



## Persistent Diarrhoea Still A Serious and Difficult Problem

Persistent diarrhoea is defined by most investigators as an episode of acute diarrhoea that continues for more than two weeks. Although knowledge about the management of acute dehydrating diarrhoea has advanced remarkably in the past two decades, very little is known about the aetiology and treatment of persistent diarrhoea. Four recent papers from studies conducted at ICDDR,B contribute important information about this affliction which baffles the medical profession and causes death and deterioration of health, especially among very young children.

### Recognising the risk factors

Studies conducted in developing countries around the world show that children experience from two to ten episodes of diarrhoea every year. In Bangladesh, the risk estimate of the episode becoming persistent varies among investigators from about 7.5% to 23%, depending, it seems, upon the methodology used. Nevertheless, says one researcher writing in one of these four studies (1), "it is important to better understand the frequency, aetiology, pathogenesis and the impact of persistent diarrhoea. Knowledge of the clinical characteristics of the early phase of illnesses that culminate in persistent diarrhoea could assist in the initial management of such episodes to shorten their duration and reduce their adverse effects."

Another of the four studies (2) that set out to determine what the possible predictors are discovered that the pathogen most frequently found in the stools at the onset of those cases that became persistent was aggregative adherent *Escherichia coli* (EAggEC). But because this pathogen is also found in the stools of children without diarrhoea, and many of the pathogens (e.g., *Shigella*, *Giardia*, *Aeromonas*, and rotavirus) found in persistent diarrhoea were found more frequently in acute diarrhoea, the investigator concluded that "other factors, such as diet, nutritional status, or variations in the virulence factors might be more important contributors to the prolongation of symptoms than specific pathogens."

He does add, however, that other studies have also shown that EAggEC are often associated with prolonged diarrhoeal disease in

children, prompting the question: Does the adherence factor of the organism actually cause disease, is it just a marker for a yet unknown virulence factor in these *E. coli*, or is it an incidental host, interacting with other factors to bring about prolonged diarrhoea? More investigation is clearly needed.

In two of the studies, the rates of diarrhoeal incidence, both acute and persistent, were found to be highest in the 6-11-month's age group (1,2); the risk of children having diarrhoea during the fifth year of life is less than half that of those in the first two years. Other factors which were found more often associated with cases that became prolonged were the presence of clinical dehydration, vomiting, and blood and mucus in the stool during the first week, reduced breast-feeding, consumption of cow's milk, and malnutrition.

### Risk of Dying

Forty-nine per cent of the diarrhoeal deaths, in one of the studies (3), were in children with malnutrition-associated persistent diarrhoea. These children were at the highest risk of dying during their third year of lives. In fact, between the ages of 24 months and 35 months, more children die from malnutrition complicated persistent diarrhoea than from all non-diarrhoeal causes of death combined.

### Malnutrition

Besides having a higher risk of dying, patients with malnutrition and diarrhoea also suffer

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Children with diarrhoea are being registered at the reception counter for treatment at the Moulab Health and Research Centre of ICDDR,B.

## High-Protein Diet Facilitates Growth of Children After Shigellosis

Increasing the protein content of the diet during convalescence from shigellosis in children leads to better growth. Protein-rich food with adequate calories supports a rapid catch-up growth in children with shigellosis during convalescence.

650,000 children die annually due to shigellosis.

Protein-rich food with adequate calories supports a rapid catch-up growth.

Shigellosis, most commonly known as bacillary dysentery, is an infectious disease associated with high mortality in many developing countries, including Bangladesh. It has been estimated that nearly 650,000 children die each year due to shigellosis (1). A substantial number of children who survive develop severe malnutrition. Previous studies at ICDDR,B have shown that children who had shigellosis were significantly shorter than those who had watery diarrhoea (2,3). Part of this growth retardation was due to less intake of food, excessive loss of blood and body protein during the acute illness (4). As the food intake is limited due to severe anorexia, high fever, increased catabolism, and traditional food withholding during the acute phase of the disease, a dietary intervention during the recovery period is more likely to have a positive impact on catch-up growth. Therefore, it was hypothesised that a diet containing a higher amount of protein with adequate calories will achieve a rapid catch-up growth in these children.

Sixty-nine children aged 2 to 5 years, during convalescence from shigellosis, were randomly assigned to either (i) a high protein diet containing 150 kcal/kg.d with 15% of total calories as protein or (ii) a standard control diet that was isocaloric with high protein diet and 7.5% of total calories as protein. The children were fed these diets for 21 days in the metabolic study ward of ICDDR,B. Body weight was measured daily, and heights were measured every 3rd day for 21 days. Mid-upper-arm circumference and triceps skinfold were measured on day 1 and day 21. Assays of serum proteins were done on admission to study and were repeated on day 21. In 29 children, a metabolic balance was done and food absorption was determined. The effect of feeding of high-protein diet on body composition was measured by bio-electrical impedance assay in 35 children.

The result of the study shows that children fed the high-protein diet were significantly taller than those fed the standard protein diet ( $p < 0.01$ ). Body weight increased significantly more in high-protein group than in the control group ( $p < 0.01$ ), and prealbumin and retinol-binding protein also rose significantly more in children fed the high-protein diet ( $p < 0.01$ ). However, the mean increases of serum albumin were similar in both groups, suggesting that this biochemical parameter does not change so rapidly and is not a good indicator of the short-term effect of nutritional therapy. Concentrations of serum somatomedin-C before dietary interventions were lower than normal in both groups of children, but

increased significantly more in the high-protein group than in the control group ( $p < 0.01$ ). This indicates more effective protein repletion and stimulus to growth in the high-protein group.

The fat-free mass (FFM) as determined by bioelectrical impedance analyser showed that children receiving the high-protein diet had significantly more increase in FFM as compared with that of the control group ( $p < 0.01$ ). However, the fat mass was similar in both the groups, suggesting that increasing the amount of protein in the test group resulted in more deposition in muscle tissue than adipose tissue.

The food intake and absorption of macronutrients were determined in a 72-hour metabolic balance study. The coefficient of protein absorption was significantly higher in children receiving the test diet than in those who were fed the control diet ( $p < 0.01$ ), although absorption of fat and carbohydrate was similar.

Data for 31 children in the test group and 27 children in the control group at 3-month and 6-month periods were available for analysis. The mean (SD) weight gain was 1.05 (0.48) kg in the test group vs 0.82 (0.59) kg in the control group after 3 months and was not significantly different. However, the mean increase in ht/age of the test children was significantly greater after 21 days, as well as after 3 months ( $p < 0.03$ ) and 6 months ( $p < 0.001$ ) respectively. This indicates that the "height-spurt" in the test children, which was achieved after 21 days, was maintained even at 3 months and 6 months after their discharge from the hospital.

These results indicate that increasing the protein content of the diet during convalescence from shigellosis in children leads to better growth. The higher concentration of high-turnover protein like prealbumin and retinol-binding protein in the high-protein group suggests that additional dietary protein is being utilised to synthesise more of the essential body proteins at a faster rate to compensate for the negative nitrogen balance due to stool losses during acute shigellosis.

It is recommended that the dietary management of children with shigellosis during convalescence should include protein-rich food with adequate calories to support a rapid catch-up growth.

### References

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2. Black RE, Brown KH, Becker S. Effects of diarrhea associated with specific enteropathogens on the growth of children in rural Bangladesh. *Pediatrics* 1984;73:799-805.
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4. Rahaman MM, Wahed MA. Direct nutrient loss and

diarrhea. In: Chen LC, Scrimshaw NS, eds. Diarrhea and malnutrition: interactions, mechanisms, and interventions. New York: Plenum, 1983:155-60.

[This article is a summary of the Ph.D. thesis by Dr Iqbal Kabir of the Clinical Sciences Division]. ■

## Child Survival Increases Contraceptive Use

An ICDDR,B study in rural Bangladesh showed that couples who lost a child often stopped practising contraception in order to have another child. Logistic regression analysis revealed that contraceptive continuation was related to maternal age, parity, husband's education and the sex of the last child.

The contraceptive practices of couples whose last child died are different from those whose last child survived. Information about the way in which child mortality affects fertility is particularly important for population policy, because childhood mortality reduction is not only a goal in itself but may also represent a way to reduce fertility. Child mortality may affect fertility in three ways; the death of a breast-fed child reduces the lactation period and thus may reduce the post-partum amenorrhoeic period, whereas infant survival and prolonged lactation should increase average pregnancy intervals.

Al Chowdhury and his colleagues studied 2,111 women in the Matlab study area of ICDDR,B during 1977-1979. Of them, 414 were using contraceptives in the baseline survey in December 1977. The researchers monitored these women's changing contraceptive practices 1 and 2 years later and related changes to the survival status of their last child. There were no significant differences in contraceptive use pattern in relation to mother's age, parity, or husband's education, but there was a significant effect if the last child was male. The women who had lost their last child were less likely to continue using contraception. Contraceptive continuation was greater among higher parity women and those with literate husbands.

Survival studies have concluded that reducing child mortality is not an efficient way of reducing fertility. The mechanisms by which a decline in child mortality could cause a decline in fertility are both biological and behavioural in origin. When a child dies the mother stops lactating and the cessation of breast-feeding (suckling response) increases the mother's chance of becoming pregnant. This mechanism is likely to be important in countries where fertility is not consciously controlled, and where breast-feeding is prolonged. The replacement mechanism exists when parents have not already reached their reproductive goals.

The results of this study suggest that if child mortality can be reduced, contraceptive use is likely to increase.

[Source: Chowdhury Al, Fauveau V, Aziz KMA. Effect of child survival on contraceptive use in Bangladesh. *J Biosoc Sci* 1992;24:427-32]. ■



*A bari-mother (a trained local house-wife) demonstrates to village mothers the proper method for preparing oral rehydration solution at home.*

## Breast-feeding and ORT at Home During Diarrhoea Prevent Dehydration Significantly

For the home management of infants and children with diarrhoea, mothers with breast-fed children are advised to provide oral rehydration therapy (ORT) and continue breast-feeding during an acute attack of illness. This helps protect the breast-fed infants from developing a more severe illness, because it provides much needed nutrition. Breast-milk also provides extra fluid during diarrhoea which may assist in preventing dehydration.

In a case-control study at ICDDR,B, ASG Faruque and his colleagues assessed the role of maternal behaviour, as reflected in maintenance of breast-feeding and the use of ORT at home during acute diarrhoea, in preventing dehydration in infants and young children. In this case-control design, 285 children aged 1-35 months attending the ICDDR,B hospital at Dhaka with moderate-to-severe dehydration were cases, while 728 children with no dehydration served as controls.

In a multivariate analysis using a logistic regression model, the researchers showed that withdrawal of breast-feeding during diarrhoea was associated with a five-times higher risk of dehydration compared with continuation of breast-feeding during diarrhoea at home. Lack of ORT with either the complete formula or a salt and sugar solution at home was associated with a 57% higher risk of dehydration compared with receipt of a reasonable amount of ORT after controlling for many confounders. Children of mothers with one or more years of school education had 37% reduced risk of dehydration. Young age and indicators of severe disease (e.g. vomiting, high stool frequency and positive stool test for cholera) were useful prognostic factors for dehydration. The study provides evidence that continued breast-feeding in the home management of

acute diarrhoea may reduce the risk of dehydration by 81%, and home use of a convincing amount of ORT may reduce the risk of dehydration by about 39%, although the amount of ORT fluid used at home may not have been adequate.

[Source: Faruque ASG, Mahalanabis D, Islam A, Hoque SS, Hasnat A, Breast feeding and oral rehydration at home during diarrhoea to prevent dehydration. *Arch Dis Child* 1992 Aug;67(8):1027-9.] ■

## Persistent Diarrhoea

(continued from page 1)

more severely and longer. Prolonged diarrhoea may even cause malnutrition, especially if there is vomiting and the care-giver does not encourage eating.

In one of the studies (4), an inexpensive, local, nutritious diet prepared with rice powder, soya oil, glucose, egg white, and water, was fed to children with persistent diarrhoea. It was done to measure the absorption of nutrients in these patients, and the results were compared with that of children free of disease. Eighty-one per cent improved within one week, despite a significant reduction in nutrient absorption. In malnourished patients, recovery took twice as long as in those who were better nourished. They also were noted to have more severe disease (3x higher stool wt.) and more reduced absorption. Interestingly, carbohydrate absorption was not reduced in the malnourished group and was the least affected nutrient of those compared between the patients and controls. This suggests that those entrusted with the dietary management of persistent diarrhoea patients should consider diets higher in carbohydrates, such as cereals.

### Oral Rehydration Therapy (ORT)

In Bangladesh, ORT has been the main component of strategies to reduce diarrhoeal deaths, and support for ORT should continue, especially among children of less than one year of age, as most deaths from watery diarrhoea occur then. Yet, says one investigator (3), "there is a clear need for specific measures to reduce the number of deaths from non-watery diarrhoea." And "diarrhoea control programmes which focus on rehydration therapy must also emphasise the importance of feeding during and after diarrhoea to achieve a major impact on diarrhoeal mortality." In agreement, another (4) writes, "compared with acute diarrhoea, rehydration has a limited role, and dietary manipulation remains the cornerstone of successful management of persistent diarrhoea."

### Management

All four investigators seem to agree that "dietary manipulation" is the primary consideration in the treatment of persistent diarrhoea and in the prevention of prolonged episodes. Neither clinical characteristics nor laboratory findings seem to have significant predictive value. Therefore, "appropriate fluid and dietary management for all episodes should be the goal.

Children with more severe initial illness characterised by the presence of blood in the stool or clinical dehydration should have more careful follow-up to identify persistent episodes and adverse nutritional effects. Breast-feeding should be continued during acute diarrhoea, but the role of ORT, antibiotics and cow's milk deserves further investigation" (1).

### References:

1. Baqui AH, Black RE, Sack RB, Yunus MD, Siddique AK, Chowdhury HR. Epidemiological and clinical characteristics of acute and persistent diarrhoea in rural Bangladeshi children. *Acta Paediatr* 1992; 81(suppl 381):15-21.
2. Henry FJ, Udo AS, Wanke CA, Aziz KMA. Epidemiology of persistent diarrhoea and etiologic agents in Mirzapur, Bangladesh. *Acta Paediatr* 1992; 81(suppl 381):27-31.
3. Fauveau V, Henry F, Briend A, Yunus M, Chakraborty J. Persistent diarrhoea as a cause of childhood mortality in rural Bangladesh. *Acta Paediatr* 1992; 81(suppl 381):12-4.
4. Roy SK, Akramuzzaman SM, Haider R, Majid N, Khatun M, Akbar MS, Alam AN. Persistent diarrhoea: factors affecting absorption and clinical prognosis during management with a rice-based diet. *Acta Paediatr* 1992;81(suppl 381):139-43. ■

Appropriate fluid and dietary management for all episodes should be the goal.



Fifteen years on, William Mashler is still an energetic member of the Board of Trustees of two of the CGIAR centres.

## History Revisited

Fifteen years ago, in 1977, William Mashler, Senior Director, Division for Global and Interregional Projects, UNDP, headed the initiative to internationalise the Cholera Research Laboratory. This process finally led to the birth of ICDDR,B in 1978. Subsequently, Mr Mashler approached OPEC to finance the construction of what is now the Dhaka Clinical Research Centre. Seeing the value of the hospital for the country (both in terms of the provision of additional health services and jobs creation), the government of Bangladesh and OPEC sanctioned the Taka equivalent of US \$ 950,000 for the construction of the foundations and ground floor. The construction began in 1982, and the hospital was inaugurated in March 1983. Nearly 10 years later, with the help of the Sasakawa Foundation, and some of the Centre's own reserve funds, the second story of the hospital complex is finally completed and houses the Sasakawa International Training Centre and the Laboratory Sciences Division. ■

## David B Sachar Visits ICDDR,B

Dr David B Sachar, Professor of Medicine and Director, Division of Gastroenterology, at the Mount Sinai School of Medicine in New York City, was once the Assistant Chief of Clinical Research of the Pakistan-SEATO Cholera Research Laboratory, the predecessor of ICDDR,B.

Dr Sachar's whirlwind visit to the Centre in early November, during which time he toured the Dhaka hospital and met with various members of the staff, prompted him to write the following comments about his observations and impressions of ICDDR,B:

For the 25 years since we left Dhaka, my wife and I had always regretted not having had an opportunity to return. Finally, my work on the scientific organising committee of an international symposium in New Delhi gave us the long-awaited chance! We stole a few days of holiday and paid a visit to the city that had been our home for two years. Of course, we were amazed by the physical growth of Dhaka in general and ICDDR,B in particular, but even more, we were thrilled by the scientific and intellectual sophistication of the Centre. Despite all the changes, however we were gratified most of all to find the warmth and enthusiasm of the people undimmed after 25 years. ■

## Ongoing Research at ICDDR,B

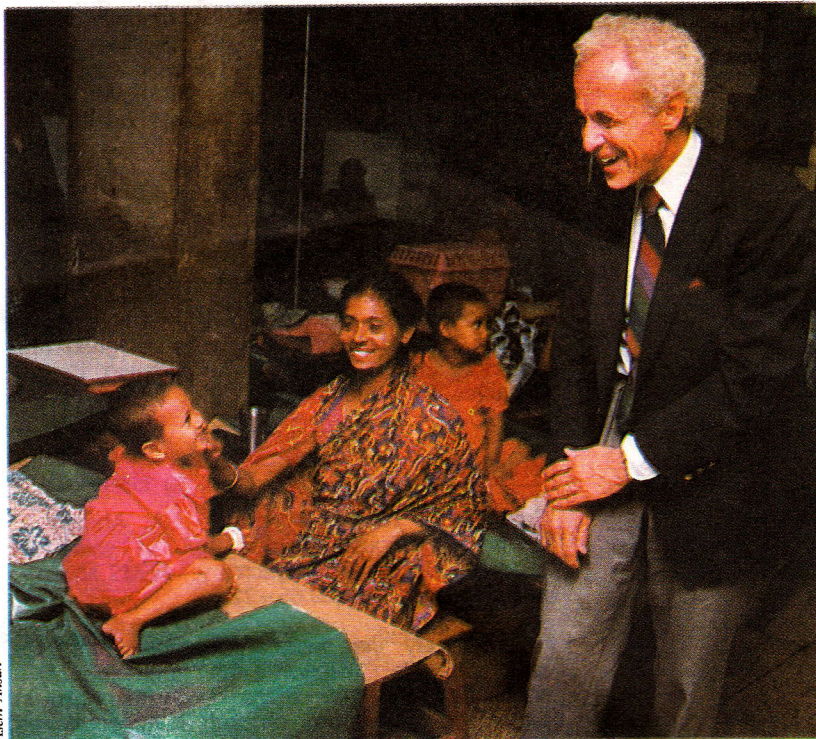
**Environment and *Shigella* dysentery.** (July 1991-June 1993). \*Bilquis A Hoque, D Mahalanabis. \*Community Health Division

The objective of the study is to determine environmental risk factors with *Shigella* dysentery in urban and rural areas of Bangladesh, using a case-control design. Index cases are those with shigellosis and controls are patients with non-*Shigella* diarrhoea. Households of the cases are visited to assess environmental risk factors. The results of the study will have implications for environmental interventions which are particularly effective against *Shigella* dysentery but might also control other types of diarrhoea.

**Environment and child survival.** (January 1991-December 1993). Bilquis A Hoque, Community Health Division.

The objectives of this study are to study the association between

- environmental factors and diarrhoeal deaths,
- environmental factors and acute respiratory infections,
- environmental factors and deaths from other infectious diseases, and



*This young patient in the Dhaka hospital ward responds to the joy expressed by Dr Sachar when he visited the Clinical Research Centre of the ICDDR,B after a 25-year absence.*

- mineral content of water and risk of dying from diarrhoea.

The study uses a case-control design with a child under 5 years who dies as an index case.

Environmental risk factors, including poor personal hygiene, kitchen/household hygiene, maternal behaviour, water supply and sanitation, indoor pollution and child-feeding practices, will be identified and evaluated. Using these data it will be possible to design an appropriate intervention study in the future. ■

## ABSTRACTS of ICDDR,B Publications

### Family planning

Simmons R, Mita R, Koenig MA. Employment in family planning and women's status in Bangladesh. *Stud Fam Plann* 1992;23(2):97-109.

"This study investigates how employment in family planning affects the status of community workers. The focus is on three critical variables: prestige, professional status, and social influence. The data are derived from a focus-group study conducted in 1987-88 in the Maternal and Child Health and Family Planning Project in Matlab, Bangladesh. Focus-group sessions were held with community workers, their husbands, community leaders, and community women. Results show that although community workers initially faced

intense hostility in the community, they succeeded in maintaining the prestige that is traditionally accorded to women in their conservative, rural society. Moreover, they established themselves as valued health and family planning professionals in a social context where professional roles for women have been extremely circumscribed. Finally, they gained social influence by performing a range of functions in the community that exceed formally prescribed job responsibilities. The professional and social leadership roles that community workers now assume imply a degree could result from a well-designed and appropriately managed family planning project deserves careful attention."

### Shigella

Schultz C, Qadri F, Hossain SA, Ahmed F, Ciznar I. *Shigella*-specific IgA in saliva of children with bacillary dysentery. *FEMS Microbiol Immunol* 1992;89:65-72.

"To study the secretory immune response after *Shigella* infection, the anti-lipopolysaccharide and anti-Shiga-toxin response in saliva, obtained from children with confirmed shigellosis and healthy children, were determined by enzyme-linked immunosorbent assay by Western blot. Children with infection showed high titers compared to healthy controls. After *Shigella dysenteriae* type 1 infection a significant change in titer could be observed in a large number of cases, in contrast to *Shigella flexneri* infection. It appeared that, in children living in endemic areas, infection with one serotype can give a rise in antibody titer to another serotype. This could be ascribed to polyclonal B cell activation since children in endemic areas routinely show relatively high titers to *Shigella* antigens. We conclude that the dynamics of salivary anti-*Shigella* LPS and anti-Shiga-toxin in children with dysentery indicate that it can be applied to studies of immune response in shigellosis for epidemiological and vaccination purposes."

Schultz C, Qadri F, Ciznar I, Bartkova G, Hossain SA, Wadstrom T. Binding of *Shigella* species to hydrophobic gels. *Biologia (Bratislava)* 1992;47(3):249-56.

"The interaction of strains of *Shigella dysenteriae* type 1, *Shigella flexneri*, *Shigella boydii* and *Shigella sonnei* with amphiphilic gels was studied by hydrophobic interaction

chromatography (HIC). Results showed that *S. dysenteriae* type 1 had a greater affinity for Phenyl Sepharose and Palmitoyl Sepharose, than for Octyl Sepharose. For *S. boydii* also an affinity for Phenyl Sepharose was apparent. For strains of *S. flexneri* and *S. sonnei* both Octyl and Phenyl Sepharose gave similar results. Rough strains of *S. dysenteriae* type 1 and *S. sonnei* interacted with the absorbents in lower concentrations of ammonium sulfate than that required for the smooth strains, indicating a higher hydrophobicity and lower net negative surface charge. For all the *Shigella* species studied, the smooth virulent parent strains had a greater affinity for the amphiphilic gels than the avirulent mutants. It thus appears that hydrophobic interaction chromatography indicates a difference between virulent strains and avirulent mutants of *Shigella* species."

Albert MJ, Ansaruzzaman M, Aïm ARMA, Mitra AK. Fluorescent antibody staining test for rapid diagnosis of *Shigella dysenteriae* 1 infection. *Diagn Microbiol Infect Dis* 1992 May-Jun; 15(4):359-61.

"An indirect fluorescent antibody test for rapid detection of *Shigella dysenteriae* 1 in diarrhoeal stools was developed. A diagnosis could be made within 90 min of submission of specimens to the laboratory. On comparison with culture results, the test had a sensitivity of 92%, a specificity of 93%, and positive and negative predictive values of 94% and 92%, respectively."

### Plesiomonas shigelloides

Amin II, Hossain MA, Hossain M, Miah MRA, Rahman Z, Rahman KM. Studies on virulence determinants of *Plesiomonas shigelloides*. *Bangladesh Med Res Council Bull* 1992 April;18(1):12-21.

"Virulence determinants of nineteen strains of *Plesiomonas shigelloides* isolated from stool samples of diarrhoeal children were studied. Heat-labile toxin was detected in seven strains using rat ileal loop model and in none of the strains using Chinese hamster ovary cell assay system and by enzyme-linked immunosorbent assay. Rat ileal loop model was used for the first time to assay toxin in *P. shigelloides* and is suggested to be a cheap and effective method of detecting labile toxin in the organism. Heat stable toxin, cytotoxin, hemolysin and hemagglutinin were not detected in the strains tested. Invasiveness could not be established by using HEp-2 cell assay system. The results of this study provide some experimental support for an etiological role for *P. shigelloides* in the production of diarrhoea."

### Cholera vaccine

Sack DA, Clemens JD, Huda S, Harris JR, Khan MR, Chakraborty J, Yunus M, Gomes J, Siddique O, Ahmed F, Kay BA, van Loon FPL, Rao MR, Svennerholm A-M, Holmgren J. Antibody responses after immunisation with killed oral cholera vaccines during the 1985

## **Forthcoming International Workshops and Conferences**

6TH INTERNATIONAL CONGRESS FOR INFECTIOUS DISEASES, Prague, Czechoslovakia, 26-30 April 1994. For further information please contact: Norman R Stein, Executive Director, International Society for Infectious Diseases, 180 Longwood Avenue, Boston, MA 02115, USA.

vaccine field trial in Bangladesh. *J Infect Dis* 1991 Aug;164(2):407-11.

"Sera collected during the 1985 oral cholera vaccine trial in Matlab, Bangladesh, which demonstrated efficacy of a whole cell combined with cholera B subunit vaccine (WC/BS) and a whole cell only vaccine (WC), were analysed for antitoxin and vibriocidal antibodies. Before vaccines were given, antitoxin titers were highest in children, especially those with O blood group, whereas vibriocidal titers rose throughout life. Two weeks after three doses of vaccine, geometric mean antitoxin titers were 2.5-4.5 times higher in vaccinees who received the WC/BS vaccine; the vibriocidal titers were 1.3-2.1 times higher in vaccinees who received either vaccine. The titer elevations were relatively brief and were barely detectable 7 months after the third dose even though significant levels of protection persisted  $\geq 3$  years. Thus, the oral vaccines induced a serum response in this large field trial that was similar to that seen in earlier pilot studies, but the duration of the serum responses was much shorter than the duration of the protection."

Ciznar I, Ahsan CR, Rahman A, Shahabuddin M, Bartkova G, Clemens JD, Sack DA. Crossed immunoelectrophoretic analysis of antigenic composition of B-subunit/whole-cell and whole-cell only killed oral cholera vaccines. *Vaccine* 1992;10(9):591-6.

"Crossed immunoelectrophoresis was used to identify antigens preserved in the whole-cell component of oral cholera vaccines tested in the field trial in Bangladesh. The composition and immunogenicity of the vaccine antigens were compared with those of antigens obtained from live cells of *Vibrio cholerae* O1 of both biovars and serovars. The whole-cell component of the vaccine contained ten antigens in comparison with the live *Vibrio* cells which revealed the presence of 30 antigens. The whole-cell component contained lipopolysaccharide, flagellar antigen, one cell-bound haemagglutinin and at least six outer membrane protein antigens."

### Health services

Salahuddin AKM, Rahman S, Nessa F, Begum RA, Bhuyan MNH. Disease profile in respect of health services of upazila health complex. *Bangladesh Med Res Council Bull* 1992 April; 18(1):36-46.

"This study was carried out to identify the disease profile in relation to medical services at upazila health complex. Thirty different types of diseases were identified. Diarrhoeal diseases were found to be highest (53%), the second highest was intestinal worms (44%). About 97% patient attended the OPD and only 2% were attended in the emergency department. On average 172 patients were admitted per month and the highest of admission was found in the months of September and October. The average length of stay in the hospital was 11.6 days. Among the patients admitted 55% were male, and 45 were female. 5% pregnant

mothers attended in U.H.C. for antenatal checkup and 2% mother were admitted into the hospital after delivery. Metronidazole was the drug of highest consumption followed by B-Complex and Penicillin."

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## Short Training Courses

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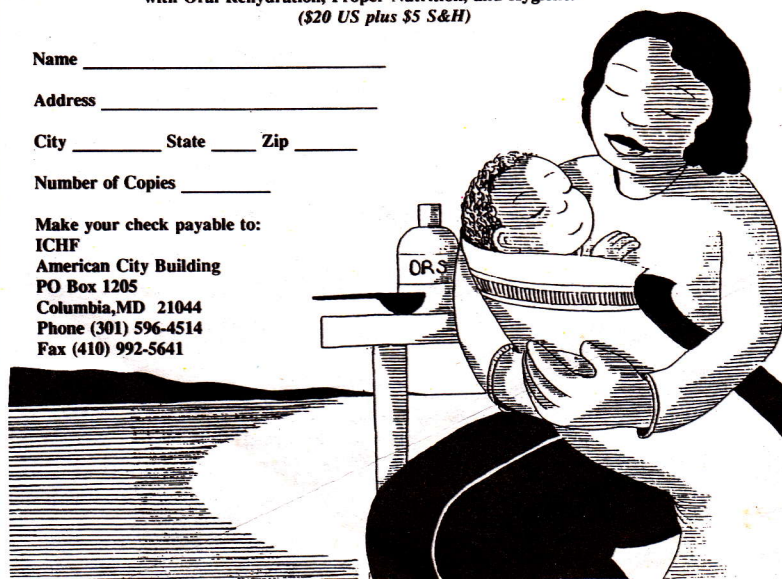
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## ABSTRACTS of ICDDR,B Publications

(continued from page 7)

### Adenoviruses

Jarecki-Khan K, Unicomb L. Seroprevalence of enteric and nonenteric adenoviruses in Bangladesh. *J Clin Microbiol* 1992 Oct;10(10): 2733-4.

"Single serum samples obtained from infants between 0 and 24 months of age admitted to a diarrhoeal disease hospital in Bangladesh were tested for the presence of adenovirus-specific immunoglobulin G (IgG) and IgA antibodies by using enzyme immunoassay and neutralizing antibodies to adenovirus types 2, 40, and 41. IgG antibodies were more prevalent than IgA antibodies, and neutralizing activity to enteric adenovirus was found in serum samples from 50% of infants who had reached 2 years of age."

### Blood culture

Saha SK, Khan WA, Saha S. Blood cultures from Bangladeshi children with septicaemia: an evaluation of conventional, lysis-direct plating and lysis-centrifugation methods. *Trans R Soc Trop Med Hyg* 1992;Sep-Oct;86(5):554-6.

"The use of a laboratory-made lysis-direct plating and lysis-centrifugation (LD/LC) device for blood cultivation has been compared with the conventional broth culture method in respect of speed and sensitivity in detecting organism(s) and cost effectiveness. 400 blood cultures yielded 95 clinically significant isolates. Both methods recovered 73 organisms (76.8%); 20 (21%) were detected by LDP/LC methods only, and 2 (2.1%) were isolated by the conventional method only. All the 93 isolates (97.8%) recovered by LDP/LC were isolated within 48 h, whereas the broth culture method took 7 d to isolate a total of 75 organisms (78.9%). The LDP/LC method, with our laboratory-made device, costs one-fourth of the cost of the conventional broth culture system. ■

[Views and opinions expressed in the articles/abstracts are those of the authors, and not necessarily those of the editors or the publisher.]

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Adam Siole

Some members of the CHD meeting in a small group at the Division's first Annual Retreat.

### Community Health Division Reidentifies Its Priorities

In the final analysis, the evaluation was unanimous: the Community Health Division's (CHD) first annual retreat was a success. The retreat was held at the Mid Town Hotel in Gulshan on the 2nd and 3rd of November with Dr Masee Bateman, the acting Associate Director, and many individuals from all the projects playing key roles in organising and facilitating it. The programme was designed and the objectives determined in consultation with all participants.

The objectives of the retreat were: 1) to identify CHD priorities and areas of research for the next five years; 2) to identify ways of achieving the priorities; and 3) to improve working relationships and develop inter-group collaboration.

Forty of the Division's staff members met in both plenary and small group sessions to achieve these goals, discussing, among other things, the CHD's role within ICDDR,B and health as more than the absence of disease. Since the CHD's primary clinical areas of concern are acute and persistent diarrhoea, acute respiratory infections, nutrition, health systems, women's health and family planning, these were the subjects of the small group discussions. The small groups identified research priorities and the multi-disciplinary composition of the investigative teams that might study the problems.

On the closing evening of the retreat, the participants gathered with their families for a social time and a dinner together at the Centre's guest house. ■

### Ford Foundation Trustees Visit ICDDR,B

Mr Edson W Spencer, Chairman, Board of Trustees of The Ford Foundation visited the ICDDR,B on 2 November 1992. He was accompanied by Mr Henry B Schacht, another member of the Board of Trustees of the Ford Foundation. After meeting the senior staff members, the trustees were taken around the Centre's facilities. They showed keen interest in the activities of the Centre. ■