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International Centre for Diarrhoeal Disease Research, Bangladesh

Recent Diarrhoea Epidemic in Bangladesh caused by a new strain of *Vibrio cholerae* non-O1

A major epidemic of diarrhoea struck Dhaka in the first week of February; most of the patients were residents of Dhaka or its suburbs. The epidemic reached its peak in March and as *Glimpse* goes to press there are still 400 – 450 cases per day.

Background

In Bangladesh, diarrhoea epidemics commonly occur during two different times of the year: in the months of April – May, and September – October. This untimely epidemic of severe life – threatening diarrhoea, however, started in the southern districts of Bangladesh in December 1992, affecting mostly adults. Similar epidemics were reported in Tamil Nadu and West Bengal in India from October 1992. An outbreak of diarrhoea also occurred in Dhaka following a large religious congregation in mid – January lasting for about 10 days, but all these affected people were not residents of Dhaka; a few were non – Bangladeshis.

The organism responsible for the epidemics in Bangladesh has been identified as a new serotype of *Vibrio cholerae* non – O1 and most likely is identical to the Indian serotype. It has some distinctive characteristics in common with 138 other serotypes of *V. cholerae* non – O1 recognised to date. It is being hypothesised that infected people from the southern districts of Bangladesh, from India, or from both places carried the pathogen to the Dhaka congregation and contaminated the environment.

Magnitude of the problem

The Clinical Research and Service Centre (CRSC) of the ICDDR,B offers free treatment to all diarrhoeal patients. During March 1993, there were 137% more patients treated at this Centre than in the same month in 1992. This unusually high number of patients created a number of management problems at the CRSC.

First, there was a shortage of beds and space. The hospital has 160 service beds, 30 research beds, and 16 beds in its nutrition rehabilitation ward; creation of additional beds and space was critical. After all available space within the CRSC building was used to provide an additional 125 service beds, two big tents with 40 beds and two large pandles (temporary sheds) with 120 beds were set up outside the building. A large number of new "cholera cots" (portable beds with a hole in the middle leading to a bucket beneath) were also needed. More importantly, the production of these needed to be fast to keep pace with the increasing number of patients. The advantage of cholera cots over other types of beds was demonstrated once again; they are cheaper and can be constructed locally in large numbers within a very short time.

Second, efficient management of the additional patients required more nurses, doctors, cleaners, and health workers, with some practical knowledge of the management of diarrhoeal patients. A pool of available doctors, nurses, health workers, and cleaners who had been trained earlier through organised training courses here or through practical work during earlier epidemics proved

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Patients in the temporary facility receive ORS from family members.

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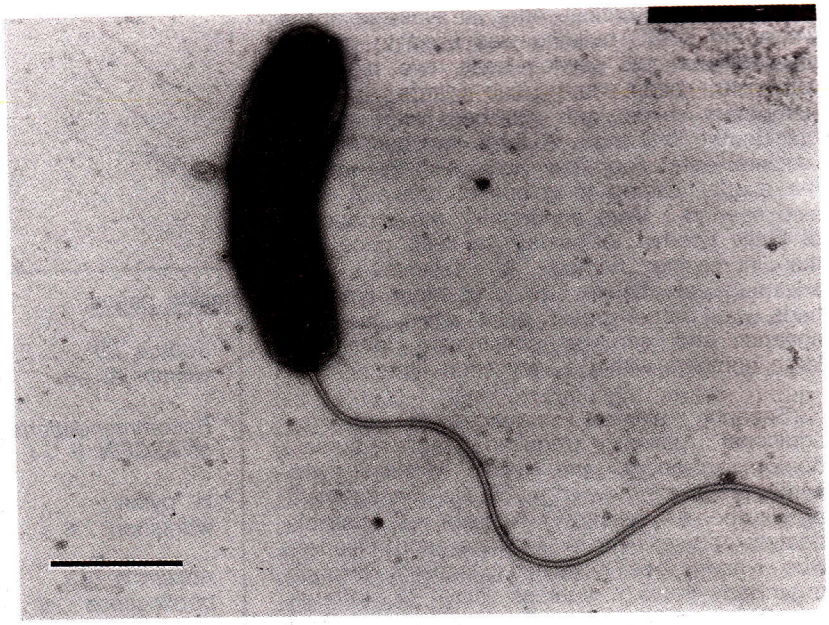
to be very useful. Although the financial implications are great, these recruitments allowed a rapid turnover of patients, and made possible the promotion of ORT with less use of costly intravenous (IV) fluids, making management more cost effective.

Third, more IV fluid, ORS, antibiotics, linens/blankets, hospital supplies, materials for cholera cots, buckets, containers to distribute ORS to patients, cups and spoons for administration of ORS, disinfectants, insecticides, fans, laundry services, etc. were required. During the peak of the epidemic, more than 1,200 litres of appropriate IV fluids, thousands of litres of rice-based and sucrose-based ORS, thousands of tetracycline and erythromycin doses were being given every day.

Last, an adequate supply of essential items and maintenance of sufficient stock had to be ensured to avoid shortfalls. Great coordination of activities between the CRSC and the Centre's administration, supply, general services, maintenance, and personnel management branches, finance and transport services were vital. Decision-making and implementation of decisions were extremely fast. A "reverse flow management policy" was employed, i.e. instead of busy CRSC administration seeking help from other logistic branches, those branches were maintaining close contact with the CRSC to respond to its requirements.

Since the epidemic was caused by a new bacterium, a number of studies were undertaken *vis-a-vis* the clinical management of patients. These studies were important to understand the characteristics of this new organism, its pathophysiology and immune response, and patient's clinical characteristics, and to evaluate the effectiveness of various antimicrobials, etc. with the objectives of better clinical management of patients.

The financial implications of all these additional activities have been monumental; infact, the activities were draining the Centre's limited resources. Therefore, additional support from the donors was sought and received. The Government of Bangladesh responded by deputing nurses and physicians and providing supplies.



Electron micrograph of a V. cholerae *0139 synonym Bengal showing a single polar flagellum. (Photo courtesy of Dr. M. Ehara, Institute of Tropical Medicine, Nagasaki University, Japan)*

What is this new bacterium?

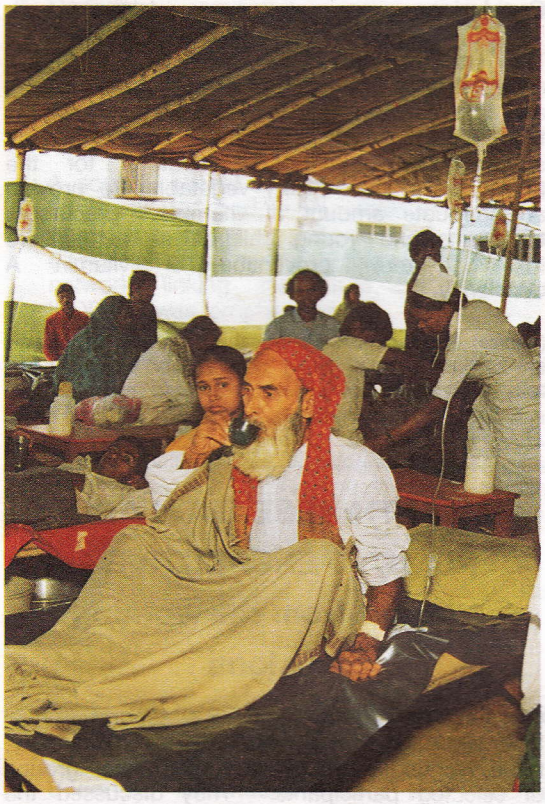
The bacterium causing the epidemics is a member of the genus *Vibrio*. Vibrios are Gram-negative, curved or rod-shaped bacteria. The members of the genus are classified according to their biochemical characteristics and cell wall composition (somatic O antigen). The *Vibrio* which causes cholera is designated as *V. cholerae* serotype O1. Based on a set of biochemical reactions and other criteria, *V. cholerae* O1 is classified into classical and El Tor biotypes, and each of the biotypes can be further divided into Ogawa and Inaba serotypes. The "O" antigens of the rest of the vibrios are different from that of *V. cholerae* O1 and are grouped together as *V. cholerae* non-O1 which has 137 different serotypes.

The *Vibrio* responsible for the current epidemics is being classified under *V. cholerae* non-O1. Yet, this new serotype is unlike the 137 previously recognised *V. cholerae* non-O1s. It produces cholera toxin in quantities similar to that produced by *V. cholerae* O1. This explains the severity of diarrhoea caused by this new serotype; the other non-O1 serotypes usually cause milder disease.

The previously identified 137 members of *V. cholerae* non-O1 are known as pathogens for humans, and they can be isolated from surface water. However, they are minor causes of diarrhoea in Bangladesh, accounting for less than 1% of cases of diarrhoea at the CRSC. In contrast, between 40% and 45% of the patients had this new serotype isolated from their stools during this epidemic, a situation comparable to large cholera epidemics. During the early epidemics, almost all patients were adults (instead of the usual large number of children) who presented with severe diarrhoea of short duration, indicating that the epidemic was due to a new strain against which people have no immunity. Interestingly, this new serotype appears to have suppressed *V. cholerae* O1 which has been only occasionally encountered during the usual time for cholera.

Clinical characteristics

The clinical characteristics of the disease caused by this new strain of *V. cholerae* non-O1 are indistinguishable from that of cholera. The onset of diarrhoea is sudden and vomiting is a feature of nearly all cases. Fever is typically absent, and abdominal pain is present in about 40% of cases. Diarrhoea is as severe as cholera, and around 90% of the patients present with dehydration. The interval between onset of diarrhoea and hospitalisation is short in most cases and ranges between 3 to 24 hours, similar to severe cholera. Also similar are the stools which are quite voluminous, some of the patients passed as much as 10 litres of stools during the first 8 hours after their initial rehydration. And as in cholera, muscle cramps are commonly seen in severe cases.



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This elderly gentleman has received IV treatment and is now taking ORS.

Management

The principles of management of diarrhoea caused by this new serotype are no different from other severe watery diarrhoeas, such as cholera. The key to the success is prompt rehydration with appropriate IV fluids and maintenance of hydration with ORS or IV fluids. Like in cholera, antimicrobials can play a useful role in reducing stool volume and the duration of diarrhoea. The antimicrobials that have been shown to be clinically effective include tetracycline, ciprofloxacin, and erythromycin. The organism is resistant to trimethoprim – sulphamethoxazole, but about 80% are sensitive to furazolidone; the latter could be an alternative antimicrobial for treatment. The mortality rate is virtually zero in patients who reach the treatment facilities.

Prevention

The bacterium responsible for the recent epidemics in Bangladesh has been isolated from surface water, but the infective dose remains unknown. However, as with other diarrhoeal pathogens, transmission occurs through the faecal – oral route. Therefore, the preventive measures are similar to those of other diarrhoeal diseases. Maintenance of personal hygiene, and ensuring provision for safe drinking water and fresh food are required to prevent the disease from spreading.

Conclusion

Epidemics due to an untypable *V. cholerae* non – O1 were reported from different parts of India and southern Bangladesh during late 1992. In Dhaka, the epidemics began in January 1993, following a large religious gathering. The bacterium has been subsequently identified as a new serotype of a group of bacteria named *V. cholerae* non – 01 which has 138 different serotypes. Although serologically distinct from *V. cholerae* O1 that causes cholera, this new bacterium produces cholera toxin in large amounts, and the clinical features and severity of diarrhoea are identical with cholera. Rehydration and maintenance of hydration are the two most important treatment objectives, and therapy with an effective antimicrobial is clinically useful. Preventive measures are similar to those of other diarrhoeal diseases. Detailed studies are underway to define epidemiology, laboratory and clinical characteristics, host immune responses, pathophysiology, and management of diarrhoea caused by this new serotype of *V. cholerae* non – O1. ■

Green Leafy Vegetables - A source of Vitamin A

Recently there has been a dramatic increase of interest in the problem of vitamin A deficiency, largely due to several reports which have shown that administration of vitamin A can substantially reduce mortality in young children in developing countries. Considering this role of vitamin A, several developing countries, including Bangladesh, have initiated massive – dose vitamin A supplementation programmes. However, using periodic massive doses of synthetic vitamin A can only be regarded as an interim measure. The long – term solution to the problem of vitamin A deficiency, which is also the leading cause of nutritional blindness, should be based on the dietary intake of vitamin A or its precursor from inexpensive food available to the majority of people in developing countries. In fact, green leafy vegetables are the chief source of β – carotene in the sub – continental diet; the absorption of β – carotene even in malnourished children was shown to be about 70%, and 40 g of green leafy vegetables cooked with 2 – 3 g of oil has been shown to provide about 1,200 µg of β – carotene, which is the recommended daily allowance (RDA) by the World Health Organization. Researchers at ICDDR,B, therefore, investigated the possibility of promoting green leafy vegetables to reduce mortality and prevent blindness in infants and young children.

Vitamin A can substantially reduce mortality in young children in developing countries.

One hundred eighteen children 6 to 35 months old of either sex who had just recovered from acute diarrhoea at the Diarrhoea Treatment Centre of ICDDR,B took part in this study before their discharge. The mothers were interviewed to elicit their perceptions about feeding their children with green leafy vegetables, commonly called `sag' in Bangla. If they agreed, the children were offered a single meal of a traditional leafy vegetable preparation with boiled rice. Mothers were instructed to mix a small amount of rice with the cooked preparation and to feed their children after mashing it, which is their usual practice at home. No exact proportion of the

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Mothers feeding their children `sag' with rice.

cooked leaf and rice was advised, but mothers were told to mix them in proportions they felt their children would take. The intake was calculated and recorded immediately, subtracting the weight of the left-over amount from the amount offered. During feeding, observations, such as vomiting, abdominal pain or discomfort, and acceptance or refusal by the child were recorded. The attitude and immediate reaction of mothers were also observed and recorded.

Of the 118 mothers, 54% expressed some disbelief that their children could take the required amount; 59 mothers remained neutral, 3 mothers hesitated to start, and only 2 mothers refused to feed the preparation. Regarding perceptions, the overwhelming majority of 87 (74%) mothers believed that green leafy vegetables are good for one's health. However, 25% of the mothers also expressed some concern about feeding them to infants and children, indicating that they might cause stomach-ache, diarrhoea, or abdominal distention. As observed during feeding, 102 (87%) children ate the `sag' meal spontaneously; mothers managed to feed 13 other children with some effort; and one child vomited, but no children gave any signs of having abdominal pain or discomfort.

Most of the children could eat more of the vegetables than is required to meet the RDA (40 g). The median intakes in children below 12 months of age, 12-17 months, and 18-35 months were 41 g, 71 g, and 129 g respectively. It is interesting to note that the percentage of breastfeeding was quite high, highest in those 6 to 11 months old (77%), and gradually reduced to 49% in the third year of life. The non-breastfed children ate more than their breastfed counterparts (median intake 90 vs 50 g), suggesting that the breastfed children, perhaps, get the rest of their requirements from breast-milk.

Conclusion

This study suggests that leafy vegetables are acceptable to young children and their mothers and that children are able to take as much as they require from one meal. These findings support the basis of a strategy for the promotion of green leafy vegetables to provide an adequate amount of vitamin A precursors to infants and young children as a measure for long-term prevention of vitamin A deficiency.

[Source: Rahman MM, Mahalanabis D, Islam MA, Biswas E. Can infants and young children eat enough green leafy vegetables from a single traditional meal to meet their daily vitamin A requirements? *Eur J Clin Nutr* 1993; 47:68-72]. ■

HEALTH RESEARCH AND POLICY PERSPECTIVES
A report from the working sessions

On the final day of ICDDR,B's second Annual Scientific Conference (ASCON II) in January, three working sessions were held with groups of selected participants. They discussed the findings that had been presented in the symposia and free paper sessions, and developed a list of comments and recommendations for policy consideration and future research. This was in keeping with the ASCON II theme, "Health Research and Policy Perspectives," which implies the hope that the communications between the Centre and those working in programme and policy arenas will continue even after the final farewell of the meetings. Some of these comments and recommendations are presented here.

MCH and Nutrition Working Session

Policy:

1. Appropriate home treatment of acute respiratory infections (ARI) as a key component of the national ARI strategy should be emphasised.
2. Current measles vaccine programmes should be refined with adequate quality control.
3. Gender equality should be promoted.
4. Pregnancy risk factors used by the traditional birth attendants and others need to be redefined, focussing on those factors that require direct action.

Research:

1. Identify and measure risks and benefits of vitamin A supplementation during the first 6 months of life.
2. Investigate other strategies for decreasing the case rate in infants less than 9 months of age by testing alternate vaccination schedules and different vaccines.

3. Undertake causative and sociocultural studies on violent deaths of women.

Diarrhoeal Disease Working Session

Policy:

1. A sound national antimicrobial policy should be formulated and implemented. Training of physicians on their rational use and the dissemination of research findings through a network linking the GOB, NGOs, and ICDDR,B was emphasised.

2. Enhancement of career development opportunities for local scientists may be important to sustain research excellence.

3. There is need for nutrition education, a mechanism for early detection of growth faltering, and practical interventions, particularly with respect to micronutrients.

4. Emphasis was placed on efforts to produce enteric reagents and vaccines locally.

Research:

1. Develop methods for the rapid diagnosis of enteric pathogens and low-cost reagents.

2. Undertake behavioural studies and vaccine development for the prevention of diarrhoea.

3. Investigate the possibilities for better case management, including improved ORT.

Population and Family Planning Working Session

Policy:

1. There is a need to develop communication strategies to increase awareness and knowledge of satellite clinics. Also, a broad range of services should be offered there to improve attendance.

2. Research results show that vaccination and family planning coverage can be improved by developing special communications with women who accompany patients to hospital.

3. Increasing the number of family planning community workers tends to increase contraception acceptance.

4. The family planning inspector diary -- a useful record-keeping system for improving effectiveness and accountability -- should be field tested on a wider scale.

Research:

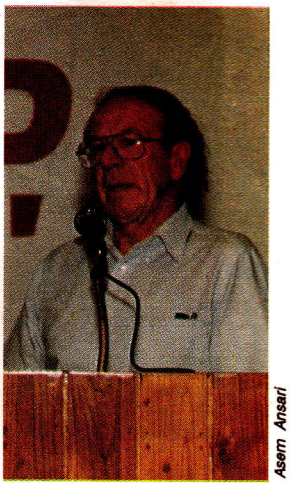
1. Study and field test ways to improve acceptance of long-term methods of contraception (IUDs and sterilisation).

2. Experiment with strategies to improve the roles of FWAs and FWVs and front-line supervisors.

3. Develop ways to increase the contraceptive prevalence rate beyond 50% in both urban and rural areas. ■

Derrick Rowley Shares Personal Account of History with ICDDR,B

Professor Derrick Rowley, Biotechnology Consultant for the University of Adelaide in Australia and a person with over two decades of association with ICDDR,B was a guest of the Centre at the 2nd Annual Scientific Conference organised by ICDDR,B. He was invited to talk on a subject of his choice. In his own words, Dr Rowley called his address to the delegates and visitors in January a "rambling historical account of my association with the Centre from visitor to Board Chairman." Speaking at the first symposium, Dr. Rowley said that his age gave him the liberty to risk lacing his lectures with personal anecdotes. However, in this frank address, which was called "An Occasional History of ICDDR,B", he laced his personal anecdotes with lecture! This summary focuses on that "lace" and each segment is called a "footnote".



Asem Ansari

Professor Derrick Rowley.

FOOTNOTE ONE:

This first footnote coincides with visit number one to the Cholera Research Laboratory (now ICDDR,B) in 1965. Dr. Rowley, a bacteriologist doing research on the genetics of cholera, was invited to Dhaka by the then director, Dr. R. Phillips. He was to give advice on the bacteriology services.

One of his recommendations was to continue using local media and glassware washing facilities which were labour intensive and cheap. But, for whatever reasons, they did not heed his advice and replaced the local materials and hands with expensive, disposable, imported products and automatic machines. He wonders if, in a country with high unemployment, this was wisdom.

FOOTNOTE TWO:

After discussing several of the achievements of the Centre and his associations with those who worked here who, in so doing, have made a name for themselves, Dr. Rowley expressed his concern that not enough top-level Bangladeshi scientists have emerged in all these years. Moreover, he explained, it is not due to a lack of fine intellects among the professionals. He urged for renewed efforts to build national research expertise.

FOOTNOTE THREE:

"In general, one might say social acceptance of existing science may be more important than doing new science and here is an opportunity for the Centre." Dr. Rowley prefaced this remark with an anecdote about his early years of teaching when all factors in the laboratory were carefully controlled. It was his contact with scientists at ICDDR,B which made him realise how much wider the parameters of infection are in real life. Not just the virulence of the bacteria are to be considered, but the potential victim's environment, education, socioeconomic, and religion determine whether a sufficient infective dose reaches his mouth. And the immunity of the host is greatly

influenced by his nutritional state, body weight, feeding practice, and family size, among other factors. "These many interacting variables of human life," he said, "cannot be studied sensibly in laboratories."

FOOTNOTE FOUR:

Dr. Rowley recalled his experiences with the Centre during his tenure as a Board of Trustees member from 1983 through 1989 (Chairman – November 1988 to June 1989). During this period, he struggled to fill the gap between Board members and scientists. "It is my conviction," he said, "that for an institute supported by public funds and governed by a board to be a happy and secure workplace, there is clearly a need for the scientists, the board, and the public donors to meet from time to time and to agree on a future strategy acceptable to all parties." This was, of course, achieved, and the Centre continues to change and grow, in attitudes, functions, and structure. As an example of the latter, the speaker pointed to the "magnificent auditorium which would be the envy of the teaching hospitals where I work in Australia."

Nevertheless, he pointed out, the time is approaching when more cost – effective measures will need to be taken. Humanitarian dollars are shrinking and one must persuade donors that what is being done here will produce a better and more general effect than other competing claims. Programmes to restrict alcohol consumption and prevent cirrhosis of the liver are more cost effective, for example, than costly liver transplants.

Dr Rowley concluded his address by emphasising the importance of ICDDR,B and Bangladesh in his life experience and his hope that the Centre would continue to be one of the world's great research institutes. ■

National Population Day Observed

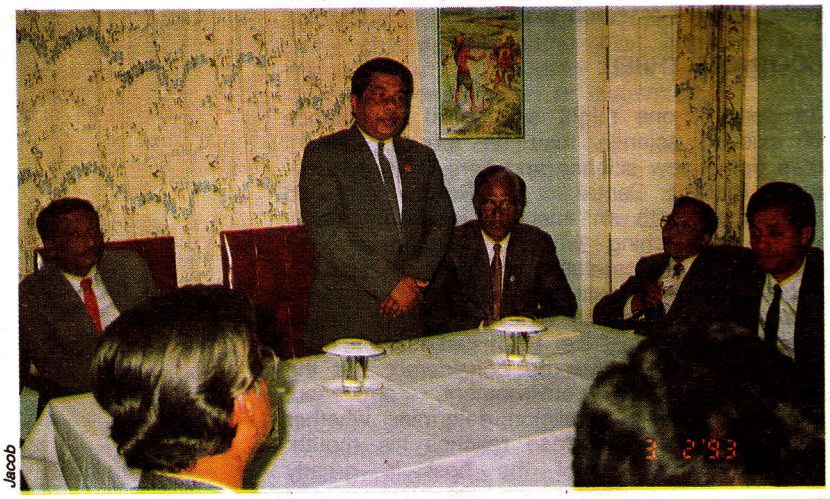
National Population Day was observed in Sirajganj on February 2, 1993.

A colourful procession was brought out from the Thana Family Planning Office and a meeting was held at the Medical Assistant Training School with Mr. Adiluzzaman, Thana Nirbahi Officer, in the chair. Besides the government sponsored function, the ICDDR,B also organised a special reception and awarded additional prizes to best family planning workers.

In the evening, another discussion meeting was held at ICDDR,B with Mr. Shamsul Alam, Deputy Director, Family Planning, in the chair, Mr. A.Z.M. Shafiqul Islam, Deputy Commissioner, attended it as the chief guest.

The Deputy Commissioner, Thana Nirbahi Officer, Deputy Director (Family Planning), Union Parishad Chairman, Dr. Zahurul Huque Raja (NGO Representative), Advocate Hedayetul Islam (Special Correspondent, Bangladesh Observer), Mr. Mahidul Islam and Mr. Wazed Kamal of ICDDR,B, in their speeches stressed the need for bringing newly wed couples under family planning programme. ■

Mr AZM Shafiqul Islam, Deputy Commissioner, addresing the celebration of Population Day '93.



Jacob

Eight Countries Represented at *Helicobacter pylori* Workshop

Eighteen experts, representing eight countries (Peru, Gambia, Thailand, India, USA, UK, Canada, and Bangladesh), met for three days in February at Matlab and in the Sasakawa International Training Centre to evaluate the present data of *Helicobacter pylori* (HP) infections in developing countries and suggest priorities for future research. This workshop was sponsored by several private industries and pharmaceutical companies in Switzerland.

HP, recognised as potential human pathogens only for the past ten years or so, are Gram negative, spiral – shaped bacteria which grow below the mucous membrane on the surface of the stomach. Patients with this disease may experience symptoms of gastritis or peptic ulcer, but vast numbers of people are infected without having any symptoms. The destruction of the gastric mucosa continues, however, and may progress to an intestinal type of cancer.

Poor socioeconomic status and lack of good sanitation seem to be the critical risk factors in acquiring the infection which is transmitted by the faecal – oral route. Therefore, a large percentage of people in less – developed countries are infected from early childhood. Treatment with bismuth preparations and antibiotics is very effective, but eradication of the disease in developing countries is an unrealistic goal, because recurrence is almost inevitable.

Yet research is important, the participants at the workshop decided, to determine the organism's role in acute and persistent diarrhoeas which claim the lives of many children every year. HP may also be associated with malnutrition, and since it is so wide – spread, other associations may one day be discovered.

Prof. R. Bradley Sack of ICDDR,B and Prof. Klaus Gyr of the University of Basle in Switzerland were coordinators of the workshop. A summary of the workshop conclusions will soon be published in a scientific journal. ■

BANGLADESH ON "PICK" LIST

Population Action International has published its 1992 "Population Picks and Pans," a selection of the ten countries worldwide making the most and least progress in family planning, and Bangladesh is on the "pick list." In selecting the countries, the organisation solicited nominations from close to a hundred international experts. Bangladesh shares this rating with Iran, Peru, Indonesia, and Zimbabwe, who are all cited for their impressive, recent progress in expanding access to family planning services. A strong political commitment to expand family planning services is credited with much of the success.

According to "Picks and Pans," the doubling of contraceptive use in Bangladesh – – from less than 20% of couples in 1981 to 40% in 1991 – – is a remarkable achievement, given the country's extreme poverty, high levels of illiteracy, and the low status of women. In contrast, contraceptive use is estimated at just 12% of couples in Pakistan, a country sharing many of the same economic and social characteristics.

In addition, average family size is now only slightly more than four children. Today most young Bangladeshi women say they want only two or three children. Home visits by female health workers and one of the strongest social marketing programmes in the world are two factors in this success.

The "pans," that is, countries making the least progress, were Russia, Pakistan, Poland, Iraq, and Ireland. The report says that these countries are "tragic examples of countries unresponsive or actively opposed to the desires of women and men for greater control over their reproductive lives."

Population Action International (formerly known as Population Crisis Committee) is an independent, non – profit research and advocacy organisation committed to early world population stabilisation through universal access to voluntary family planning services. A copy of the "picks and pans" report can be obtained by writing to them at the following address: 1120 19th St. NW, Suite 550, Washington, DC 20036, USA.

(**ED.** *At the same time, i.e. 1991, in the Centre's MCH – FP intervention area in Matlab, contraceptive use was 60% (61% in 1992) and as high as 46% in the MCH – FP Extension Project area in Abhoynagar – – an area of research collaboration between ICDDR,B and the Government of Bangladesh.)* ■

Expansion of FP Activities

A two – day national seminar on injectable contraceptives was held in Sirajganj on December 6 – 7, 1992. Dr Aminul Islam, Director (MCH Services), Directorate of Family Planning, inaugurated the seminar organised by ICDDR,B at the Zila Parishad auditorium on December 6. Dr Rushikesh Maru, Research Scientist, ICDDR,B attended it as the special guest.

Wazed

Dr Aminul Islam, Director, MCH Services, addressing a national seminar on injectable contraceptives.

The MCH – FP Extension Project research has shown that injectable contraceptives can be safely delivered by the Family Welfare Assistants at the clients' home. A total of 42 experts, policy makers, programme coordinators, and Deputy Directors of the Family Planning Directorate participated in the seminar to discuss the ways and means of expanding the successful strategy for the doorsteps delivery of injectable contraceptives like "Depoprovera" and "Noristat" to other parts of the country.

The first phase of expansion will take place in 8 thanas: Tala in Satkhira, Kotchandpur in Jhenaidah, Charghat in Rajshahi, Akkelpur in Joypurhat, Monohardi in Norshingdi, Bhaluka in Mymensingh, Nangalkot in Comilla, and Chagalnaiya in Feni district.

The seminar was presided over by Mr. Afsar Ali Mollah, Divisional Director, Family Planning, Rajshahi. Mr. Wazed Kamal, Field Research Manager, ICDDR,B, and Mr. Shamsul Alam, Deputy Director, Family Planning, Sirajganj conducted the seminar. ■

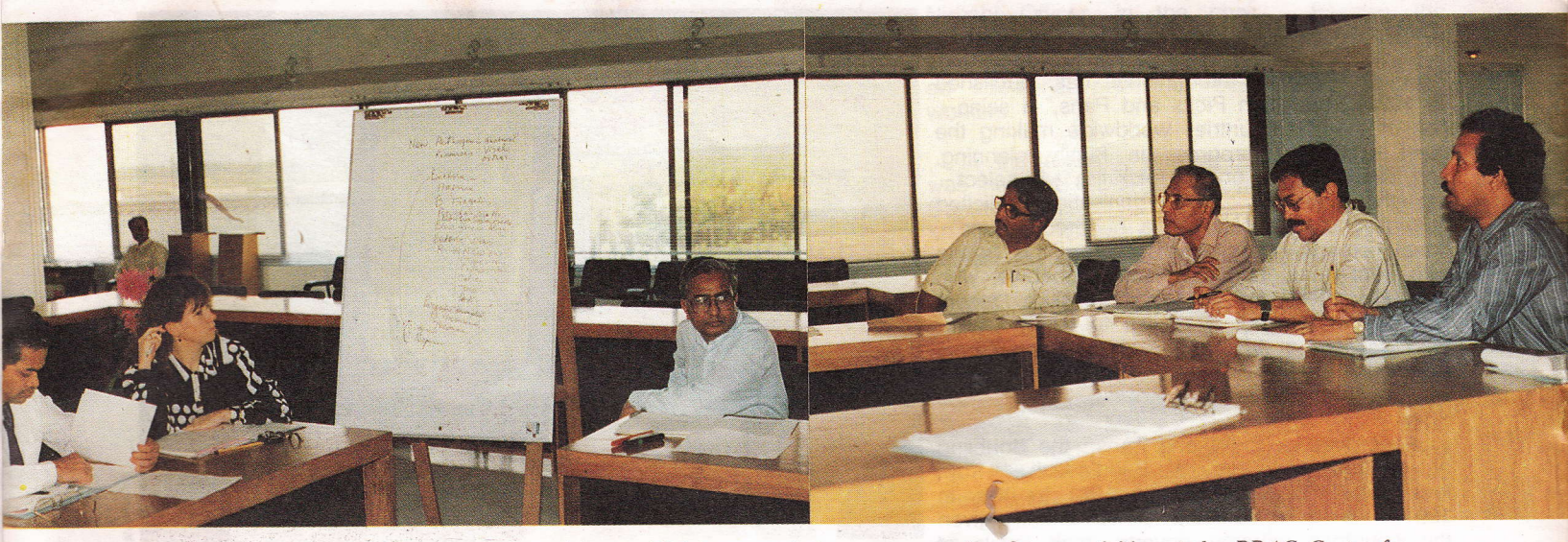
Training Courses Abroad

The International Statistical Programs Centre of the USA invites applications for its 1993 – 1994 training programmes. The programme highlights:

* Short – term (2 to 8 weeks) applied training in:
  Geographic Information Systems
  Data Dissemination
  Computer Technology
  Management
  Sampling and Statistical Methods
  Economic Statistics
  Population Statistics

* State – of – the – art "hands – on" microcomputer technology for all trainees.

For further information contact: Chief, International Statistical Programs Centre, Bureau of the Census, US Department of Commerce, Washington, DC 20233, USA. ■



About 38 staff members of the Laboratory Sciences Division attended a retreat to plan future activities at the BRAC Centre for Development Management in Rajendrapur, Gazipur district, on the 12th and 13th of February. (Photo courtesy: Dr. R.B. Sack)

Abstracts of ICDDR,B Publications

Kabir I, Butler T, Underwood LE, Rahman MM. Effects of a protein-rich diet during convalescence from shigellosis on catch-up growth, serum proteins, and insulin-like growth factor-I. *Pediatr Res* 1992 Dec;32(6):689-92.

"Shigellosis in children can cause growth retardation, worsening of malnutrition, and hypoproteinemia. To assess the effects of ingestion of a protein-rich diet during convalescence, 22 children aged 2 to 4 y with culture-proven shigellosis were randomly assigned after 5 d of antibiotic treatment to 21-d feeding regimens of either a 150 kcal/kg/d high-protein diet with 15% of calories as protein or an isocaloric control diet with 6% of calories as protein. At the start and end of dietary treatment, weight, height, mid-arm circumference, skinfold thickness, serum protein concentrations, and serum IGF-I were measured. Means of weight gain and increases in mid-arm circumference were greater in children fed high-protein diets than those fed control diets (1.23 *versus* 0.76 kg; 1.40 *versus* 0.96 cm; $p<0.05$). Mean increase in height in children fed high-protein diets (0.83 cm) was not significantly greater than with control diets (0.74 cm). Mean increases in serum concentrations of total protein, prealbumin, and retinol-binding protein were greater in the high-protein group than in controls ($p<0.05$). Mean serum concentrations of IGF-I were low in both groups before treatment [4.2±2.6 nmol/L (31.9±19.6 ng/mL) in controls; 3.1±3.4 nmol/L (24.0±26.3 ng/mL) in the high-protein group] but increased more in the high-protein group [39.0±16.2 nmol/L (298±124 ng/mL)] than in the control group [16.7±9.2 nmol/L (128±70 ng/ml), $p<0.01$]. These results suggest that high dietary protein is more effective than a normal protein intake in repleting body proteins and in stimulating growth after shigellosis in children. A possible mechanism for this stimulatory effect on growth may be through the restoration of IGF-I."

Rahman MM, Kabir I, Mahalanabis D, Malek MA. Decreased food intake in children with severe dysentery due to *Shigella dysenteriae* 1 infection. *Europ J Clin Nutr* 1992 Nov;46(11); 833-8.

"Factors that affect food intake in acute shigellosis were studied in 82 children aged 24-59 months. Children were offered an energy-dense milk-cereal-oil-based diet every 2 h. Food intake was compared between children with *Shigella dysenteriae* 1 infection and those infected with other *Shigella* spp (predominantly *S. flexneri*. Mean energy intake in the first 48 h was 435 kJ/kg.d in children infected with *S. dysenteriae* 1 and 536 kJ/kg.d in children infected with other *Shigella* spp ($P<0.001$). Febrile children ate significantly ($P<0.05$) less food than afebrile ones (469 vs 517 kJ/kg.d). Food intake remained significantly ($P<0.001$) less in children infected with *S. dysenteriae* 1 after controlling for the effect of fever. The results show that food intake is significantly reduced in dysentery due to *S. dysenteriae* 1 infection compared to that of other *Shigella* species; however, adequate calorie intake can be maintained by providing frequent energy-dense meals despite anorexia, fever, abdominal pain and diarrhoea."

[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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