P[6] specificity raises the question whether these strains are reassortants of human and animal RV strains. This finding underscores the need for extension of RV surveillance programmes to animal RV strains. Additionally, water samples, particularly those collected during floods, can be evaluated for the presence of unusual RV strains, which might have been introduced from domestic animals.

For the first time in Bangladesh, the very uncommon human RV strain G12 was detected. The G12 strain was first detected in 1987-1988 in the Philippines. More than 10 years later, it has been emerging all over the world. A considerable proportion of patients with diarrhoea had G12 strains isolated during our study period; the proportion reached 13.6% in the latest RV season (2005-2006). Thus, the emergence of G12 strains has led to the need for prospective surveillance using new diagnostic RT-PCR primers for G12 strains.

P genotype analysis showed that rotavirus strains with the non-P[8] specificity comprised 21.9% of the circulating strains during 2001-2005. The most interesting finding about P types in our study was that the non-P[8]

strains represented more than half of the strains (56.8%) during the RV season 2005-2006. The currently licensed RV vaccines RotaTeq (developed by Merck and Co.) and RotaRix (developed by GlaxoSmithKline) have shown high efficacy rates in trials and have focused on the role of the major G genotypes, but the role of P genotypes has not been addressed (9,10). These vaccines include the P[8] specificity and it remains to be seen how the vaccines will perform in settings where non-P[8] types are prevalent. Since the efficacy trial of the RV vaccine RotaTeq will be started very soon in Bangladesh the findings of our study regarding the RV strain diversity will be very important in interpreting the results of this trial.

Our study has confirmed that rotaviruses remain one of the most important causes of diarrhoea in both urban and rural areas in Bangladesh. The tremendous incidence of RV disease underscores the urgent need for interventions, particularly to prevent childhood deaths. There is no specific treatment for rotavirus infection. Various formulations of oral rehydration salts (ORS) solutions have been shown to be effective in the treatment of dehydration, with some minor variations in their efficacy. If oral rehydration does not correct the fluid and electrolyte loss, or if the patient is severely dehydrated or in shock, intravenous fluids must be given immediately. The use of antiviral agents and various medications like loperamide, anticholinergic agents, bismuth subsalicylate, adsorbents, or lactobacillus-containing compounds for symptomatic treatment is contraindicated. New researches indicate that zinc supplementation can significantly reduce the burden of dehydration caused by diarrheal disease. Because excellent standards of hygiene and sanitation have little effect on virus transmission, an effective vaccine is required to prevent rotavirus infection. The currently licensed vaccines showed big promise in trials conducted in the United States, Latin America and Europe; however, trials in Africa and Asia, including Bangladesh, are yet to be done.

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ANNOUNCEMENT

Fourth international conference on scaling up zinc will be held from May 06-07, 2007 at ICDDR,B. This year the presentations will focus on the launching of zinc treatment in Bangladesh, research in support of scaling up and initiatives from other parts of Asia and Africa.

Interested persons to attend the conference are requested to please send the registration form filled up by e-mail/fax /mail, by 20 April 2007 to: **Nazratun Nayeem Monalisa**, Information Manager, SUZY Project, ICDDR,B, Mohakhali, Dhaka 1212, Bangladesh, Tel: +880-2-886 0523-32/2539, +880-2-9886497 (Direct), Cell: +8801713093884, Fax: 880-2-8811568, E-mail: monalisa@icddrb.org, Website: www.icddrb.org.

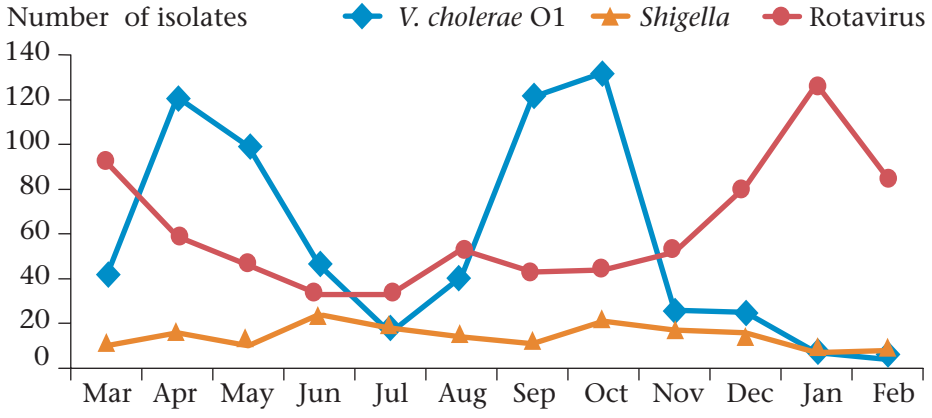
Surveillance update

With each issue of the HSB, updates of surveillance data described in earlier issues are provided. These updated tables and figures 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: March 2006-February 2007

Antimicrobial agents	*Shigella* (n=173)	*V. Cholerae* O1 (n=680)
Nalidixic acid	27.7	Not tested
Mecillinam	94.2	Not tested
Ampicillin	57.2	Not tested
TMP-SMX	33.5	2.8
Ciprofloxacin	99.4	100.0
Tetracycline	Not tested	57.2
Erythromycin	Not tested	6.5
Furazolidine	Not tested	0.1

Monthly isolation of V. cholerae *O1,* Shigella *and Rotavirus: March 2006-February 2007*



Antimicrobial resistance patterns of 179 M. tuberculosis *isolates: January 2006-December 2006*

Drugs	Resistance type		Total (n=179)
	Primary (n=164)	Acquired* (n=15)	
Streptomycin	46 (28.0)	8 (53.3)	54 (30.2)
Isoniazid (INH)	16 (9.8)	6 (40.0)	22 (12.3)
Ethambutal	8 (4.9)	2 (13.3)	10 (5.6)
Rifampicin	17 (10.4)	5 (33.3)	22 (12.3)
MDR (INH+ Rifampicin)	6 (3.7)	3 (20.0)	9 (5.0)
Any drugs	59 (36.0)	9 (60.0)	68 (38.0)

() column percentage * Antituberculous drugs received for one month or more

Antimicrobial susceptibility of N. gonorrhoeae *isolated during October-December 2006 (n=12)*

Antimicrobial agents	Susceptible (%)	Reduced susceptibility (%)	Resistant (%)
Azithromycin	91.7	8.3	0.0
Ceftriaxone	100.0	0.0	0.0
Ciprofloxacin	0.0	8.3	91.7
Penicillin	0.0	0.0	100.0
Spectinomycin	91.7	8.3	0.0
Tetracycline	0.0	0.0	100.0
Cefixime	100.0	0.0	0.0

Antimicrobial susceptibility pattern of S. pneumoniae *among children <5 years during November-December 2006*

Antimicrobial agents	Total tested (n)	Susceptible n (%)	Reduced susceptibility* n (%)	Resistant* n (%)
Ampilillin	13	13 (100.0)	0 (0.0)	0 (0.0)
Cotrimoxazole	12	2 (16.7)	1 (8.3)	9 (75.0)
Chloramphenicol	13	13 (100.0)	0 (0.0)	0 (0.0)
Ceftriaxone	13	13 (100.0)	0 (0.0)	0 (0.0)
Ciprofloxacin	13	12 (92.3)	1 (7.7)	0 (0.0)
Gentamicin	13	1 (7.7)	0 (0.0)	12 (92.3)
Oxacillin	13	13 (100.0)	0 (0.0)	0 (0.0)

Source: Data obtained from children participating in PneumoADIP surveillance - a joint collaboration of ICDDR,B and Dhaka Shisu Hospital which has been conducted in Dhaka Medical College Hospital, Chittagong Medical College Hospital, Sir Salimullah Medical College Hospital, ICH-Shishu Sasthya Foundation, Chittagong Maa Shishu O General Hospital, Dhaka Shishu Hospital, Kumudini Hospital-Mirzapur, and ICDDR,B's urban surveillance in Kamalapur (Dhaka) and rural surveillance in Mirzapur (Tangail).

Antimicrobial susceptibility pattern of S. typhi *among children <5 years during November-December 2006*

Antimicrobial agents	Total tested (n)	Susceptible n (%)	Reduced susceptibility* n (%)	Resistant* n (%)
Ampicillin	12	6 (50.0)	0 (0.0)	6 (50.0)
Cotrimoxazole	11	6 (54.5)	0 (0.0)	5 (45.5)
Chloramphenicol	12	6 (50.0)	0 (0.0)	6 (50.0)
Ceftriaxone	12	11 (91.7)	0 (0.0)	1 (8.3)
Ciprofloxacin	12	12 (100.0)	0 (0.0)	0 (0.0)

Source: Data obtained from children participating in PneumoADIP surveillance - a joint collaboration of ICDDR,B and Dhaka Shisu Hospital which has been conducted in Dhaka Medical College Hospital, Sir Salimullah Medical College Hospital. ICH- Shishu Sasthya Foundation, Chittagong Maa Shishu O General Hospital, Dhaka Shishu Hospital and Kumudini Hospital, Mirzapur

Virology team members working in the laboratory

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